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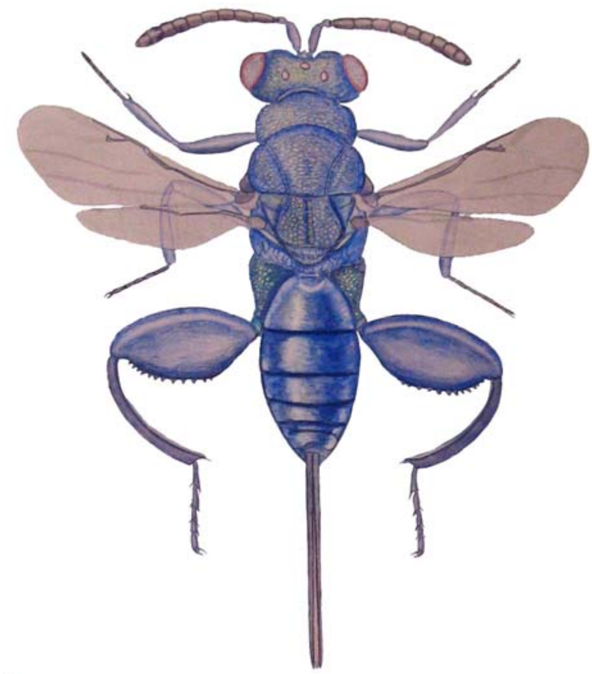
(SERIE NOUĂ)

LUCRĂRILE SIMPOZIONULUI

ENTOMOFAGII ŞI ROLUL LOR ÎN PĂSTRAREA ECHILIBRULUI NATURAL



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SUMAR

INAUGURAL SPEECH

Honoured Presidium and Auditorium, allow me to present you the inaugural speech of The Third National Symposium **„Entomophags and Their Role In Natural Equilibrium”**.

Welcome to Agigea, on Pont Euxin, at "Prof. Dr. Ioan Borcea" Biological Sea Resort. Thank you for your presence here, to this spiritual festivity. Thank you all that you decided to be here.

It seems that this institution has no connections with the insects and entomology. More than that, it seems that The Black Seaside has no connections with this domain, because this ecosystem isn't preferred by insects. But, that is not so and we have arguments for it. Therefore, this institution deserves to organize a scientific meeting like this one.

If we come to think of the founder of this institution, professor Ioan Borcea, we found that the greater scientist „The Titan of the Romanian Zoology”, as he was named by his disciples, was a great entomologist. Also, he was one of the founders of Entomology School from Iaşi, a school which is, without a false modesty, the greatest Entomology School from Romania.

When we investigate the history of this scientific resort, we find that many of important scientists worked here, spent here an important part of their life and, some of them are important entomologists: Prof. PhD. Ionel Andriescu (he was Director of the resort), Prof. PhD. Victor Ciochia, C.S. I Dr. Klaus Fabriţius, Lecturer PhD. Ion Suciu (he was Director for a period of time), Carol Nagy (he became a citizen of Israel with a new name Qabir Argoman, he is a specialist on Heterogenidae species), and Prof. Paul Borcea (ex-Director also, who investigated Heteropteres).

More than that, as you will see, „Dune Reserve” from inside of this biological resort represents a real huge entomological treasure.

Also, we should mention here that this scientific session takes place after 100 years since Ioan Borcea published his paper concerning the aphids of Moldavia.

In 1908, Prof. Ioan Borcea published **„Materiaux pour l'étude de la faune des Aphides de Roumanie”**. For many researchers, this was a surprise, because Ioan Borcea was known as a specialist in comparative anatomy of fish domain. This was the subject of his doctoral thesis named „Recherche sur le système urogénital des Elasmobranches”.

Suddenly, it appears a huge paper, very impressive, which presents 217 species of aphids from 34 genera. We are not talking about a systemic information or a monographic study of these species. In that paper it was presented, for the first time, a huge number of species and genera from Romania's fauna.

He published his paper, in the same year, as „Contributions to the Catalogue of Aphids from Romania” („Contribuţii la catalogul Aphidelor din România”), in „Vasile Adamachi” Collection. The main reason for this was to make it accessible for all the specialists in this domain.

In 1910, he published in Annals of „Al.I.Cuza” University of Iaşi, a paper named **„Zoocecidies from Romania”**. This paper was another huge surprise if we mention that there were presented 339 taxa (galligenous or cecidogenous species) which were identified on 208 species of host-plants.

After a time, he published an additional paper referring to zoocecidies from Romania. Therefore, Ioan Borcea (the morphologist, ihtiologist and hydrobiologist) demonstrated to us that he was one of the most important entomologists of that time.

Impressed by his scientific contributions, some of biologists proposed the paper „**Materiaux pour l'étude de la faune des Aphides de Roumanie**" to receive the prize „Năsturel" of Romanian Academy.

But, one of his reviewers was the great entomologist Arnold Montandon. He could'nt believe that a young scientist, only 29 years old, could realize a scientific study like this. He knew the young Ioan Borcea as a specialist in other domain of biology. Then, Montandon made negative appreciations for Borcea's paper and he didn't receive The Romanian Academy Award.

We consider that Arnold Montandon made a big mistake and he didn't see Borcea as a great zoologist. He didn't know that Ioan Borcea was, in that period, Inspector of Domains of State Ministry and he gave information concerning the phyto-sanitary stage of crops from Moldavia. He investigated the areas from Botoşani, Iaşi, Vaslui, Suceava, Neamț, Roman and Bacău. During his studies, he accumulated a huge quantity of scientific biological material and he made ecological observations which constituted the basis for those two important papers.

We have to mention here that, Arnold Montandon's decision wasn't fair and correct and we paid for this. Since the time of Professor Borcea until present none has done investigations on the family of Aphidae. I hoped that one of my PhD. student, named Elena Feraru, to do it. She realized already an important study, in her doctoral thesis, concerning the pests (aphids) from orchards. But, it wasn't like I hoped it . Now, she is a PhD. student again in the domain of genetics.

Now, it is a huge emptiness in investigations concerning the domain of Aphids from Romania. About this subject, few researches were realized by Jaroslav Holman and Albert Pintera, who published a paper in Prague referring to the aphids from Romania.

If we are here, at The Third National Symposium **„Entomophags and Their Role In Natural Equilibrium"**, this is because of Prof. Ioan Borcea, too.

We don't use a metaphor; he was the founder of The Entomology School from Iaşi. He didn't realize only studies in the filed of entomology, but he created an entomology school focused on knowing of entomophagous insects and their use in the control of pests on a biological way (in agriculture and sylviculture). Prof. Borcea was a promoter of biological combat against pests in Romania.

In 1910, Prof. Ioan Borcea published the paper **„Role of Predator and Parasite Insects in Agriculture"** in „V. Adamachi" Review. This paper contains important information concerning the role of entomophagous insects in the control of pests from agricultural areas. He had the revelation of the importance of these insects in the biological control of pests.

For his dream, he focused the activities of his assistants (Mihai Constantineanu and Petru Şuster) in the knowledge of these two families: *Icheumonidae* and *Tachinidae*.

Those great entomologists, Mihai Constantineanu and Petru Şuster, represent the second generations of specialists who contributed to the solid basis for The Entomological School from Iaşi.

Prof. Mihai Constantineanu, one of the greatest Romanian entomologist (died at the age of 99 years , founded and developed The Entomological School initiated by Prof. Ioan Borcea. Prof. Mihai Constantineanu's disciples (Constantin Pisică, Ionel Andriescu, Victor Ciochia, Gheorghe Mustață, Mircea Varvara, Ionel Petcu, Constantin Filipescu, Raoul Constantineanu etc., more than 20 PhD. graduated) has constituted the third generation of this school, which prepared the fourth generation. This generation, the fourth, includes more specialists with important scientific achievements. This could be named „Gold Generation" which keeps developing and transmitting from generation to generation fame of The Romanian Entomological School initiated by Ioan Borcea and founded by Mihai Constantineanu.

That's why we are here today, at this special celebration of Prof. Ioan Borcea, in this special area which is Agigea. The Agigea Oasis is an entomological area with a big scientific potential. Without many words, we tried to present a few elements concerning this entomological treasure from The Dune Reserve from Agigea. This natural reserve is famous for the endemic plants living here. These plants are very rare and characteristic for sand-hills.

In this context, more interesting is the hidden part of the reserve. You could believe that during more than a half a century was necessary to discover all its secrets. But it isn't so. Researches from our time discover more and more new species, rare, very rare and, some of them, unprecedented. We named them „unprecedented" because they are new for science (they are mentioned for the first time by scientists).

PhD. Irinel Popescu, a specialist in *Torymidae* and *Eurytomidae* families, developed extensive researches in the Dune Reserve from Agigea, where he discovered 4 new species for science and 26 new species for Romania's Fauna.

Species as *Adontomerus grisselli* I. Popescu, *Eridontomerus mioritae* I. Popescu, *Torymus varvarai* I. Popescu, *Pseudotorymus pisicai* I. Popescu are new for science. These species was not only discovered, but they were investigated from biological and ecological point of views.

From *Eurytomidae* family, the following species were registered for the first time in Romania's Fauna (they were founded in the reserve from Agigea by PhD. I. Popescu): *Tetramesa brevicollis* (Walker), *T. brevicornis* (Walker), *T. cereipes* (Erdös), *T. cornuta* (Walker), *T. gracilipennis* Szelinyi, *T. cylindrica* (Schl.), *T. longula* (Dalman), *T. maderae* (Walker), *T. viktorina* Szelinyi, *T. riparia* Zerova; *Eurytoma castorella* Erdös, *E. cylindrica* Thomson, *E. elymi* Zerova, *E. gallicola* (Szelinyi), *E. harmoliticola* Zerova, *E. onobrycola* Zerova, *E. pallustris* Erdös, *Bruchophagus parvulus* Zerova, *Systole salviae* Zerova.

From *Torymidae* family, PhD. I. Popescu discovered in the same reserve, the following new species for fauna: *Eridontomerus syrphi* (Förster), *Idiomacromerus mayri* (Wachtl.), *I. pallistigmus* Askew., *I. phlomoides* (Zerova and Seryogina) and *I. syrphi* (Förster).

Microdontomerus annulatus (Spinola) , this species was discovered by Prof. Ionel Andreiscu in Agigea and founded again by PhD. Irinel Popescu.

Lecturer PhD. Ovidiu Popovici, during his important studies, discovered, in the same reserve, the following species: *Calotelea sarrai* (Masi), *Macroteleia minor* Kozlov and Kononova, *Sparasion aenescens* Förster, *S. obtusifrons* Kieffer, *Trissolcus waloffae* (Javahery) and *Xenomerus canariensis* Huygest.

Aradophagus fasciatus Ashmead and *Synopeas (Sactogaster) ventralis* Westwood species were founded, for the first time, by PhD.**Klaus Fabritius** and, after that, they were refounded by PhD. Ovidiu Popovici.

Lecturer PhD. **Mircea Mitroiu** presents, together with Prof. PhD. **Ionel Andriescu**, some of their important scientific results. They present 28 ***Pteromalidae*** species which were discovered in Agigea Reserve areas. On this territory there was discovered a new subfamily for Romania, *Cratominae*, with the genus *Cratomus* , and the species C.*megacephalus* (Fabricius) . Also, *Plutothrix trifasciatus* is a new genus and a new species for Romania’s Fauna, as *Ecrizotes monticala* Förster. And, the species such as *Eunotus acutus* Kurdjumov and *Gastrancistrus glabellus* (Ness) are new for fauna.

We could keep up this monologue about some new species for science and for Romania’s Fauna with information concerning other organisms. But, we don’t do it just for any special reason. We want only to present the importance of this Dune Resere from Agigea area. It is a treasure of species biodiversity which populate the ecosystems from the marine dunes. Besides, we have researchers recognized as important specialists who realize modern studies concerning the protected areas from Romania, whence The Dune Reserve from Agigea is only a part.

That’s the reason for we have to protect this area, in what way, this area could be out of antropic pressure, even partially.

On this special occasion, we invite you all to come back to Agigea. Here is a lot of fresh air and happiness in a space that comes across human history.

Today, here there are present some of Mihai Constantineanu’s disciples, some of the disciplines of his disciples, specialists from the whole country and abroad. Therefore, all the conditions are accomplished and we declare open The Session of The Third National Symposium - **„Entomophags and Their Role In Natural Equilibrium”**.

We wish good luck to all the participants at The Third National Symposium - **„Entomophags and Their Role In Natural Equilibrium”**!

Prof. PhD. Gheorghe MUSTAȚĂ

MARCEL BRÂNDZĂ
1868-1934

Aristocratic origin and the influence of the great botanist Dimitri Brândză, his uncle, have put imprint on life and destiny of Marcel Brândză as biologist. Earthly roots come from George Brandzilă, from Brândză of Bassarabia, who was an important high ruler at the Muşatini's court, and, the spiritual ones were formed under the influence of eminent botanist Dimitri Brândză (founder of Botanical Garden from Cotroceni and professor).

Marcel Brândză honoured his aristocratic origin and spiritual nobleness by botanical and zoological contributions made in the first quarter of the XX century.

He was born in Iasi, on the 1-st of March, 1868. Marcel is the son of Smaranda and Alexandru Barbu Brândză, professor of history and director of the National High School in Iaşi.

He had a native and brilliant intelligence, with a spirit of mutual observation, Marcel was formed under the guidance of careful and competent father and uncle, who was professor of botany at the Michaelian University of Iasi. Professor Dimitri Brândză published in 1883, when Marcel was only 15 years, a book called "**Pogrom of Romanian flora"**, the first academic work of this kind in the Romanian districts. No trip was made by Dimitri Brândză with his students, or to collect botanical material, which Marcel not to participate. This was his apprenticeship.

He was interested to know as many plants as possible. Marcel accumulated scientific knowledge that were very impressive for students who attended along with his uncle in botanical training stage.

He was already formed as a good specialist in systematic botany, knowing to use the dichotomical keys for identifying plants. So, that explains the fact than Marcel discovered to Policiori (under muddy volcanoes close to Buzău), few individuals of *Nitraria schoberi* from *Zygophyllaceae* family.

Next studies were made at the National School of Iaşi, that he graduated in 1887. During high school period, he was formed by important teachers, such as Alexandru Philipide, Alexandru Şuţu, Petre Culianu and Alexandru Barbu Brandia.

After graduating from high school he was sent to Paris to continue studies at Sorbonne University. Here is formed at school of the eminent teachers Gaston Bonnier and Van Tieghem.

In 1888, he graduated at Sorbonne. After, he was registered as PhD. student with a theme of research concerning to seed teguments. He worked together with Gaston Bonnier in Biology Laboratory organized in Fontainebleau Forest and which became famous through some pictures of great painters.

Undoubtedly, Gaston Bonnier was one of the greatest botanists of France from his time. Marcel Brândză had a profound respect for his mentor. Moreover, he mentioned: *"We, the Romanians, owe him special respect and veneration, he gave us advices, information and goals and he pursued us till last year of his existence.*

We were lucky to make even part of the first series of G. Bonnier's students, and, for four years, as we have worked under his leadership, we listen to these conferences. Therefore, we could estimate the value of him. Even as students - and I already knew that *they are the best judges of teachers - how profoundly were his lectures and how easyly were for us to learn and to use them. "*

We saw here a lot of respect and admiration for Gaston Bonnier, but, in the same time, how great teacher he was. He knew that, at the end, that the students are the greatest and more competent critics of his work. This is what we called “desk psychology”. When you are a student, regardless of age you have, you become a critic with a high power of analysis and discernment. His special skills for didactics and teaching could capture them all in the teacher presence:

"Being a valuable researcher in science, to share successfully to your students the knowledge necessary to prepare as many disciples as it needs, that is all you have to know as professor. But, G. Bonnier, with a huge love for Botany wanted much more than that. He hoped that this so appealing and useful science should not remain exclusively only for a few specialists. Through a popularization process, it has to be accessible to everyone, regardless of age or academic status and he worked for it to the end of his life.”

You can not identify so many qualities of your teacher if you do not think and feel the same.

In 1891, Marcel Brândză presented PhD. thesis named “Developpement des tegumentes de la graine“.

After the sustaining of doctoral dissertation, he was back in the country and he was employed as professor of "Gh. Lazar" High School of Bucharest.

Marcel Brândză, a dynamic and independent person, often beyond the allowed limits, has begun a true career through different High Schools of Romania. He moved to "Carol" High School of Craiova. Then, he returned to Bucharest where he remained till 1900 and where he worked at Pedagogic High School and "Matei Basarab” High School.

During 1900-1907, he was a teacher at the "Şincai" Gymnasium and the "Cantemir" Gymnasium. During 1907-1909, he was a teacher at the "Saint Sava" High School.

After, he became a politician , he had few conflicts with the Liberal Party. As a consequence, he was transferred to the "Unirea" High School of Focşani, where he was a teacher during 1909-1920. It was an important period for research and teaching. He performed many scientific expeditions and accumulated a huge quantity of myxomycetes and zoocecidies as biological material for his researches. He made remarkable scientific discoveries in different areas from many forests of Petresti, Beciu-Vârteşcoiu, Câmpineanca, Faraoanele, Soveja and other localities of Moldavia.

During 1920-1927 periods, he returned to the "Matei Basarab" High School of Bucharest. But, in 1924, he was employed as an Associate Professor of the Pharmacy Faculty of Bucharest - Department of Systematic of Pharmaceutical Plants. In 1927, he became curator at The Institute of Botany of Bucharest, which was founded by his uncle. As curator, he realized a huge Herbarium, which had to be used, later, by his students. In the same time, he was the founder of The Department of The Medicinal Plants as a section of Botanical Garden of Cotroceni.

As his disciple stated , Sylvester Forstner, *"Marcel Brândză’s creation bears the stamp of his sustained, honest and correct work. He expressed all the facts and events with extreme accuracy. He was stimulated only by his own desire to serve science and his country without a personal purpose".*

Honest with open-heart, a very modest man, he wanted to open few pathways for young scientists who required it. Marcel Brândză was really loved both by his students and all those who knew him.

After a short but heavy suffering period, on 30 March 1934, he passed in the world of shadows. He left a beautiful opera and many unpublished scientific papers, his wife Caliopia and his child, Emil, who became university professor of Pedagogy at the University of Bucharest.

As we already mentioned, Marcel Brândză worked as a professor at several prestigious High Schools in our country.

His courses were being concise and clear, but, in the same time, they were very interesting and attractive, in the interests of students. Although, he had a bustling personality with exotic behaviour, he catches the sympathy of his students, colleagues and the admiration of school managers.

In 1905, when he was a teacher of **The Central School of Agriculture of Herăstrău**, published a handbook entitled **"Didactics of Botany of Central School of Agriculture"**, in which he presented 12 patterns of lessons, programs of study and practical works. He re-examined all the subjects and lessons of botany, which were taught after old handbooks and he proposed an analytical modern curriculum, which took into account the new scientific achievements in the field and included theoretical issues accompanied by practical works.

As he noted in the foreword of the handbook and analytical program: *"In addition to its defects generated by the fact that it is an absolutely inappropriate copy uncorrelated with needs of agricultural education, this analytical program has another huge inconvenient – it is not connected with science".*

The scientific opera of Professor Marcel Brândză is focused on few scientific directions:

In his PhD thesis he realized a study referring to the teguments of seeds from few families: *Geramiaceae, Lythraceae* and *Oenotheraceae*.

The most important scientific study was entitled **"Myxomycetes of Romania"**. He identified 114 species and made a comparative analysis between Romanian species and those of neighbouring countries.

Another area of research was investigated through studies concerning to Zoocecidies. He followed the same way as Professor Ion Borcea and he was able to identify over 600 zoocecidie species, of which 219 were new for Romania.

Teaching Opera of Marcel Brândză has a particular value to everyone. Botanical systematic Exchange was drafted by his Preparatory-assistant S. Forster and prepared for publication. The illustrated Volume of Flora of woody plants in Romania, published after his death in 1934, is a model which means a catalogue of superior plants.

They remained in manuscript many other valuable scientific works:

- **The Illustrated Flora of Romania, 12 volumes, with almost 3000 figures**;
- **A Catalogue of plants with simple and composed flowers of Romania;**
- **Flora of plants in the neighbouring areas of Bucharest.**

His disciple, Sylvester Forstner, described him as a Master: *"Man with an admirable modesty, altruist, willing to open the pathway to any young scientists who asked him to do it. All the time, he offered an open-heart and a sincere friendship to all his collaborators, his main essential characteristic and its beautiful nature. A person who* *was appreciated and loved by his students as well as those who have known him and had only learned of its treasury of knowledge."*

His aristocratic origin and its noble soul helped him that, through a sustained, competent and hard work, to be considered one of the greatest men of our people. Although, less known, he was the founder of pharmaceutical education and he had valuable contributions to knowledge of Myxomycetes, Gastromycetes and Zoocecidies of our country. He was formed as specialist by the great botanist Dimitri Brândză and he was able to make an opera with a great scientific academic value.

His courses were very interesting, and, the course of Systematic Botany was published in three editions. During 1923-1930, this course represented an impressive model of academic course, which followed the requirements of those times. The volume entitled **" The Illustrated Flora of Woody Plants of Romania"**, published post mortem by Panca Eftimiu was the first academic work of this kind. Panca Eftimiu was the closest relative of Smaranda Brândză, Marcel Brândză's wife, who was a member of Victor Eftimiu's family.

As an evidence of teaching qualities of Marcel Brândză are many decorations and orders received from the King Carol I and King Ferdinand I, during 1894, 1905, 1906, 1922, 1926 and 1931.

The Scientific opera of Professor Marcel Brândză is focused on several directions. The first scientific paper was published in the Bulletin of Botanical Society of France, in 1889, during the preparation period of doctoral dissertation and it is referring to the anatomy and development of tegument of seed plants of following families: *Geraniaceae, Lythraceae* and *(Oenotheraceae) Onagraceae*.

In 1890 he wrote another scientific paper, with the same subject as doctoral thesis presented in 1891.

His doctoral thesis had two parts, depending on how the teguments were forming:

- seeds with a single tegument from the only integument of ovule, as we found at the following : *Ranunculaceae, Amaryllidaceae,* and *Papilionaceae Liliaceae*;
- seeds with two teguments from those two integuments of ovule.

It is believed that this kind of seeds represent an *Euphorbiaceae* family. Marcel Brândză probed that seeds with two teguments were identified at about 20 families.

The researches were made at the Sorbonne University and The Laboratory of Plant Biology "Fontainebleau" under the careful guidance and competence of Gaston Bonnier. The success achieved by Marcel Brândză in finding explanations for the origin and development of tegument of seed plants was because, until him *"most of anatomists who investigated this issue were happy to present those two extreme situations. They examined both young ovule and mature seed. But, none of them had been concerned to observe the gradual disappearance of those parts which they admit that they disappeared at the end of maturity stage of seeds. "*

Interesting are anatomical researches concerning to tissue structures of different hybrids. The researches were made in Paris during 1890. Even if they investigated only few hybrids, they made very interesting comments with new evolutionary and genetic meanings. First of all, they found that when we talk about combining characters of two parental species in hybrids, we don't mean that these aspects are reflected only in morphologic appearance but also in its histology. On the contrary, the morphology of hybrids is less differentiated than in parents. But, histological structure is more differentiated with large number of obvious combinations of structures. Through histological researches, he elucidated aspects concerning to the fact that *Marrubium vaillanti* is a hybrid between *Marrubium vulgare* and *Leonurus heart*, and he putting to an end to discussions held contradictory in that time.

The main opera of Marcel Brândză is a study of Myxomycetes. Until his researches, in Romania there were known only 26 species. Through the huge quantity of biological material collected from a wide area, he fails to identify a number of 114 species, which **were** presented in a paper entitled *"Myxomycetes of Romania"*, published in 1914. This paper made a comparative analysis between the species founded by him and others published in neighbouring countries, and he found a wide range of variations.

Study concerning to Myxomycetes constitutes a constant concern of Marcel Brândză's last book which was published in 1930.

Through its researches, he fails to come into the world of the great specialists from Europe and beyond. His researches recognized him as a great modern mycologist. As a scientific reward, he was distinguished with the title of Honorary Member of the Society of Mycology" from France.

In the paper entitled **"About Myxomycetes appearance in Bucharest City on nutritive advance prepared layer"**, he presents some experimental researches concerning to the growing of myxomycetes which were existing as spores in the dust.

Researches concerning to Myxomycetes in Bucharest City does not concern only taxonomic aspects. In the scientific paper entitled **"About Polychromy of Myxomycetes Developed in Full Sun"**, he analyzed some subtle and interesting aspects registered on a number of over 50 species of ***Calcarea*** Suborder which were collected from old roofs of houses and fences from Neamț Monastery and forests of nearby, which live between muscles and lichens. Marcel Brândză has made evidence some adaptive changes which appeared in many species both as regards the protection or warning colour, and concerning to sporangium structure as a result of adapting to intense sunlight and fast evaporation.

The researches were extended on Myxomycetes plasmodia. In the paper entitled **"About merger or plasmodia separation taken as criteria for determining of Myxomycetes species"**, he presented few interesting observations concerning to the plasmodia behaviour of *Fulico septica* species. This species developing two kinds of plasmodia, some of them with yellow colour and others yellowish, which are formed on sawdust moist woods. He mentioned that two masses of yellow plasmodia put them in contact, could smelt and they may form a single yellow **aethalium** with brown-yellowish colour.

Also, the yellowish plasmodia can smelt and form yellow or white aethalia. He considered that those two colours of plasmodia justified the existence of two physiological species. He mentioned that on *Tubifera ferruginosa* Ymel species are two types of plasmodia (one colourless and the other one coloured in yellow), but there is no smelt between them.

Through his observations, he elucidated multiple aspects of sclerotized plasmodia. Sclerotized is determined by a slow loss of water in a calm atmosphere, and variations of atmospheric condition (when dry, when wet) extended the sclerotize period and developed a huge influence on the regularity and equality of spherolize.

During 1932-1934, he concentrated his efforts on Gastromycetes. In 1932, he published another scientific paper entitled *"Contributions to the study of Gastromycetes from Romania"* in which, together with Professor Theodore Solacolu, he presented 68 species harvested from the former districts: Neamţ, Putna, Râmnicu Sărat and Prahova. From Gastromycetes taxonomy, he focused on investigations concerning to some structural and biological characteristics. He focuses attention on *Lycoperdon, Geaster* and *Calvatia* with special mentions about structures and development of fructification corps. Also, he investigated some species with different ecological values:

- *Lycoperdon pyriforme*, lignicolous species with a vivacious mycelium, deeply infiltrated into the rotten wood giving annually extensive colonies of fructification bodies;
- *Calvatia candida*, siliceous species with a fine network of external mycelium, which represents an active zone, which carries through an acid secretion a milling and dissolution of sand particles;
- *Geaster fimbriatus*, specie which penetrated soils from forests with its ramified mycelium.

Another area of researches conducted by Marcel Brândză is the study of Zoocecidies. During 1914-1916, he accumulated a huge zoocecidies material, which processed the scientific and drafted an impressive cecidatic - Cecidotheca "Dacica", which published every 6 series 300 numbers until 1921.

Through Cecidotheca "Dacia", he managed to produce the interest of specialists throughout the world. The same interest was generated by "Romanian Myxomycetes" collection, some of those individuals is still available The Museum of Natural History "Grigore Antipa" of Bucharest, The Museum of Natural History of Iasi and The Institute of Botany of Cluj. These collections were listed and some species are new for science and for Europe (as, *Physarum cinereum* var. *scintilans* and *Comatricha laxa* var. *rigida*).

In 1914, he published a scientific paper entitled "Contributions to the study of Zoocecidies in Romania", followed by another one entitled "Deuxieme contribution a l'etude of Zoocecidies de la Romania").

He continued Professor Ioan Borcea's work, which made the first investigations on Zoocecidies. Marcel Brândză managed to present not less than 600 species from Moldova, Bucharest and in surroundings, of which 219 species were new for Romania.

Researches concerning to cecidies have not stopped only to systematic aspects, but they were also extended to some histological and anatomical aspects.

When you read Marcel Brândză's paper, you are impressed by the large number of localities in which he made researches and training-trips in the mountains. He was an ordinary guest of the Neamţ Monasteries. From the areas of the former district Putna he has a huge collection of biological material collected from Focşani Forest, Black Forest, Urseşti Forest, Bahana Forest and a few other areas (Faraoani, Soveja, Vârteşcoi, Vidra and Odobeşti). He identified the species extremely rare from Romania, such as *Didynium dubium* (Black Forest), *Diaderma testaceum* (Vârteşcoi) and some new varieties.

We have to mention here another paper entitled "Contributions to the study of *Peridermium elatinum*". These investigations were realized based on observations concerning to a strong attack registered in Slănic Moldova area. There were investigated aspects both of the whole evolution of attack and its physiological consequences generated by the host-plant.

Marcel Brândză was not only an extraordinary teacher and an exceptional scientist, but, also, a man anchored in the life realities. He was high involved in social issues of his time.

Being married with a Macedo-Romanian woman, Marcel Brândză adopted their life-style. In a series of scientific papers he published in a few newspapers, he presented the moral and intellectual values of this people.

"If someone wants to understand, as faster as possible, this people and his rules, then, that person has to recognize three things with the same importance for Macedo-Romanians. The first is the purity of moral life, that has been kept untouched for many centuries of hard existence. The second are their special commercial skills, which represent a significant part of Peninsula richness. Finally, the third important thing is represented by their spirit of equality, which shows a great respect for their cultural places for life and, above all, for the state authorities".

He was highly connected to social realities. In this context, Marcel Brândză was an exigent analyst of political and social events. In an article published in **the** newspaper **"Ordinea"** and signed with the pseudonym **"A Transylvanian"**, he made some confessions concerning to the **" Promises of opposition and the achievements of the government's Iuliu Maniu"**.

"I was, telling us our friend, one of the naive people, which I believed in honesty and Mr. Maniu's abilities. Often, in boss house, we discussed together things about the future of our country. I had heard his every wise word with a special admiration and respect. Here is an example of just I already told you about:

When we are leaders, we have a huge mission, said Mr. Maniu. First of all, we have to put two essential aspects: order and honour."

"And so forth, when Mr. Maniu talks about order and honour, he made a lot of theories from which, oh, no one has not been achieved."

The article has been cut from the newspaper by his son, Emil Brândză, and put in his father's archive.

In the article entitled "Life and the origin of spirited matter ", we found Marcel Brândză's concerns about issues about philosophy some life evolution. Here we could admire a special beauty of phrase and clear analysis of human being as scientist.

"Poets personify sky, land and sea, they give voice to wind and forest, they make cry the icy north-wind which running out over the land, they see all waves screaming and strike rocks, only through themselves. So, this is an argument for that I couldn't find the image of things and objects with souls from nature. Then, they have assigned them all their own inner voices, sad, happy, calm or restless."

Speaking about organism evolutions, about their origin into matters without soul, the author said:

"Far from being from a sect or school, this doctrine is a common asset of a huge number of very special philosophers into their systems. This opinion was shared by: Leibnitz's "monads" that have not only alive but also a soul; Jesuit priest Boscowich, who assigns to ***invisible points*** *a kind of lower vitality; St. Thomas, the angelic doctor who thought that substances without soul had a kind of activity and some preferences for certain acts."*

The scientist and professor Marcel Brândză enjoyed the love of his family and the appreciation of those who knew him . For his contributions in education and science, he was rewarded with many awards. The most important reward for him was received from his pupils and students.

His aristocratic origin and the nobleness of his soul helped him to work hard and with competence. That's why he was accepted as a great personality of our people.

Although, less known than him, he didn't remaine in the shadow of his uncle, the great teacher and botanist Dimitri Brândză. But, he was the founder of botanical pharmaceutical education and contributed to the knowledge of Myxomycetes, Gastromycetes and Zoocecidies from our country.

Prof. PhD. Gheorghe MUSTAȚĂ

Lucrările Simpozionului *„Entomofagii şi rolul lor în păstrarea echilibrului natural”*
Universitatea „Al.I. Cuza” Iaşi, 2008

EQUILIBRIA AND DISEQUILIBRIA IN NATURE AND HUMAN ECONOMY

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Abstracts. The paper approaches different aspects on some disequilibrium and equilibrium states occurring in ecosystems, starting from the researches devoted to the parasitoid complexes which limit the populations of some insects attacking the cabbage cultures of Moldova, and also to the colonies of some aphid species.
An attempt is made at elucidating the causes provoking disequilibrium in ecosystems, and at the manner in which nature re-establishes equilibrium. The self-regulation mechanisms occurring in parasitoid-type biocoenoses are put into evidence, stress being laid on the ecological analysis that should be performed within the ecosystems, prior to any – either chemical or biological – combat against pests.

Key words: nature, natural balance, disequilibrium, ecosystem, biocenosis, bio-geo-chemical circuit

Rezumat. În lucrarea de față prezentăm o serie de aspecte privind unele stări de dezechilibru şi echilibru care apar în ecosisteme, pe baza cercetărilor efectuate asupra complexelor de parazitoizi care limitează populațiile unor specii de insecte dăunătoare culturilor de varză din Moldova şi asupra coloniilor unor specii de afide.
Se încearcă elucidarea cauzelor care provoacă apariția unor dezechilibre în ecosisteme şi modul în care natura reuşeşte să restabilească unele stări de echilibru. Sunt puse în evidență nişte mecanisme de autoreglare existente în biocenozele de tip parazitoid şi se pune accent pe necesitatea analizei ecologice a ecosistemelor înainte de a acționa pentru combaterea dăunătorilor prin folosirea armei chimice sau a celei biologice.

Key words: natură, echilibru natural, dezechilibru, ecosistem, biocenoză, circuit bio-geo-chimic.

Introduction

To talk about equilibria and disequilibria in nature may nowadays appear as a didactic aspect, approached in a classroom during an ecology course.

The disequilibria induced by the human action in nature are being manifested in air, water or soil, as well as at cosmic level, outside the terrestrial atmosphere. However, nothing will be said in the following about global warming, destruction of the ozone layer, the danger represented by the coming absence of clear water or about the greatest enemy of the contemporary world: pollution.

The interest of the authors will focus exclusively on the disequilibrium induced by man in certain ecosystems. The natural history of the planet witnessed several disequilibria (such as earthquakes, tornados, hurricanes, possible impacts with meteorites), induced by natural causes. For example, in the Carboniferous Age, huge forests of columnar ferns, massive trunks have been cleared out as matches and pitched in mountain depressions, covered by earth and transformed into coal – the same coal we are now wildly exploiting, up to complete exhaustion. The natural disequilibrium thus provoked favourized the emergence of Gymnosperme and Angiosperme species, which changed the aspect of the world.

The impact with a huge meteorite brought about the extinction of dinosaurians and of other groups of reptiles, which had conquered the whole Terra from one Pole to another.

Other factors caused the extinction of an impressive number of other species and, consequently, severe natural disequilibria. However, each time, Nature healed its wounds and went on. Along the evolution stages to follow, dinosaurians and reptiles have been replaced by mammals.

Nevertheless, the natural disequilibria induced by human intervention are different. As known, humans emerged on the Earth quite recently. Until then, nature managed its challenges quite satisfactorily. Man is the only species living on Terra aiming at detaching himself from nature, which makes him its enemy. Evolution took a major change, indeed, when creating man. By generating the so-called "**noosphere**", man changed the world irreversibly and essentially.

Human condition on earth is paradoxical: on one side, man is its most clever creature, the only one endowed with brain power, which permits to the matter to grasp its own inner essence and, on the other, man may be judged as the most dangerous beast of the planet. To put it with the words of the great humanist of the Renaissance, Pico della Mirandola: "*man is a chameleonic creature*".

In this respect, a most naturally occurring interrogation is: when did man begin to cause disequilibrium in nature?

A first, plausible answer might be: when he became a tiller of the soil. One may therefore assume that, up to the emergence of humans on the Terra, nature was in equilibrium. According to the ideas of the prominent genetician N. Vavilov, in those times, all existing species developed well-balanced relations, in their genetic center, with all the others. Accordingly, the inter-relations between producers, phytophagous consumers, zoophagous consumers of various types (up to top zoophagous ones), on one side, and decomposers, on the other, permitted no exponential development of some species at the expense of another, so that neither the phytophagous species caused the extinction of their host producers nor the predatory ones eliminated their victims of the local fauna. Such a situation may be viewed as a co-evolution of all species. Some plant species was seen as being controlled by several phytophagous species. When the number of phytophagous species increased too much, a specialization process -oriented towards the consumption of certain organs and/or tissues – was installing. Neither of the phytophagous species nor even the complex of phytophagous species which attack a host plant provoked its extinction, once the phytophagous species are controlled – in their turn – by a variable number of natural enemies (predatory, parasite or parasitoid insects). In this way, cybernetic loops – assuring the work of self-regulation mechanisms – were created. When man came to exploit the soil for agricultural ends, a much larger biomass of organic substances of vegetal origin became available by the multiplication of more numerous plants. The phytophagous species that used to attack such plants shared this newly–occurring biomass, which increased their prolificity. Obviously, the dominant phytophagous species (characterized by a higher number of individuals and by increased prolificity) conquered more hosts plants, which is already the beginning of some disequilibrium among species. It is also true that, in their turn, the predatory and parasitoid insects took equal advantage of the richer available biomass.

The phytophagous species are controlled by a bigger or smaller swarm of entomophagous species, which is a function of the prosperity of each host species. Consequently, agriculture came to change both the aspect of the world and the relationships among species.

At a certain moment of time, the phytophagous species turned into pests, attacking the plant cultures, and causing numerous damages to farmers.

To protect their products, they decided to destroy the pest species through various – agro-technical, physical, chemical – means. When the DDT synthesis has been accomplished, the situation was completely reserved, due the unexpected success of such a substance. Impressive increases in agricultural production were registered, which encouraged the development of intensive cultures. Thousands of hectares have been therefore cultivated with only one type of plant. Quite naturally, the huge vegetal biomass suddenly provided to the phytophagous species led to their exponential multiplication, and to increased amounts of natural wastes. However, their multiplication occurred slowly, and even more slowly along the direction of the trophic chains (plant – phytophagous insect – parasitoide I-II-III). Disequilibria therefore occurred between the phytophagous and the zoophagous species, materialized in huge damages caused by the dominating pests. The flourishing chemical industry resorted to a savage – uncontrolled – utilization of chemical weapons against all types of pests. The chemical combat extended on immense (thousands of hectares) cultivated surfaces led to the extinction of both the main and the secondary pests active in the area, which produced a "**white spot**" in the ecosystem, *i.e.*, an area free of pests.

The biomass released by the pests was now shared by other harmful species, which were kept at bay by the main pest. The availability of such a huge biomass led to their mad multiplication, as well, the more so that they were followed by a more reduced procession (swarm) of entomophagous insects. In this way, more dangerous pests – compared to the initial one – appeared. In its succession of cultures, agriculture followed the same road.

Chemical weapons were used against serial pests, which favourized the birth of increasingly dangerous enemies, no longer controlled – through natural means – by the entomophagous species. An important aspect should be here underlined, namely: in the genetic center of the world, each species occurs in some ratio *versus* the species to which it interrelates. Worth mentioning is that each species is controlled, or followed, by a smaller or larger swarm of natural enemies. Application of chemical weapons against phytophagous insects has an equal effect on the entomophagous insects, as well. In such a case, tragedy breaks, because the emergence of more and more dangerous pests is accompanied by a progressive (chemical) destruction of the entomophagous species.

In some cases, extended chemical combat was performed in cabbage cultures attacked by *Plutella xylostella* L. in ratios exceeding 70-80 and even 90%. Then, against which enemy had been such treatments applied?

To put it plainly, this is only one example of an ecological crime. Still one more important aspect has to be discussed here. In the opinion of N. Vavilov, in its world genetic center, a species usually interrelates with many others, along their whole common evolution.

The assertion may be therefore made that, in its genetic center, some species is controlled by the highest number of its possible natural enemies. If a – presumedly phytophagous – species migrates from its genetic center along a certain direction, the longer the distance it will cover, the fewer will be the number of natural enemies chasing it.

Possibly, at very long distances, it may wholly escape from the attack of its predators and parasitoids, which leads to its exponential multiplication. A good example in this respect is provided by the *Leptinotarsa decemlineata* Say species (the Colorado bug), entering Europe from America without being accompanied by the natural enemies which usually control its existence in its genetic center, which explains its immediate naturalization and exponential multiplication, so that, even today, it remains one of most dangerous and difficult to combat pests in all Europe.

A similar situation might be evidenced for the *Plutella xylostella* L. species, which migrated from Europe to America, South-East Asia, Australia, etc. In South-East Asia, in Taiwan and in other areas of the globe, *Plutella xylostella* was not accompanied – during its migration – by the entomophagous complex controlling its populations in the origin center, so that it became an extremely dangerous, difficult to combat enemy of the cabbage cultures. Numerous other examples may be provided, as it is now largely known that, in different regions of the world, numerous invasive species create almost insuperable problems, inducing severe disequilibria, the balancing of which requires special efforts.

There results from here that many of the disequilibria now manifesting in nature have been provoked by human intervention. In the combat against pests, man irrationally resorted to the chemical weapon. An example will follow on the effect of the DDT utilization against harmful insects. Chemical industry produced millions of tons of DDT, spread in the fields without any concern for further consequences. The half time of DDT is about 30 years. The remanence of this toxic substance in soil and waters, along with its concentration in the living organisms along the trophic chains made it one of the most dangerous enemies for both humans and environment. Traces of DDT were found in the adipose substances of penguins in Antarctica or of the people from the Pacific Ocean islands, who have newer heard of DDT. Eventually, the application of DDT for agricultural ends was prohibited at world wide level.

Apparently, one might hope that mankind is now safe. Not a bit of it! The DDT has been replaced by others, thousands or even tens of thousands of equally dangerous chemicals. It is by now unanimously known that any chemical treatment is a double–edged solution: on one hand, it is efficiently combating some harmful species while, on the other, it acts as a boomerang, attacking man and jeopardizing human life. This is the way in which **POLLUTION** – the most noxious consequence of man's irrational intervention in nature – appeared, threatening the whole world. Today, man and the surrounding nature are at stake, so that drastic steps should be taken for facing this menacing situation, beginning with the substitution of the chemical weapon by the biological one.

The biological combat began even prior to the synthesis of DDT and to its subsequent utilization in agriculture. Nevertheless, the huge economic interests of pesticide manufactures will hardly convince them to reduce their production. They have launched the concept of "selective pesticides", which – it is said – have no noxious effects upon either man or environment, which is only an illusion, if not a lie. In spite of such attitudes, in many developed countries, the biological combat against plant pests has recorded encouraging success – not sufficiently, however, for annihilating the obstinate opposition of the barons involved in the fabrication of chemical pesticides.

The disequilibria now manifested in nature are not caused exclusively by agriculture or by the pesticide industries, many other causes being here involved. Pollution is equally induced, and even amplified, by supra industrialization and by man's reckless attitude towards nature. The threatening induced by global warming, by the uncontrolled arming process of the most powerful nations, the proliferation of nuclear and biological weapons, as well as by the – up to now inefficient – mode of solving the problem of (nuclear, chemical, industrial, household, etc.) wastes may indeed question the very existence of human – and not only – life on earth, of the whole Terra.

Materials and method

The scientific interest of the authors on the entomophagous complexes active in populations of insects attacking cabbage cultures and some aphid colonies dates back since almost 40 years. The numerous investigations developed along all these years permitted the identification of an impressive number of parasitoid species controlling the *Plutella xylostella* L., *Pieris brassicae* L., *Pieris rapae* L., *Delia radicum* L., *Brevicoryne brassicae* L. etc., populations. Thorough studies devoted to such species put into evidence the common evolution of the entomophagous species with their hosts, and also the fact that the parasitoid insects form, together with their hosts and with the primary producers, genuine biocoenotic complexes, defined as parasitoid biocoenoses, a concept facilitating to a considerable extent a better understanding of the complex relations established among the host plants, phytophagous insects and the entomophagous species controlling their existence.

Starting from the results obtained on the parasitoid complexes that restrict the *Brevicoryne brassicae* L., *Uroleucon cichorii* Kalt., *Aphis fabae* Scop., *Plutella xylostella* L., *Pieris brassicae* L., *Pieris rapae* L., *Mamestra brassicae* L., *Delia radicum* L. etc., populations, the authors attempt – in the following – at elucidating some more subtle aspects that might explain the equilibria and disequilibria manifested in certain ecosystems.

Discussions

A careful analysis of the parasitoid species controlling the insects damaging the cabbage cultures of Moldova put into evidence the fact that this culture plant is the main target of the attack of more than 50 insect species.

As the number of phytophagous species is extremely high, a competition will be un- doubtedly occurring among them, as to the position they should conquer inside cabbage cultures. In the evolution of the cabbage–phytophagous species biological system, a certain specialization of the latter ones was accomplished, as to the organs and tissues of the host plant they used to attack. Most of the species attack the leaves, which provide the richest biomass, others attack the flowers, silicvae, seeds, strains or roots. In such a case, the competition becomes milder. Another interesting observation was that a cabbage leaf occupied by some species (*Brevicoryne brassicae* or *Mamestra brassicae*) is less preferred by others, although, quite seldom, two, three or even more phytophagous species may be found out on one and the same cabbage leaf. The presence of phytophagous species attracts some other (predatory or parasitoid) entomophagous species.

As already mentioned, the parasitoid species may be divided into primary, secondary, tertiary and even quaternary parasitoids. In the world genetic centers, a plant is never wholly destroyed, even when attacked by several phytophagous species. A complete devastation would severely affect the very existence of the phytophagous consumers, controlled, in their turn, by a series of primary parasitoids, the action of which reduced their populations, thus favourizing the host plant. When the number of primary parasitoids is high and their populations are very large, the secondary parasitoids take action, by limiting the populations of the former ones, thus impeding the exponential development of a species and the extinction of another one. Sometimes, tertiary parasitoids, acting as either secondary or quaternary parasitoids, may be also involved. In this way, feed-back cybernetic loops – known as paying an important part in maintaining a certain equilibrium among species – are formed (Fig. 1).

Such mechanisms are particularly efficient in the ecosystems in which man did not cause any disequilibria, a situation better understood if viewing it from an economic perspective of nature.

Analysis of the relations established among species from the viewpoint of human economy reveals that plants and animals are either useful or harmful.

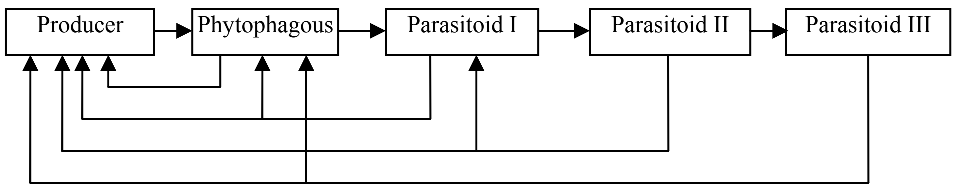

Fig. 1 Cybernetic loops with an important role in maintaining a reasonable balance between species

Thus, *Brassica oleracea* var. *capitata* is useful, once it serves human economy, while *Brevicoryne brassicae* is harmful as it attacks on cabbage may considerably reduce field production; primary parasitoids are useful, once they limit the prejudicial action of *Brevicoryne brassicae*; in their turn, the secondary parasitoids are detrimental, because they reduce the populations of primary parasitoids, thus favourizing the harmful, phytophagous species; tertiary parasitoids should be useful, however, the fact that they may also act as quaternary parasitoids complicates things to some extent.

Such an intricate situation has different effects on both nature and human economy. In the economy of nature, all species are equally important, as each one plays a well-established part in the trophic network (in the biocoenotic complex). As already mentioned, tertiary parasitoids act as a genuine buffer system within the biocoenotic system, permitting no exponential development of any species, because it is exactly the species evidencing a tendency towards exponential development that provides a higher number of host larvae, to be further utilized by the species from the buffer system. All such aspects may be easily put into evidence in the trophic networks of *B. brassicae* L. and *Uroleucon cichorii* Koch (Figs. 2 and 3).

All these analytical observations show the impressive abilities of the huge number of species (the secondary ones, especially) present in these parasitoid type biocoenoses.

When viewing the situation from the perspective of human economy, it appears catastrophic, indeed, because, in such biocoenotic systems, no biological combat is effective, as any species of primary parasitoids grown in the laboratory and released in nature for attacking *Uroleucon cichorii* would be rapidly annihilated (only after a few generations).

What do Figure 2 and 3 suggest: the equilibrium or the disequilibrium of these parasitoid biocoenoses?

From the perspective of human economy, the observation may be made that, in the case of the *Uroleucon cichorii* species, the trophic relations should assure certain cybernetic mechanisms, which will inhibit the exponential development of any species. The existence of a buffer system – provided by the intervention of the *Asaphes suspensus, Asaphes vulgaris* and *Pachyneuron aphidis* species - apparently supports the idea that the biocoenotic complex reached its maturity, that the biocoenoses attained its climax. However, the question still remains on the occurrence of so many species of secondary parasitoids.

A correct answer requires a more subtle analysis. A synecological investigation on the parasitoid species from the *Uroleucon cichorii* colonies reveals that only some of them are euconstant and constant, eudominant, dominant and subdominant (Table 1), while many others are only accessory or incidental, and also recedent and subrecedent, evidencing a low value of the index of ecological significance (W_2 and W_1). Many species of secondary parasitoids are only accessory or accidental, which means that they prefer the colonies of other aphids and that they had entered this complex by pure chance. However, which is the significance of "pure chance", when speaking of nature, a domain in which – all biologists do know – nothing is accidental? The biologists of today do no longer worship God Hazard, so much exalted by their colleagues of the XX^{th} century! The accessory and accidental species are phytophagous or at least oligophagous (by no means monophagous) structures, capable of easily migrating from one host to another, as a function of the biomass it offers. Obviously, the species providing the richest biomass will be preferred. An extended analysis performed on other types of parasitoid biocoenoses will show, beyond any doubt, that the accessory and accidental species form a different type of buffer system within the parasitoid biocoenoses, their main function being that of preventing the exponential development of other species – in other words, that of maintaing natural equilibrium.

This is an important observation, to be certainly not overlooked! The minute investigations devoted to the complex of parasitoid species controlling the *Plutella xylostella* populations which attack cabbage cultures – extended along almost 3 decades – revealed the presence of a huge number of primary parasitoids (Fig. 4), the conjugated action of which succeeded in reducing the *Plutella xylostella* populations up to 70, 80 or even 90% of their effectives (Mustaţă Gh., 1973, 1986; Mustaţă Gh. and Mustaţă Mariana, 2000). In some regions of Moldova, the extinction of *Plutella xylostella* appeared as highly probable which, obviously, is not a natural phenomenon. If, in the beginning of our studies, a quite restricted number of secondary parasitoids was evidenced, their effectives increased dramatically in the last decade, as well as their efficiency in reducing the populations of primary parasitoids. As a result, several feed-back-type cybernetic loops were created, for saving the *Plutella xylostella* species, the situation of which appeared as highly critical.

It is true that, after the year 1998, utilization of the chemical weapon has been considerably reduced in vegetable growing, which permitted the intervention of certain self-regulation mechanisms. More than that, the occurrence of a buffer system formed of species possessing multiple ecological valencies was expected. Such a buffer system is already working (Fig. 5) - for example, the *Oomyzus sokolowskii* species is acting as both primary and secondary parasitoid, a situation that may announce that this parasitoid-type biocenosis is approaching its climax.

Coming back to the parasitoid biocoenosis formed by the *Uroleucon cichorii* colonies, the assertion may be made that the presence of such a high number of secondary parasitoids demonstrates the manifestation of a severe, man-induced disequilibrium. In the spontaneous flora, the *Cichorium intybus* L. plants occur in quite high numbers. Frequently, they are attacked by *Uroleucon cichorii*. The colonies of this aphid were reduced, to a considerable extent, by the action of the parasitoid species (the trophic network specific to *Uroleucon cichorii* being probably much simpler and involving fewer species). In Romania, the endives still represent a new type of food, however, in the last decades, an organized cultivation of *Cichorium intybus* (L.) ssp. *sativum* (DC) var. *foliosum* Hegi may be observed, a possible explanation being related to the occurrence of a considerably rich biomass, on a restricted area, which favourized the exponential development of *Uroleucon cichorii*. The colonies of this aphid provoked a corresponding multiplication of both primary and secondary parasitoids. Such a severe disequilibrium, caused by the large–scale cultivation of endives, accounts for the existence of a charged trophic network in the *Uroleucon cichorii* colonies.

However, which is the exact situation of the aphid colonies? Apparently, the trophic networks evidence the finalization of some self-regulation mechanisms, no longer permitting the exponential development of any species. Indeed, the mechanisms are well-established, but they work in conditions of severe disequilibrium, so that they cannot inhibit the exponential development of the host aphids. The situation is clearly evidenced in the colonies of both *Uroleucon cichorii* and *Brevicoryne brassicae* (Fig. 2) or *Aphis fabae*.

The mummies formed by the species of primary parasitoids often represent only 2-3% of the respective aphid population, which means a very low ratio; in other words, it is as if a system meant at assuring the equilibrium among species works in full disequilibrium.

Then, if the host aphid provides such a rich biomass, why the parasitoid species from the whole trophic chain do not grow proportionally? In such a case, biological equilibrium would be re-established up to the tolerance limit of the ecosystem.

However, this never happens as, year after year, the farmers use the chemical weapon, thus destroying large part of the useful (parasitoid) species. Consequently, each time, they have to resume the process from the beginning. Similarly with the ordeal of Sisyphus, parasitoids attempt at re-establishing equilibrium. Yet, each time, the system falls down and all has to be re-launched. This explains why some species, intensely controlled by the entomophagous species, remain as pests, a situation also favourized by the fact that the farmers have never taken coordinated steps for combating the harmful species. Each time, some areas and cultures remain not treated, so that they become a most favourable cradle for both pests and useful fauna.

In the *Plutella xylostella, Pieris brassicae, Pieris rapae, Delia radicum,* etc., populations, the situation is different.

As illustrated in Fig. 6, in the *Pieris brassicae* L. *Pieris rapae* and *Pieris napi* L. populations, a large number of parasitoids is active. Lately, the efficiency of the primary parasitoids has been much restricted by the intervention of hyperparasitoids. A special case is represented by the *Delia radicum* and *Mamestra brassicae* species, which are controlled by a large number of secondary parasitoids.

In the *Plutella xylostella* populations, the primary parasitoids succeed in considerably reducing the number of pests – in some cultures – up to ratios of 70-80 and even over 90%.

The observed consequence was an increased number of secondary parasitoids, along with the occurrence of certain self-regulation buffer systems. Mention should be made of the fact that, in all cases, quite numerous accessory and accidental parasitoid species have been identified in the parasitoid complexes limiting the populations of harmful insects, which is indicative of the normal working of the second self-regulation buffer system.

The question still to be answered is: if the *Plutella xylostella, Pieris brassicae, Pieris rapae,* etc., populations are so drastically limited, in the absence of any biological methods, why are they still considered as harmful? Two possible explanations may be provided, namely: the chemical intervention from the part of the farmers, without first establishing the exact situation in the attacked cultures – which leads to the destruction of the auxiliary fauna (*i.e*., the entomophagous species), with severe consequences on the normal working of the ecosystems and, secondly, the occurrence of buffer systems as self-regulation mechanisms.

The data collected during the investigations have been considerably influenced by the fact that, after the year 1989, chemical combat was affected by the general crisis of Romania agriculture. In recent years, vegetable gardeners began to re-organize their activity, resorting once again to chemical combat, which provokes – as expected - catastrophic consequences, namely: disequilibria and increased pollution.

As already demonstrated, the disequilibria manifested in nature have human causes. Nature, in its turn, attempts at re-establishing equilibrium, in spite of the fact that, in most of the cases, the self-regulation mechanisms are themselves affected by man's intervention.

Usually, disequilibria are induced by:

- agricultural works;
- modification of the ratio among species;
- development of intensive agriculture, correlated with large-scale application of chemical weapons (pesticides, chemical fertilizers) and – more recently – of hormones, all these interventions favourizing the occurrence of increasingly harmful species, under conditions in which the number of their natural enemies is constantly decreasing;
- intensive application of the chemical means has severely damaged the useful fauna (the entomophagous insects, but not only);
- development of large-scale monocultures destroyed the existing refuge areas for useful fauna (ruderal ecosystems);
- pest combat measures are taken without a serious ecological analysis of the real condition of the ecosystems. Synecological analyses are recommended even in the case of biological combat, which permits a more thorough knowledge on the species present in the biocoenotic complex, as well as on the relationships established among them, for most appropriate subsequent interventions (at this level). Quite frequently, biological combat involves the introduction of some parasitoid species, without knowing exactly the position they hold in the trophic network and, especially, which are the hyperparasitoid species controlling their existence. The struggle against

pests should follow a most careful analysis of the species occurring in the affected biocoenotic complexes, once known that any – chemical or biological – intervention should be based on reliable information.
- The phytosanitary restrictions in force do not succeed in hindering the attack of the invasive species, as they conquer new areas without being accompanied by their natural enemies.

The modern means of pest combat require necessarily to extend the investigation from the species to be destroyed to the analysis of the entire biocoenosis. No – either chemical or biological – measures should be applied in the absence of an all-inclusive synecological analysis.

This new orientation does not involve the development, under laboratory conditions, of more numerous species from the biocoenotic complex under consideration and their subsequent releasing in nature, but a full knowledge on the position of the entomophagous species present in the trophic network, as well as on the real relationships established between them and the hyperparasitoid species controlling their existence.

Therefore, a new concept should be considered prior to the application of any pest combat method: that of a full analysis of the biocoenoses.

Conclusions

The study discusses the disequilibria and equilibria observed in natural ecosystems starting from the results obtained on the parasitoid complexes controlling the populations of insects harmful for cabbage cultures and on the populations occurring in some aphid colonies.

Since almost 4 decades, the authors developed thorough investigations on the parasitoid complexes controlling the *Plutella xylostella* L., *Pieris brassicae* L., *P. rapae* L., *Mamestra brassicae* L., *Autographa gamma* L., *Delia radicum* L. populations and the colonies of some aphid species, such as *Brevicoryne brassicae* L., *Aphis fabae* Scop., *Uroleucon cichorii* Koch., *Macrosiphum rosae* L., etc. Along all these years, an extremely large number of parasitoid species, known as naturally limiting the populations of the *P. xylostella, Pieris brassicae, P. rapae, Autographa gamma,* etc. species, have been identified. Attacking together, the species of primary parasitoids succeed, quite frequently, in parasitating 70-80 up to 90% of the *Plutella xylostella, Pieris brassicae* and *Pieris rapae* populations, and up to 40-50% of the *Mamestra brassicae* and *Autographa gamma* populations. Also, 27 parasitoid species, seen as limiting the *Delia radicum* populations, have been identified.

In spite of the fact that the *Plutella xylostella* populations are parasitated to an extremely high extent, they are still active as pests, a first explanation to this phenomenon being provided by the chemical treatments applied for destroying the harmful species.

The authors are especially putting forward this idea – of the chemical treatments meant at combating the pest species – because their effect is firstly oriented towards the parasitoid species capable of considerably reducing the populations of the species under analysis.

In the opinion of the authors, this is nothing else then an ecological crime.

The present study attempts at elucidating the main causes of the severe, disturbing disequilibria manifested in ecosystems and also the way in which nature succeeds in re-establishing a state of – even partial – equilibrium. Some of the self-regulation mechanisms of the biocoenotic complexes are evidenced, and the important idea that no - chemical or biological – treatments should be applied by farmers against pests (for plant protection) in the absence of a thorough ecological analysis of the ecosystems is strongly supported.

The conclusion of the investigation is that time has come for substituting the concept of species analysis to that of biocoenosis.

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Table 1. Synecological analysis of species from biocoenotic complex of *Uroleucon cichorii* specie

No.	Specie	Abundance	Constant	Dominance	Index of ecological significance
1	*Aphidius funebris*	2164	100 C_4	38.87 D_5	38.87 W_5
2	*Asaphes suspensus*	808	100 C_4	14.64 D_5	14.64 W_5
3	*Charips pusillus melanothorax*	455	100 C_4	8.22 D_4	8.22 W_4
4	*Pachyneuron aphidis*	385	100 C_4	6.97 D_4	6.97 W_4
5	*Asaphes vulgaris*	221	100 C_4	4.00 D_3	4.00 W_3
6	*Praon dorsale*	187	95 C_4	3.22 D_3	3.05 W_3
7	*Charips curvicornis*	92	90 C_4	1.67 D_2	1.50 W_3
8	*Charips victrix victrix*	77	85 C_4	1.38 D_2	1.18 W_3
9	*Charips leunisii*	61	70 C_3	1.10 D_2	0.77 W_2
10	*Charips microcerus*	59	70 C_3	1.07 D_2	0.74 W_2
11	*Ephedrus campestris*	53	80 C_4	0.96 D_1	0.76 W_2
12	*Alloxysta campyla*	52	75 C_3	0.94 D_1	0.70 W_2
13	*Charips melanogaster*	51	65 C_3	0.92 D_1	0.59 W_2
14	*Alloxysta semiclausa*	48	70 C_3	0.87 D_1	0.43 W_2
15	*Dendrocerus bicolor*	46	85 C_4	0.83 D_1	0.70 W_2
16	*Charips perpusillus*	40	60 C_3	0.72 D_1	0.43 W_2
17	*Alloxysta subaperta*	34	60 C_3	0.62 D_1	0.37 W_2
18	*Alloxysta perplexa*	33	65 C_3	0.60 D_1	0.39 W_2
19	*Alloxysta nigrita*	22	55 C_3	0.40 D_1	0.22 W_2
20	*Alloxysta ulrichii*	19	55 C_3	0.34 D_1	0.22 W_2
21	*Dendrocerus carpenteri*	19	45 C_2	0.34 D_1	0.15 W_2
22	*Alloxysta ulrichii homotoma*	17	45 C_2	0.31 D_1	0.13 W_2
23	*Charips dolichocerus*	16	25 C_1	0.29 D_1	0.07 W_1
24	*Aphidencyrtus aphidivorus*	15	55 C_3	0.27 D_1	0.12 W_1
25	*Charips recticornis recticornis*	14	15 C_1	0.25 D_1	0.12 W_1
26	*Charips flavicornis*	13	30 C_2	0.24 D_1	0.07 W_1
27	*Charips tscheki*	9	35 C_2	0.16 D_1	0.05 W_1
28	*Charips arcuatus*	7	20 C_1	0.13 D_1	0.02 W_1
29	*Charips cabrerai*	7	25 C_1	0.13 D_1	0.032 W_1
30	*Charips castaneiceps*	7	20 C_1	0.13 D_1	0.026 W_1
31	*Charips pusillus unicolor*	6	15 C_1	0.11 D_1	0.016 W_1
32	*Charips cameruni*	5	20 C_1	0.09 D_1	0.018 W_1
33	*Charips carpenteri*	5	20 C_1	0.09 D_1	0.007 W_1
34	*Charips victrix infuscatus*	5	15 C_1	0.05 D_1	0.007 W_1

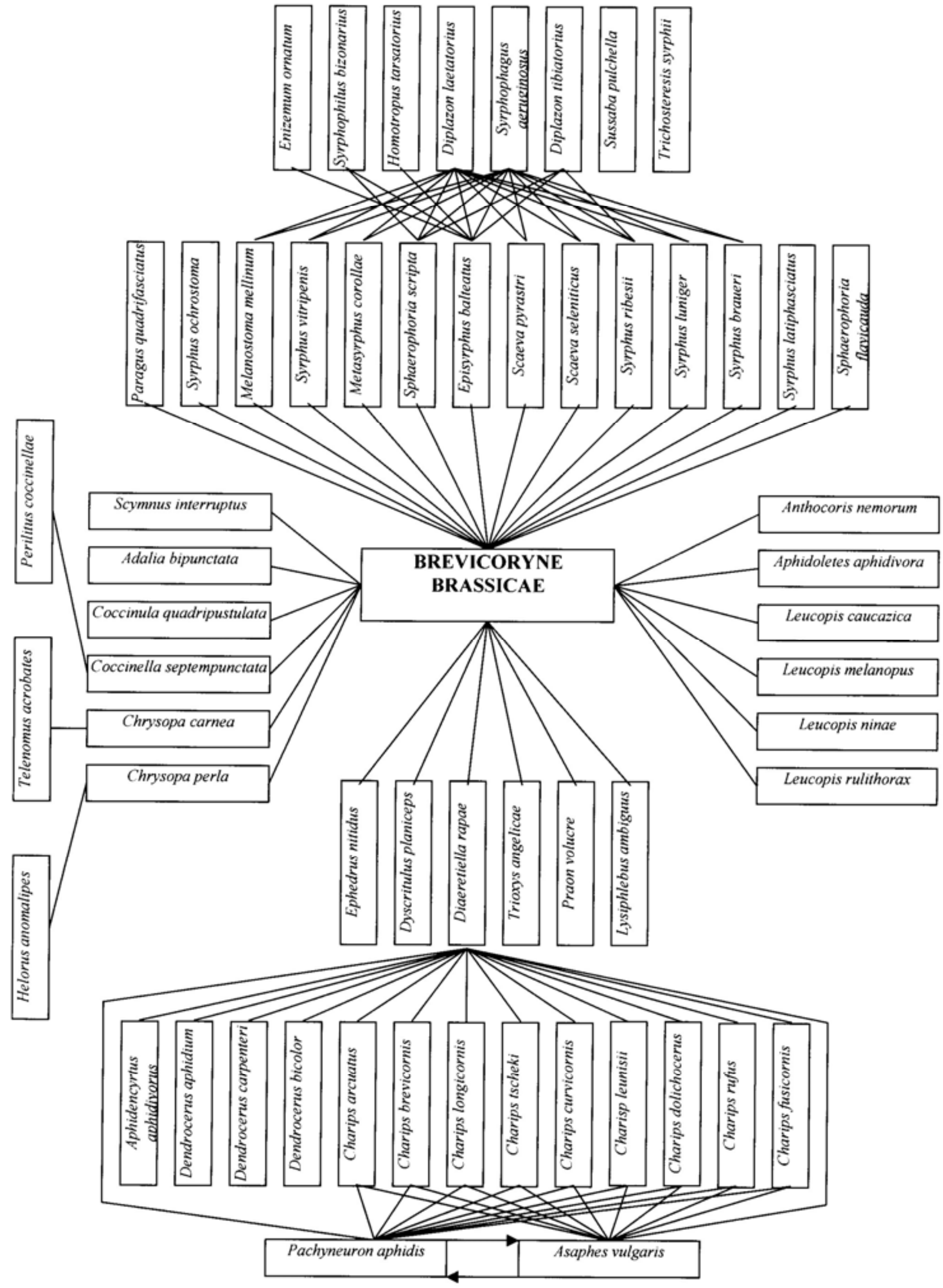

Fig. 2. The entomophagous complex controlling the *Brevicoryne brassicae* L. populations

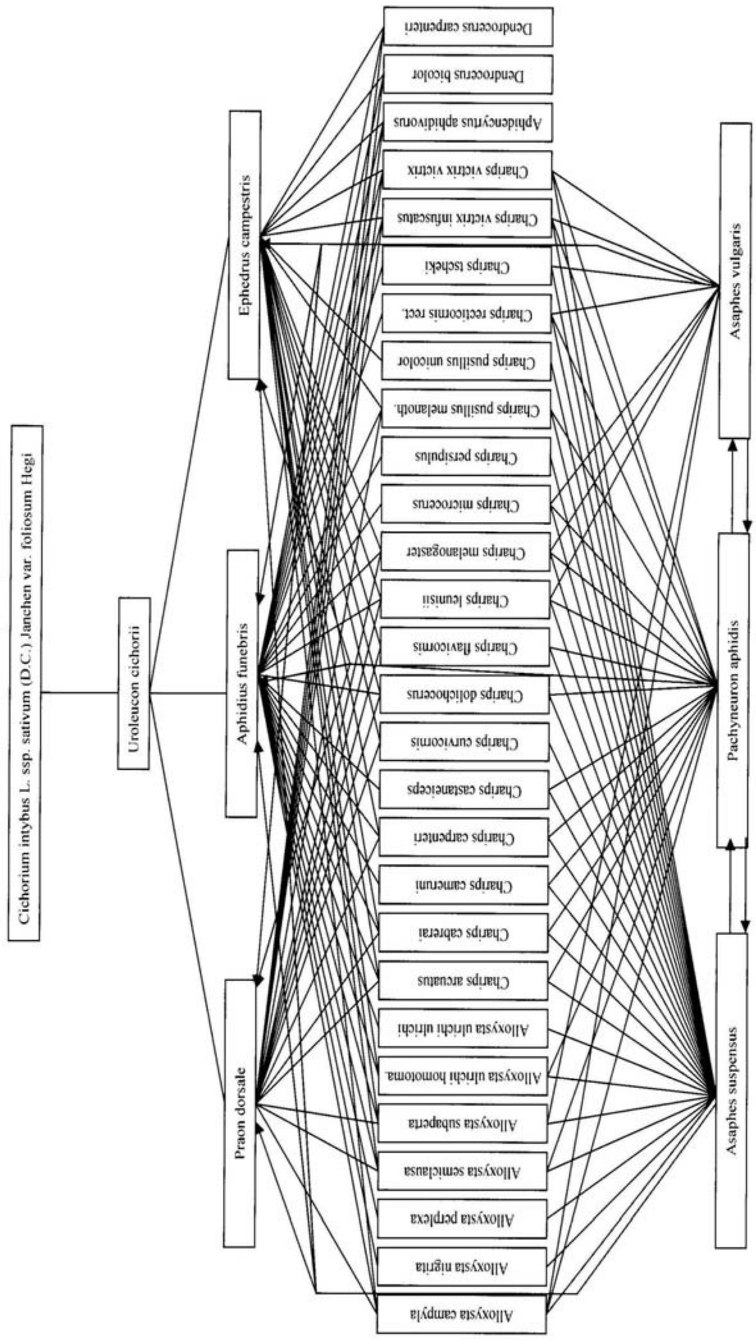

Fig. 3. Parasiotid complexul from *Uroleucon cichorii* Koch

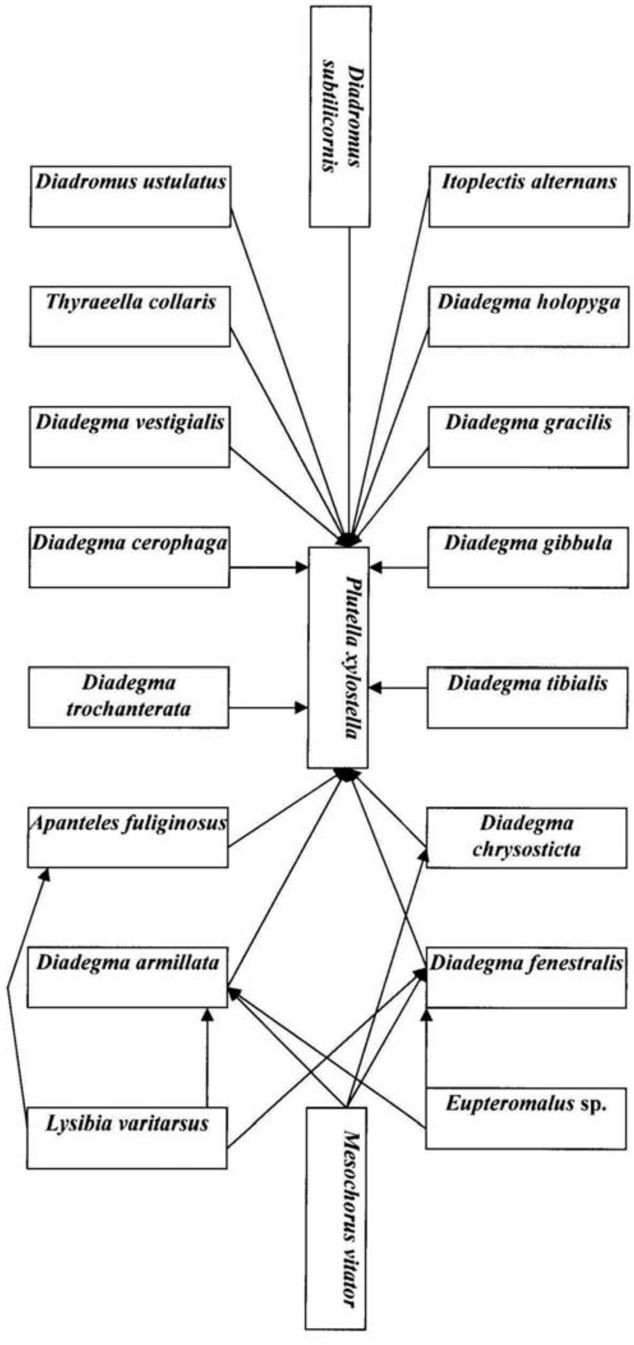

Fig. 4. The parasitoid complex of *Plutella xylostella* L. species

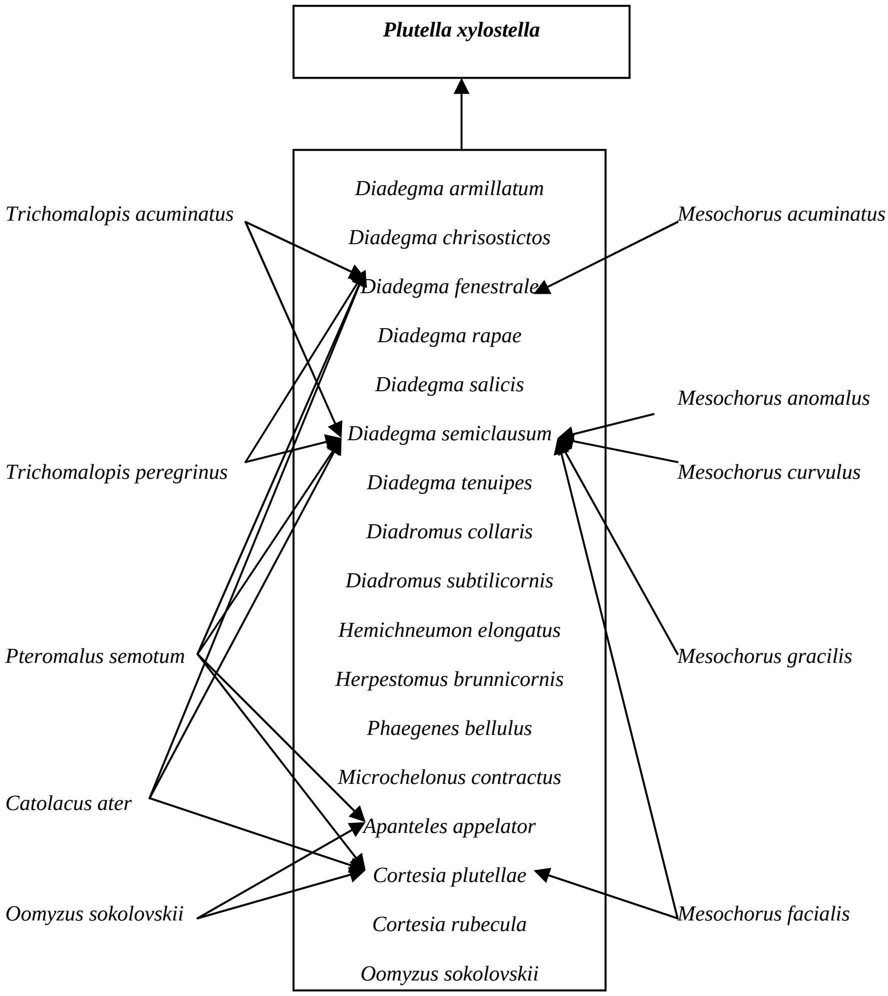

Fig. 5. Parasitoid complexul of *Plutella xylostella L.* specie

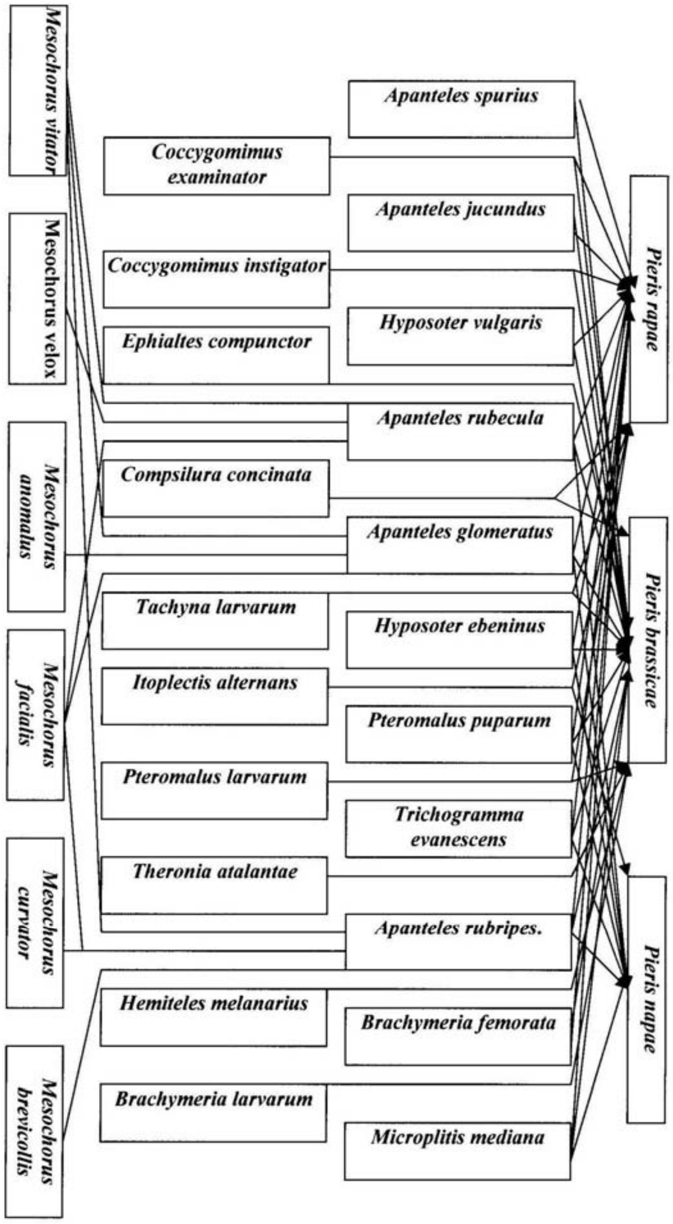

Fig. 6. The parasitoid complex limiting the *Pieris* sp. populations

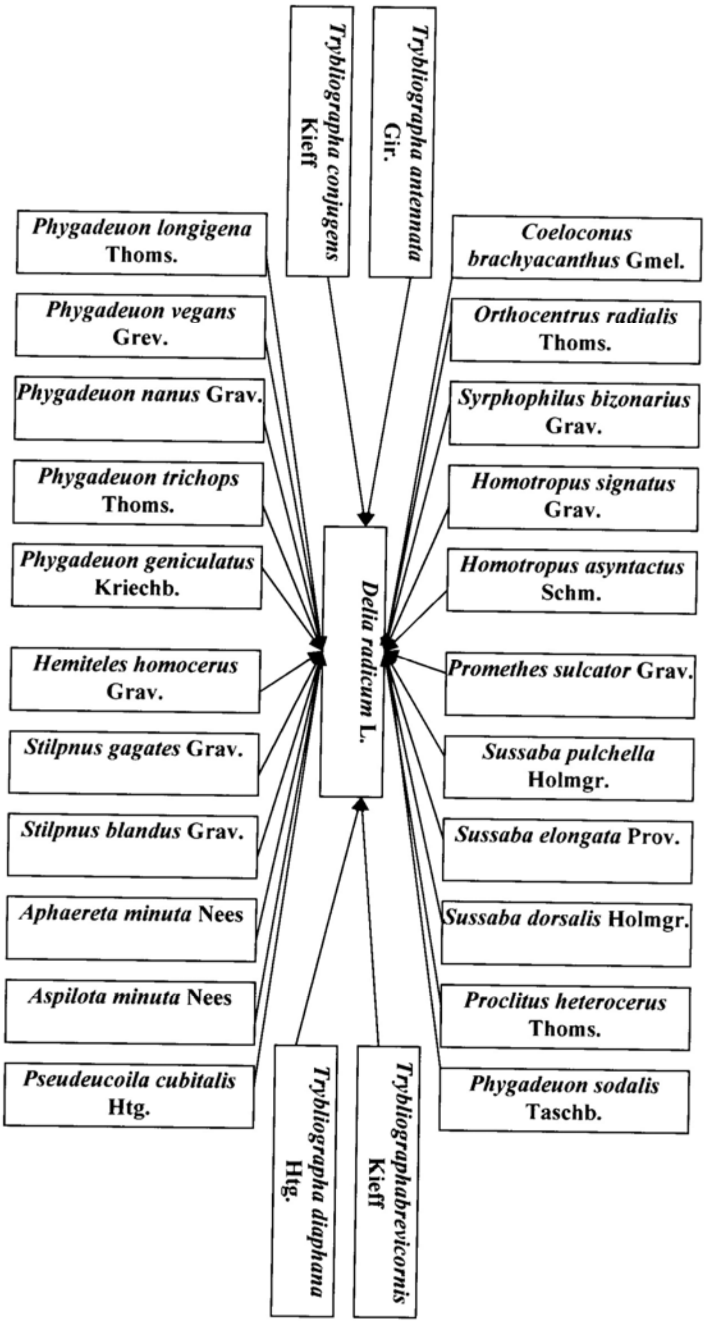

Fig. 7. The parasitoid complex controlling the *Delia radicum* L. populations

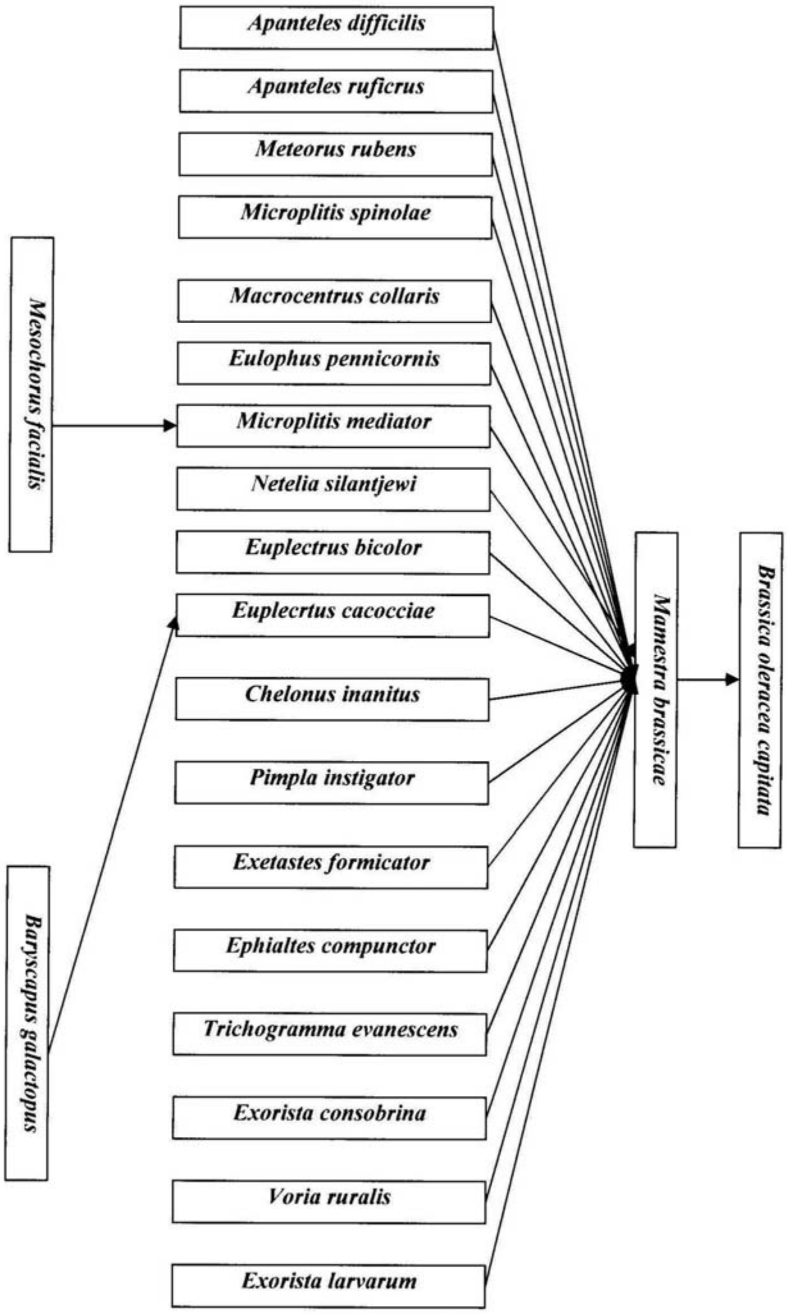

Fig. 8. The parasitoid complex of the *Mamestra brassicae*

Lucrările Simpozionului „*Entomofagii şi rolul lor în păstrarea echilibrului natural*”
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THE SPECIES. BIOSEMIOTIC DIMENSIONS

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Abstracts. The investigations devoted to the pest-natural enemies complex found as active in the cabbage cultures of Romania favourized the discovery of a natural thesaurus highly illustrative for the way in which nature is developing under our eyes.
For example, *Brassica oleracea* var. capitata L. is controlled, along its whole existence, by numerous phytophagous species occurring as a compact swarm surrounding it.
Such phytophagous species are characterized by precise specializations of their nutrition ways, dividing the organs of the host plant so that to avoid too large superpositions. Along its evolution, each phytophagous species creates its own ecological niche, so that neither occupied nor free niches ever appear.
In their turn, the phytophagous species are controlled by large swarms of entomophagous insects, the existence of which depends on one another. The assertion may be therefore made that a species may be actually represented as a swarm of swarms, living its life as part of the huge swarm represented by the integral biocoenosis.
The present study aims at applying the 7th biosemiotic principle of Jasper Hoffemeyer, according to which any organism is a swarm of swarms.
Consequently, analysis of species and of the biocoenotic complexes in the light of the above-mentioned principle may open new, fascinating perspectives for a better and thorough understanding of the living world.

Key words: producers, phytophagous species, zoophagous species, zoophagous species, swarms of swarms, swarms, parasitoids

Rezumat. Urmărind complexul de dăunători şi duşmanii lor naturali care acţionează în culturile de varză din România, am descoperit un tezaur natural care ne ilustrează ceea ce se petrece în natură.
Brassica oleracea var. *capitata* L. este controlată în existenţa sa de o mulţime de specii fitofage care formează un fel de roi în jurul acestei specii cultivate. Speciile fitofage prezintă stricte specializări în modul de nutriţie şi îşi împart organele plantelor gazdă în aşa fel încât să nu existe suprapuneri prea mari. Fiecare specie fitofagă îşi creează propria nişă ecologică. Nu există nişe ecologice ocupate şi nici nişe libere, ele fiind creaţia fiecărei specii în evoluţia sa.
Speciile fitofage sunt controlate, la rândul lor, de adevărate roiuri de insecte entomofage, care depind în existenţa lor unele de altele. Descoperim astfel că o specie reprezintă, de fapt, un roi de roiuri care îşi desfăşoară existenţa în roiul uriaş al biocenozei integrale.
Dorim să aplicăm în această lucrare cel de al şaptelea principiu biosemiotic al lui Jasper Hoffmeyer (Emmecke Claus and coll., 2000) în care se postulează că organismul este un roi de roiuri. Abordând în acest mod cunoaşterea speciilor şi a complexelor biocenotice deschidem o nouă perspectivă în înţelegerea lumii vii.

Key words: specie, biocenoză, producători, fitofagi, zoofagi, parazitoizi, roi, roi de roiuri, biosemiotică.

Introduction

On June 7, 2007, which was a hot summer day, maybe the most torrid one in the last 50-60 years (following an almost non-existent winter, with neither snow nor low temperatures, as no one had seen in the last 100 years), we were controlling a cabbage culture at Agigea, the district of Constanţa, on the Black Sea shore.

The summer cabbage was well-grown, its heads already well-developed in some plants, or only in the process of forming - in others. The authors have been interested in the analysis of the pest complexes attacking cabbage for more than 40 years, so that they were quite surprised to observe an extremely high number of *Plutella xylostella* butterflies. On each cabbage head, tens of butterflies could be observed flying in swarms -

an impressive density of *Plutella xylostella* adults, innumerable swarms never seen before in any field we used to control, along the years, against pests and entomophagous species.

A careful controlling of the cabbage leaves evidenced numerous small, blacky granules gathered on their base. First, we did not understand what these granules might have been: actually, they were *Ceuthorrhynchus quadridens* Panz. individuals, falling down in thanatosis. Without any exaggeration, 50-60 individuals, or even more could be observed on each plant in part.

Curiously, in the same place of the cabbage culture, yet in 2006, the presence of this species was hardly observable (only few individuals, the attack of which was negligible). This time (*i.e.*, in 2007), the overwhelming presence and intensity of their attack was really surprising.

Once again, we remembered the invasion of swarms of swarms in the cabbage cultures of 2006.

As the last chemical treatment of the cabbage culture had been applied 3 weeks ago, the *Brevicoryne brassicae* L. colonies were freely installing on plants, covering almost completely their leaves, a careful and patient watching evidencing the presence of tens of parasitoid insect species on such colonies.

The experience we had got during the investigations devoted to the entomophagous complex of *Brevicoryne brassicae* permitted us to identify easily the presence of *Diaeretiella rapae*, of various *Charips* species, of *Asaphes* and *Pachyneuron*. Once again, the occurrence of the huge *B. brassicae* swarm on the cabbage, accompanied by a swarm of swarms, formed of parasitoid insects, took us by surprise.

The large swarms of *Pieris rapae* L. and – even if more rarely - of *P. brassicae* L. butterflies flying over the whole surface of the culture, surrounding us, created the illusion that the entire field was the scenery of a theatrical show, the main protagonists of which were: light, color and graceful movements.

As far as we were concerned, the cabbage culture was actually an authentic national thesaurus.

All passionate investigators interested in studying pest insects and their natural enemies know that the chance of finding out cultures over-attacked by phytophagous insects, over-controlled – in their turn – by entomophagous species, is extremely rare. For us, such a dream came true on June 7, 2007, at Agigea.

At first sight, everything seemed equally unreal and unaccountable… after which, we did try to find a possible explanation. Not far from "our" cabbage culture, we saw an already harvested rape (*Brassica rapae* var. *oleifera* D.C.) culture; without fail, many of its pests *Plutella xylostella*, *Ceuthorrhynchus quadridens*, *Pieris, Brevicoryne* and the whole suite of entomophagous species, to be identified during subsequent analyses, had migrated to the cabbage field.

Another, even more plausible cause might have been the absence of a cold winter, the simply aberrant climatic conditions induced by the emerging global warming of the earth. Apart from the already mentioned national natural thesaurus (the cabbage culture described should have been preserved as an open-air museum, as a scientific evidence of the free manifestation of biodiversity in nature and, equally of nature's - not man's! – economy, we shall never forget the fascinating image of the swarms of swarms busily active within the larger swarm of the integral biocoenosis.

The metaphor is far from being casual and we did not use only accidentally, but as a most convincing expression of the biosemiotic thinking of Jasper Hoffemeyer, according to whom a living organism occurs as a large swarm of cellular swarms. Actually, this is the 7th of the biosemiotic principles elaborated by Hoffmeyer.

Our investigations supported the idea that any species is a swarm of swarms, living and developing inside the huge swarm of the integral biocoenosis – which is exactly the idea to be demonstrated in the following.

Discussion

In ecology, one of the main principles still working is that "everything depends on everything", more precisely that the existence of each living being depends on all the other living organisms and on the whole life of the biosphere. The bio-geo-chemical ecological circuit is the proof that all substances are involved in a perpetual cycle, which will go on as long as life will continue on earth. The existence of throphic chains, with more or fewer links, is indicative of the inextricable circuit of matter and energy.

As unanimously known, life on our planet depends entirely on the existence of producers - especially plants, as well as other autotrophic organisms. Plants are photo-synthesizing autotrophic organisms, which means that life on the Terra depends primarily on the Sun – yet not only. There also exist chemo-synthesizing autotrophic organisms, which do not need solar energy for the synthesis of organic substances, namely methano- and ferro-bacteria, and others.

However, there also exist photo-synthesizing bacteria species – in others words, plants and bacteria are autotrophic organisms which synthesize the organic substances starting from water, carbon and mineral salts.

Producers serve as food sources for (primary) phytophagous consumers, which transform the organic substance – of either vegetal of bacterial nature – into organic substance of animal nature. One and the same organic substance – of vegetal nature – may be transformed into a qualitatively different organic substance of animal nature. Rabbits eat cabbage: goats, snails, cabbage butterflies, cabbage flies and cabbage bugs eat cabbage, too, so that the same food is transformed into extremely different organic substances of animal nature. Primary (phytophagous) consumers may be eaten by zoophagous consumers belonging to different (secondary, tertiary, quaternary or top) orders. Primary consumers represent a real "industry" through their capacity to transform an organic substance of vegetal type into an organic substance of animal type. During their entire life, animals depend on producers. Both producers and consumers are born, live, grow, develop, get old and die.

Along their whole existence, they produce different organic substances, which they release in the environment, together with large amounts of undigested organic substances, *i.e.*, excrements. All dead organic substances should be decomposed, i.e., mineralized and re-introduced into the bio-geo-chemical circuit. Decomposition of the organic substances of biogenic nature is performed by decomposing agents, mainly bacteria, as well as by fungi or some Protiste representatives.

Decomposers close the bio-geo-chemical circle, developing at planetary, zonal and even local level.

The already mentioned principle – everything depends on everything – is perfectly applicable, too, in the analysis of the complex interrelations developed between a species and all the other species present in the biocoenosis in which the former one lives.

Let us exemplify this on the *Brassica oleracea* var. *capita* L. species – known as a cultivated species, requiring therefore man's protecting intervention in its competition with the spontaneous plants. The cabbage growing in the field may be attacked by weeds and herbs, known as far more vigorous and favourized in the struggle for space, water, mineral salts and light. If carefully looked after, the cabbage plants will soon show a proper development, their rounded leaves growing and gradually surrounding the forming cabbage head.

Inevitably however, their presence in the field draws the prompt attention of the phytophagous species always looking for host-plants capable of feeding them and, mainly, permitting egg deposition. Consequently, the *Plutella xylostella* (L.) females start to deposit their eggs on the developing buds of the cabbage plants. It is only 3-4 larvae of this species that may completely destroy the bud, thus affecting growing of the whole plant. *Plutella* produces several generations, yet only those developed on young plants of both summer and autumn cabbage are harmful. In the case of large, well–developed cabbages, with vigorous, extended leaves in their basal rosettes, the *Plutella* females deposit their eggs on the basal leaves which are not wrapping the head, so that, when the cabbage gets harvested, both larvae and pupae remain in the field, on the basal leaves. Such an extremely subtle adaptation is perfectly illustrating the "intelligence" of the species.

However, even more interesting is that, in a harvested cabbage culture, in which numerous vigorous leaves are still present and new buds – also vigorous – get formed, the *Plutella* female – as well as the *Pieris*, *Mamestra* and *Autographa* ones – do not deposit their eggs until the soil is not freshly tilled. Prior to this observation, we were happy to find out harvested, abandoned cabbage cultures, as we knew that, in the absence of any pest-killer treatments, we might trace either pests or their entomophagous complex. Is time, we came to understand that the insects attacking cabbage never deposit their eggs on harvested cabbage cultures, even if the leaves remained behind are still robust, with young, well–grown buds. Apparently, the females know that such plants will be soon destroyed, so they never put their newly emerging generations at stake.

In Romania, cabbage cultures constitute a proper target for more than 50 phytophagous species (Mustaţă, Gh., 1974), an exceedingly high number of pests, to which one should add bacteria and pathogenic fungi, the only possible observation to be made being that cabbage is controlled by a very large number of species (Cherry et col., 2004).

Actually, this should not surprise anybody. The great genetician N. Vavilov found out that each species has its own birth place, defined by him as the "World Genetic Center" of the respective species. Here, in its birth place, the species comes into contact with all species occurring in its "native" biocoenosis; the relationships thus established are quite different: some are simply neutral, others are competitive, while others control its very existence (*e.g*., the relations with parasites, parasitoids or species of prey) or are controlled by it. Therefore, all these species evolve together, along a co-evolution process. The relations established among species are governed by some cybernetic principles, such as the self-regulation mechanisms, which do not allow the exponential development of a species and the elimination of others (Mustaţă Gh. *et col*., 2000).

Along the whole cycle of their life, the phytophagous species depend on the plants they prefer as their food. Let us assume that, on a desert island, there exist together some plant and the phytophagous insect that eats is leaves (or roots, or any other organ); it goes without saying that the insect will not destroy all plants it attacks, which would cause – in the absence of any food – its own extinction. Consequently, some relationship – similar to that discovered by the great scientist Voltera – is therefore established between the predator and its victim, which might become permanent in the absence of the disturbing environmental factors, the action of which is known as inducing disequilibria. In such a cycle, declining and ascending periods may occur, in both predators and victims. More than that, the phytophagous species are attacked – in their turn – by zoophagous organisms. In the case here under investigation, the phytophagous insects are controlled by a predatory or by a parasitoid species. As the predator does not consume the whole population of phytophagous insects, some self-adjustable cycle is manifesting, too. In addition, the zoophagous species restricts the populations of the phytophagous one, thus assuring the existence of producers within certain limits. In this way, feed-back type loops – involved in the self-regulation mechanisms of the organisms – are formed (Fig. 1).

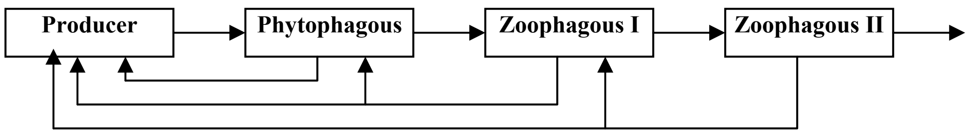

Fig. 1 Self-regulation feed-back loops

When zoophagous organisms of superior order are involved, the interrelations among species become increasingly complex (Mustață Gh. et col., 2001).

In the case of the *Plutella xylostella* species, an extremely high number (20-25) of species of primary parasitoides are active, their conjugated actions coming to restrict this pest up to 70-80, and even 90% its populations (Mustață Gh., 1973; Mustață Gh., M. Lăcătuşu, 1973; M. Constantineanu, Gh. Mustață, 1973, 1974).

With a biosemiotic expression, the observation may be made that a swarm of parasitoid insects is actively controlling the populations of the *Plutella xylostella* species.

As evidenced in Fig. 2, some species act as secondary parasitoids, limiting the – beneficial for humans – action of the primary ones. All in all, this complex of parasitoids provides a self-regulation mechanism which prevents any possible exponential development of some species (Mustață Gh., Andriescu Ionel, 1972-1973; Mustață Gh., 1974-1975, Mustață Gh. et col., 2001, 2002, 2003).

Nevertheless, the *Brassica oleracea* var. *capitata* is not attacked exclusively by *Plutella xylostella*. As already mentioned, a whole complex of phytophagous insects is controlling the existence of this culture plant. Previous investigations of ours have been devoted to the action, quite different from one case to another, of the *Pieris brassicae* L., *P. rapae* L., *P. napi* L. and species (Ionescu, Gh. Mustață, 1976-1977; Gh. Mustață, 1978). Thus, the *Pieris brassicae* larvae, gregarious in their first stages, attack simultaneously the cabbage leaves; they consume the limb completely, leaving intact only the main nervures. The effect of such an attack is extremely serious for the plant, calling for a prompt chemical intervention from the part of producers.

In *P. rapae* and *P. napi*, the larvae are solitary, their presence on one and the same plant being much more reduced. The *Pieris brassicae* females deposit several groups of 20-60 eggs each, which means that between 100-300 larvae will be active on a single plant. In the relation established between the host plant and this species of

Lepidoptera pest, the same principles as those discussed for the preceding species are applicable – namely, these pests cannot completely destroy the host plants from some area, as this would jeopardize their own existence. More than that, in the environmental conditions of Romania, these pests are, in their turn, controlled by an impressive number of parasitoid insects (Fig. 3) (Mustaţă Gh., 1978, Mustaţă Gh., Nguyen Thi Thoi, 1979). Primary parasitoids conjugate their action for restricting the pest populations within acceptable limits but, in their turn, they are controlled by a large number of secondary parasitoids. The trophic network specific to this complex occurs as a swarm of parasitoid insects developing a highly organized action within *Pieris* populations, impeding the exponential development of the species. Each *Pieris* species is accompanied by its own swarm of primary and secondary parasitoids and, because all these species belong to the same genus, many of the parasitoid species are common, which permits merging of the various trophic networks in only one, global network, occurring also as a swarm of parasitoid insect swarms (Mustaţă Gh., 1986; Mustaţă Gh. et col., 1986, 2000, 2005). Although attacking the same host species, *Mamestra brassicae* L. is controlled by a complex of parasitoid species different from those of the *Pieris* and *Plutella* species. Special mention should be made of the fact that *Mamestra brassicae* L. is one of the most dangerous enemies of cabbage as its larvae – occurring in their last development stages – enter the head and destroy it on the whole.

Mamestra brassicae, too, is controlled by some parasitoid complex (Fig. 4), yet its attack is weaker. However, in some cabbage cultures, in some areas, in some years, the eggs of this species are parasitated by *Trichogramma evanescens* Westw., in ratios of 40-60% and even more. A wholly different swarm of parasitoid insects was identified during the investigations devoted to *Mamestra brassicae* (Mustaţă Gh., Mustaţă M., 2000), to which the complex of parasitoid insects traced out in the *Autographa gamma* L. (Mustaţă Gh., Gabriela Costea, 2000) populations should be also added.

A quite special case is represented by the *Brevycorine brassicae* L. aphid, the colonies of which might sometimes compromise a cabbage culture, in the absence of any chemical treatments for their combat.

The proliphicity of this aphid is huge – its colonies may completely cover the cabbage leaves. Let us imagine that, on a cabbage hectare attacked wholly by *Brevycorine brassicae*, the density of its representatives on only one leaf varies between 50 and 200/cm^2, which is an inconceivable biomass. Let us also retain that, if the cabbage leaves are almostly completely covered by this aphid, no place remains free for many of the other common pest species. Consequently, it may be concluded that a cabbage culture can be wholly destroyed by only one pest species, which actually happens in numerous cases, yet not always! The intensity of the attack may vary from one culture to another, from one region to another, from one period of time to another. One and the same plant species should face the aggression of the attack of numerous phytophagous species.

Brevicoryne brassicae invades as a huge swarm, covering an entire cabbage culture. When the density of the virginogene apterous females attains a certain supportability threshold, a special program of reproduction - permitting the birth of winged virginogene organisms – is launched.

As these beings pass more easily from one plant to another and even from one culture to another, the sensation of swarm is created both really and metaphorically. Such a crazy multiplication may be explained by the occurrence of a disequilibrium in nature, which prevents any control on these aphid populations from the part of the entomophagous species.

Previous investigations have put into evidence a quite high member of species of prey, the conjugated actions of which are oriented towards the reduction of such pest populations within reasonable limits (Fig. 5). Among them, mentioned should be made of the ***Syrphidae, Itonitidae, Chamaemyidae (Diptera), Coccinellidae (Coleoptera), Heteroptere, Neuroptere*** (Mustață Gh., 1986; Mustață Gh., Mustață M., 2001), species, which attack the *B. brassicae* colonies in June and July, considerably reducing their effects. However, in their turn, the predators may be controlled by some parasitoid species, which restricts their action – beneficial for human economy. Besides predatory insects, complexes of parasitoid insects are also occurring in the colonies of this aphid, appearing as a huge swarm acting inside a swarm of aphids.

As illustrated in Fig. 5, such a swarm performs a highly ordered action, primary, secondary, tertiary and even quaternary parasitoids – each one with a "mission" of its own – being here involved. The parasitoid species perform either conjugated or opposite actions, thus assuring a coherent and perfectly ordered development of the whole process. Within such a complex, the tertiary parasitoids (*Asaphes vulgaris* and *Pachyneuron aphidis)* may act as both secondary and tertiary agents – or even as quaternary ones, when the species are reciprocally parasitating one another.

The multiple trophic valencies evidenced by these two species permit the creation of a special buffer system inside the biocoenotic complex. As a function of the biomass provided by their hosts, the species move more from one trophic level to another. Therefore, realization of such a buffer system assures the self-regulation mechanism of the biocoenotic complex (Mustața Gh. et col., 2000, 2001, 2007).

Study of these biocoentic complexes permits a better understanding of the mechanisms assuring both self-regulation in nature and the natural equilibrium.

The entomophagous complex controlling the *B. brassicae* populations explains the application – by the authors of the present study – of the "swarm of swarms" concept, usually utilized in biosemiotics for explaining organisms' working as an entity.

Prior to a more ample discussion on such aspects, the observation should be made that the great number of phytophagous species that attack a plant determines their specialization (feeding mode and organs upon which the attack is directed). In the case of cabbage, it is the leaves that **assure** the largest part of the biomass.

In seedy plants, besides other organs, a flowery stem is developed, that may be attacked by some phytophagous insects. Some species attack the leaves, others – the flowers or the fruit, seeds, stem and even root. Some species, such as *Ceuthorrhynchus pleurostigma* Marsh attack the cabbage roots, thus provoking the formation of galls, in which the larvae are fed. *Delia radicum* L. (sin.: *Delia brassicae* Bche., *Chortophila brassicae*) attacks the roots, while *Baris chlorizans* attack the stems, the larvae digging large galleries, which considerably affect the host plant (Mustața Gh., 1978).

A careful investigation of the complex of entomophagous species controlling the *Delia radicum* populations put into evidence an extremely high number of parasitoid species, which conjugate their actions for reducing the populations of such a dangerous pest. *Delia radicum* has its characteristic parasitoids, not occurring in other species that attack the cabbage. The swarm of parasitoids which control the *Delia radicum* populations has its specific structure, each species occupying a precise position in the trophic network (Fig. 6) and building, along its evolution, an ecological niche of its own. Possibly, some ecological niches might be superposed to some – lower or higher – extent, however they may be still differentiated by specific peculiarities of theirs, which means that all species attacking cabbage are related to it since very long times, possibly as early as their biological beginnings. As known, the phytophagous species may be mono-, oligo- or polyphagous, which may be viewed as ecological valencies acquired along their evolution. Obviously, they will attack preferentially the plant species that provide a larger amount of biomass. However, many of the species of phytophagous insects that attack cabbage include among their nutritive preferencies other *Cruciferae* species, as well, such as the rape, mustard, etc.

A thorough, monographic investigation of the *Brassica oleracea capitata* species should necessarily include the analysis of the complex of phytophagous species controlling the course of its existence, which will lead to the discovery of a swarm of phytophagous insects more or less specialized for attacking this plant.

The number of parasitoid species controlling some of the cabbage–attacking species is really impressive. As the phytophagous insects apparently form a swarm around the host plants, one might quite easily image the intense, busy activity of the swarms and swarms of parasitoid insects surrounding some phytophagous species (*Brevicoryne brassicae, Plutella xylostella, Pieris brassicae, Delia radicum,* etc.). In the opinion of the authors, such complexes of parasitoid insects, which control some pest insects, do form genuine biocoenotic complexes, defined by the same authors as parasitoid biocoenoses. Once accepting the term, one may also realize that these biocoenoses evidence characteristic, well-defined structures established along the geological time, *i.e.* during the evolution process, and that they work according to well-established laws.

In other words, such swarms of parasitoids do not act chaotically, their evolution following precise regulations.

Fig. 7 attempts at illustrating the swarm of swarms represented by *Brassica oleracea* var. *capitata*, together with the phytophagous species controlling its existence, and which are controlled – in their turn – by swarms of entomophagous species, reciprocally depending on one another. According to the authors of the present study, each complex of parasitoid species that controls a phytophagous species represents a parasitoid – type biocoenosis, which should be nevertheless viewed as part of the integral biocoenotic complex represented by the agrobiocoenosis – *i.e.*, the cabbage culture.

There might be deduced from here that the species here under investigation, *Brassica oleracea* var. *capitata*, represent a swarm of swarms, which is but part of the larger swarm of the integral biocoenosis. For better illustrating the metaphorical expression of "swarm", applied from a biosemiotic perspective, one should follow the trophic network established by the investigations developed in an endive (*Cichorium intybus* L. ssp. *sativum* (D.C.) Janchen var *foliosum* Hay) culture attacked by *Uroleucon cichorii* Koch. (Fig. 8) (Mustaţă Gh. et col., 1991, 2001).

The trophic network developed by the parasitoid species controlling the populations of this aphid is impressively huge, indeed, which might explain the extremely complex structure evidenced by the numerous species belonging to it. Again metaphorically, one may imagine an immense swarm, within which the species, divided into castes, perform specific functions, all contributing to the edification of an indestructible whole. Nothing is accidental or chaotic, each step is controlled by the interrelations established among species along millions and millions of years of their evolution.

As to the role played by tertiary parasitoids (*Asaphes suspensus, A. vulgaris* and *Pachyneuron aphidis*), they may act – as already mentioned – as secondary and quaternary ones, as well. Their larvae are ectoparasitary. One might deduce from here that they are younger parasitoide species, which have not found yet their perfect host. However, this would mean that a parasitoid species has a more advanced parasitary life, the fewer the number of its hosts is. Would it be possible that, millions of years later, these species will restrict their action exclusively to some hosts and will occupy a fixed position inside the trophic network? Maybe yes, maybe no. According to the authors, involved here is rather the realization – within these biocoenotic complexes – of a buffer system capable of granting a highly functional self-regulation mechanism.

Now, which might be the conclusions to be possibly drawn from the analyses performed?

A strict observation – extended over more than 30 years – of the parasitoid complexes of some pest species permitted a first estimation on the large number of parasitoids which act together for restricting the development of some pest species (*Pieris brassicae, Pieris rapae, Plutella xylostella* etc.) (Mustață Gh. et col., 2005). Also, secondary parasitoids could be sporadically noticed.

From one decade to another, the efficiency of the primary parasitoids increased considerably. Why? The *Plutella xylostella* populations were found as reducing by 70-80, up to 90% or even more, in certain cultures, so that the idea the phytophagous species is on the brink of extinction appeared as possible (Mustață Gh., 1974, 1992, 1992-1993). A similar situation was also recorded in the *Pieris brassicae* and *P. rapae* populations. Quite surprising, indeed, was the observation that, from one period of time to another, the number of secondary parasitoid species increased, as well as – in the last decade, mainly – their efficiency. This was quite an alarming aspect, once the biological combat against pests had been always viewed as beneficial. Consequently, the authors focused their scientific concerns on such aspects, the results being published along the years (Mustață Gh., et col., 1974, 2000, 2001). Still, no satisfactory explanation for such a phenomenon was found until the research came to include the complex of parasitoids known as restricting the populations of such aphid species. Let us consider, for example, the complexes controlling the *Brevicoryne brassicae* and *Uroleucon cichorii* populations.

As previously mentioned, the huge, immensely huge number of parasitoids, as well as the complexity of the trophic networks are astonishing, indeed. The phenomenon can be understood in all its intricacy only if accepting a new view on the way in which nature works.

Man looks at nature exclusively from the perspective of one's immediate interest, and not from that of nature's economy. Starting from this, we simply divide animals into useful and pest species. For example, *Cihorium intybus* L. ssp. *sativum* (D.C.) Janchen var. *foliosum* Hey is a quite appreciated culture plant in some regions, while *Uroleucon cichorii* Koch is a pest species, once it attacks the former. Primary parasitoids from the Aphidiidae family are useful, as they restrict the negative action of *U. cichorii*. In a similar manner, the whole complex of secondary parasitoids is also harmful, once it affects the beneficial action of the primary parasitoids. Tertiary parasitoids might be also beneficial, as they reduce, to some extent, the disastrous effect of the secondary parasitoids. The fact still remains that the tertiary parasitoids are extremely unreliable, frequently acting as secondary and even as quaternary parasitoids. Therefore, the mystery remains non-elucidated.

Let us now analyze all these relationships from the perspective of nature's interest. As biologists, the authors known that, in nature, nothing is missing, nothing is in excess. Any possible absence is exclusively the result of human intervention. Each species occupies its precise position in nature, fulfilling its pre-established function. As already stated, nothing is accidental or chaotic.

Let us now imagine a deserted island, on which endive cultures grow. Let us assume that, by migration, the *Uroleucon cichorii* species is present in these cultures. With such a rich biomass available, the aphid has multiplied overwhelmingly, up to jeopardizing the very existence of the plants, which is unacceptable. Equilibrium should be re-established in the plant – aphid relations, as the biosystem has to survive and not to collapse. Quite accidentally, the *U. cichorii* colonies are traced by some species of primary parasitoids belonging to the Aphidiidae family. The rich biomass provided by this aphid led to an exponential development of these species. The host plant is thus saved from extinction and the biosystem gets recovered. However, the observation is made that *U. cichorii* starts to decline, an almost dangerous decline, while some species of secondary parasitoids become prosperous after the discovery of the endive cultures, along with the presence of aphids and primary parasitoids. They build up impressively large populations, thus providing a "new breathing" to the *U. cichorii* colonies. Tertiary parasitoids begin to manifest their presence, as well. Their action will last long at this trophic level, however some equilibrium is gradually established among the species. In such a case, tertiary parasitoids begin to act as secondary parasitoids, as well, thus assuring to themselves the necessary hosts. If larvae of tertiary parasitoids appear, they do not refuse them, either. Gradually, the parasitoids come to exhibit their buffer system function. However, their action will depend on the type of biomass at hand, which means that the species with the largest number of individuals will became the target of the main attack. A self-regulation system, which prevents the exponential development of some species, becomes therefore active. In such a stage, the assertion may be made that the biocoenosis reached its full maturity. The biocoenotic complex attained its climax.

Now, natural equilibrium may be maintained within natural limits, as long as no perturbing factors, capable of inducing disequilibrium, are manifested.

The old, not-answered questions still remain: What does really happen inside the parasitoid complexes attacking the *Plutella xylostella, Pieris brassicae, Pieris rapae, Brevicoryne brassicae, Delia radicum* populations? Nothing special, indeed, apart from the normal development of the natural relations among species.

In the environmental conditions characteristic for the province of Moldova or, better, for the whole Romania, *Plutella xylostella* is controlled by a large complex of parasitoid insects. This control occurs quite naturally, no artificial intervention – *i.e.*, growing of parasitoids and their launching in nature – being ever necessary.

In the Romania of the last two decades, agriculture suffered a terrible decline. Among others, the chemical combat against pest insects was renounced at for quite a long time, after which the situation got reserved: numerous farmers simply burn their cabbage cultures with too large amounts of pesticides, which is a pitty, indeed! In the period along which no chemical treatments had been applied to the fields, nature wisely intervened. As known, the virulence of the primary parasitoids is extremely high; for example, in some cabbage cultures, the *Plutella xylostella* larvae and pupae were parasitated in ratios of 70-80%, sometimes exceeding even 90%, which is quite alarming for the economy of nature: *Plutella xylostella* was facing extinction. Nature should re-activate its self-regulation mechanisms, among which of special importance is increasing the number of secondary parasitoids and of their efficiency. The occurrence of a buffer system in this biocoenotic system would support the correctness of such reasoning.

The hypotheses put forward by the authors were confirmed. The occurrence of the *Oomyzus sokolovskii* species in the fauna of Romania could not be precisely dated, however it is present, and its presence in quite active. Especially important is that the new species acts both as a primary and as a secondary parasitoid, in the *Plutella xylostella* populations, coming to take over the buffer system function within the biocoenotic complex. The assumption may be therefore made that the biocoenotic complex under discussion approaches its climax.

The swarm of species acts in an efficient and highly organized manner. The question still remaining is related to its size: why is it so huge? Why is *Plutella xylostella* controlled by such a high number of parasitoids? The only possible explanation in that this part of Europe might be -according to the ideas of N. Vavilov – the genetic center of the world. In Asia and America, the number of parasitoid species is extremely low. For example, in Taiwan, *P. xylostella* is comparable to *Leptinotarsa decemlineata* Say, which arrived in Europe without its natural enemies.

The condition of the *P. xylostella* species has been also followed in other parts of the world. For example, N.S. Talekar analyzed – and elucidated – numerous aspects on the biological control of this species in Asia, while D.F. Waterhouse and M.M. Alam brought important contributions in the Pacific, and also in Jamaica and the Carabbiees.

Ayalen G., B. Löhr, Baumgärtner C.K. *et al*. (2004), who investigated the *P. xylostella* populations of Kenya, have grown parasitoid insects, known as playing an important part in the biological combat of such a pest.

Sall-Sky *et al*. provided important information on the complex of parasitoid hymenoptera controlling the *P. xylostella* populations of Senegal, while A.A. Kirk and R. Kfir (2004) published promising results on the biological control of this species.

P. xylostella has conquered the whole planet, being spread all over the world. However, in many cases, it was not accompanied by its whole suite of natural enemies, which creates serious problems in numerous parts of the globe, related to the control of these populations.

Under such circumstances, a question still to be asked is whether all parasitoid species present in these pest populations are equally important. Consequently, a synecological analysis of the parasitoid species from each complex should be necessarily performed.

Such a synecological analysis, devoted to the parasitoid species present in the *Uroleucon cichorii* colonies will evidence a relative abundance of *Aphidius funebris* (2,164 individuals), while the *Charips cameruni, Ch. Carpenterii* and *Ch. Victrix infuscatus* are represented by only 5 individuals. Out of the 34 parasitoid species, 10 are euconstant, 11 are constant, 4 are accessory, and the rest are accidental. As to dominance, only 2 species are eudominant, two are dominant and two are subdominant, 4 species are recedent and the remaining ones are subrecedent. A similar situation should be also mentioned for the index of ecological significance. Consequently, not all species bear the same significance within a biocoenotic complex. The presence of species as part of the biocoenotic complex is conditioned by the biomass available to them. The accidental species occurring in such colonies have appeared accidentally, indeed. Most certainly, the females of these species would have preferred other species, however, being in a situation of crisis and finding none of the desired species, they accepted to put their eggs even in the *U. cichorii* colonies, thus assuring the continuity of the species. As polyphagous species, they control several host species, moving easily and freely from one host to another, looking for those capable of offering a richer biomass. At a global level of the biocoenosis, one may therefore state that the polyphagous species take over the buffer system function, as well, thus impeding the exponential development of some species inside the biocoenotic complex (Mustaţă Gh. et col., 1991, 2001).

For the first time, the authors have had the intuition of this mechanisms in the 70'ies, during the investigations devoted to the efficiency of the *Trichogramma evanescens* Westw. species in controlling the *Mamestra brassicae* populations, through egg parasition (Mustaţă Gh., 1974).

For years and years, the values recorded on *Mamestra brassicae* egg parasitation did not exceed 20-30%. However, in 1978, values between 60-70% were suddenly registered, so that a gradual increase of the *Mamestra* egg parasitation ratio was expected – which was not the case. What might have explained such an unexpectedly high ratio? Possibly, this polyphagous species might have also parasitated other species, capable of providing a higher egg biomass and, after some reduction of such populations, they got re-grouped and moved to *Mamestra brassicae*.

Why have the authors resorted to a biosemiotic language in the attempt of elucidating the essence of some complex structures and biological processes?

In their paper entitled **Reading Hoffmeyer rethinking biology**, issued in 2002, Emmecke Claus, Kull Kalevi and Stjernfelt Frederik give their interpretation on the biosemiotic principles stated by Jasper Hoffmeyer. As known by the specialists of the field, the 7th principle states that "The living organism is a swarm".

According to Jasper Hoffmeyer, the swarm of cells forming the organism of a pluricellular animal may be viewed as a swarm of swarms, as a huge swarm formed of various, hierarchically–superposed swarms (Hoffmeyer J., 1995, 1996). In other words, the cells forming the organism do not constitute a self-contained entity, nor are they isolated. Instead, they communicated among them, interact and conjugate their efforts for assuring the vital functions of the organism (such as immunity, recovery of some injured organs, etc.), quite similarly with the bees inside a colony. At first sight, the swarm appears as irregular developing hazardous, random activities. Instead, things are entirely different. The multitude of cells intervening in the active defense of the organism, their incredible communication and mobilization capacity for assuring their scope: the immunity of the organism is an impressive show, indeed.

In the opinion of Jacob Uexküll (1980), differentiation of the cells and tissues from pluricellular organisms granted the special capacity of receiving and transmitting information, so that large environmental areas should be manipulated, in both space and time, which finally favorizes the increase of the so-called *Umwelt*.

One can easily imagine the swarms of cells, either in the moment of their mobilization or simply mobilized for facing the attack of a pathogenic agent, or for repaining a blood vessel, the breaking of which might produce an internal hemorrhage, possibly fatal for the respective living organism.

Therefore, a living organism appears as a swarm of cellular swarms, which communicate among them and develop coordinated actions for assuring a normal running of the entity represented by the organism (Mustaţă Gh., Mustaţă M., 2006).

Biosemiotics permits a more profound understanding of certain biological processes and phenomena. The same biosemiotics made us re-discovery the cell as an edifying unit of the organism structure (Mustață Gh., Mustață M., 2006).

Application of the biosemiotic principles may help one to view not only the organism, but also the species (population), the biocoenosis and the biosphere, as a whole. Similarly with cells, the individuals belonging to some species form a structural and functional unit, actually represented, at organizational level, by the species.

The heterogeneity characterizing the individuals belonging to a species confers to it a higher integrality and a special openness towards the other species.

The syntagm "**the species is a swarm of swarms**" may appear as a simple metaphor, having no real meaning. However, a more careful analysis might bring to light important aspects that should be necessarily taken into consideration.

According to the systemic theory of Ludwig von Bertalanffy, any material system, the biological ones included, possesses certain characteristics, such as: integrality, dynamic equilibrium, self-regulation, programs, historical evolution and heterogeneity.

The species represents a biological system, a level of organization, which grants its heterogeneity; consequently, the individuals forming the species are different and may play different roles.

Let us exemplify the above statements with the *Brevicoryne brassicae* L. species. In Romania, it hibernates as resistance eggs, deposited on the strain and on the leaves remaining after cabbage harvesting. In the springtime, the founding (womb) females come out from the eggs, giving birth - through parthogenesis – to unwinged virginogene (virginopare) females. When the density of such wingless virginogenous females is sufficiently high, there appear the winged virginogenous females, which assure spreading of the colonies on other plants and even on other cultures. They get installed on other plants and, until autumn, they give birth to other generations. When autumn is near, the sexupare females – the last generation of parthenogenetic females – appear and give birth to sexuate (female and male) forms which immediately begin their nuptial dance, thus forming innumerable swarms. The fertilizing mating is followed by egg deposition and by the harsh winter, followed by spring revival.

Tracing out the most suitable places for egg deposition, from the part of female swarms, represents the last vital activity prior to the beginning of winter.

Generations and generations of *Brevicoryne brassicae* L. swarms, following one after another, may be cyclically observed from early spring until late autumn, either as real swarms of winged organisms or only as imaginary, yet perpetual dynamics of swarms of winged and wingless virginogeneous females.

The uninterrupted succession of these swarms represent a major condition for the accomplishment of the yearly biological cycles, no matter how many generations are involved. Nothing is accidental, the aphid generations contribute together to the fulfillment of the ontogenetic cycle and to successfully facing any moment of crisis.

In *Brevicoryne brassicae* L., no castes occur; however, the fundatrigenous element is wholly different from the winged ones, and the sexupare differ from the sexuate ones.

The generations overlap on one another, the whole works as an immense swarm, formed of numerous other swarms.

The same metaphor will be employed for describing the succession of other generations of species – be them phytophagous or parasitoid. The large swarm forming the species modifies its structure and functionality as a function of the concrete environmental conditions, on one side, and of its specific requirements, on the other.

If analyzing the swarm of swarms of the *Brevicoryne brassicae* L. species as such, *i.e.* isolated, without considering its complex relationships with the swarms of parasitoids and predatory insects, no reliable results will be attained.

However, once accepting the idea that the producers continue their existence in the swarms of swarms represented by parasitoid and predatory species, one will easily understand that, in nature, **everything depends on everything**, and it is exactly this manner of approaching nature that facilitates one to view the biological concept of species as a swarm of swarms, belonging to the huge swarm represented by the biocoenosis.

No species can ever live isolated, separated from the other species and from the whole which is the biosphere. Therefore, the assertion that: **everything depends on everything** is an ecological principle perfectly applicable, too, for a deeper understanding of the structure and functionality of some species.

As demonstrated above, the existence of a vegetal species depends on a complex of phytophagous species, on a swarm of phytophagous insects which attacks its various organs. Such attacks are highly different, as a result of the different specialization, as to the manner in which the attack is conducted and also as to the nutrition mode of the assailant. That is why, no study on any species from the vegetal world should leave aside the corroborated analysis of the swarm of phytophagous insects which controls and determines its existence.

More than that, any investigation should consider that each phytophagous species is accompanied by a swarm of entomophagous insects. As to the parasitoid insects, they are acting as primary, secondary, tertiary and/or quaternary parasitoids, which form extremely complex trophic networks. All these species live and exist as part of the huge swarm of the integral biocoenosis, within which **everything depends on everything**.

It is only in this way that one can really and thoroughly understand the organization levels of the species (populations), biocoenosis and biosphere type. No living being can ever live alone, isolated from its fellow creature from the same species and/or from its neighbors belonging to other species from the same biocoenosis. Therefore, it is only at the level of such complex structures of swarms of swarms, which are part of the huge swarm of the biocoenosis, that one may really grasp the complex interrelations established among species, and "translate" into human terms the semiotic dialogue permanently developed among them.

Conclusions

Investigation of the complex of phytophagous species that attack some cultivated plants put into evidence innumerable swarms of species which control one another in an amazingly reciprocal manner, and which depend wholly, along their entire life, on the inter-relationships consolidated along millions and millions of generations.

The attempt of applying certain biosemantic principles for better understanding the vital structures and processes led to the discovery that any species is formed of swarms of swarms, busily active in the huge swarm represented by the biocoenosis.

Along its whole life, *Brassica oleracea* var. *capitata* L. is controlled by a huge complex of phytophagous insects, which represents a first huge swarm; in their turn, the phytophagous species are accompanied by a bigger or smaller swarm of entomophagous insects, as actually illustrated by the investigations performed by the authors on the phytophagous–controlling species, namely: *Plutella xylostella* L., *Pieris brassicae* L., *Pieris rapae* L., *Mamestra brassicae* L., *Brevicoryne brassicae* L., *Delia radicum* L. etc. The immense number of insect swarms of swarms involved in the life of *Brassica oleracea* var. *capitata* L is impressive, indeed. Here, again, the principle according to which **everything depends on everything** is perfectly illustrated.

Therefore, in the present study, the authors attempted – successfully, they hope! – at applying the seventh biosemiotic principle established by Jasper Hoffmeyer, according to which any organism is a swarm of swarms, for understanding the species as a **swarm of swarms**, acting unitarily within the huge swarm represented by the biocoenosis.

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Table 1. Sinecological analysis of the species from the biocenotic complex of the *Uroleucon cichorii* species

No.	Species	Abundance	Constance		Dominance		Index of ecological significance	
1	*Aphidius funebris*	2164	100	C_4	38.87	D_5	38.87	W_5
2	*Asaphes suspensus*	808	100	C_4	14.64	D_5	14.64	W_5
3	*Charips pusillus melanothorax*	455	100	C_4	8.22	D_4	8.22	W_4
4	*Pachyneuron aphidis*	385	100	C_4	6.97	D_4	6.97	W_4
5	*Asaphes vulgaris*	221	100	C_4	4.00	D_3	4.00	W_3
6	*Praon dorsale*	187	95	C_4	3.22	D_3	3.05	W_3
7	*Charips curvicornis*	92	90	C_4	1.67	D_2	1.50	W_3
8	*Charips victrix victrix*	77	85	C_4	1.38	D_2	1.18	W_3
9	*Charips leunisii*	61	70	C_3	1.10	D_2	0.77	W_2
10	*Charips microcerus*	59	70	C_3	1.07	D_2	0.74	W_2
11	*Ephedrus campestris*	53	80	C_4	0.96	D_1	0.76	W_2
12	*Alloxysta campyla*	52	75	C_3	0.94	D_1	0.70	W_2
13	*Charips melanogaster*	51	65	C_3	0.92	D_1	0.59	W_2
14	*Alloxysta semiclausa*	48	70	C_3	0.87	D_1	0.43	W_2
15	*Dendrocerus bicolor*	46	85	C_4	0.83	D_1	0.70	W_2
16	*Charips perpusillus*	40	60	C_3	0.72	D_1	0.43	W_2

17	*Alloxysta subaperta*	34	60	C_3	0.62	D_1	0.37	W_2
18	*Alloxysta perplexa*	33	65	C_3	0.60	D_1	0.39	W_2
19	*Alloxysta nigrita*	22	55	C_3	0.40	D_1	0.22	W_2
20	*Alloxysta ulrichii*	19	55	C_3	0.34	D_1	0.22	W_2
21	*Dendrocerus carpenteri*	19	45	C_2	0.34	D_1	0.15	W_2
22	*Alloxysta ulrichii homotoma*	17	45	C_2	0.31	D_1	0.13	W_2
23	*Charips dolichocerus*	16	25	C_1	0.29	D_1	0.07	W_1
24	*Aphidencyrtus aphidivorus*	15	55	C_3	0.27	D_1	0.12	W_1
25	*Charips recticornis recticornis*	14	15	C_1	0.25	D_1	0.12	W_1
26	*Charips flavicornis*	13	30	C_2	0.24	D_1	0.07	W_1
27	*Charips tscheki*	9	35	C_2	0.16	D_1	0.05	W_1
28	*Charips arcuatus*	7	20	C_1	0.13	D_1	0.02	W_1
29	*Charips cabrerai*	7	25	C_1	0.13	D_1	0.032	W_1
30	*Charips castaneiceps*	7	20	C_1	0.13	D_1	0.026	W_1
31	*Charips pusillus unicolor*	6	15	C_1	0.11	D_1	0.016	W_1
32	*Charips cameruni*	5	20	C_1	0.09	D_1	0.018	W_1
33	*Charips carpenteri*	5	20	C_1	0.09	D_1	0.007	W_1

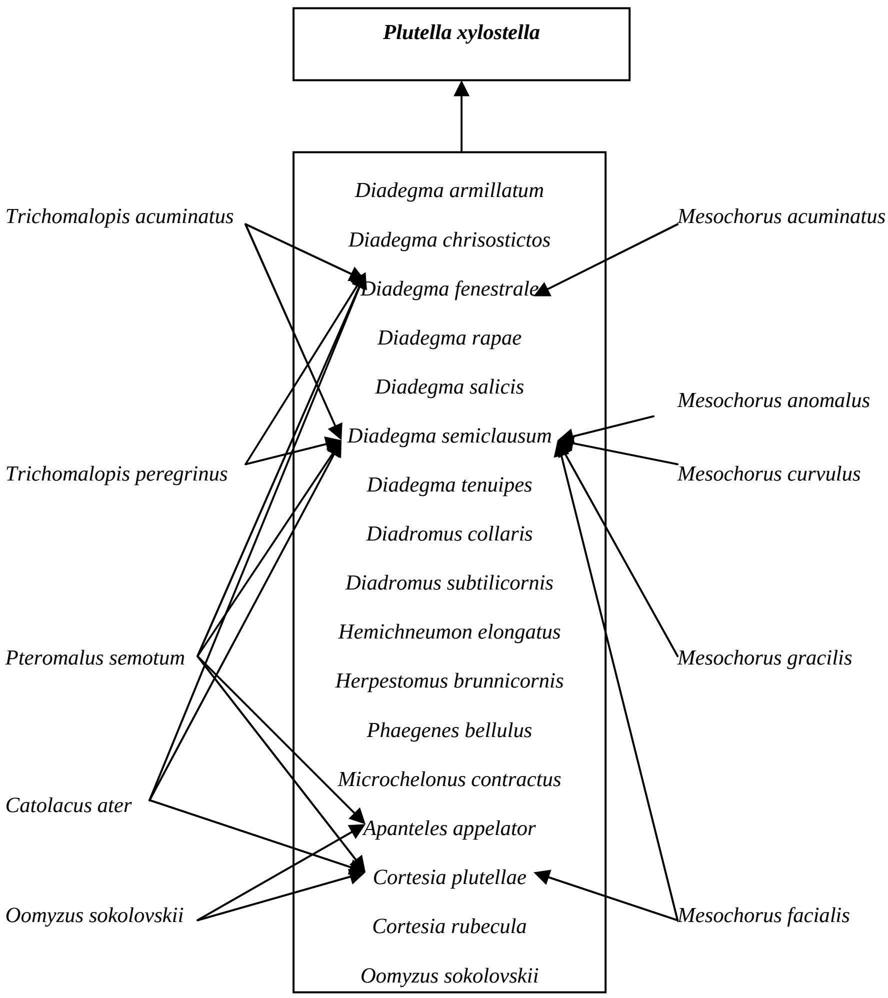

Figure 2. The parasitoid complex of the *Plutella xylostella* L. species

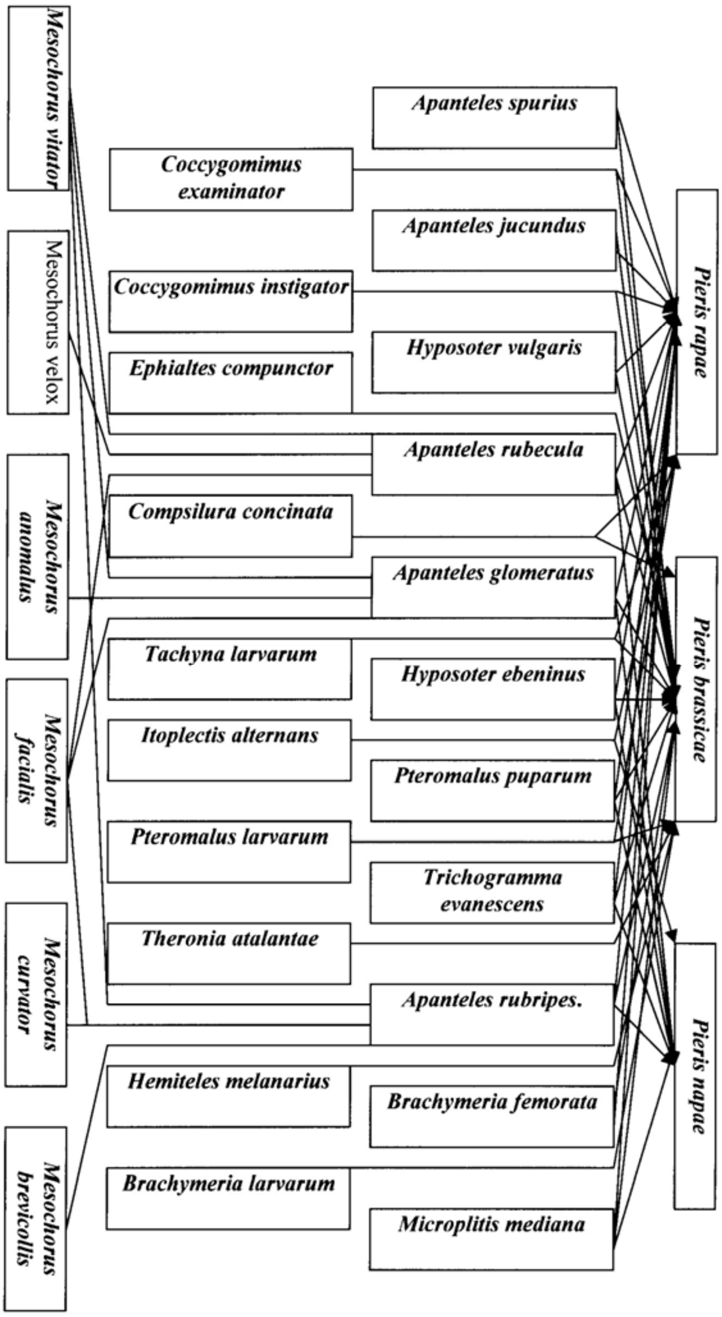

Figure 3. The parasitoid complex limiting the *Pieris* populations

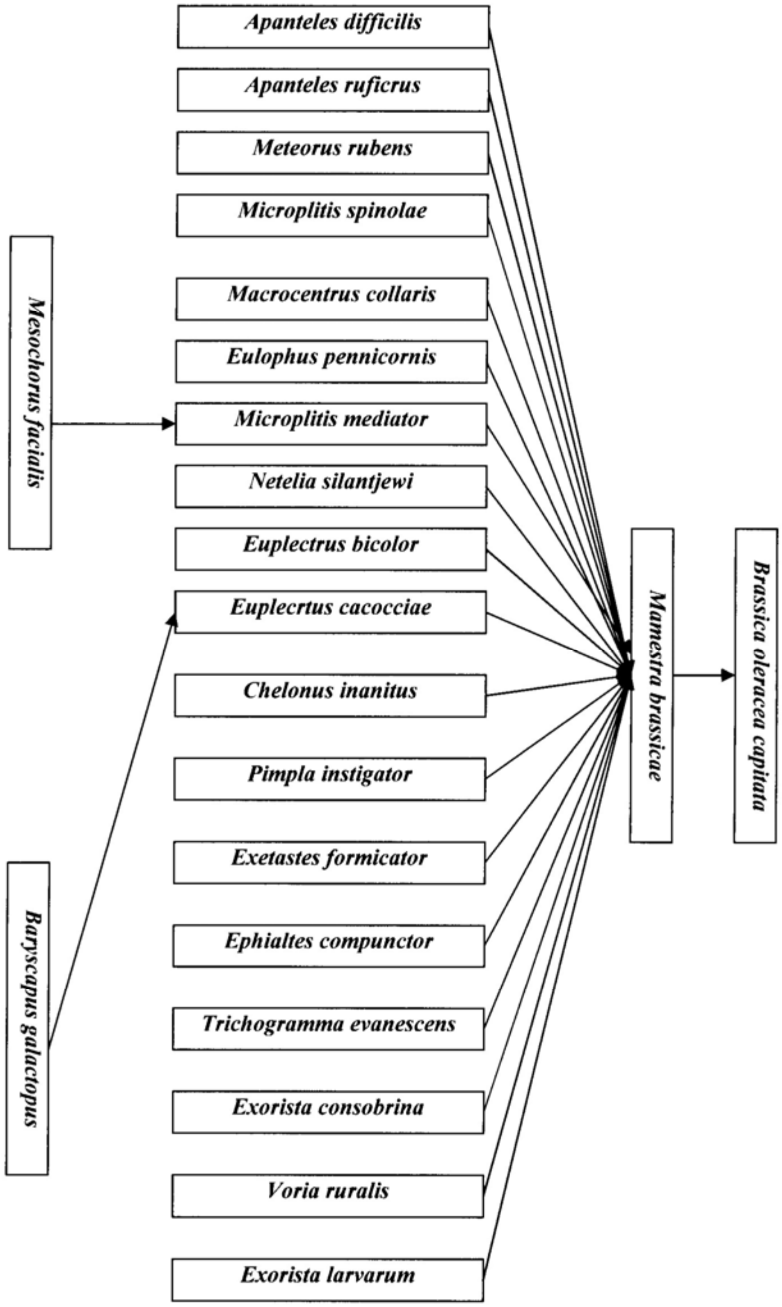

Figure 4. The parasitoid complex of the *Mamestra brassicae* populations

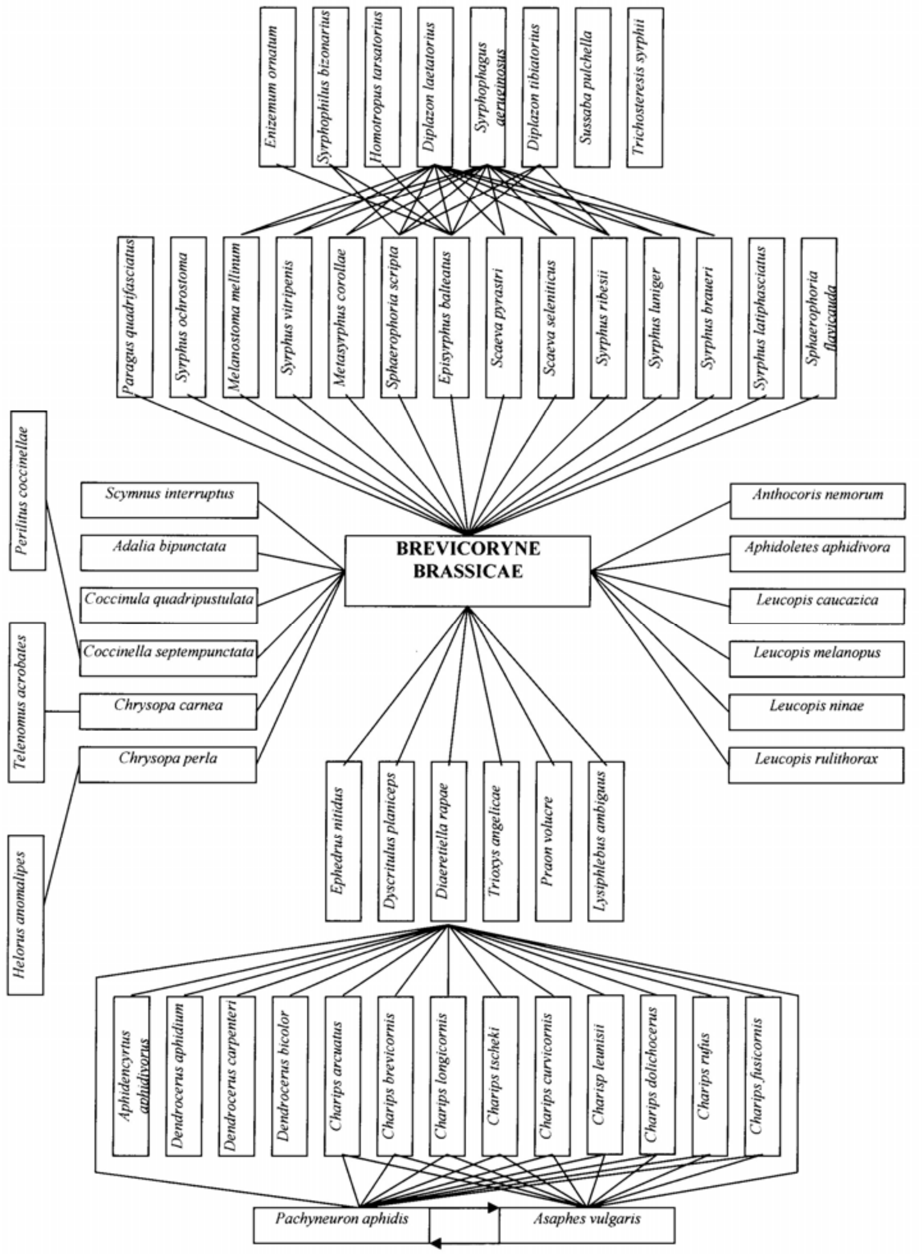

Figure 5. The entomophagous complex controlling the *Brevicoryne brassicae* L. populations

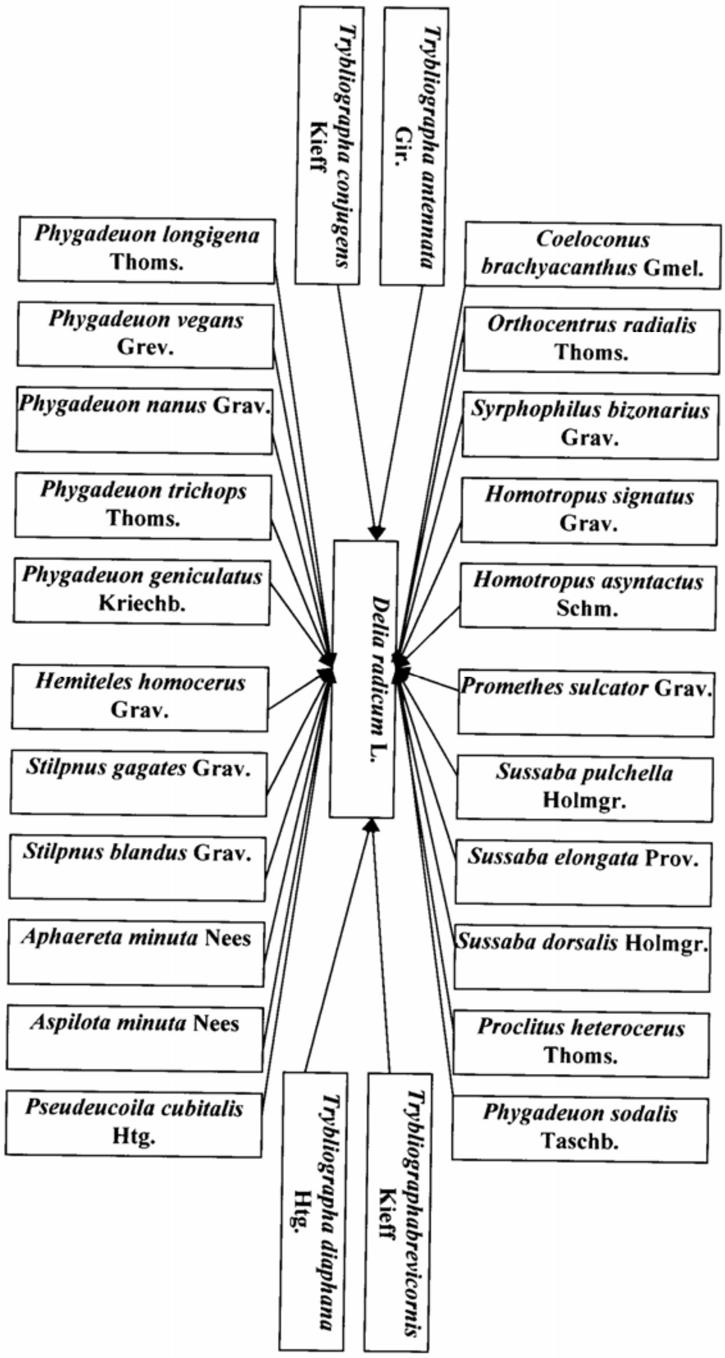

Figure 6. The parasite complex controlling the *Delia radicum* L. populations

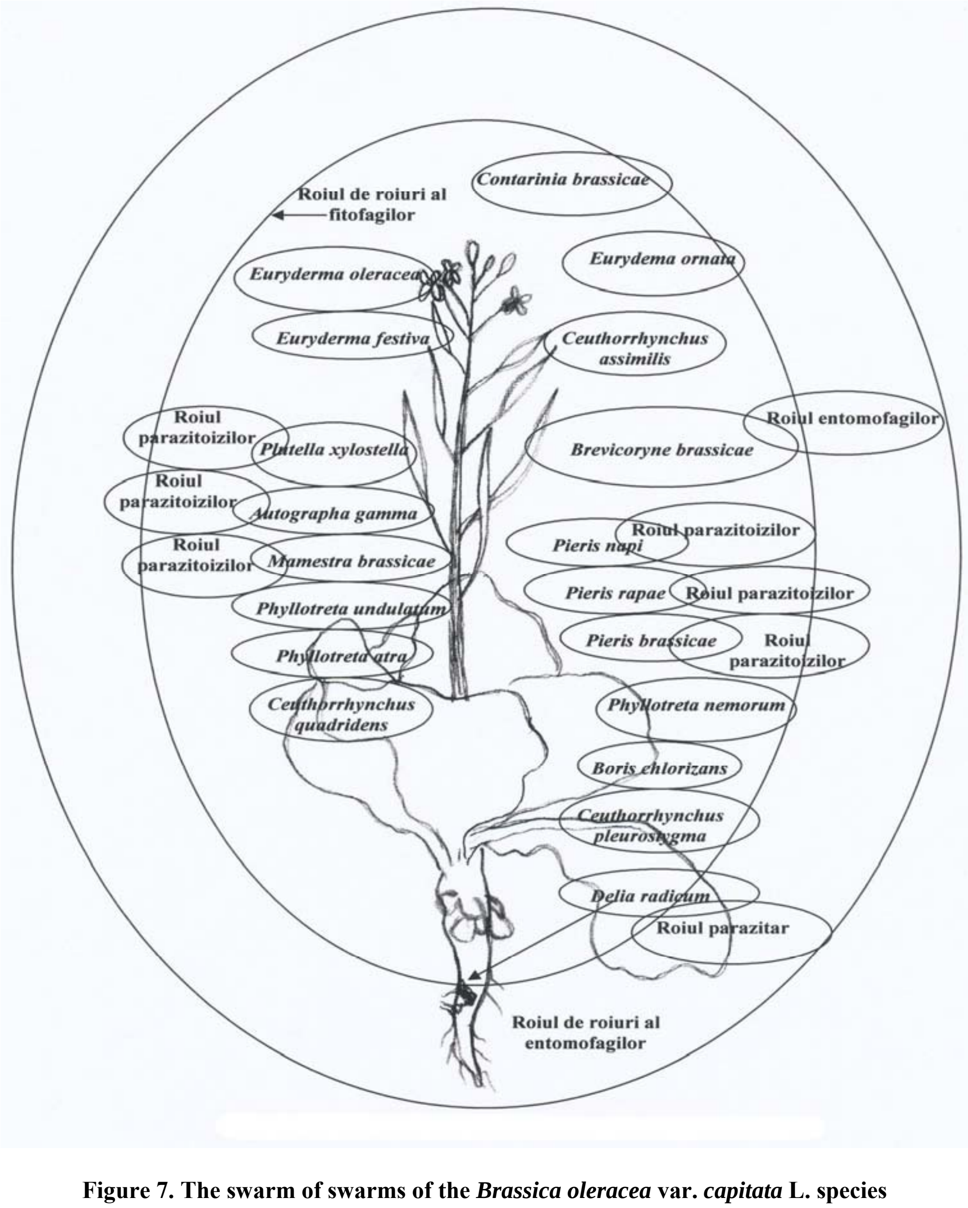

Figure 7. The swarm of swarms of the *Brassica oleracea* var. *capitata* L. species

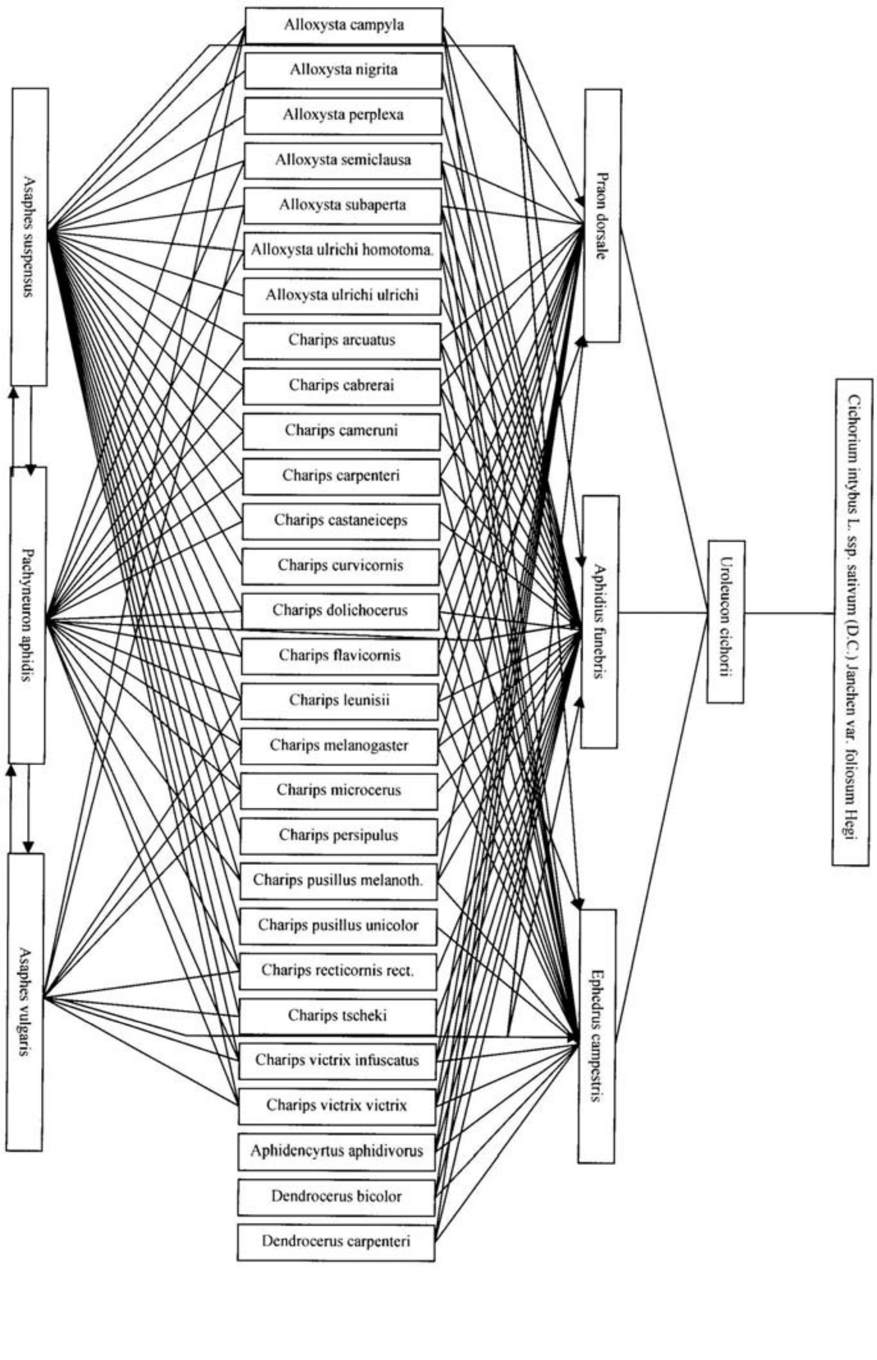

Figure 8. The parasitoid complex of the *Uroleucon cichorii* Koch. populations

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HYMÉNOPTÈRES PARASITOIDES QUI RESTREIGNENT L'ESPÈCE *ERIOPELTIS FESTUCAE* FONSCOLOMBE (COCCIDAE, HOMOPTERA) EN ROUMANIE

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The investigations were carried in the localitys Uzlina from the Danube Delta (Tulcea county), Breazu and Scobâlteni (Iaşi county). In total, 1138 females of *E. festucae,* 2443 specimens parasitoides and 1871 specimens predators were analysed. 16 species of parasitoides were identified of wich 12 species are primary parasitoides - *Trichomastus albimanus, Tr. cyaneus, Tr. cyanifrons, Metaphycus zebratus, M. melanostomatus, Baeocharis pascuorum, Discodes encopiformis, D. tamaricicola, Mayrencyrtus imandes, Coccophagus lycimnia (*females), *C. scutellaris and Fidiobia rugosifrons* -, and 5 species are secondary parasitoides - *Pachyneuron concolor, Macroneura vesicularis, Cerapterocerus pilicornis, Cheiloneurus paralia and C. lycimnia (males)*. Also, were identified three species of predators: *E. cretaceus, Hyperaspis campestris* and *Leucopis* sp. The total parasiting percentage were comprised between 9.3% in the locality Scobâlţeni and 45.5% Uzlina, 1991. The importants species was *Tr. albimanus, Tr. cyaneus and D. encopiformis*. In this complexe of entomophages I have registered 18 types of combinations of entomophages. The average number of eggs laid by a parasitoid into a female of *E. festucae* varied between 4.8 in the case of species *Tr. cyaneus* and 13.7 eggs in the species *D. encopiformis.* Though parasited, some females laid eggs. The reconings made have established that the parasiting caused the reduction of the prolificity 89.0% an average.

Mots clef: *Eriopeltis festucae,* complexe parasitaire, parasitoides, prédateurs, dominante, dynamique du vol, pourcentages de parasitisme, la prolificité.

Rezumat. Obseraţiile şi colectările de material s-au făcut în localităţile Uzlina (judeţul Tulcea), Scobâlteni et Breazu (judeţul Iaşi). În total am analizat 1138 femele de *E. festucae*, 2443 exemplare de parazitoizi şi 1871 examplare de prădători. S-au identificat 16 specii de parazitoizi din care 12 specii au fost parazitizi primari - *Trichomastus albimanus, Tr. cyaneus, Tr. cyanifrons, Metaphycus zebratus, M. melanostomatus, Baeocharis pascuorum, Discodes encopiformis, D. tamaricicola, Mayrencyrtus imandes, Coccophagus lycimnia (*♀♀), *C. scutellaris* şi *Fidiobia rugosifrons* -, 5 specii de parazitoizi secundari - *Pachyneuron muscarum, Macroneura vesicularis, Cerapterocerus pilicornis, Cheiloneurus paralia şi C. lycimnia* (♂♂) şi 3 specii de prădători - *Eunotus cretaceus, Hyperaspis campestris* et *Leucopis* sp. Procentajele totale de parazitare au fost fost cuprinse între 9,3 şi 45,5%, speciile importante fiind *Trichomastus albimanus, Tr. cyaneus et Discodes encopiformis.* Între prădători *E. cretaceus* şi *Leucopis* sp. au fost cele importante. În acest complex parazitar noi am înregistrat 18 tipuri de coparazitism. Deşi parazitate, unele femele de *E. festucae* au reuşit să depună ouă. Prolificitatea femelelor parazitate a fost diminuată în medie cu 89%.

Cuvinte cheie: *Eriopeltis festucae,* complex parazitar, parazitoid, prădător, dominant, dinamica zborului, procentaje de parazitare, la prolificitate.

Introduction

Eriopeltis festucae est un coccide qui produit des dégâts aux graminées spontanés surtout ceux de la steppe et de la sylvosteppe de la zone Paléarctique (TEREZNIKOVA, 1981). En Roumanie, nous l'avons trouvé sur *Agropyron repens*, fam. *Gramineae* dans les localités Uzlina (Delta du Danube) prés de Murighiol (département Tulcea), Scobâlţeni-Podu Iloaie et Breazu, département Iaşi. Chez Uzlina, *Agropyron repens* était dans un écosystème naturel, àScobâlţeni il y a un agroécosystème (verger de prunier) àBreazu un pâturage pour le bétail.

Matériel et méthodes

Les observations et les échantillonages du matériel (des feuilles ou des tiges avec des femelles sur elles) ont été fait dans les localités Uzlina durant 1986-1987 et 1991, Scobâlteni, 1988 et Breazu 1995 (Tab. 1). En total, on a analysé 1138 femelles d'*E. festucae,* 2443 exemplaires de parasitoides et 1871 exemplaires de prédateurs. La èfréquence d'attaque de ce ravageur a été très faible (à Uzlina 1987, de 500 exemplaires d'*A. repens* annalysées, seulement 3 étaient attaquées, chez Scobâlteni et Breazu plus faible). Les femelles collectées ont été isolées (une femelle dans une éprouvette), les éprouvettes ont été couvertes par des bouchons de cotton.

Tab. 1. Les localités et les dates d'échantillonage

Nr.	Localité	Date	Femelles analysées
1.	Uzlina	28.06.1986	184
2.	Uzlina	10.07.1987	490
3.	Uzlina	05.07.1991	90
4.	Scobâlteni	14.09.1988	257
5.	Breazu	09.08.1995	117

Résultats

En Roumanie, ce complexe parasitaire n'a pas été étudié jusqu'ànous. En total, nous avons obtenus 2443 exemplaires de parasitoides et 1871 exemplaires de prédateurs. On a identifié 16 espèces de parasitoides qui appartiennent à 5 famille de Superfam. *Chalcidoidea* et *Proctotrupoidea,* Ord. *Hymenoptera* et trois espèces de prédateurs. Parmi les espèces de parasitoides 12 sont parasitoides primaires, le reste parasitoides secondaires (Tab. 2).

Tab. 2. Le complexe des entomophages d'*Eriopeltis festucae*

Nr.	Espèce	Famille	Parasitoide		Prédateur
			primaire	secondaire	
	Suprafam. ***Chalcidoidea***				
		Pteromalidae			
1.	*Eunotus cretaceous* Walker				+
2.	*Pachyneuron concolor* Förster			+	
		Eupelmidae			
3.	*Macroneura vesicularis* Retzius			+	
		Encyrtidae			
4.	*Trichomastus albimanus* Thomson		+		
5.	*Trichomastus cyaneus* Dalman		+		
6.	*Trichomastus cyanifrons* Dalman		+		
7.	*Metaphycus zebratus* Mercet		+		

8.	*Metaphycus melanostomatus* Timberlake		+		
9.	*Cerapterocerus pilicornis* Thomson			+	
10.	*Cheiloneurus paralia* Walker			+	
11	*Baeocharis pascuorum* Mayr		+		
12.	*Discodes encopiformis* Walker		+		
13.	*Discodes tamaricicola* Sugonj. et Babaev		+		
14.	*Mayrencyrtus imandes* (Walker)		+		
		Aphelinidae			
15.	*Coccophagus lycimnia* Walker		+(♀♀)	+ (♂♂)	
16.	*Coccophagus scutellaris* Dalman		+		
	Suprafam. ***Proctotrupoidea*** - Fam. ***Platygastridae***				
17.	*Fidiobia rugosifrons* Crawford		+		
	Coleoptera **-** Fam. ***Coccinellidae***				
18	*Hyperaspis campestris* (Herbst)				+
	Diptera - Fam. ***Chamaemyidae***				
19.	*Leucopis sp.*				+

L'espèce *C. lycimnia* est un parasitoide primaire dans les larves secondaires de l'hôte, d'où apparaîtrons seulement des femelles. En même temps, *C. lycimnia* peut se comporter en parasitoide secondaire, dans les dernières stades de développement (larves ou pupes) des parasitoides primaires ou dans les larves et pupes de sa propre espèce; dans ce cas on obtiendra seulement des mâles. Ce phénomène a été étudié par Zinna 1961 qui l'a dénomé adelphoparasitisme obligé. Dans nôtre cas, *C. lycimnia* a été trouvée comme parasite primaire aussi dans les femelles de l'hôte (8 cas) lorsque celles-ci se trouvaient au début de la phase du développement.

En Europe, Kozar & Sugonjaev (1979) mentionent les entomophages de ce coccide pour Hongrie, Kosztarab & Kozar (1988) pour l'Europe Centrale et Diadeciko, (1950) cité par tereznikova, (1981) pour Ukraine (Tab 3).

Tab. 3. Les entomophages du coccide *Eriopeltis festucae* dans certain pays de l'Europe

Nr.	Espèce	Roumanie	Ukraine (1)	Hongrie (2)	Europe Centrale (3)
	Chalcidoidea				
1.	*Eunotus cretaceous*[b]	+			
2.	*Pachyneuron concolor*[a]	+		+	
3.	*Pachyneuron coccorum*[a]				+

4.	*Macroneura vesicularis*[a]	+			
5.	*Encyrtus hyalipennis*[a]		+		
6.	*Encyrtus cyanocephalus*[a]		+		
7.	*Trichomasthus albimanus*[a]	+		+	+
8.	*Tr. cyanifrons*[a]	+		+	+
9.	*Tr. cyaneus*[a]	+	+		+
10.	*Tr. frontalis*[a]				+
11.	*Subprionomitus cantabricus (festucae)*[a]		+		+
12.	*Cerchysius subplanus*[a]			+	+
13.	*Metaphycus parvus*[a]				+
14.	*M. zebratus*[a]	+			
15.	*M. melanostomatus*[a]	+			
16.	*Discodes encopiformis*[a]	+			+
17.	*D. tamaricicola*[a]	+			
18.	*Choreia maculate*[a]			+	+
19.	*Beocharis pascuorum*[a]	+	+	+	+
20.	*Cerapterocerus mirabilis*[a]		+	+	+
21.	*C. pilicornis*[a]	+			+
22.	*C. multiradiatus*[a]				+
23.	*Cheiloneurus paralia*[a]	+			
24.	*Mayrencyrtus imandes*[a]	+			
25.	*Coccophagus lycimnia*[a]	+			
26.	*C. scutellaris*[a]	+			+
27.	*C. rjabovi*[a]				+
28.	*Marietta picta*[a]			+	+
	Platygastridae				
29.	*Fidiobia rugosifrons*[a]	+			
	Coccinellidae				
30.	*Hyperaspis campestris*[b]	+	+	+	+
	Chamaemyidae				
31.	*Leucopis annulipes*[b]				+
32.	*L. vorax*[b]		+		+
33.	*L. szepligeti*[b]			+	+
34.	*L. silesiaca*[b]			+	
35.	*Leucopis sp.*[b]	+			
36.	*Nephys bipunctatus*[b]		+		+

(1) = d'après Diadeciko, (1950); (2) = d'après Kozar et Sugonjaev (1979); 3 = d'après Kosztarab et Kozar (1988); (a) = parasitoides; (b) = prédateurs;

En Roumanie, les principales espèces des parasitoides primaires ont été: *Trichomasthus albimanus, Discodes encopiformis* et *Trichomasthus cyaneus* (Tab. 4 et 5). Parmi les parasitoides secondaires, les plus importants ont été *Cerapterocerus pilicornis* et *Cheiloneurus paralia.* Chez Uzlina, *C. pilicornis* a réduit l'effectif de *D. encopiformis* de 4,3% en 1987 et de 4,4% en 1991. *Ch. paralia,* en même localité, a réduit l'effectif de *D.*

encopiformis de 3,9% en 1987, et de 2,3% en 1991, celui de *Tr. albimanus* avec 1,1% en 1986 et celui de *Tr. cyaneus* avec 1,7% en 1986.

Tab. 4. L'abondance et la dominance des entomophages d' *Eriopeltis festucae* dans la localité Uzlina

Nr.	Espèce	1986		1987		1991	
		A	D	A	D	A	D
		Parasitoides primaires					
1.	*Discodes encopiformis*	0	0	1060	68,0	42	12,6
2.	*Trichomasthus albimanus*	188	65,3	310	19,9	209	62,8
3.	*Trichomasthus cyaneus*	59	20,5	92	5,9	72	21,6
4.	*Coccophagus scutellaris*	0	0	42	2,7	0	0
5.	*C. lycimnia* (♀♀)	0	0	12	0,8	8	2,4
6.	*Mayrencyrtus imandes*	0	0	34	2,2	0	0
7.	*Trichomasthus cyanifrons*	24	8,3	2	0,1	0	0
8.	*Metaphycus zebratus*	14	4,9	6	0,4	0	0
9.	*Fidiobia rugosifrons*	3	1,0	0	0	0	0
10.	*Discodes tamaricicola*	0	0	0	0	2	0,6
	Total	288		1558		333	
		Parasitoides secondaires					
11.	*Cerapterocerus pilicornis*	0		51	41,5	2	
12.	*Cheiloneurus paralia*	3		46	37,4	1	
13.	*Coccophagus lycimnia* (♂♂)	0		25	20,3	2	
14.	*Macroneura vesicularis*	0		1	0,8	0	
	Total	3		123		5	
15.	*Eunotus cretaceus*(b)	819		818		195	
16.	*Hyperaspis campestris*(b)	0		2		0	

(b) = prédateur

Tab. 5. L'abondance et la dominance des entomophages d' *Eriopeltis festucae* dans les localités Scobâlteni et Breazu

Nr	Espèce	Scobâlteni		Breazu	
		A	D	A	D
		Parasitoides primaires			
1.	*Trichomastus albimanus*	39	69,6	53	86,9
2.	*Baeocharis pascuorum*	12	21,4	2	3,3
3.	*Trichomastus cyaneus*	4	7,1	2	3,3
4.	*Coccophagus scutellaris*	0	0	2	3,3
5.	*Trichomastus cyanifrons*	0	0	1	1,6
6.	*Metaphycus zebratus*	0	0	1	1,6
7.	*Metaphycus melanostomatus*	1	1,8		
	Total	56		61	
		Parasitoides secondaires			
8.	*Coccophagus lycimnia* (mâles)	3		8	
9.	*Pachyneuron concolor*	1		3	

10.	*Cheiloneurus paralia*			1	
	Total	4		12	
11.	*Leucopis sp.* [(b)]	37			

(b) = prédateur

Parmi les prédateurs, les plus importants ont été: *Eunotus cretaceus* pour Uzlina et *Leucopis* sp. pour Scobâlteni.

En ce qui concerne le nombre des oeufs déposés par une espèce d'entomophage dans une femelle d'*E. festucae,* celui-ci a été compris entre 4,8 en moyenne pour *Tr. cyaneus* et 13,7 pour *D. encopiformis,* le plus grand nombre etant 35 pour *D. encopiformis* (Tab. 6).

Tab. 6. Le nombre des oeufs déposés par les principales espèces d'entomophages dans une femelle d'*E. festucae*

Nr.	Espèce	*E. festucae* analysées (nr)	Oeufs déposés par des entomophages (nr.)		
			min.	max.	moyen
1.	*Discodes encopiformis*	74	1	35	13,7
2.	*Eunotus cretaceus*	161	1	26	7,3
3.	*Trichomastus albimanus*	67	1	13	5,2
4.	*Trichomastus cyaneus*	18	1	14	4,8

De plus, dans une femelle d'*E. festucae* peuvent cohabiter des espèces du même rang (coparasitisme) ou des rangs différents. Voila pourquoi dans le même exemplaire de femelle d'*E. festucae* nous avons rencontré 18 types de combinaisons des entomophages, dont chez Uzlina les plus fréquentes ont été les suivantes: *Tr. albimanus + E. cretaceus, Tr. albimanus + Tr. cyaneus, Tr. cyaneus + E. cretaceus* et *D. encopiformis + E. cretaceus* (Tab. 8*).*

En même temps à Uzlina, dans les années 1986, 1987 et 1991, nous avons suivi la dynamique du vol chez les espèces *Tr. albimanus, Tr. cyaneus, D. encopiformis et E. cretaceus*. Les premières 3 espèces volent en juillet, mais la dernière, deux semaines plus tard (Tab. 7).

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Tab. 7. La dynamique du vol chez les principales espèces d'entomophages d'*Eriopeltis festucae* (%)

Date du vol	*Tr. albimanus*			*Tr. cyaneus*			*D.e.*	*E. cretaceus,*		
	1986	1987	1991	1986	1987	1991	1987	1986	1987	1991
06 juillet	34,6									
10 juillet	41,5			6,9						
12 juillet	18,0			70,7						
16 juillet			27,6							
18 juillet	5,6	20,3	58,8	19,0	17,1		7,1			
19 juillet			13,6	5,2						
20 juillet		53,8			34,3		34,2			
21 juillet						48,5				
22 juillet		25,9			48,6		56,8			

23 juillet						37,9				
24 juillet							1,9			
29 juillet						13,6				5,6
01 août									2,9	
02 août										25,1
03 août								16,8		
05 août									23,3	17,9
07 août								45,0		
09 août								25,5	57,2	31,8
14 août								12,7	16,5	
25 août										19,6
nr. exem-plaires	188	301	199	58	70	66	1060	760	788	179

D.e. = D. encopiformis

En ce qui concerne l'efficacité, les poucentages totaux de parasitisme ont été compris entre 9,3% à Scobâlțeni et 45,5% à Uzlina, en 1991. Chez Uzlina, les pourcentages totaux ont eu des valeurs proches (entre 33,1% en 1986 et 45,5% en 1991) (Tab. 8). La grande difference entre les pourcentages de parasitisme enregistrés à Uzlina et ceux enregistrés à Scobâlțeni et Breazu est expliquée par le type d'écosystème - chez Uzlina il y a un écosystème naturel où l'influence anthropique est presque absente, à Scobâlțeni c'est un agro-écosystème où on applique des traitements chimiques mais à Breazu il y avait un pâturage pour le bétail. Parmi les espèces de parasitoides, à Uzlina les plus efficaces ont été *Tr. albimanus, Tr. cyaneus* et *D. encopiformis*, à Scobâlteni et Breazu *Tr. albimanus* (Tab. 8).

Tab. 8. L'efficience des entomophages pour des femelles d' *E. festucae*

Nr.	L'élément analysé	Uzlina			Scobâlteni	Breazu
		1986	1987	1991	1988	1995
	Femelles analysées (nr)	184	490	90	257	117
	Femelles parasitées (%)	33,1	41,5	45,5	9,3	16,2
	dont ont été parasitées par: (%)					
1.	*Discodes encopiformis*	0	12,0	2,2	0	0
2.	*Tichomastus albimanus*	9,8	7,3	17,8	6,2	12,8
3.	*Trichomastus cyaneus*	1,6	4,3	11,1	0,4	0
4.	*Coccophagus lycimnia*	0	1,4	1,1	0,4	0
5.	*Mayrencyrtus imandes*	0	0,6	0	0	0
6.	*Trichomasthus cyanifrons*	0	0,2	0	0	0,9
7.	*Coccophagus scutellaris*	0	0,4	0	0	0,9
8.	*Metaphycus zebratus*	0	0,2	0	0	0,9
9.	*Metaphycus melanostomatus*	0	0	0	0,4	0
10.	*Baeocharis pascuorum*	0	0	0	0,2	0
11.	*Tr. albimanus + E. cretaceus*[(b)]	15,8	3,3	5,6	0	0
12.	*Tr. albimanus + Tr. cyaneus*	0,5	0,2	2,2	0	0,9
13.	*Tr. albimanus + D. encopiformis*	0	0,4	0	0	0

14.	*Tr. albimanus* + *C. scutellaris*	0	0,2	0	0	0
15.	*Tr. albimanus* + *D. encopiformis* + *E. cretaceous*(b)	0	0,4	0	0	0
16.	*Tr. albimanus* + *Tr. cyaneus* + *E. cretaceus* (b)	0	0,4	1,1	0	0
17.	*Tr. albimanus* + *D. encopiformis* + *Tr. cyaneus* + *E. cretaceus*(b)	0	0,2	0	0	0
18.	*Tr. cyaneus* + *E. cretaceus*(b)	3,3	0,6	2,2	0	0
19.	*D. encopiformis* + *E. cretaceus*(b)	0	5,9	1,1	0	0
20.	*D. encopiformis* + *Tr. cyaneus*	0	0,4	0	0	0
21.	*E. cretaceous*(b) + *M. imandes*	0	0,2	0	0	0
22.	*E. cretaceous*(b) + *C. scutellaris*	0	0,2	0	0	0
23.	*E. cretaceous*(b) + *Tr. cyanifrons*	1,1	0	0	0	0
24.	*E. cretaceous*(b) + *M. zebratus*	0,5	0	0	0	0
25.	*E.cretaceus*(b) + *Fidiobia rugosifrons*	0,5	0	0	0	0
26.	*D. tamaricicola* + *D. encopiformis*	0	0	1,1	0	0
27.	*Tr. albimanus* + *Leucopis*(b) *sp.*	0	0	0	0,8	0
28.	*C. lycimnia* (mâles) + *Leucopis*(b) *sp.*	0	0	0	0,8	0
29.	Femelles dont le parasite a volé en nature	0	2,7	0	0	0
30.	Femelles tuées par *E. cretaceus*(b)	35,9	16,3	15,6	0	0
31.	Femelles tuées par *Leucopis* sp.(b)	0	0	0	14,4	0

(b) = prédateur

L'efficience des prédateurs est aussi significative, comparable àcelle des parasitoides. Ainsi, à Uzlina, *E. cretaceus,* seule, a tué entre 15,6% des femelles d'*E. festucae* en 1991 et 33,1% en 1986, *Leucopis* sp. à Scobâlteni a tué 14,4%.

Quoique parasitées, certaines femelles d'*E. festucae* réussissent à déposer des oeufs, mais leur prolificité est pourtant vivement affectée. Le nombre des oeufs déposés est en corrélation positive avec le nombre d'exemplaires de parasitoides qui se développent dans une femelle. Si le parasitoide dépose l'oeuf dans la femelle lorsque celle-ci se trouve au début du développement, elle est tuée et elle n'arrive plus àdéposer des oeufs. On a calculé l'amoindrissement de la fécondité des femelles comme résultat du parasitisme à l'aide de la relation:

$$D_{(\%)} = 100 - (X_p \,.\, 100)/X_{np} \quad \text{où}$$

$D_{(\%)}$ - le pourcentage de l'amoindrissement de la fécondité;

X_p - la fécondité moyenne des femelles parasitées;
X_{np} - la fécondité moyenne des femelles nonparasitées;

On a analysée la prolificité de 50 femelles parasitées et de 50 femelles nonparasitées. Chez les femelles nonparasitées la prolificité a été comprise entre 1873 et 4264 oeufs, la moyenne étant de 3108. Chez les parasitées, la prolificité a été comprise entre zéro et 1528 oeufs, la moyenne étant de 308. Le parasitisme a diminué la prolificité des femelles d'*E. festucae* en moyenne avec 89,0%.

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COMPLEXES PARASITAIRES DE QUELQUES ESPÈCES DE DIASPIDIDES (HOMOPTERA, DIASPIDIDAE) EN ROUMANIE

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Nous présentons ici les complexes parasitaires de *Lepidosaphes ulmi*, *Quadraspidiotus perniciosus*, *Q. gigas* et *Q. ostreaeformis*, les espèces importantes et les pourcentages de parasitisme.
L. ulmi (♀♀) a été collectée de neuf localités de Delta du Danube (Doboudja) et de deux localités de la Moldavie. En total nous avons analysé 4024 exemplaires de parasitoïdes et on a identifié les espèces: *Zaomma lambinus*, *Epitetracnemus zetterstedtii*, *Aphytis mytilaspidis*, *Physcus testaceus*, *Marietta picta* et Proctotrupoidea. L’espèce importante a été *A. mytilaspidis*.
Q. perniciosus (♀♀) a été collectée sur de pommier de trois localités de département Iasi et de deux localités de département Vaslui. En total nous avons analysé 2162 exemplaires de parasitoïdes et on a identifié les espèces: *Zaomma lambinus*, *Aphytis proclia*, *Aphytis mytilaspidis*, *Pteroptrix dimidiate, Archenomus longicornis*, *Coccophagoides similis* et *Thysanus ater*. L’espèce importante a été *A. proclia*.
Q. gigas (♀♀) a été collectée sur de peuplier de la zone industrielle de Iasi. En total nous avons analysé 2517 exemplaires de parasitoïdes et on a identifié les espèces: *Zaomma lambinus*, *Aphytis proclia*, *Archenomus longicornis*, *Archenomus bicolor*, *Azotus atomon* et *Coccophagoides similis*. Les espèces importantes ont été *A. longicornis* et *C. similis*.
Q. ostreaeformis (♀♀) a été collectée sur de prunier en deux localités des départements Botosani et Iasi et sur de *Prunus spinosa* de localité Hanu Conachi (département Galati). En total nous avons analysé 82 exemplaires de parasitoïdes et on a identifié les espèces: *Aphytis mytilaspidis*, *Archenomus longicornis* et *Coccophagoides similis*. L’espèce importante a été *Aph. mytilaspidis*

Mots-clefs: Roumanie, complexe parasitaire, parasitoïde, le poucentage de parasitisme, l’espèce importante

Rezumat. **Complexele parazitare ale unor specii de diaspidide (Homoptera, Diaspididae) în România**. Prezentăm complexele parazitare la patru specii de Diaspidide (*Lepidosaphes ulmi*, *Quadraspidiotus perniciosus*, *Q. gigas* şi *Q. ostreaeformis*), speciile importante şi procentajele de parazitare.
L. ulmi (♀♀) a fost colectat din nouă localităţi din Delta Dunării şi din 2 localităţi din Moldova. In total au fost analizate 4.024 exemplare de parazitoizi şi au fost identificate speciile: *Zaomma lambinus*, *Epitetracnemus zetterstedtii*, *Aphytis mytilaspidis*, *Physcus testaceus*, *Marietta picta* şi Proctotrupoidea. Specia importantă a fost *A. mytilaspidis*.
Q. perniciosus (♀♀) a fost colectat de pe măr din 3 localităţi din judeţul Iaşi şi din 2 localităţi din judeţul Vaslui. In total au fost obţinute şi analizate 2.162 exemplare de parazitoizi şi au fost identificate speciile: *Zaomma lambinus*, *Aphytis proclia*, *Aphytis mytilaspidis*, *Pteroptrix dimidiate, Archenomus longicornis*, *Coccophagoides similis* şi *Thysanus ater*. Specia importantă a fost *A. proclia*.
Q. gigas (♀♀) a fost colectat de pe plop din zona industrială a oraşului Iaşi. În total au fost analizate 2.517 exemplare de parazitoizi şi au fost identificate speciile: *Zaomma lambinus*, *Aphytis proclia*, *Archenomus longicornis*, *Archenomus bicolor*, *Azotus atomon* şi *Coccophagoides similis*.
Q. ostreaeformis (♀♀) a fost colectat de pe prun din două localităţi din judeţele Botoşani, Iaşi şi de pe porumbar de la Hanu Conachi-Galaţi. In total au fost obţinute şi analizate 82 de exemplare de parazitoizi şi au fost identificate speciile: *Aphytis mytilaspidis*, *Archenomus longicornis* şi *Coccophagoides similis*.

Cuvinte cheie: România, complex parazitar, parazitoid, procentaje de parazitare, specie importantă.

Introduction

En Roumanie, les dispidies *Lepidosaphes ulmi, Qadraspidiotus perniciosus, Q. gigas* et *Q. ostreaeformis* sont des ravageurs importants et produisent des dégâts notamment aux arbres fruitiers, mais aussi aux arbres décoratifs.

Matériel et methods

Les observations et les échantillonages du matériel (des branches des arbres avec des femelles de Diaspidides) ont été éffectués dans les départements Botoşani, Iaşi, Neamţ, Vaslui, Galaţi et Tulcea.

Les branches avec des femelles de Diaspidides sont mises dans des bocaux (une branche en longueur de 10-15 cm dans un vaisseau) qui ont été couverts puis par un tissu serré. Les parasitoïdes ont été ramassés périodiquement et sont mis en alcool éthylique 80% dans des éprouvettes.

Résultats

***Lepidosaphes ulmi* Linne et son complexe parasitaire**

Lepidosaphes ulmi est répandu surtout dans les pays tempérées de tous les continents (Kosztarab et Kozar, 1988). En Roumanie, il est répandu partout, de la zone de plaine jusque dans la montagne (Săvescu, 1982). Elle est polyphage, parmi les arbres fruitiers, en Roumanie attaque plus fréquant le pommier, parmi les arbres décoratifs notamment le peuplier et le saule (Săvescu, 1982).

Les observations et les collectages du matériel ont été éffectués durant 1982-1996 en neuf endroits de Delta du Danube et dans deux localités de la Moldavie (Bîrgăoani-Neamţ et Iaşi). Les espèces des plantes attaquées ont été *Salix caprea L., Populus sp., Hypophae rhamnoides L.* et *Tilia sp.* (Tab. 1).

Tab. 1. Les localités de collectages de l'espèce *L. ulmi*

Nr.	Localité	Département	Date	Plante hôte
1.	Murighiol	Tulcea	08.09.1982	*Salix caprea*
2.	Murighiol	Tulcea	06.10.1982	*Salix caprea*
3.	Murighiol	Tulcea	03.06.1983	*Salix caprea*
4.	Periprava	Tulcea	20.08.1993	*Populus sp*
5.	Periprava	Tulcea	18.09.1994	*Populus sp*
6.	Canal Madgearu	Tulcea	20.06.1993	*Salix caprea*
7.	Matiţa	Tulcea	17.09.1993	*Salix caprea*
8.	Sfîntu Gheorghe	Tulcea	12.08.1994	*Hypophae rhamnoides*
9.	Portiţa	Tulcea	20.08.1994	*Salix caprea*
10.	Bisericuţa	Tulcea	21.08.1994	*Salix caprea*
11.	Km – 54	Tulcea	22.08.1994	*Salix caprea*
12.	Periteaşca	Tulcea	22.08.1994	*Salix caprea*
13.	Bîrgăoani	Neamţ	17.08.1992	*Salix caprea*
14.	Iaşi	Iaşi	19.08.1996	*Tilia sp.*

En Roumanie dans ce complexe parasitaire Boţoc, 1965 mentionne trois espèces: *Pachyneuron solitarium* Hart., *Pteroptrix occidentalis* Silvestri & Mercet et *Metaphycus zebratus* Mercet. En ce qui nous concerne de toutes les localités et de tous les années nous avons analysé 4024 exemplaires de parasitoïdes et on a identifié les espèces: *Zaomma lambinus* (Walker), *Epitetracnemus zetterstedtii* (Westwood), (fam. *Encyrtidae), Aphytis mytilaspidis* Le Baron, *Physcus testaceus* Masi, *Marietta picta* André (fam. *Aphelinidae*) et *Proctotrupoidea.*

Dans la République de la Moldavie Goanţă şi colab.(1974) menionnent quatre espèces (Tab. 2) en temps que pour l'Europe Kosztarab et Kozar (1988) mentionnent les espèces: *Anagyrus matritensis* (Mercet), *Epitetracnemus zetterstedtii* (Westwood), *Habrolepis dalmani* (Westwood), *Zaomma lambinus*, *Aphytis abnormis* Howard, *A. caucasiscus* Tschumakova, *A. diaspidis* Howard, *A. moldavicus* Jasnosh, *A. mytilaspidis* Le Baron, *A. proclia* (Walker), *Archenomus maritimus* Nikolskaja, *Aspidiotiphagus citrinus* Craw, *Coccophagus insidiator* Dalman, *C. parvipennis* Ferriere, *Coccophagoides similis* Masi, *Eusemion cornigerum* (Walker), *Hispaniella longiclava* Nikolskaja, *H. lauri* Mercet et *Physcus testaceus* Masi.

Tab. 2. Le complexe parasiraire de *Lepidosaphes ulmi* en Roumanie, Rép. de la Moldavie et Europe Centrale

Nr.	Espèce	Roumanie	Rép. Moldave (3)	Europe Centrale(4)
1.	*Pachyneuron solitarium*	+(1)		
2.	*Zaomma lambinus*	+(2)		+
3.	*Epitetracnemus zetterstedtii*	+(2)	+	+
4.	*Aphycus zebratus*	+(1)		
5.	*Anagyrus matritensis*			+
6.	*Habrolepis dalmani*			+
7.	*Encyrtidae sp.*	+(2)		
8.	*Aphytis mytilaspidis*	+(2)	+	
9.	*Aphytis abnormis*			+
10.	*Aphytis caucasicus*			+
11.	*Aphytis diaspidis*			+
12.	*Aphytis moldavicus*			+
13.	*Aphytis mztilaspidis*			+
14.	*Aphytis proclia*		+	
15.	*Archenomus maritimus*			+
16.	*Aspidiotiphagus citrinus*			+
17.	*Coccophagus insidiator*			+
18.	*Coccophagus parvipennis*			+
19.	*Coccophagoides similis*			+
20.	*Eusemion cornigerum*			+
21.	*Hispaniella longiclava*			+
22.	*Hispaniella lauri*			+
23.	*Physcus testaceus*	+(2)	+	+
24.	*Marietta picta*	+(2)		
25.	*Pteroptrix occidentalis*	+(1)		
26.	*Proctotrupoidea*	+(2)		

(1) = après Boțoc 1965; (2) = identifiées par l'auteur; (3) = après Goanță et col. 1974; (4) = après
Kosztarab et Kozar 1988

Dans nos recherches parmi les parasitoïdes primaires *Aphyts mytilaspidis* a été l'espèce dominante dans tous les échantillons, parmi les parasitoïdes secondaires *Zaomma lambinus* (Tab. 3).

Tab. 3. L'abondance des parasitoïdes du complexe parasitaire de *L. ulmi*

Localité	Date colectării	Parasitoïdes primaires						Parasitoïdes secondaires	
		A. m	*E. z*	*Ph.t*	*Prct*	*Enc*	Total	*Z. l*	*M.p*
Murighiol	08.09.1982	369	2	0	0	1	372	71	1
Murighiol	06.10.1982	236	0	0	0	0	236	39	0
Murighiol	03.06.1983	180	0	0	2	0	182	2	0
Periprava	20.08.1993	156	5	15	0	1	177	36	15
Periprava	18.09.1994	57	3	6	0	0	66	12	1
Canal Madgearu	20.06.1993	46	0	0	0	0	46	1	0
Matița	17.09.1993	294	1	0	0	0	295	15	0
Sf.Gheorghe	12.08.1994	48	4	3	0	0	55	79	3
Portița	20.08.1994	84	0	0	0	0	84	3	0
Bisericuța	21.08.1994	193	0	0	0	0	193	8	0
Km – 54	22.08.1994	60	0	0	0	0	60	9	0
Periteașca	22.08.1994	1306	5	0	16	0	1327	578	0
Bîrgăoani	17.08.1992	37	1	0	0	0	0	0	0
Iași	19.08.1996	18	0	0	0	0	0	0	0

A. m. = A. mytilaspidis; Enc. = Encyrtidae sp.; E. z. = E. zetterstedtii; Ph. t. = Ph. testaceus; Proct. = Proctotrupoidea; Z.l. = Z. lambinus

En ce qui cocerne l'efficacité des parasitoïdes les pourcentages totaux de parasitation se trouvent entre
3,2% à Murighiol en 1983 et 39,3% à Periprava en 1993. Sur espèce de parasitoïdes plus efficace a été *A. mytilaspidis* qui a parasité entre 3,0% dans les échantillons de Murighiol en 1983 et 35,2% pour Periprava en 1993 (Tab. 4).

Tab. 4. La parasitation de *L. ulmi*

Localitaté	Date de collectage	Femelles					
		analysées (nr)	parasitées (%)				
			Total	dont ont été parasitées par: (%)			
				A. m.	*E. z.*	*Ph. t.*	autres sp.
Murighiol	08.09.1982	317	17,4	17,0	0,3	0	0
Murighiol	06.10.1982	265	16,6	16,6	0	0	0
Murighiol	03.06.1983	437	3,2	3,2	0	0	0
Periprava	20.08.1993	349	39,5	35,2	0,9	3,2	0,3
Periprava	18.09.1994	501	12,8	12,1	0,2	0,4	0
Canal Madgearu	20.06.1993	437	3,7	3,7	0	0	0
Matița	17.09.1993	323	17,0	16,7	0,3	0	0
Sf. Gheorghe	12.08.1994	465	4,0	3,6	0,2	0,2	0
Portița	20.08.1994	410	11,5	11,3	0,3	0	0
Bisericuța	21.08.1994	367	5,7	5,7	0	0	0
Km – 54	22.08.1994	290	4,8	4,8	0	0	0
Periteașca	22.08.1994	466	16,7	16,2	0	0	0,4

Bîrgăoani	17.08.1992	237	6,3	5,9	0,4	0	0
Iaşi	19.08.1996	183	4,4	4,4	0	0	0

A.m. – A. mytilaspidis; *E.z. – E. zeterstedtii*; *Ph.t. – Ph. testaceus*;

Le pou de San José (*Quadraspidiotus perniciosus* Comstock) et son complexe parasitaire

Le pou de San José (*Quadraspidiotus perniciosus*) est un ravageur cosmopolite qui produit des dégâts importants dans les pays de la zone tempérée et méditérranéene (Balachowsky et Mesnil 1935).

En Roumanie, il est répandu partout, étant un important ravageur du pommier où produit des colonies sur l'écorce des branches et de tronc (Săvescu, 1982).

Des études concernant le complexe parasitaire de ce coccide ont été effctuées partout dans le monde. En Roumanie des études similaires ont été effctuées par Rogojanu (1955) en Transylvanie qui mentionne deux espèces de parasitoïds *(Aphytis proclia* Walker et *Aphytis mytilaspidis* Le Baron), Boţoc (1965) qui pour la même zone mentionne trois espèces (*Archenomus maritimus* Nikolskaja, *Pteroptrix dimidiata* Westwood et *Thysanus ater* Walker) et Andriescu et Sauciniţanu (1972-1973) qui pour les zones sous-carpathique et montagneuse de la Moldavie mentionnent sept espèces: *Zaomma lambinus* Walker*, Metaphycus hederaceus* Westw., *Aphytis proclia, A. aonidiae* Mercet*, A. moldavicus* Jasnosh*, Ahytis sp.* et *Thysanus ater* (Tab. 5).

Nous avons collecté des branches de pommier avec des femelles de *Q. perniciosus* de deux localités du départment Vaslui (le verger de pommier Crâng, près de Bârlad en 2001 et le verger de pommier Tutova en 1995, 1996) et de trois localités du départment Iaşi (Bucium 1982, Scobâlţeni 1997 et Iaşi-Jardin Botanique en 2003, 2004).

En total nous avons analysé 2.162 exemplaires de parasitoïds (Tab. 6, 7) et on a identifié sept espèces:
Zaomma lambinus (fam. Encyrtidae), *Aphytis proclia*, *A.phytis mytilaspidis*, *Pteroptrix dimidiata*, *Archenomus longicornis* Nikolskaja, *Coccophagoides similis* Masi (fam. Aphelinidae) et *Thysanus ater* (fam. *Thysanidae*).

En Europe le complexe parasitaire de ce ravageur comprend 28 espèces (Erdös 1964, Ferrière 1965, Nikolskaja et Jasnosh 1966, Domenichini 1969, Blahutiak 1987, Kosztarab et Kozar 1988) (Tab. 5).

Tab. 5. Le complexe parasitaire de pou de San José en certain pays de l'Europe

Nr crt	Espèce	RO (1)	RM (2)	Fed. Rusă (3)	H (4)	Europea (5)
1.	*Zaomma lambinus*	+			+	
2.	*Arrenophagus chionaspidis* Aurivillius			+		+
3.	*Aphytis proclia*	+	+	+	+	+
4.	*A. maculicornis* (Masi)			+		
5.	*A. mytilaspidis*	+	+	+	+	+
6.	*A. aonidiae*	+		+		
7.	*A. moldavicus*	+	+			
8.	*Pteroptrix dimidiata*	+			+	+
9.	*P. chinensis* (Howard)			+		

10	*P. maritima* Nikolskaja			+	+	
11.	*Archenomus maritimus* (Nikolskaja)	+		+	+	
12.	*A. bicolor* Howard					+
13.	*A. longicornis* (Nikolskaja)	+	+	+		+
14.	*Hispaniella lauri* (Mercet)			+		+
15.	*Aspidiotiphagus citrinus* (Craw)			+		+
16.	*Coccophagoides similis*	+		+		
17.	*Physcus testaceus* Masi					+
18.	*Prospaltella fasciata* Malenotti			+		+
19.	*P. aurantii* (Howard)			+		+
20.	*P. perniciosi* Tower			+		+
21.	*Azotus atomon* (Walker)			+		+
22.	*Thysanus ater*	+			+	
23.	*T.* (sin *Chartocerus*) *subaeneus* (Förster)					+
24.	*Polynema fulmecki* Soyka				+	
25.	*Erythmelus goochi* Enock					+
26.	*E. gracilis* (Howard)				+	
27.	*Anagrus atomus* (Linné)					+

(1) – après Rogojanu 1955, Boţoc 1965, Andriescu şi Saucinițanu 1972-1973, Moglan 2004; (2) – après Goanță & col 1974; (3) – après Nikolskaja & Jasnosh 1966; (4) – après Erdös 1964, Kozar & Sugonjaev 1979 et Kosztarab & Kozar 1988; (5) – après Domenichini 1969, Ferrière 1965 et Blahutiak 1987; RO-Roumanie; RM-Rep. Moldove; H-Hongrie

Dans nos recherches, dans tous les échantillons, dans tous les localités et dans tous les années l'espèce dominante a été *A. proclia* (Tab. 6 et Tab. 7).

Tab. 6. L'abondance et la dominance des parasitoïdes de *Q. perniciosus* dans les localités Bârlad et Tutova

Espèce	Bârlad								Tutova			
	17.7.2001		22..8.2001		29.8.2001		29.9.2001		18.9.1995		29.8.1996	
	A	D	A	D	A	D	A	D	A	D	A	D
Aphytis proclia	32	91,4	86	95,6	168	91,8	134	89,9	1150	99,6	230	97,5
C. similis	1	2,9	1	1,1	5	2,7	3	2,0	2	0,2	6	2,5
A. mytilaspidis			2	2,2	1	0,6	4	2,7	2	0,2		
Z. lambinus					2	1,1	5	3,4				
P. dimidiata	2	5,7	1	1,1	3	1,6						
Thysanus ater					4	2,2	3	2,0				
Total	35		90		183		149		1154		236	

Tab. 7. L'abondance et la dominance des parasitoïdes de *Q. perniciosus* dans les localités Bucium, Scobâlţeni et Iaşi

	Bucium		Scobâlţeni		Iaşi			
Espèce	18.6.1982		11.6.1997		20.08.2003		15.06.2004	
	A	D	A	D	A	D	A	D

Aphytis proclia	218	79,7	37	97,5	178	97,3	81	97,6
Coccophgoides similis	43	15,5	1	2,5	3	1,6	2	2,4
Aphytis mytilaspidis	8	2,9	0	0				
Zaomma lambinus	6	2,2			2	1,1		
A. longicornis	2	0,7						
Total	277		38		183		83	

En ce qui concerne l'efficacité des parasitoïds, les pourcentages totaux de parasitations ont eu, en général de faibles valeurs, étant comprises entre 4% à Scobâlțeni (1997) et 11,7% à Bucium (1982) (Tab. 8).

Tab. 8. Les pourcentages de parasitation de *Q. perniciosus*

Nr	Localitaté	Date	Aspects investigués		
			♀♀ analysées (nr)	♀♀ parasité es (%)	dont parasitées par *A. proclia* (%)
1.	Bârlad	17.7.2001	142	4,2	4,1
2.	Bârlad	22.8.2001	171	9,3	8,8
3.	Bârlad	29.8.2001	157	6,7	6,4
4.	Bârlad	29.9.2001	208	11,5	11,1
5.	Tutova	18.9.1995	267	5,2	4,9
6.	Tutova	29.8.1996	116	7,2	6,4
7.	Bucium	18.6.1982	317	11,7	9,5
8.	Scobîlțeni	11.6.1997	97	4,0	4,0
9.	Iaşi	20.8.2003	122	8,6	8,4
10.	Iaşi	15.6.2004	73	5,5	

La plus efficace a été l'espèce *A. proclia* qui a parasité entre 4,0% de femelles de *Q. perniciosus* (Scobîlțeni) et 11,1% (Bâlad, 2001) (Tab. 8).

Andriescu et Sauciniţanu 1972-1973 mentionnent pour l'espèce *A. proclia* dans la zone sous-carpathique de la Moldavie le pourcentage de parasitisme de 18,5%.

Quadrasidiotus gigas Thiem et Gerneck et son complexe parasitaire

En Roumanie se trouve plus fréquent dans les zones de steppe et sylvosteppe (Săvescu**,** 1982). Ce ravageur attaque surtout le peuplier, mais aussi le saule et le tilleul où produit des colonies de 30-40 femelles/cm^2 sur l'écorce des branches et du tronc.

Les observations et les collectages de matériel ont été fait dans la zone industrielle de Iaşi pendant les années 1979, 1980, 1982 et 1983.

En total nous avons analysé 2.517 exemplaires de Hyménoptères parasitoïdes et on a identifié les espèces:

Zaomma lambinus (Walker) (fam. *Encyrtidae)*, *Aphytis proclia* Walker, *Archenomus longicornis* Nikolskaja, *Archenomus bicolor* Howard, *Azotus atomon* Masi şi *Coccophagoides similis* Masi (fam. *Aphelinidae)*. Les espèces

A. proclia, *C. similis*, *A. longicornis* et *A. bicolor* sont de parasitoïdes primaires, le reste parasitoïdes secondaires.

Parmi les parasitoïdes primaires, dans les années 1979, 1980 et 1982 dominante nettement a été *A. longicornis* mais en 1983 *C. similis* (Tab. 9).

En Europe Schmutterer (1959), Nikolskaja M.N. et Jasnosh (1966), Trjapitzin (1978) et Kosztarab et Kozar (1988) mentionnent dans ce complexe parasitaire les espèces: *Comperiella bifasciata* Howard, *Metaphycus duplus* Tshumakova, *Trichomasthus dissimilis* Tshumakova, *Zaomma lambinus* (fam. Encyrtidae), *Aphytis mytilaspidis* Le Baron, *Archenomus caucasicus* Jasnosh, *A. longicornis*, *A. maritimus* Nikolskaja, *Aspidiotiphagus citrinus* Craw, *Azotus atomon* Walker, *Coccophagoides similis*, *Hispaniella lauri* Mercet, *Prospaltella gigas* Tshumakova, *Pteroptrix dimidiata* Westwood et *Pt. maritimus* (fam. Aphelinidae).

Tab. 9. L'abondance et la dominance des parasitoïdes de *Q. gigas*

Nr	Specia	1979		1980		1982		1983	
		A	D	A	D	A	D	A	D
	Parasitoïdes primaires								
1.	*Archenomus longicornis*	308	83,9	73	89,0	1215	96,4	0	0
2.	*Coccophagoides similis*	51	13,9	9	11,0	37	2,9	42	95,5
3.	*Aphytis proclia*	6	1,6	0	0	2	0,2	2	4,5
4.	*Archenomus bicolor*	2	0,5	0	0	6	0,5	0	0
	Total	367		82		1260		44	
	Parasitoïdes secondaires								
5.	*Azotus atomon*	417	60,8	5	83,3	55	91,6	8	66,7
6.	*Zaomma lambinus*	269	39,2	1	16,7	5	8,3	4	33,3
	Total	686		6		60		12	

Dans nos échantillons les pourcentages totaux de parasitations ont été compris entre 47,5% en 1980 et 61,1% en 1983 (Tab. 10).

Tab. 10. Les pourcentages de parasitations chez *Q. gigas* dans la localitaté Iaşi

Aspects analysés	1979	1980	1982	1983
Femelles analysées (nr)	574	118	357	59
Femelles parasitées (%)	60,8	47,5	57,4	61,1
dont parasitées par:				
Archenomus longicornis	59,9	44,5	56,3	0
Coccophagoides similis	0,5	0	0	59,3

A. longicornis est l'espèce importante, en parasitant entre 0% de femelles en 1983 et 59,9% en 1979 (Tab. 10).

Quadraspidiotus ostreaeformis Curtis et son complexe parasitaires

C'est une espèce commune en Europe, se trouve aussi dans le nord de l'Afrique, Moyen Orient, Nouvelle Zéelande, Australie, l'Amerique du Sud et de Nord (Kosztarab et Kozar 1988).

En Roumanie, il est répandu de la zone de plaine jusqu'à la zone de hêtre. Ce ravageur attaque nettement le prunier (Săvescu, 1982).

Nous l'avons trouvée sur le prunier dans les localités Broscăuți (département Botoşani) en 1982, Bucium (département Iaşi) en 1983 et sur le *Prunus spinosa* dans la localité Hanu Conachi (département Galați) en 1995.

Nous avons analysé, en total, 82 exemplaires de parasitoïdes et on a identifié trois espèces de la fam. *Aphelinidae (Chalcidoidea)*: *Aphytis mytilaspidis* (Le Baron), *Archenomus longicornis* Nikolskaja et *Coccophagoides similis* Masi.

En Europe, Schmutterer (1959), Nikolskaja M.N. et Jasnosh (1966), Trjapitzin (1978), Kosztarab et Kozar (1988) mentionnent dans ce complexe parastaire les espèces: *Anagyrus schmuttereri* Ferrière, *A. schoenherri* (Westwood), *Zaomma lambinus* Walker (fam. Encyrtidae), *Aphytis bovelli, A. mytilaspidis* Le Baron, *A. testaceus, Archenomus caucasicus* Jasnosh, *A. longicornis* Nikolskaja, *A. maritimus* Nikolskaja, *A. bicolor* Howard, *Azotus atomon* Walker, *A. celsus* Walker, *A. marchali* Howard, *A. pinifoliae* Mercet, *A. pulcherrimus* Mercet, *Coccophagoides similis* (Masi), *Hispaniella lauri* Mercet, *Prospaltella aurantii* Howard, *P. gigas* Tshumakova, *Pteroptrix dimidiata* Westwood (fam. Aphelinidae) et *Thysanus ater* Walker (fam. Thysanidae).

Dans toutes les localités l'espèce dominante a été *A. longicornis* (Tab. 11).

Tab. 11. L'abondance et la dominance des parasitoïdes de *Q. ostreaeformis*

Nr.	Specia	Localitatea					
		Broscăuți 1983		Bucium 1982		Hanu Conachi 1995	
		A	D	A	D	A	D
1.	*Archenomus longicornis*	8	88,8	17	77,2	47	92,1
2.	*Aphytis mytilaspidis*	1	11,2	5	22,7	3	5,9
3.	*Coccophagoides similis*					1	2,0
	Total	9		22		51	

Les pourcentages de parasitisme ont eu de faibles valeurs, moins de 5% de femelles de *Q. ostreaeformis* ont été parasitées (Tab. 12)

Tab. 12. Les pourcentages de parasitations chez *Q. ostreaeformis*

Aspects analysés	Bucium 1982	Hanu Conachi 1995
Femelles analysées (nr)	127	200
Femelles parasitées (%)	3,9	4,5

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Lucrările Simpozionului „*Entomofagii şi rolul lor în păstrarea echilibrului natural*”
Universitatea „Al.I. Cuza” Iaşi, 2008

LIMITING BIOTIC FACTORS WITHIN *BRACHYCAUDUS CARDUI* L. COLONIES

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Abstracts. In 2007, we collected several hundred of mummies from *Brachycaudus cardui* L. colonies installed on plants of *Carduus acanthoides* L. and *Onopordum acanthium* L. which are founded in sand Dunes Reserve from Agigea (buffer-area). There have been identified 23 parasitoid insect species which belonging to 11 genera and following families: *Aphidiidae, Charipidae, Encyrtidae, Megaspilidae* and *Pteromalidae*. All of them are from *Hymenoptera* Order.
There have been elucidated aspects concerning to trophic relationships between species and we have realized a trophic network designed to illustrate these relationships. To be able to investigate the role of some important species in limiting of *Brachycaudus cardui* colonies, we made a synecological analysis concerning to few indexes (abundance, constancy, dominance and ecological significance index).

Keywords: parasitoids, hyperparasitoids, mummies, aphids, trophic relationships, buffer-system.

Rezumat. În anul 2007 am colectat câteva sute de mumii din colonii de *Brachycaudus cardui* L. instalate pe plante de *Carduus acanthoides* L. şi *Onopordum* acanthium L din rezervaţia de dune de la Agigea (zona tampon). Au fost identificate 23 de specii de insecte parazitoide care aparţin la 11 genuri încadrate în familiile Aphidiidae, Charipidae, Encyrtidae, Megaspilidae şi Pteromalidae din ordinul Hymenoptera.
Au fost elucidate relaţiile trofice dintre specii şi a fost concepută o reţea trofică pentru a ilustra aceste relaţii. Pentru a putea urmări rolul principalelor specii în limitarea coloniilor de *Brachycaudus cardui* am făcut o analiză sinecologică urmărind abudenţa, constanţa, dominanţa şi indicele de semnificaţie ecologică a acestora.

Keywords: parazitoizi, hiperparazitoizi, mumii, afide, relaţii trofice, sistem tampon.

Introduction

The aphid colonies are constantly accompanied by a series of entomophagous insects limiting their populations. We investigated the complex of parasitoid insects which act within *Brachycaudus cardui* L. colonies installed on *Carduus acanthoides* and *Onopordon acanthium* plants from buffer-area of sand Dunes Reserve of Agigea.

The large number of parasitoid species is impressive. They have been identified during our researches. Those species act as primary, secondary, tertiary and even quaternary parasitoids.

Trophic relationships between these species are very complex and, because of them, we could understand the role of parasitoid insects in keeping the natural equilibrium. The fact that the parasitoid species fail to limit *Brachycaudus cardui* colonies it could be explained through the disequilibrium caused by human beings and their uncontrolled use of chemical weapons.

Material and methods

The researches were realized in buffer-area from Marine Dunes Reserve of Agigea, where there are found *Carduus acanthoides* L. and *Onopordon acanthium* L. plants that populate some ruderal systems.

Ecological observations were realized referring to the aphid colonies and we collected hundreds of mummies formed by aphid species. Mummies were investigated in laboratory conditions and there were obtained adults of parasitoid insects which are involved in limiting the aphid populations. To elucidate some aspects of trophic relationships between parasitoid species, we made dissections on some of mummies which were collected, and we analyzed carefully the exuviae remained within mummies after parasitoid eclosed. Thus, we have identified species of parasitoid insects which act as primary, secondary, tertiary and even quaternary parasitoids.

To establish the role of each species in limiting the *Brachycaudus cardui* populations, we realized a synecological analysis concerning to a few indexes of parasitoid species (abundance, constancy, dominance and ecological significance index).

Results and conclusions

During our researches, we have collected 716 mummies of *Brachycaudus cardui* which were investigated in laboratory conditions. Out of all those mummies, 51 were sacrificed in order to elucidate trophic relationships between species and the parasitic degree of these parasitoids. Out of 665 mummies, 23 species of parasitoid insects hatched, belonging to 11 genera and 5 families (Table 1):

Aphidiidae family: 1. *Aphidius matricariae* Hal., 2. *A. picipes* (Nees), 3. *A. rosae* Hal., 4. *Ephedrus persicae* Froggott, 5. *E. plagiator* (Nees.), 6. *Lysiphlebus ambiguus* (Hal.), 7. *L. fabarum* (Marsh.), 8. *Paralipsis enervis* (Ness), 9. *Lipolexis gracilis* Förster.

Charipidae family: 10. *Alloxysta nigreta* (Thmos.), 11. *A. semiclausa* Kieff, 12. *A. subaperta* Kieff, 13. *Charips arcuatus* (Kieff.), 14. *Ch. carpenteri* (Kieff), 15. *Ch. leunisii* Hartig., 16. *Ch. minutus* (Hartig.), 17. *Ch. victrix victrix* Westw.

Encyrtidae family: 18. *Syrphophagus aphidivorus* Mayr.

Megaspilidae family: 19. *Dendrocerus aphidum* Rondani, 20. *D. bicolor* (Kieff), 21. *D. carpenteri* Curtis.

Pteromalidae family: 22. *Asaphes vulgaris* Walk., 23. *Pachyneuron aphidis* (Bché.).

In Figure 1, we present trophic relationships established between parasitoid species, which act in the colonies of *Brachycaudus cardui*. As we could see, 9 species of *Aphidiidae* family act as primary parasitoids. The actions of these species together realized a major limitation of these aphid populations. When we talk about aphid colonies installed on *Carduus acanthoides* and *Onopordon acanthium* plants, we could consider that they would be very important ,because they live in spontaneous ruderal ecosystems. This aspect is only apparent, because the species *Brachycaudus cardui* attacks some tree species (*Cerasium avium* and *Prunus domestica*) and it causes significant damages.

The *Asaphes vulgaris* and *Pachyneuron aphidis* species act as tertiary parasitoids, but, it depends on the number of hosts and the presence of parasitoid insects can act as secondary or even quaternary parasitoids. That, because between these species may be established parasitic relationships. Acting as secondary, tertiary or quaternary parasitoids, these species function as a real buffer-systems within parasitoid biocoenoses. The pattern of actions depending on biomass quantity, which is available for female and their eggs. Basically, they prefer a species which offers the greatest number of individuals. Precisely, this buffer-system controls the stock of populations within this complex, so that no one species may develop an exponential multiplication.

If we presume that we try to realize a biological control of *Brachycaudus cardui* species, this could be made through artificial rearing of few parasitoid species in laboratory conditions. In this context, we realize that their efficiency would be very quickly reduced and even cancelled through the actions of secondary and tertiary parasitoids.

Reviewing this situation in terms of human interest, in such biocoenotic complex, it is not beneficial, because of humans who classify the insects into harmful and useful species. If these aspects are reviewed based on these information, than we have to identify some interesting mechanisms which can be the basis of keeping the natural equilibrium between normal limits.

We made a synecological analysis concerning to parasitoid species which limit *Brachycaudus cardui* populations. This was necessary to understand the contribution of each species to reduce the aphid populations (Table 2).

Depending on the values of the abundance index, we registered that, the first is *Lysiphlebus faborum* species (164 individuals), followed by *L. ambiguus* species (128 individuals), *Syrphophagus aphidivorus* (98 individuals) and *Pachyneuron aphidis* (39 individuals). The first two species are primary parasitoid and *Syrphophagus* is secondary parasitoid. In the same context, *Pachyneuron* can act as secondary, tertiary and even quaternary parasitoid. The first three species act as eudominant and euconstant species and they have a very high value of ecological significance (W_5). *Pachyneuron aphidis* is dominant and constant specie with a lower value of the ecological significance index (W_3). It follows subdominant species, one is recedent and the rest of them are subrecedent. *Alloxysta subaperta* and *Charips leunisii* species acting as euconstant and subdominant species, but they have a lower value of the ecological significance index (W_2 and W_3). Some species are constant (5), followed by accessory species (5) and accidental species (6).

If we analyse the ratio between the parasitoid species (Figure 2), we registered that not all species have the same significance within this biocoenotic complex.

If we realize an analysis from economic point of view based on human interests, we find out that this ratio between species is not too advantageous. Only two of those primary parasitoid species have a significant presence and they could be considered eudominant, euconstant , being a species with a high ecological significance. They are followed by two hyperparasitoid species which remain certain present. And so on, primary parasitoids are followed by secondary or tertiary parasitoids.

Regarding to nature economy, things seem to be quite common. The ratio between species is proved by functioning of a self-regulation, which allows exponential development of species.

Conclusions

Based on researches realized in 2007 within the buffer-area of sand Dunes Reserve of Agigea, we elucidated some aspects concerning to parasitoid insect complex which limit *Brachycaudus cardui* L. populations installed on *Carduus acanthoides* L. and *Onopordon acanthium* L. plants.

There were identified 23 parasitoid species belonging to 11 genera and the following families: *Aphidiidae, Charipidae, Encyrtidae, Megaspilidae* and *Pteromalidae*, from *Hymenoptera* Order.

We have elucidated the trophic relationships between parasitoid species and we designed a trophic network, very relevant in this regard. In order to assess the contribution of each species to limit *Brachycaudus cardui* populations we have made a synecological analysis concerning to few indexes (abundance, constancy, dominance and the index of ecological significance).

The trophic network is particularly complex,and the existence of tertiary parasitoids (*Pachyneuron aphidis* and *Asaphes vulgaris*), which may act as secondary and quaternary parasitoids, demonstrate the function of a self-regulation mechanism (buffer-system) which does not allow exponential development of a species .

Knowing **the** parasitoid complex limiting the populations of *Brachycaudus cardui* present a special significance because this species attacks some cultivated plant species ,too (as, *Cerasium avium* and *Prunus domestica*).

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Table 1. Parasitoid complexul from *Brachycaudus cardui* (L.) colonies

No.	Specie	*Carduus acanthoides*				*Onopodum acanthium*					
		08.06.2007	11.06.2007	14.06.2007	19.06.2007	08.06.2007	11.06.2007	14.06.2007	19.06.2007		
1.	*Aphidius matricariae*	5	-	9	-	-	11	6	-	31	4.66
2.	*Aphidius picipes*	-	3	-	2	2	-	-	-	7	1.05
3.	*Aphidius rosae*	7	2	-	4	1	4	-	9	27	4.0
4.	*Ephedrus persicae*	-	3	-	-	-	-	2	1	6	0.90
5.	*Ephedrus plagiator*	2	5	-	8	-	7	-	1	23	3.45
6.	*Lipolexis gracilis*	-	2	-	-	1	2	-	-	5	0.75
7.	*Lysiphlebus ambiguus*	7	5	11	12	14	19	5	21	128	15.24
8.	*Lysiphlebus fabarum*	19	27	32	16	15	8	27	20	164	24.66
9.	*Paralipsis enervis*	2	-	1	-	-	-	-	-	3	0.45
10.	*Alloxysta nigrita*	-	2	-	-	-	-	-	2	4	0.50
11.	*Alloxysta semiclausa*	4	-	3	4	-	7	3	2	23	3.45
12.	*Alloxysta subaperta*	5	3	1	-	4	6	2	2	23	3.45
13.	*Charips arcuatus*	1	-	3	3	-	2	4	2	15	2.25
14.	*Charips carpenteri*	-	2	3	-	-	-	-	-	5	0.75
15.	*Charips leunisii*	4	5	-	3	7	2	4	1	26	3.90
16.	*Charips minutus*	-	-	-	1	-	1	-	-	2	0.30
17.	*Charips victrix victrix*	-	3	5	-	7	2	8	3	28	4.21
18.	*Syrphophagus aphidivorus*	12	10	5	17	6	9	15	21	98	14.73
19.	*Dendrocerus aphidum*	-	2	-	-	3	-	-	-	5	0.75
20.	*Dendrocerus bicolor*	2	-	-	1	-	-	1	-	4	0.60
21.	*Dendrocerus carpenteri*	-	-	-	1	-	1	-	-	2	0.30
22.	*Asaphes vulgaris*	3	2	5	4	-	-	1	-	17	2.55
23.	*Pachyneuron aphides*	11	9	3	-	2	-	7	7	39	5.86
	TOTAL									685	

Table 2. Synecological analysis of the parasitoid insect species which act within *Brachycaudus cardui* colonies

No.	Specie	Abundance	Dominance		Constancy		Index of ecological significance	
1.	*Lysiphlebus fabarum*	164	24.66	D_5	100	C_4	24.66	W_5
2.	*Lysiphlebus ambiguus*	128	15.24	D_5	100	C_4	15.24	W_5
3.	*Syrphophagus aphidivorus*	98	14.73	D_5	100	C_4	14.73	W_5
4.	*Pachyneuron aphidis*	39	5.86	D_4	75	C_3	4.39	W_3
5.	*Aphidius matricariae*	31	4.66	D_3	50	C_2	2.33	W_3

6.	*Charips vitrix vitrix*	28	4.21	D_3	75	C_3	3.15	W_3
7.	*Aphidius rosae*	27	4.00	D_3	75	C_3	3.00	W_3
8.	*Charips leunisii*	26	3.90	D_3	87	C_4	3.39	W_3
9.	*Ephedrus plagiator*	23	3.45	D_3	62	C_3	2.13	W_3
10.	*Alloxysta semiclausa*	23	3.45	D_3	25	C_1	0.86	W_2
11.	*Alloxysta subaperta*	23	3.45	D_3	87	C_4	0.86	W_2
12.	*Asaphes vulgaris*	17	2.55	D_3	75	C_3	1.91	W_3
13.	*Charips arcuatus*	15	2.25	D_3	75	C_3	1.68	W_3
14.	*Aphidius picipes*	7	1.05	D_2	37	C_2	0.38	W_2
15.	*Ephedrus persicae*	6	0.90	D_1	37	C_2	0.33	W_2
16.	*Lipolexis gracilis*	5	0.75	D_1	37	C_2	0.27	W_2
17.	*Charips carpenteri*	5	0.75	D_1	25	C_1	0.18	W_2
18.	*Dendrocerus aphidum*	5	0.75	D_1	25	C_1	0.18	W_2
19.	*Alloxysta nigrita*	4	0.60	D_1	25	C_1	0.15	W_2
20.	*Dendrocerus bicolor*	4	0.60	D_1	37	C_2	0.22	W_2
21.	*Paralipsis enervis*	3	0.45	D_1	25	C_1	0.11	W_2
22.	*Charips minutus*	2	0.30	D_1	25	C_1	0.07	W_1
23.	*Dendrocerus carpenteri*	2	0.30	D_1	25	C_1	0.07	W_1
	TOTAL	685						

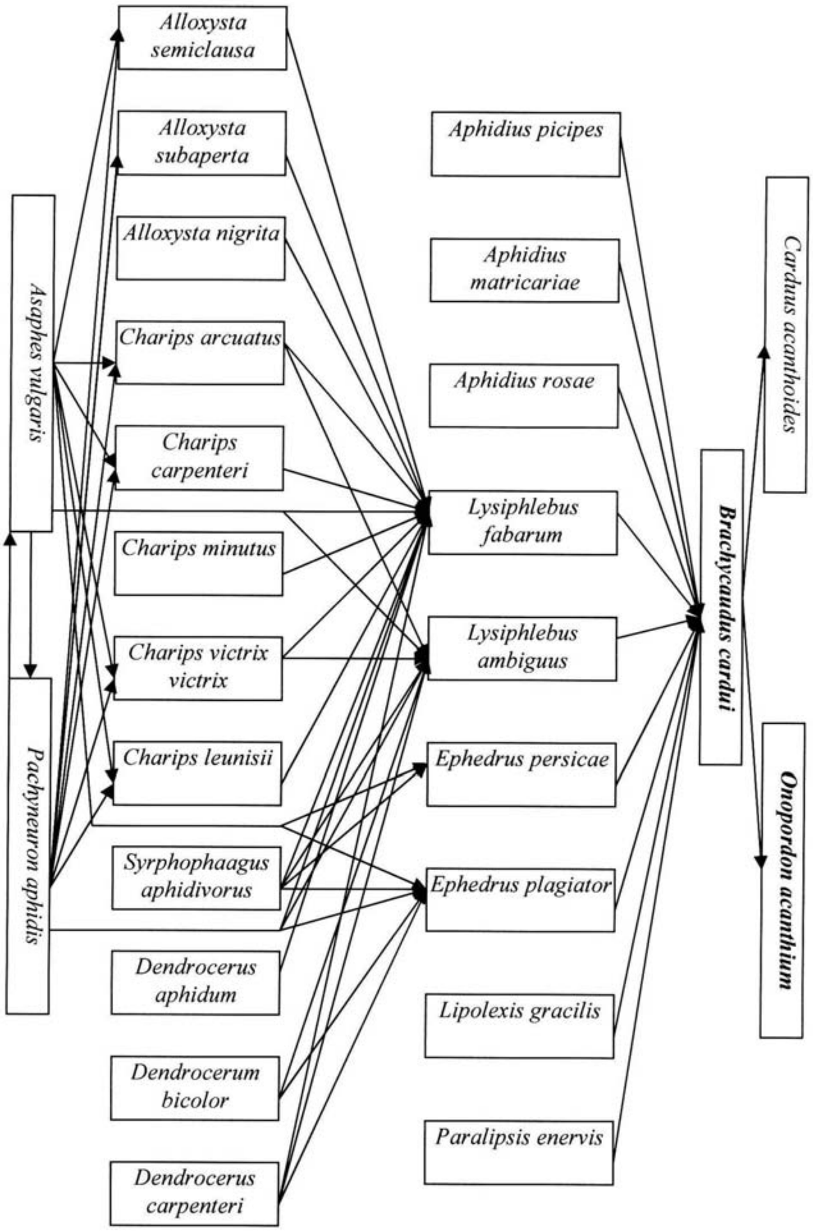

Fig. 1. Trophic network which is specific for *Brachicaudus cardui* colonies

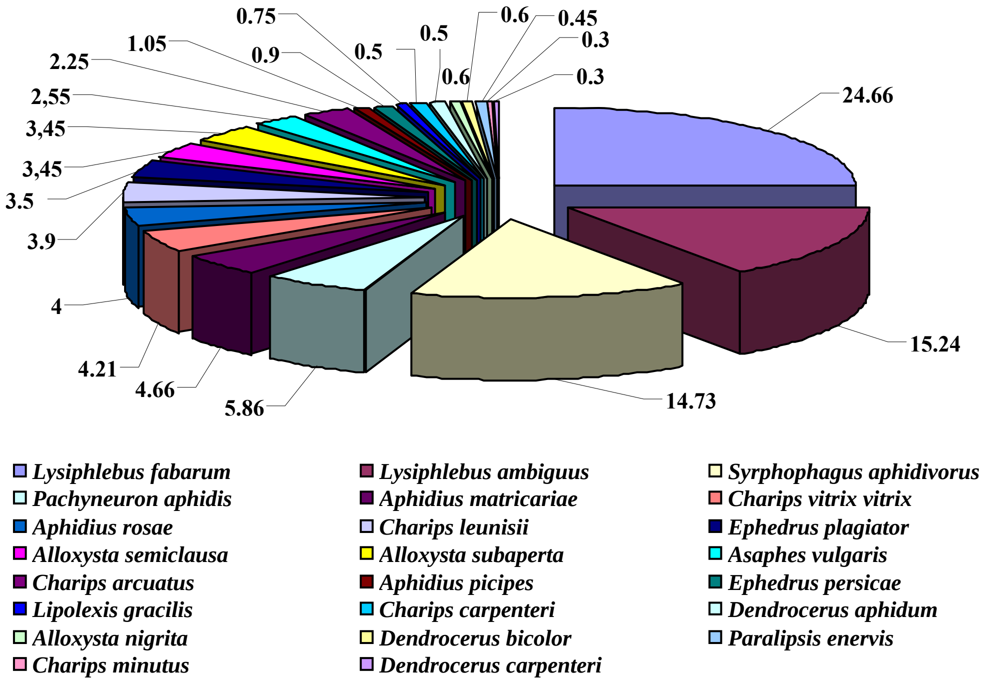

Fig. 2. Ratio between parasitoid species

PARASITOID COMPLEXES WHICH ACT IN MACROSIPHUM ROSAE L. COLONIES (HOMOPTERA. APHIDIDAE) ON PLANTS OF THE GENUS ROSA FROM THE DUNES RESERVE OF AGIGEA

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Abstracts. During 2006-2008 we have investigated parasitoids complex controlling *Macrosiphum rosae* L. populations installed on some plants of the genus Rosa from the Reserve of dune plants of Agigea (most of plants are in buffer-area). There were identified 24 parasitoid species which are included in 9 genera and 5 families.
To elucidate all trophic relationships between parasitoid species we have designed a trophic network very relevant in this concern. There have been identified different types of parasitoids (primary. secondary. tertiary and even quaternary). To appreciate the role of each species within this biocoenotic complex in limiting the *Macrosiphum rosae* L. populations. we realized a synecological analysis where we investigated few indexes (abundance. constancy. dominance and the ecological significance index).

Key words: nature. natural equilibrium. imbalance. ecosystem. biocoenosis.

Rezumat. În perioada 2006-2008 am urmărit complexul de parazitoizi care controlează populaţiile de *Macrosiphum rosae* L. instalate pe unele plante care aparţin genului *Rosa* din Rezervaţia de plante de dune de la Agigea (cele mai multe plante fiind în zona tampon). Au fost identificate 24 de specii parazitoide care sunt încadrate în 9 genuri şi 5 familii.
Pentru a elucida relaţiile trofice dintre speciile parazitoide am conceput o reţea trofică edificatoare în acest sens. Au fost identificate diferite tipuri de parazitoizi (primari, secundari, terţiari şi chiar cuaternari). Pentru a aprecia rolul fiecărei specii din cadrul acestui complex biocenotic în limitarea populaţiilor de *Macrosiphum rosae* L. am efectuat o analiză sinecologică în care am urmărit: abundenţa, constanţa, dominanţa şi indicele de semnificaţie ecologică.

Key words: natură, echilibru natural, dezechilibru, ecosistem, biocenoză.

Introduction

The Reserve of Dunes from Agigea is situated at the Marine Biological "Prof. Ioan Borcea" Scientific Resort. which belongs to “Alexandru Ioan Cuza" University of Iaşi. It was legislated as reserve in 1939. and. it has a special importance for the endemic rare and very rare plants living in this territory.

Besides lawns of *Ephedra dystachia*. *Convolvulus persicus* and *Alissum borzeanum*. here are growing few other spontaneous plants (during 1970-1990). These last of them are not characteristic for a biotope of marine dunes. In the buffer-area and inside of the Resort territory we found plants of the *Rosae canina* species and some varieties of roses (*Rosa* spp.). These *Rosa* plants are attacked by *Macrosiphum rosae* L.. which presented often large colonies. especially on both top of young twigs and floral buds.

Through their presence. *M. rosae* colonies attract many entomophagous insect species which control their existence.

We investigated the complex of parasitoid species acting inside the colonies of this aphid.

Material and Methods

During 2006-2008. we collected *Macrosiphum rosae* L. mummies produced by different *Aphidiidae* species. There are two types of mummies: one produced by *Praon* species which is characterized by the fact that its larvae make its cocoon under host-aphid. that they catch it with silky threads; and. other mummies produced by other types of aphids. which place their cocoons inside the host. The body of host is not deformed. but. it becomes mate and easily to be recognized.

The mummies were collected. separated and investigated in laboratory conditions.

To elucidate the trophic relationships between parasitoid species. we made dissections of some mummies and investigated their content. Those activities were necessary to determine, according to remained exuviae, the parasitism degree of that parasitoid. To illustrate the trophic relationships between parasitoid species we realized a trophic network. very relevant in this regard. We did a synecological analysis of parasitoid species used to appreciate the role of each species in limiting *M. rosae* populations. In this context. we have done research referring to a few indexes (abundance. constancy. dominance and the index of ecological significance).

Results and discussion

During our researches. there were collected 1162 mummies. From 1121 of mummies eclosed the same number of adults (Table 1). Some other mummies were investigated to elucidate trophic relationships. and from others have not eclosed parasitoids.

From all those 1121 mummies have eclosed individuals belonging to 24 parasitoid species. There were obtained primary. secondary. tertiary and even quaternary parasitoids. as follows:

Primary parasitoids

Aphidiidae family: 1. *Aphidius ervi* Haliday. 2. *A. rosae* Haliday. 3. *Ephedrus plagiator* (Nees). 4. *Praon volucre* (Haliday);

Secondary parasitoids:

Charipidae family: 5. *Charips brevicornis* (Kieff.). 6. *Ch. dolichocerus* (Cam.). 7. *Ch. flaviceps* (Kieff.). 8. *Ch. flavicornis* (Hartig). 9. *Ch. fracticornis* (C.G. Thoms.). 10. *Ch. leunisii* (Hartig.). 11. *Ch. perpussilus* (Kieff.). 12. *Ch. victrix victrix* (Westw.). 13. *Ch. xanthocerus* (C.G. Thoms.). 14. *Alloxysta campilla* Kieff.. 15. *A. nigrita* (C.G. Thoms.). 16. *A. semiclausa* Kieff.. 17. *A. subaperta* Kieff.;

Encyrtidae family : 18. *Syrphophagus aphidivorus* Mayr;

Megaspilidae family: 19. *Dendrocerus aphidum* (Rondani). 20. *D. bicolor* (Kieff.). 21. *D. carpenteri* (Curtis);

Tertiary parasitoids:

Pteromalidae family: 22. *Asaphes suspensus* Walk.. 23. *Asaphes vulgaris* Walk. 24. *Pachyneuron aphidis* (Bché). Those two species could act as secondary parasitoid. too. Also. the fact that they are parasitic on one another. it means that they can act as quaternary parasitoids.

In Figure 1. we present the trophic relationships between parasitoids. As primary parasitoids act only four aphid species. However. *Aphidius ervi* Hal. has the highest number of individuals. and it is followed by *Praon volucre* Hal. The good action of primary parasitoids is reduced by the influence of a large number of secondary parasitoids. More than 17 secondary parasitoid species put together their actions to reduce the primary parasitoid populations. As we can observe . here act few tertiary parasitoids (such as. *Asaphes vulgaris* Walk.. *A. suspensus* Walk. and *Pachyneuron aphidis* Bché.). These species seem to have a positive role. because they reduce the secondary parasitoid populations and encourage the primary parasitoids. The trophic relationships become more complicated because of tertiary parasitoids which may act as secondary and even as quaternary parasitoids. Many ecological values allow them to act as a buffer-system even within this biocoenotic complex. These species prefer not only certain species. but they act based on the number of larvae offered to them as host. Thus. the species with the biggest number of individuals are most parasited. So. the buffer-system limits the exponential development of some species. This is the mechanism of self-regulation of parasitoid biocoenoses. The buffer-system which act within parasitoid biocoenoses present a special role regarding to maintain a natural balance in those certain biocoenoses. Also. we can not understand these aspects. if we do not look at the trophic relationships between species based on nature economy and no human economy.

Regarding to the nature economy. all species have similar value within biocoenoses. only people divided species in useful or harmful species. depending on the interests of human economy.

Based on Table 2. we can deduct the role of each species within this biocoenotic complex. Based on the analysis of the abundance index. we could see that *Aphidus ervi* has the highest number of individuals (181). and it is followed by *Syrphophagus aphidivorus* with 58 individuals and *Pachyneuron aphidis* with 131 individuals. Referring to the presence of parasitoid species in *M. rosae* colonies. we observe that: 9 species are euconstant. 5 species are constant. 6 species are accessories and 3 species are accidental. The analysis of the dominance index makes evident that: 5 species are eudominant. only two species are dominant and 3 species are subdominant. 5 species are recedent and 9 species are subrecedent. The analysis of the ecological significance index make evident that: 3 species have maximum value (W_5). 4 species have medium value (W_4). 4 species have another medium value (W_3) and most of them have lower values.

The number of parasitoid species which act within *M. rosae* colonies is impressive. Even if species do not have the same value in this biocoenotic complex by parasitoid type. they put together their actions and realize the integrity of the entire system.

In Figure 2 we present the ratio between parasitoid species to have the right image of their presence within *M. rosae* colonies.

Analyzing the complex of species acting within *M. rosae* colonies. we recognize that we are talking about a parasitoid biocoenosis which works like a biological system well outlined.

Conclusions

During 2006-2008 we realized researches referring to the complexes of parasitoid species acting on the *Macrosiphum rosae* L. populations installed on some plants belonging to the genus *Rosa* from the Dunes Reserve of Agigea. The attacked plants are situated in the buffer-area of the Dunes Reserve.

There were identified 24 parasitoid species from 9 genera and 5 families. Parasitoid species act as primary. secondary. tertiary or even quaternary parasitoids. To elucidate those trophic relationships between the species of biocoenotic complex. we have to realize a trophic network very relevant in this regard.

To realize a correct analysis concerning to the role of each species in limiting of *Macrosiphum rosae* populations. we made a synecological study of few indexes (abundance. constancy. dominance and ecological significance).

The obtained data are arguments for our conclusion that this kind of parasitoid complex forms certain parasitoid biocoenoses. This is a concept that we want to explain during several decades.

Table 1. Parasitoid complex of *Macrosiphum rosae* colonies from the species of the genus Rosa – Dune Reserve of Agigea

No	Place and data	*Aphidis ervi*	*Aphidius rosae*	*Ephedrus plagiator*	*Praon volucre*	*Charips brevicornis*	*Charips dolichocerus*	*Charips flaviceps*	*Charips fracticornis*	*Charips flavicornis*	*Charips leunisii*	*Charips perpussilus*	*Charips victrix victrix*	*Charips xanthocerus*	*Alloxysta campyla*	*Alloxysta nigrita*	*Alloxysta subaperta*	*Alloxysta semiclausa*	*Syrphophagus aphidivorus*	*Dendrocerus aphidum*	*Dendrocerus bicolor*	*Dendrocerus carpenteri*	*Asaphes suspensus*	*Asaphes vulgaris*	*Pachyneuron aphidis*	
1	26.05. 2006	7	-	15	4	2	-	-	2	-	7	-	5	-	-	-	-	-	8	-	-	1	3	8	7	69
2	30.05. 2006	15	8	4	12	-	1	-	-	1	3	-	8	-	1	-	3	-	11	-	-	-	2	11	9	89
3	14.06. 2006	-	7	3	3	1	-	2	2	-	9	-	3	-	1	-	5	-	21	1	-	3	-	5	11	77
4	21.06. 2006	9	-	11	18	1	2	-	-	1	-	2	-	3	-	2	-	-	6	-	1	-	2	1	17	76
5	14.05. 2007	18	11	5	-	-	6	-	1	-	2	-	2	-	2	-	6	-	14	-	-	2	1	4	6	80
6	18.06. 2007	26	6	-	12	3	-	2	-	3	1	2	1	2	-	2	2	2	3	1	2	-	1	7	23	101
7	23.06. 2007	-	22	-	8	-	-	-	1	-	3	-	1	-	1	-	8	1	21	-	-	-	1	15	20	102
8	28.06. 2007	12	8	19	7	2	-	-	-	2	5	1	1	1	-	1	-	-	23	-	-	1	-	2	15	103
9	27.05. 2008	18	15	6	13	-	3	-	3	-	11	1	4	1	3	-	1	3	6	1	-	1	3	-	4	97
10	08.06. 2008	31	-	5	16	-	-	1	-	1	-	-	6	-	3	-	2	1	15	-	1	-	1	2	-	85

11	14.06. 2008	10	-	17	9	2	4	1	-	-	6	-	1	-	-	-	1	-	12	-	-	4	2	1	2	72
12	21.06. 2008	21	7	23	11	4	-	-	-	-	9	1	-	-	1	-	-	-	10	-		1	1	4	4	97
13	30.06. 2008	14	9	8	5	-	-	-	-	1	2	-	5	-	-	-	3	-	8	-	-	-	1	7	13	76
		181	93	116	118	15	16	6	9	9	58	7	37	7	12	5	31	7	158	3	4	13	18	67	131	1121
	%	16.14	8.29	10.34	10.52	1.33	1.42	0.53	0.80	0.80	4.72	0.62	3.30	0.62	1.07	0.44	2.76	0.62	14.09	0.26	0.35	1.15	1.60	5.97	11.68	

Table 2. Synecological analysis of parasitoid species from *Macrosiphum rosae* L. colonies

No.	SPECIE	Abundance	Constancy		Dominance		Index of ecological significance	
1	*Aphidius ervi*	181	84	C_4	16.14	D_5	13.55	W_5
2	*Syrphophagus aphidivorus*	158	100	C_4	14.09	D_5	14.09	W_5
3	*Pachyneuron aphidis*	131	92	C_4	11.68	D_5	10.74	W_5
4	*Paron volucre*	118	92	C_4	10.52	D_5	9.67	W_4
5	*Ephedrus plagiator*	116	84	C_4	10.34	D_5	8.68	W_4
6	*Aphidius rosae*	93	69	C_3	8.29	D_4	5.72	W_4
7	*Asaphes vulgaris*	67	92	C_4	5.97	D_4	5.49	W_4
8	*Charips leunisii*	58	84	C_4	4.72	D_3	3.96	W_3
9	*Charips victrix victrix*	37	84	C_4	3.30	D_3	2.77	W_3
10	*Alloxysta subaperta*	31	69	C_3	2.76	D_3	1.90	W_3
11	*Asaphes suspensus*	18	84	C_4	1.60	D_2	1.34	W_3
12	*Charips dolichocerus*	16	38	C_2	1.42	D_2	0.53	W_2
13	*Charips brevicornis*	15	53	C_3	1.33	D_2	0.70	W_2
14	*Dendrocerus carpenteri*	13	53	C_3	1.15	D_2	0.60	W_2
15	*Alloxysta campyla*	12	53	C_3	1.07	D_2	0.56	W_2
16	*Charips fracticornis*	9	38	C_2	0.80	D_1	0.30	W_2
17	*Charips flavicornis*	9	46	C_2	0.80	D_1	0.36	W_2
18	*Charips perpussilus*	7	38	C_2	0.62	D_1	0.23	W_2
19	*Charips xanthocerus*	7	30	C_2	0.62	D_1	0.18	W_2
20	*Alloxysta semiclausa*	7	30	C_2	0.62	D_1	0.18	W_2
21	*Charips flaviceps*	6	30	C_2	0.53	D_1	0.15	W_2
22	*Alloxysta nigrita*	5	23	C_1	0.44	D_1	0.10	W_2
23	*Dendrocerus bicolor*	4	23	C_1	0.35	D_1	0.08	W_1
24	*Dendrocerus aphidum*	3	23	C_1	0.26	D_1	0.05	W_1

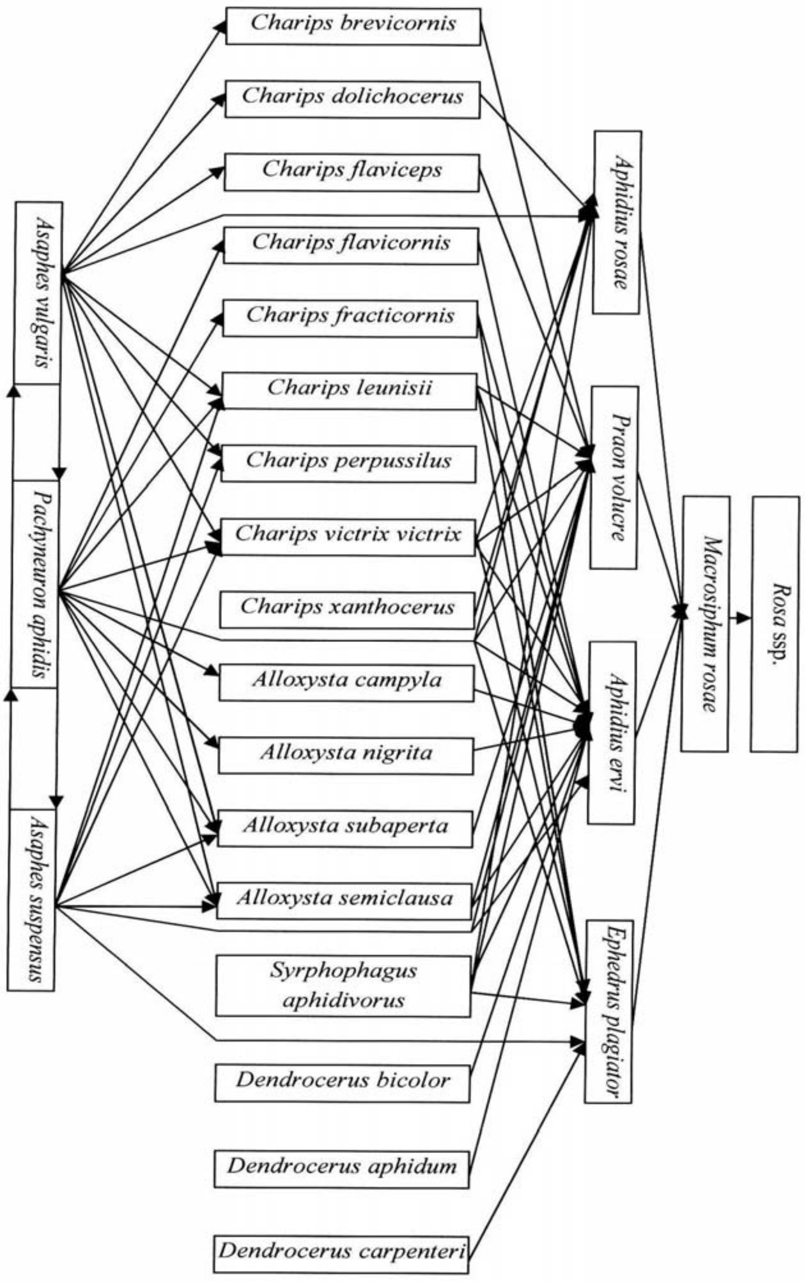

Fig. 1. Parasitoid complex which control *Macrosiphum rosae* L. populations on plants from *Rosa* genus

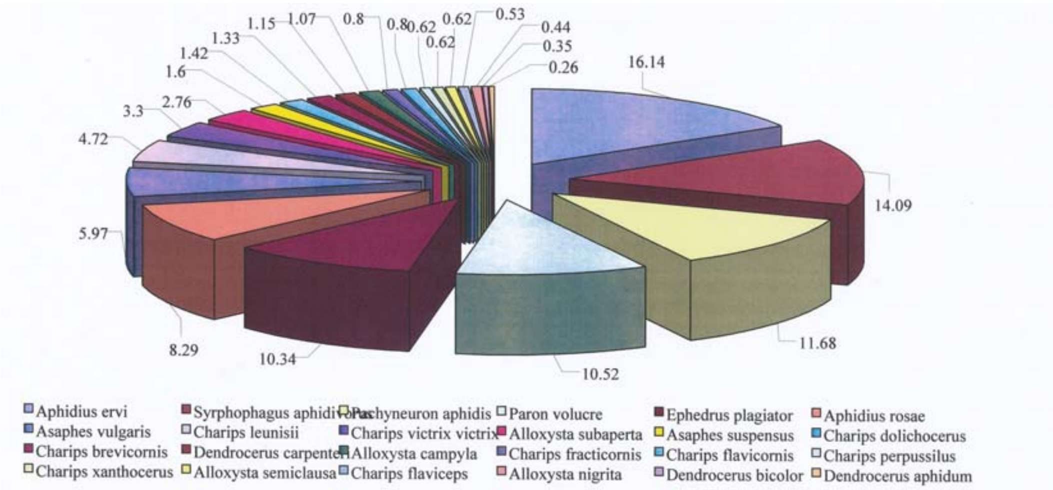

Fig. 2. The Ratio between the parasitoid species

CONTRIBUTION TO THE KNOWLEDGE OF THE PTEROMALIDS (HYMENOPTERA, CHACIDOIDEA, PTEROMALIDAE) FROM PĂDUREA DOMNEASCĂ NATURAL RESERVE

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Abstract: The Pădurea Domnească natural Reserve represents a natural silvic meadow and swamp complex situated in the middle part of the Prut River. The total surface of the rezerve is of 5736 ha among which 4952 ha covered with forests.

Key words: Pteromalidae, Pădurea Domnească natural Reserve, new genus and species for the Republic of Moldavia.

Introduction

After having held the investigations for the first time in this reserve there were found 110 species of pteromalids (*Hymenoptera*, *Pteromalidae*) belonging to 4 subfamilies and 52 genera, of which 2 genera (*Syntomopus* 1833, *Chlorocytus* 1956) and 7 species (*Sphegigaster glabrata* Graham, *S. negricornis* Nees, *Syntomopus incisus* Thomson, *Halticoptera polita* Walker, *Systasis parvula* Thomson, *Chlorocytus formosus* Walker, *Pteromalus intermedius* Walker) are new for the fauna in the Republic of Moldavia.

Material and Methods

The majority of pteromalids identified have been collected from different biotopes with the help of the entomologic net in 2005-2007-s, *Chlorocytus formosus* Walker was obtained in the laboratory from stems of *Artemisia annua* L.

Results

Family *Pteromalidae*
Subfamily *Miscogasterinae*
Tribe *Sphegigasterini*

1. *Sphegigaster glabrata* (Graham)
Identified material: Cuhneşti: 2♀ collected 29.07.2007
Geographical distribution: Sweden, Great Britain.[1,5,6]
Biology: parasite of *Melanagromyza simplicoides* Hendel. [5,6,7]
The species is new for the fauna of the Republic of Moldavia.

2. *Sphegigaster nigricornis* (Nees)
Identified material: Suta de Movile: 1♀ collected 29. 07.2007
Geographical distribution: England, Germany, Romania, ex Czechoslovakia [1,2,6,7]
Biology: the species was obtained from *Melanagromyza dettmeri* Hering, *M. sativae* Spencer (*Diptera*, *Agromyzidae*). [1,3,5,6]

The species is new for the fauna of the Republic of Moldavia.

3. *Syntomopus incisus* (Thomson)
Identified material: Moara Domnească: 1♀ collected 28.07.2007
Geographical distribution: western Kazakhstan, England, Sweden. [5,6,7]
Biology: parasite of *Melanagromyza lappae Lw., M. dettmeri Her., M. aeneiventris Fln.* [5,6,8]
The genus and the species are new for the fauna of the Republic of Moldavia.

Tribe *Miscogasterini*
4. *Halticoptera polita* (Walker)
Identified material: Suta de Movile: 1♀ collected 27.07.2007
Geographical distribution: Great Britain, Sweden, Romania. [1,4,6,]
Biology: hosts unknown. [1,6]
The species is new for the fauna of the Republic of Moldavia.

Tribe *Ormocerini*
5. *Systasis parvula* (Thomson)
Identified material: Cuhneşti: 1♀collected 27.07.2007
Geographical distribution: Sweden, Ireland, ex Czechoslovakia, Romania. [1,4,6,7]
Biology: unknown. [5,6]
The species is new for the fauna of the Republic of Moldavia.

Sufamily *Pteromalinae*

6. *Chlorocytus formosus* (Walker)
Identified material: Cuhneşti: 6♀♀ and 1♂ obtained 20.03.2007
Geographical distribition: England, Ireland. [5,6,8]
Biology: parasite of *Tetramesa fulvicollis* Walker (*Eurytomidae*). [5,6]
The genus and the species are new for the fauna of the Republic of Moldavia.

7. *Pteromalus intermedius* (Walker)
Identified material: Moara Domnească: 1♀ collected 25.06.2006
Geographical distribution: Sweden, England. [3,5,6]
Biology: obtained from *Artemisia vulgaris*. [6,7]
The species is new for the fauna of the Republic of Moldavia.

Conclusions

The greatest number of individuals belong to the species *Chlorocytus formosus* Walker ,obtained in laboratory conditions from stems of *Artemisia annua* L, the rest of the 6 species of pteromalids (*Hymenoptera*, *Pteromalidae*) are new for the fauna of the Republic of Moldavia.

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CONSIDERATIONS ON THE MORPHOLOGY OF THE WEST-PALAEARCTIC PTEROMALIDAE (HYMENOPTERA: CHALCIDOIDEA)

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Abstract. The morphology of the head, mesosoma and metasoma of the adult West-Palaearctic pteromalids is reviewed and illustrated. The state of the characters taken into consideration is discussed. The analyzed genera show a mixture of plesiomorphic and apomorphic traits, making difficult to reveal the phyllogenetic relationships within this family. The subfamilies displaying more plesiomorphic characters seem to be Cleonyminae, Asaphinae, Spalangiinae and Diparinae, while the subfamilies Pireninae, Eunotinae, Colotrechninae and Pteromalinae seem to have more apomorphic traits.

Key words: Hymenoptera, Chalcidoidea, Pteromalidae, morphology, evolution of characters.

Rezumat. Consideraţii asupra morfologiei pteromalidelor vest palearctice (Hymenoptera: Chalcidoidea). Morfologia capului, mezosomei şi metasomei adulţilor de pteromalide vest palearctice este revizuită şi ilustrată. Este discutată starea caracterelor luate în considerare. Genurile analizate prezintă un amestec de trăsături plesiomorfe şi apomorfe, făcând dificilă stabilirea relaţiilor filogenetice din cadrul acestei familii. Subfamiliile cu mai multe caractere plesiomorfe par a fi Cleonyminae, Asaphinae, Spalangiinae şi Diparinae, în timp ce subfamiliile Pireninae, Eunotinae, Colotrechninae şi Pteromalinae par a avea mai multe trăsături apomorfe.

Cuvinte cheie: Hymenoptera, Chalcidoidea, Pteromalidae, morfologie, evoluţia caracterelor.

Introduction

The pteromalids are one of the most diverse groups of parasitic wasps, with more than 600 genera and 4000 species in the world and 200 genera and 1000 species in the West-Palaearctic (Bouček & Rasplus, 1991; Bouček & Heydon, 1997).

The morphology of the adult Pteromalidae is presented in the main revisions of the group e.g. Graham (1969), Bouček (1988), Bouček & Rasplus (1991), but the only papers treating this subject in a greater extent are those of Dzhanokmen (1994; 2004; 2007). Bouček (1988a) briefly discussed possible relationships between the pteromalid subfamilies. Cladistic analyses were carried out by Dzhanokmen (2000) and Török & Abraham (2002), but no common agreement on the phylogenetic relationships could be established.

Unfortunately, no single character or group of characters proved to be specific for this family, thus most of the authors agree that Pteromalidae is probably a paraphyletic group (Bouček & Heydon, 1997; Török & Abraham, 2002). As it is common for the complex, poorly studied and diverse groups of organisms, the phylogenetic relationships of Pteromalidae are far from being understood. In this context an important task is to identify new characters, including molecular ones, which can be used to reveal the phylogeny of this group. Another important aspect is to establish correctly the synapomorphies and to separate them from the homoplasies (Gibson, 1986). This is not always simple and speculation cannot always be avoided.

The aim of this paper is not to perform a cladistic analysis of the group, but to review the morphological characters used in the taxonomy of Pteromalidae, as well as to discuss their possible evolution.

Material and Methods

The head capsule, mesosoma and gaster of several West-Palaearctic pteromalid genera from the subfamilies Asaphinae, Cleonyminae, Colotrechninae, Diparinae, Eunotinae, Herbertiinae, Miscogasterinae, Ormocerinae, Pireninae, Pteromalinae and Spalangiinae were analyzed using optical and electronic microscopy. The classification follows Bouček (1988). The articulated appendages were not included in this study, but will be treated in a further paper.

Results and Discussion

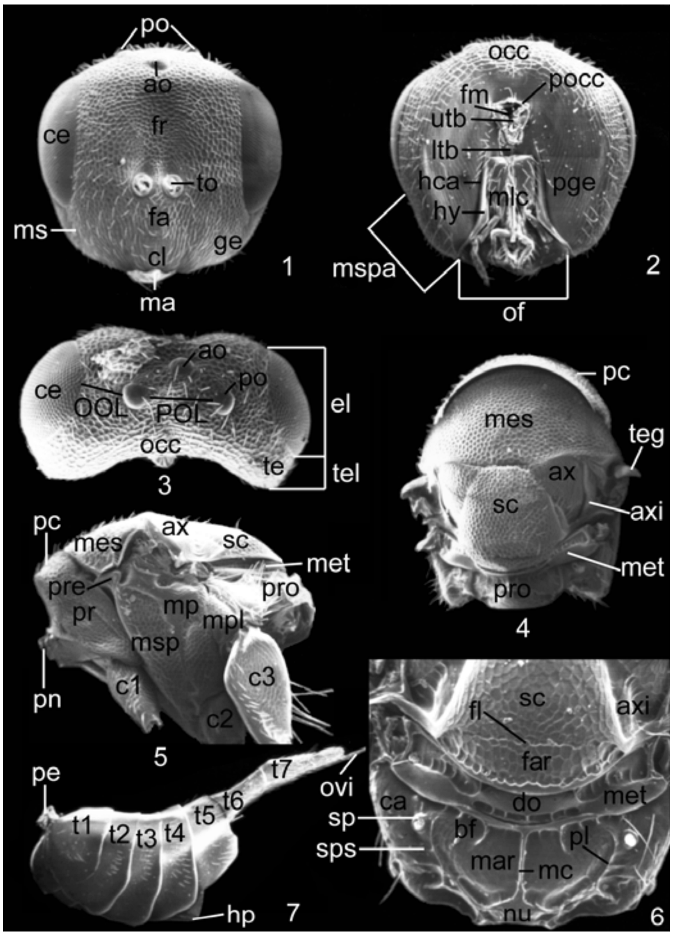
Head (Figs. 1-3, 8-34, 60, 62, 63). In most pteromalids the position of the head is orthognathous, its main axis being perpendicular on the longitudinal axis of the body. In this case, the mandibles are oriented downwards and the occipital foramen is situated at about the middle point between the vertex and the mandible insertion. Two exceptions are the members of the subfamilies Spalanginae and Cerocephalinae, where the head is almost prognathous, the mandibles being oriented forward and the occipital foramen being situated closer to the vertex than the mandibles insertion (Fig. 25). This character could be regarded as a plesiomorphy because the primitive apocritans have a rather prognathous head. Dzhanokemen (1994) instead considers the prognathous head to be secondary (reversion) in pteromalids, a specialization related to host location in narrow places.

The general shape of the head is very diverse. Some genera have a round head in frontal view, its width being approximately equal to its height as in *Pteromalus* Swederus (Pteromalinae) (Fig. 10), *Notanisus* Walker (Cleonyminae) (Fig. 11) or *Systasis* Walker (Ormocerinae) (Fig. 12). In some species the height can be greater than the width, the head being strongly elongated as in *Spalangia* Latreille (Spalangiinae) (Fig. 9); sometimes the height is smaller than the width as in *Herbertia* Howard (Herbertiinae) (Fig. 13) or *Sphegigaster* Spinola (Pteromalinae) (Fig. 21). In *Asaphes* Walker (Asaphinae) (Fig. 8) and *Eunotus* Walker (Eunotinae) (Fig. 17) the head is approximately triangular. Dorsally the head can be either thin (short) as in *Spintherus* Thomson (Pteromalinae) or very massive (broad) as in *Cratomus* Dalman (Cratominae).

The antennal insertion (torulus, toruli) can vary from being placed at about the same distance from the anterior ocellus and the lower clypeal margin as in *Systasis* (Fig. 12) and *Colotrechnus* Thomson (Colotrechninae) (Fig. 19) or closer either to the median ocellus as in *Panstenon* Walker (Panstenoninae) and *Dipara* Walker (Diparinae) (Fig. 18), or to the clypeal margin as in *Asaphes* (Fig. 8), *Herbertia* (Fig. 13), *Macroglenes* Westwood (Pireninae) (Figs. 14, 15) and *Eunotus* (Fig. 17). An extreme case is found in *Spalangia* (Fig. 9) where the toruli are situated just above the oral fosa. The inferior position of the toruli can be regarded as a plesiomorphy and their higher position as an apomorphy since the first case characterizes the most primitive groups of apocritans.

The frons can have two more or less deep furrows (scrobes) where the antennal scape can lay. Sometimes, in the centre of the frons, an interantennal crest may be present, especially in the parasitoids which develop in xylophagous coleopterans as in *Cerocephala* Westwood (Cerocephalinae), perhaps as an antennal protection when the females enter the dirty galleries in wood. The face can be almost flat or more or less protruding at the level of toruli as in *Coelopisthia* Förster (Pteromalinae). The temples can be very large as in *Conomorium* Masi (Fig. 60) (Pteromalinae) or very small, almost indistinct, as in *Peridesmia*. The genae are usually flat, but there are not rare the cases when a depression exists just above the mandible insertion as in *Catolaccus* Thomson

(Pteromalinae) or *Sphegigaster* (Fig. 23). This may allow a wider opening of the mandibles and it is regarded as an apomorphy (Dzhanokmen, 1994).

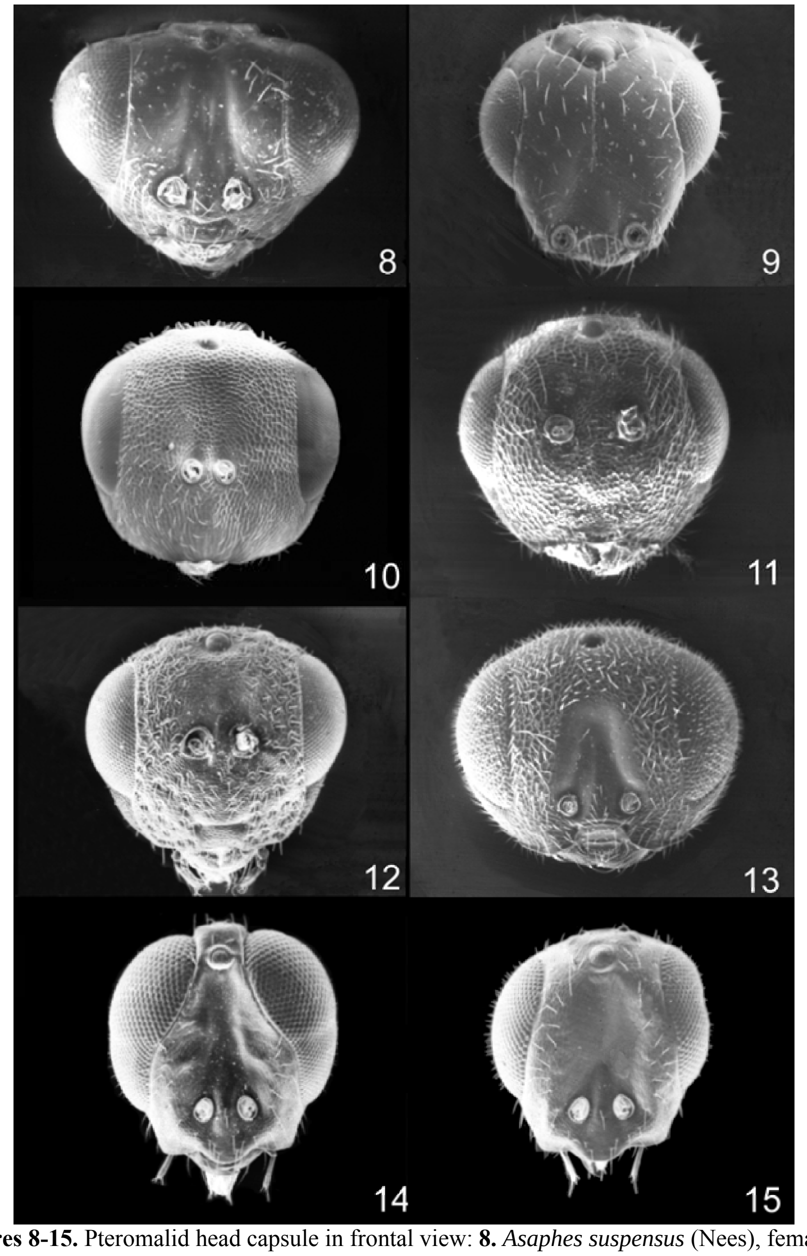


Figures 1-7. General morphology of Pteromalidae: **1.** *Pteromalus elevatus* (Walker), female, head in frontal view; **2.** Idem, head in posterior view; **3.** Idem, head in dorsal view; **4.** Idem, mesosoma in dorsal view; **5.** Idem, mesosoma in lateral view; **6.** *Halticoptera andriescui* Mitroiu, detail of posterior part of scutellum, metanotum and propodeum; **7.** *P. elevatus*, female, metasoma in lateral view (ao = anterior ocellus; ax = axilla; axi = axillula; bf = basal fovea; ca = callus; ce = compound eye; cl = clypeus; c1-c3 = coxae 1-3; do = dorsellum; el = eye length; fa = face; far = frenal area; fl = frenal line; fm = foramen magnum; fr = frons; ge = gena; hca = hypostomal carina; hp = hypopygium; hy = hypostome; ltb = lower tentorial bridge; ma = mandibles; mar = median area; mc = median carina; mes = mesosternum; met = metanotum; mlc = maxillo-labial complex; mp = mesepimeron; mpl = metapleura; ms = malar sulcus; msp = mesepisternum; mspa = malar space; nu = nucha; occ = occiput; of = oral fosa; OOL = oculo-ocellar line; ovi = ovipositor; pc = pronotal colar; pe = petiole; pge = postegena; pl = plica; pn = pronotal neck; po = posterior ocellus; pocc = postocciput; POL = postocellar line; pr = propleura; pre = prepectus; pro = propodeum; sc = scutellum; sp = spiraculum; sps = spiracular sulcus; te = temple; teg = tegula; tel = temple length; to = torulus; t1-t7 = gastral tergites 1-7; utb = upper tentorial bridge).

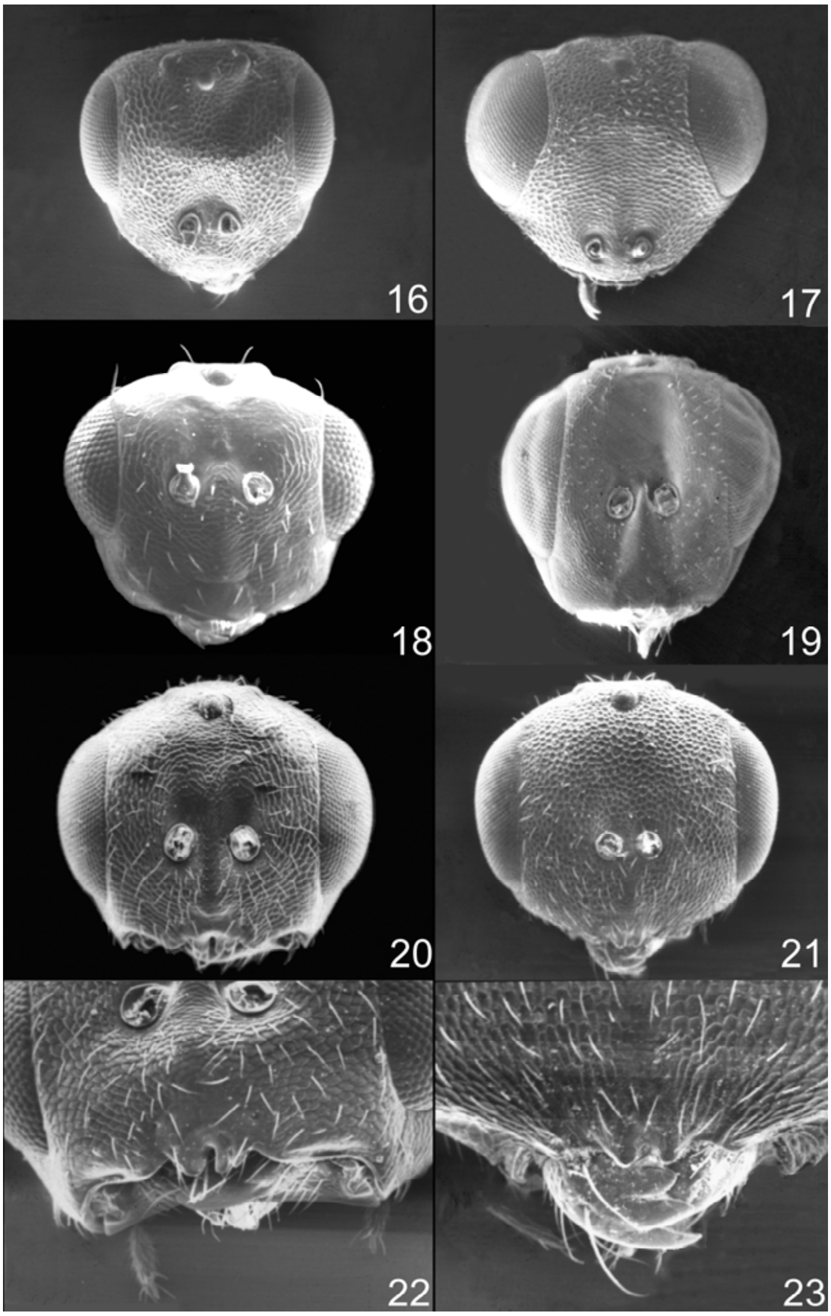
The clypeal margin can be straight, not very large, as in *Notanisus* (Fig. 11) or unusually wide as in *Habritys* Thomson (Pteromalinae), convex (protruding downwards) as in *Macroglenes* (Figs. 14, 15), more or less concave (emarginated) as in *Dipara* (Fig. 18) or with 1-3 teeth that can be symmetrical or not. The first case can be found in *Stenomalina* Ghesquière or *Cyrtogaster* Walker (Pteromalinae), both with 3 symmetrical teeth, the middle one being the largest. Two symmetrical teeth can be found ,for example, in *Sphegigaster* (Fig. 23). A single median tooth is found in Trigonoderini (Pteromalinae), such as *Trigonoderus* Westwood. The second situation is present in many genera of Miscogasterinae e.g. *Miscogaster* Walker where on the left side there are 2 unequal teeth and on the right side only one tooth (Fig. 22); the two teeth from one side can be fused, as in the case of *Halticoptera* Spinola (Miscogasterinae). In *Rohatina monstrosa* Bouček (Pteromalinae) two strong projections can be found near the mouth corners, between the clypeus and the malar sulcus. Dzhanokmen (1994) considers the emarginated clypeal margin as the plesiomorphic state in pteromalids, arguing that this "is the most typical in the most generalized subfamily Pteromalidae" (p. 114). However, the plesiomorphic state of Pteromalinae needs confirmation.

The compound eyes occupy most of the lateral sides of the head. Their general shape is ovoid, with their height larger than their width and their inner margins straight or slightly diverging ventrally. In some genera (e.g. *Habritys*) the eyes are small, while in others they are very large (e.g. the males of some *Macroglenes* (Fig. 14), where the upper part of the eye consists in larger ommatidiae). Most of the time the eyes are glabrous, but sometimes they may be covered by a more or less dense pilosity as in *Spalangia* (Fig. 9) or *Herbertia* (Fig. 13). The ocelli are always present: a median one and two lateral. They are located on the vertex, on a triangular protuberance (stemmaticum). The distance between one posterior ocellus and the adjacent eye margin is called the ocello-ocular line (OOL), and the distance between the two posterior ocelli is called the post-ocellar line (POL). The dimensions of the ocelli may vary, but usually they have the same size. An exception is the median ocellus of some *Macroglenes* males, which can be very large (Fig. 14).

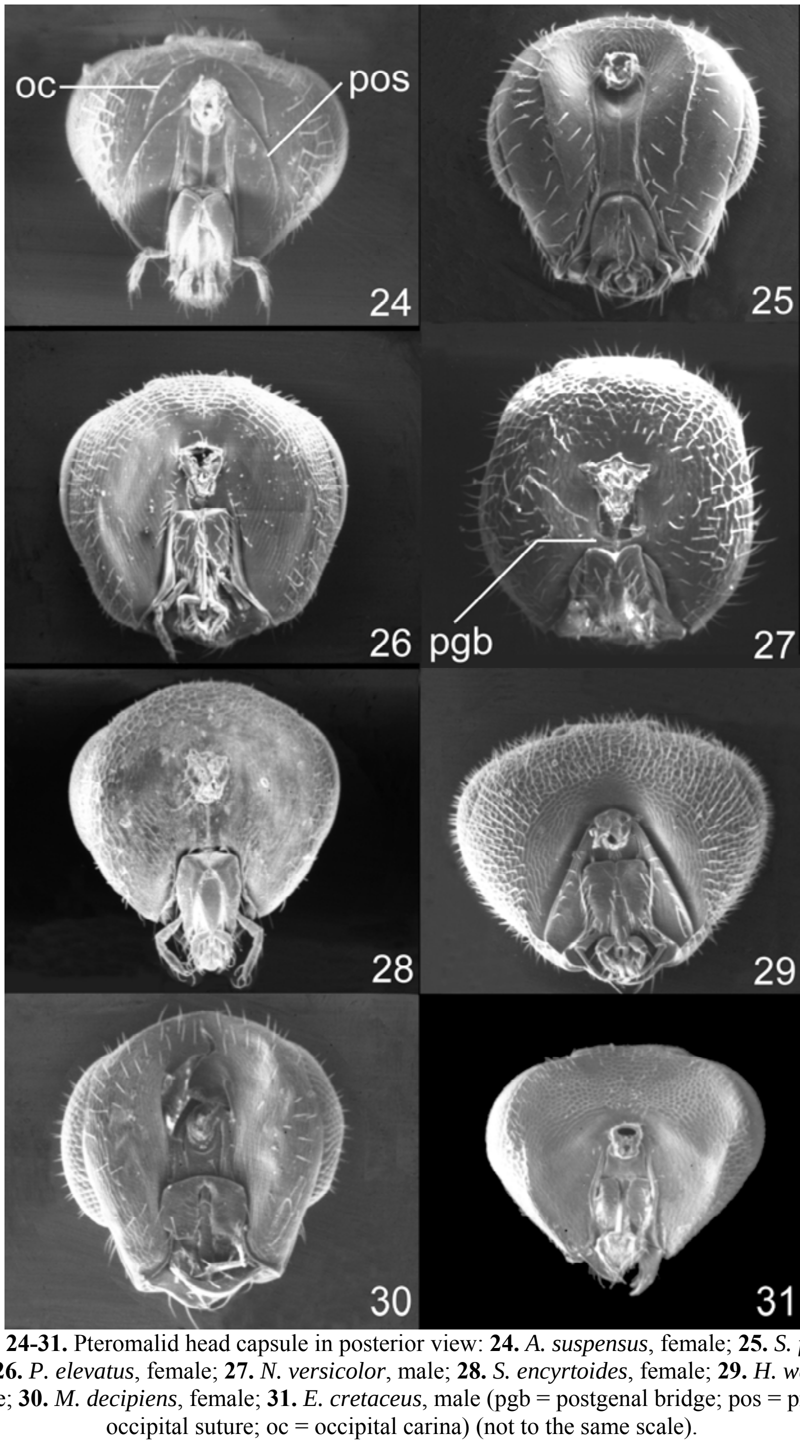
According to Bouček (1988), the posterior part of the head may reveal some important characters for the taxonomy of the group. Most of the pteromalids lack an occipital carina. This is present however in a few genera such as *Spalangia* (Fig. 25) and *Asaphes*, in the latter the occipital carina being accompanied by the primary occipital suture (Fig. 24). The presence of the occipital carina and the primary occipital suture is regarded as apomorphic (secondary development) by Dzhanokmen (1994), but this may be considered as retention of the primitive state in Apocrita, similarly with the prognathous position of the head. Two hypostomal carinae are found on the both sides of the oral fosa, continuing more or less dorsally towards the foramen magnum. The portion between the foramen magnum and the oral fosa is usually closed in pteromalids by the lower tentorial bridge (Fig. 2). This can be either totally (in *Macromesus* Walker (Macromesinae), according to Dzhanokmen (1994)), or partially replaced by the postgenal bridge (in *Notanisus* (Fig. 27)) and/or the hypostomal bridge (in *Dipara* (Fig. 32)). The upper tentorial bridge is found on the ventral side of the foramen magnum (Fig 2). Dzhanokemen (1994) states that the presence of the lower tentorial bridge must be considered as plesiomorphic since it characterize most of the species of Pteromalinae, which she considers to be less advanced; thus the presence of the postgenal bridge and the hypostomal bridge would be secondary. This may be right if we analyze the situation found in Chalcididae, where the latter structures are absent.



Figures 8-15. Pteromalid head capsule in frontal view: **8.** *Asaphes suspensus* (Nees), female; **9.** *Spalangia fuscipes* Nees, male; **10.** *Pteromalus elevatus* (Walker), female; **11.** *Notanisus versicolor* Walker, male; **12.** *Systasis encyrtoides* Walker, female; **13.** *Herbertia wallacei* Burks, female; **14.** *Macroglenes decipiens* (Graham), male; **15.** *M. decipiens*, female (not to the same scale).



Figures 16-23. Pteromalid head capsule in frontal view: **16.** *Halticoptera andriescui* Mitroiu, male; **17.** *Eunotus cretaceus* Walker, female; **18.** *Dipara petiolata* Walker, male; **19.** *Colotrechnus viridis* (Masi), female; **20.** *Miscogaster hortensis* Walker, female; **21.** *Sphegigaster nigricornis* (Nees), female; **22.** *M. hortensis*, detail of the clypeus; **23.** *S. nigricornis*, detail of the clypeus (not to the same scale).

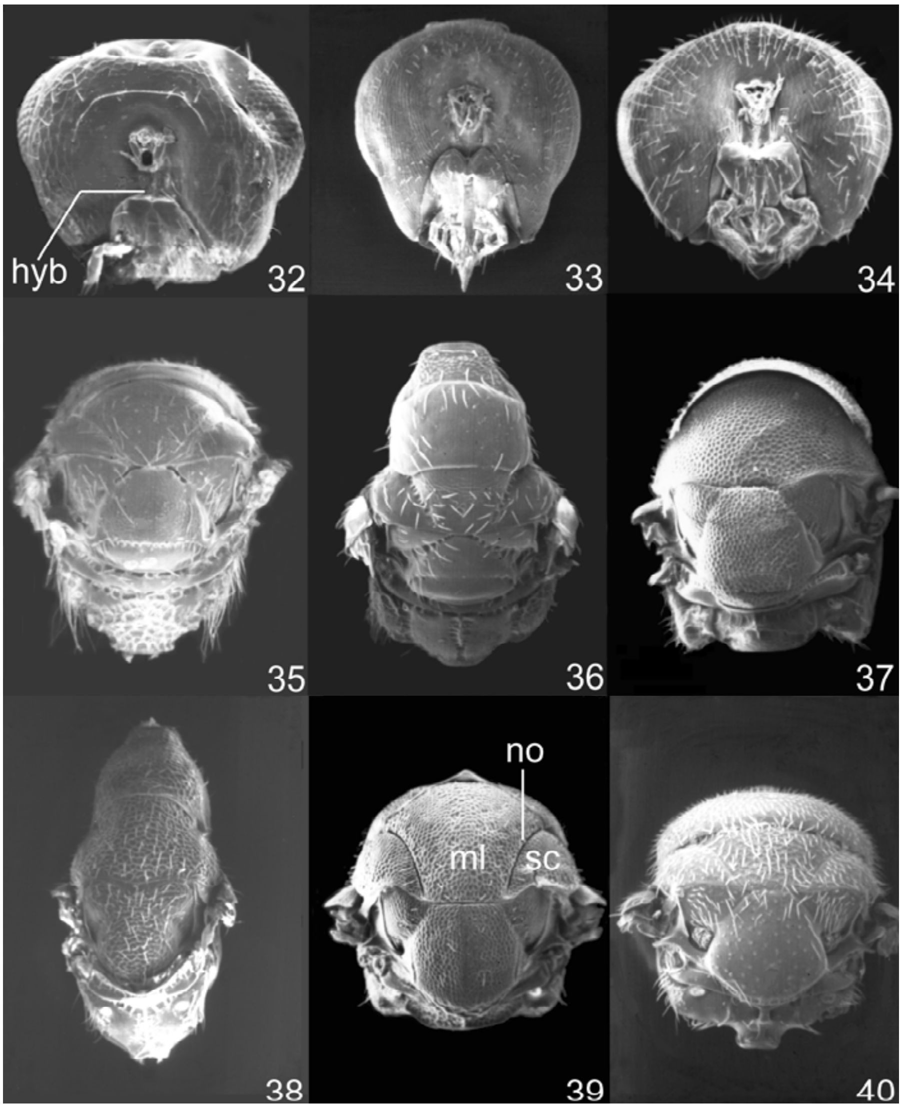


Figures 24-31. Pteromalid head capsule in posterior view: **24.** *A. suspensus*, female; **25.** *S. fuscipes*, male; **26.** *P. elevatus*, female; **27.** *N. versicolor*, male; **28.** *S. encyrtoides*, female; **29.** *H. wallacei*, female; **30.** *M. decipiens*, female; **31.** *E. cretaceus*, male (pgb = postgenal bridge; pos = primary occipital suture; oc = occipital carina) (not to the same scale).

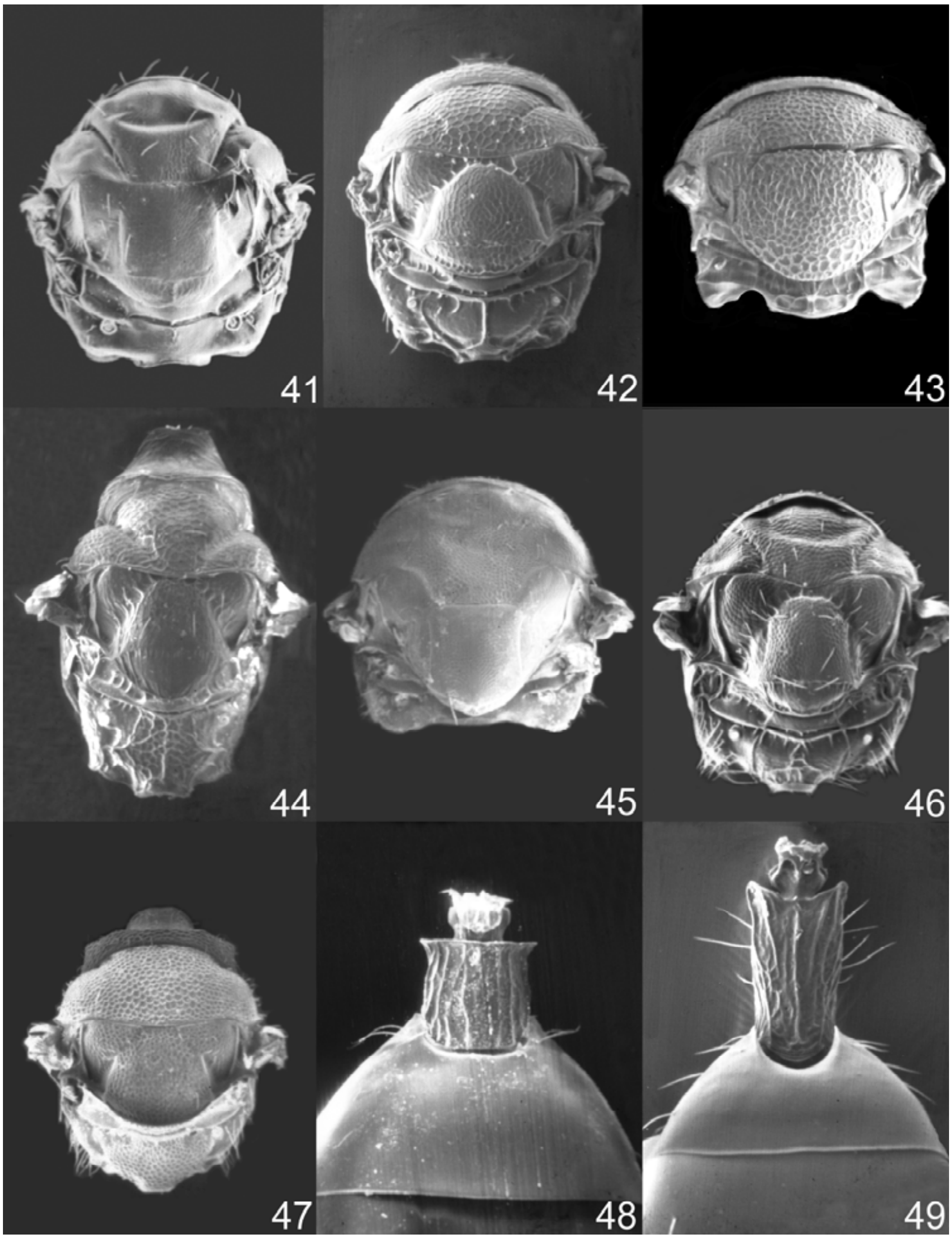
But, if we consider the Leucospidae (another primitive group of chalcids), the situation is exactly opposite, the lower tentorial bridge being absent and the postgenal and the hypostomal bridges being present (Dzhanokmen, 1994). This seems to be the situation in *Notanisus* (Cleonymidae), where the space between the foramen magnum and the oral fosa is partly closed by the postgenal bridge. This observation supports Bouček's assertion that the Cleonyminae is one of the most primitive groups of Pteromalidae (Bouček, 1988a).

Mesosoma (Figs. 4-6, 35-47). In the aprocritan hymenopterans the mesosoma includes the prothorax, the mesothorax, the metathorax and the propodeum (the first abdominal segment fused to the thorax). The prothorax consists mainly in its dorsal sclerite – the pronotum, which can be rarely rather long and narrow, as in *Spalangia* (Fig. 36), *Notanisus* (Fig. 38) or *Panstenon*, and usually shorter and wider (Figs. 35, 39-43, 45-47), sometimes almost as wide as the mesoscutum, as in *Norbanus* Walker (Pteromalinae) or *Herbertia* (Fig. 40). The long pronotum can be regarded as the plesiomorphic state for pteromalids and the short one as apomorphic because in the more primitive groups of chalcids the pronotum tends to be rather well developed. In rare cases the pronotum can be wider in its anterior part than its posterior part, as in *Spathopus* Ashmead (Pireninae). The pronotum can make a distinct angle and form a neck and a collar, as in *Pteromalus* Swederus (Pteromalinae) (Fig. 5) and *Sphegigaster* (Fig. 43), or it can be more or less rounded, without forming a distinct collar, as in *Seladerma* Walker (Miscogasterinae), *Notanisus* (Fig. 38), *Miscogaster*, or *Spintherus*. In its anterior part, the collar can have a sharp, raised margin as in *Merismus* Walker (Miscogasterinae), *Cyrtogaster* Walker or *Chlorocytus* Graham (Pteomalinae), or some more or less rounded teeth as in some *Sphegigaster*. In some cases e.g. *Syntomopus* Walker (Pteromalinae), the pronotum is almost rectangular.

The mesothorax. The mesoscutum has three lobes, a median lobe and two lateral ones, the latter also called scapulae (Fig. 39). In Asaphinae (Fig. 35), Spalangiinae (Fig. 36), Ormocerinae (Fig. 39), Herbertiinae (Fig. 40), Pireninae (Fig. 41), Eunotinae (Fig. 43), Diparinae (Fig. 44) and most Miscogasterinae (Fig. 46) the lateral lobes are clearly delimited from the median one by the complete notauli. In other cases e.g. most Pteromalinae (Fig. 37, 47) the notauli are incomplete, sometimes present only in the anterior part of the mesoscutum, thus not reaching its hind margin. Because some of the most primitive chalcids have complete notauli, this may be considered as the plesiomorphic state in Pteromalidae. The scutellum is situated posterior to the mesoscutum. The axillae and the axillulae are situated on the lateral sides of the scutellum (Fig. 4). The scutellum is usually more or less convex but there are genera where it is virtually flat, being in the same plan as the mesoscutum. In these cases the mesosoma is flattened, as in *Rakosina* Bouček or *Psilonotus* Walker (Pteromalinae). In *Colotrechnus* (Fig. 45) the axillulae are larger than usual and the axillae are more advanced towards the mesoscutum. At the posterior end of the scutellum lays the frenal area which is usually separated from the rest of the scutellum by the frenal line (Fig. 6). Sometimes e.g. in *Platneptis* Bouček (Pteromalinae) the frenal line is virtually indistinct. In some cases the sculpture of the frenal area is distinct from the rest of the scutellum, as in *Lamprotatus* Westwood (Miscogasterinae) where it has some longitudinal crests, or in *Eunotus* (Fig. 43) where the frenal area has larger reticulation than the rest of the scutellum. The lateral margins of the scutellum can converge more or less in the anterior part, in some cases virtually fusing as in some *Halticoptera* (Fig. 42). Most of the times there are no special marks on the scutellum except the reticulation, but in *Notoglyptus* Masi (Pteromalinae) there is a conspicuous central fovea. Another exceptional case is *Scutellista* Motschulsky (Eunotinae) where the scutellum is far exerted backwards, covering the propodeum and part of the gaster (Fig. 61).



Figures 32-34. Pteromalid head capsule in posterior view: **32.** *D. petiolata*, male; **33.** *C. viridis*, female; **34.** *M. hortensis*, male. **Figures 35-40.** Pteromalid mesosoma in dorsal view: **35.** *A. suspensus*, female; **36.** *S. fuscipes*, male; **37.** *P. elevatus*, female; **38.** *N. versicolor*, male; **39.** *S. encyrtoides*, female; **40.** *H. wallacei*, female (hyb = hypostomal bridge; ml = middle lobe; no = notaulus; sc = scapula or lateral lobe) (not to the same scale).



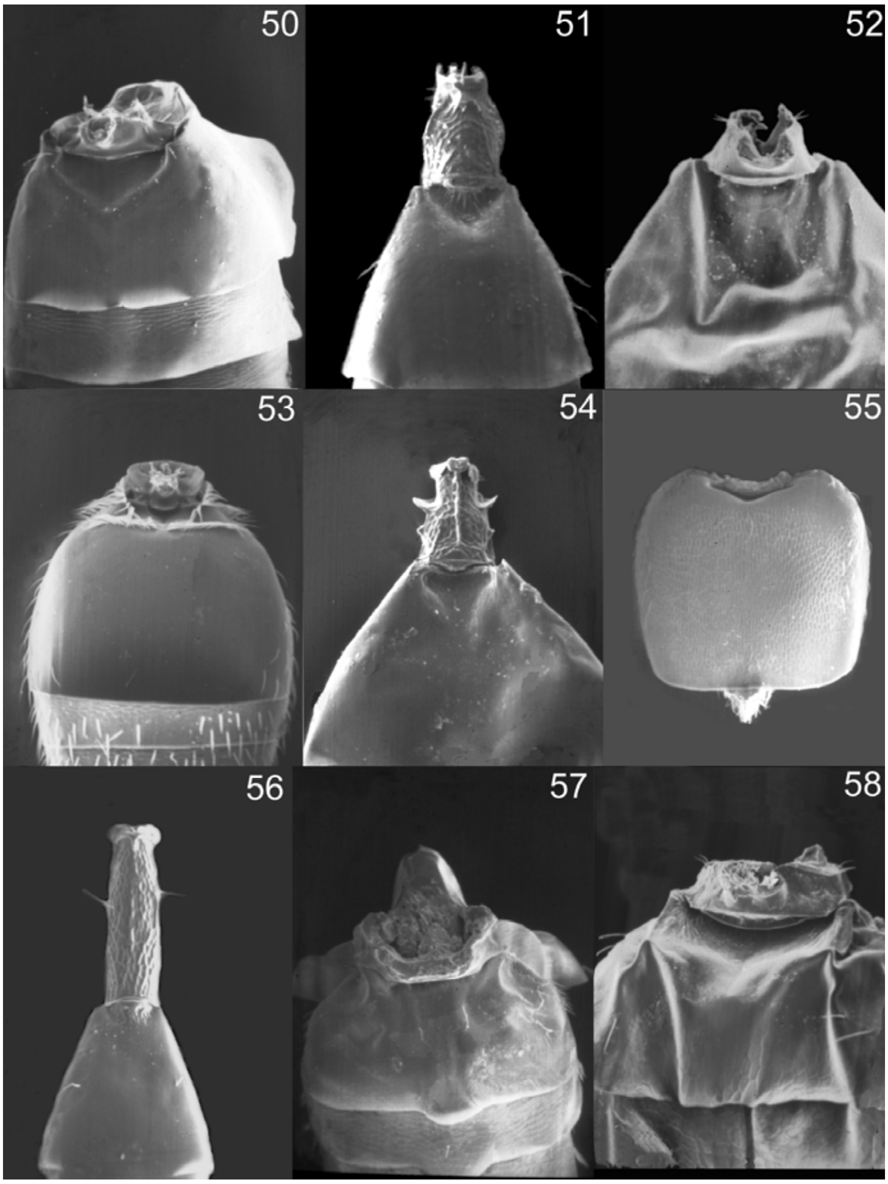
Figures 41-49. Pteromalid mesosoma in dorsal view: **41.** *M. decipiens*, female; **42.** *H. andriescui*, male; **43.** *E. cretaceus*, female; **44.** *D. petiolata*, male; **45.** *C. viridis*, female; **46.** *M. hortensis*, female; **47.** *S. nigricornis*, female. **Figures 48-49.** Petiole and first gastral tergites in dorsal view: **48.** *A. suspensus*, female; **49.** *S. fuscipes*, male (not to the same scale).

The mesopleurae are large and divided in two areas by the pleural line (femoral groove): an anterior area called mesepisternum and a posterior area called mesepimeron, the latter having an upper and lower part (Fig. 5). Usually the mesopleura is only partly reticulated but sometimes all its surface is sculptured, as in some species of *Mesoplobus* Westwood (Pteromalinae). As in all chalcids a small sclerite called prepectus can be found between the pronotum and the mesepistenum (Fig. 5). In some cases it is very small, shorter than the tegula as in *Norbanus*, but usually it is well developed and approximately triangular. The prepectus can be smooth as in *Pteromalus*, *Plutothrix* Förster (Pteromalinae) or *Merismus* Walker, or reticulated as in *Chlorocytus*, *Miscogaster* or *Trigonoderus*, with an anterior carina as in *Merismus* or without as in *Miscogaster*.

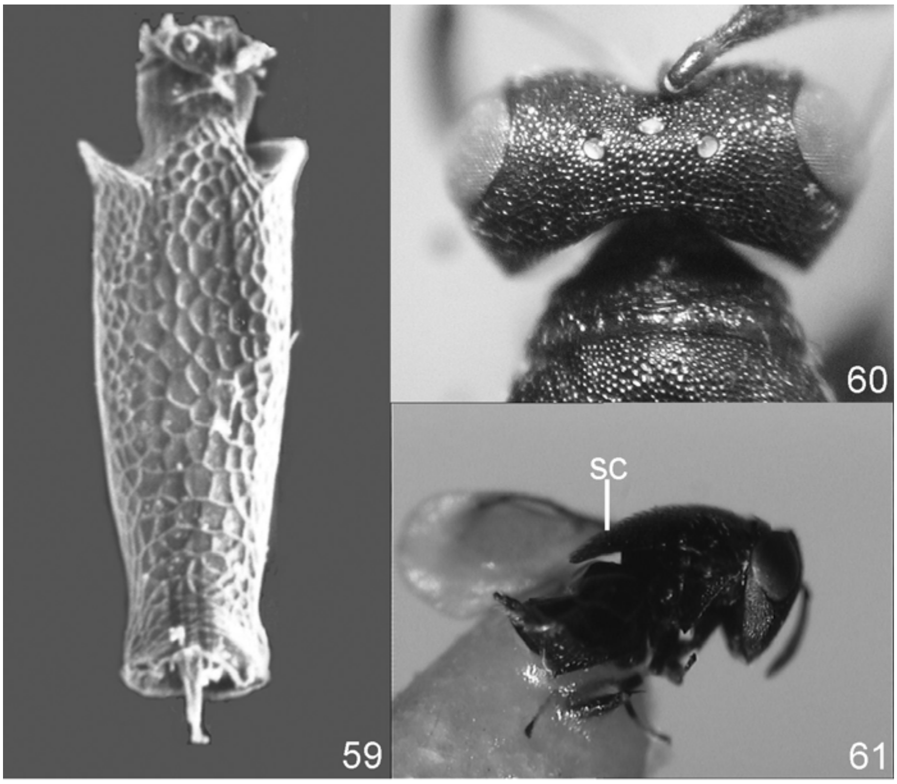
The metathorax is compressed between the mesothorax and the propodeum (Figs. 4-6). The dorsellum can be smooth or with different reticulation, glabrous or with a few setae. Metapleura is divided by the metapleuran groove in metepisternum and metepimeron.

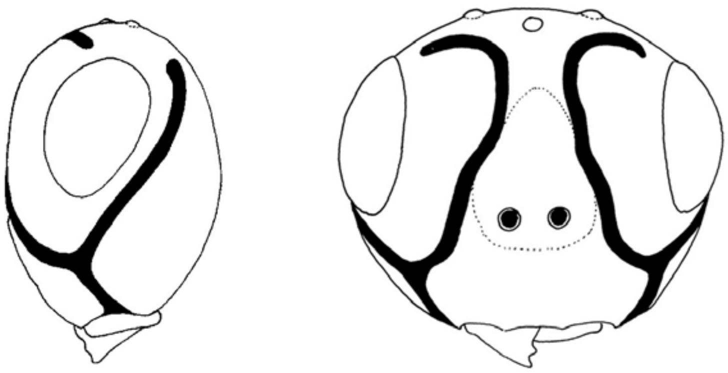
The propodeum (usually compared with the scutellum length) varies from being rather long as in *Asaphes* (Fig. 35), *Notanisus* (Fig. 38), *Dipara* (Fig. 44) or *Panstenon*, short as in *Systasis* (Fig. 39), *Herbertia* (Fig. 40), *Macroglenes* (Fig. 41) or *Eunotus* (Fig. 43), or extremely short as in *Colotrechnus* (Fig. 45). The longer propodeum can be considered as the plesiomorphic state and the reduced one as the apomorphic state. The propodeum can be smooth as in *Macroglenes* (Fig. 41), uniformly sculptured as in *Sphaegigaster* (Fig. 47) or with a central (median) area with different reticulation. This may include a more or less regular median (longitudinal) carina as in *Spalangia* (Fig. 36), *Halticoptera* (Fig. 42) or *Dipara* (Fig. 44) and/or a costula (transversal carina) as in some *Pteromalus* or *Eunotus* (Fig. 43). Laterally, the median propodeal area may be margined by plicae, which can vary from being well developed, reaching the metanotum as in *Miscogaster* (Fig. 46), to incomplete as in some *Halticoptera* (Fig. 6). In its anterior part, at variable distance from the metanotum there are the two respiratory spiracles. The angle between the propodeum and the rest of the mesosoma can differ, the propodeum being from almost horizontal as in *Psilonotus* to almost vertical, as in *Catolaccus*. The posterior part of the propodeum can be short as in *Macroglenes* (Fig. 41), *Colotrechnus* (Fig. 45), or more or less exerted towards the gaster, in the latter case forming the so called nucha (Fig. 6) as in *Herbertia* (Fig. 40).

Metasoma (Figs. 7, 48-59). As in all the apocritans, the true abdomen consists in the propodeum (analyzed above) together with the petiole and the rest of the posterior segments, the latter forming the gaster. The petiole and the gaster form the metasoma. The development and the shape of the petiole vary considerably. It can be from extremely small, virtually invisible dorsally in which case the gaster is called sessile (the Pireninae (Fig. 52), Eunotinae (Fig. 55), Colotrechninae (Fig. 57) or most of the Pteromalinae (Fig. 50)) to long and narrow as in *Spalangia* (Fig. 49), *Dipara* (Fig. 56) or *Sphegigaster* (Fig. 59), the gaster being called petiolate. An intermediate situation is the virtually quadrate petiole found in *Asaphes* (Fig. 48) or the conical one found in some *Notanisus* (Fig. 51). A special situation is found in *Callitula* Spinola (Pteromalinae) where the petiole appears to have three parts: a central one representing the true petiole and two lateral ones, which are in fact extensions of the first gastral tergite. The petiole can be almost smooth or with different types of sculpture, as in *Asaphes* (Fig. 48), *Spalangia* (Fig. 49), *Halticoptera* (Fig. 54) or *Sphegigaster* (Fig. 59). Bouček (1988) and Dzhanokmen (2007) consider the short petiole as plesiomorphic, the latter author arguing that this is the most common situation encountered in the Pteromalinae. The long petiole would be in this case a secondary formation. Another possibility is that the developed petiole is retained from the primitive apocritans.



Figures 50-58. Petiole and first gastral tergites in dorsal view: **50.** *P. elevatus*, female; **51.** *N. versicolor*, male; **52.** *M. decipiens*, female; **53.** *H. wallacei*, female; **54.** *H. andriescui*, male; **55.** *E. cretaceus*, female, whole metasoma; **56.** *D. petiolata*, male; **57.** *C. viridis*, female; **58.** *S. encyrtoides*, female (not to the same scale).





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Figures 59-63: **59.** *Sphegigaster nigricornis*, female, petiole in dorsal view; **60.** *Conomorium amplum* (Walker), female, head and anterior part of mesosoma in dorsal view; **61.** *Scutellista obscura* (Förster), female in lateral view; **62.** *Leptomeraporus nicaee* (Walker), male, head in lateral view; **63.** idem, head in frontal view (sc = scutellum) (not to the same scale).

Regarding the structure of the gaster, there are seven segments posterior to the petiole, but sometimes not all of them are visible. The last one is in fact formed by the merging of four different segments. On the sixth tergite the only functional pair of gastral spiracles is situated and the last tergite (epipygium) bears the pygostili, which can have equal (most of the species) or unequal setae (e.g. some *Halticoptera*). The hipopygium (the end of the last visible abdominal sternite (Fig. 7)) can be situated closer to or more remote from the tip of the gaster.

The gaster can vary in dimension when compared with the length of the head and thorax. In most cases it is longer than broad, an extreme case being that of *Eulonchetron* Graham or *Gastracanthus* Westwood (Pteromalidae) where the gaster is unusually long and narrow. At the opposite end is the very short, ovate gaster, which sometimes can be even wider than long, as in *Tomicobia* Ashmead, *Coelopisthia*, *Tritneptis* Girault (Pteromalinae) or *Eunotus* (Fig. 55). Dzhanokmen (2007) states that the elongated oval-rectangular and moderately laterally compressed metasoma is the plesiomorphic state in pteromalids.

The gastral tergites can have various degrees of development. They can be about of the same length, but usually the first tergite is slightly to distinctly longer than the others. The extreme cases are those when the first tergite is very large and convex, covering most or virtually all of the remaining segments, as in *Herbertia* (Fig. 53), *Eunotus* (Fig. 55), *Dipara* (Fig. 56) or *Sphegigaster*. The hind margin of the first tergite can be straight or slightly convex (most of the species), with 1-3 lobes (some *Norbanus*, *Colotrechnus* (Fig. 57)), medially incised (*Miscogaster*, some *Halticoptera*), or deeply emarginated (*Cyrtogaster* Walker). Dorsally the tergites can be either convex, strongly sclerotized as in *Eunotus*, *Herbertia* or *Sphegigaster*, or less so as in *Macroglenes* (Fig. 52) or *Systasis* (Fig. 58). According to Dzhanokmen (2007) the approximately equal gastral tergites are the plesiomorphic state in pteromalids.

Body sculpture. The body sculpture of pteromalids is quite diverse. According to Bouček & Rasplus (1991), it can be classified in several types: piliferous puncturation, reticulation and rugulosity, which usually appear in different combinations.

The piliferous puncturation is relatively rare in pteromalids and consists in circular punctures bearing hairs. It can be found in *Roptrocerus* Ratzeburg (Pteromalinae), *Spalangia* (Fig. 9) or *Systasis* (Fig. 39) where the more or less deep punctures are separated by smooth, reticulated or rugulose interspaces. Apart from the usual punctures that may occur on the head, two deeper punctures called tentorial pits may be present in the clypeal region in *Janssoniella* Kerrich (Pteromalinae), *Systasis* (Fig. 12) and a few other genera.

The reticulation is the most common and consists in a network of alveoli. It can be of two different types: engraved and raised. In the engraved reticulation the alveoli are separated by very fine lines, which are not raised above the body surface, this appearing virtually smooth as in *Macroglenes* (Fig. 41) or very finely reticulate, as in *Dipara* (Fig. 18) or *Miscogaster* (Figs. 20, 22). The engraved reticulation together with the piliferous punctures characterizes for example the mesoscutum of *Semiotellus* Westwood (Ormocerinae). In the raised reticulation the alveoli are separated by fine walls which are clearly raised above the body surface. This is the most common type of sculpture in pteromalids, covering the head and mesosoma of most of the species (Figs. 1, 3, 4, 11, 16, 17, 21, 42-44, 47). However it can present many variations. The usually polygonal alveoli can have different sizes and when they are small the body appears mate.

The rugulose sculpture is usually regular, appearing as striations or wrinkles located in different places of the body. It is usually encountered on the lower part of the face is many genera of pteromalids such as *Sphegigaster* (Fig. 23), but sometimes it can be spread beyond the level of the toruli, as in *Hobbya* Delucchi (Pteromalinae).

The males of some species may have specific sinuous lines among the reticulation of their face, frons and temples, as in *Meraporus* Walker, *Leptomeraporus* Graham (Figs. 62, 63) or *Peridesmia* Förster (Pteromalinae). These lines appear smooth and dark compared with the surrounding areas and probably represent species identity marks for the females.

Conclusions

The pteromalids are a morphologically very diverse group of parasitoids, if only considering the West-Palaearctic fauna. The analyzed genera show a mixture of plesiomorphic and apomorphic traits, making difficult to reveal the phyllogenetic relationships within this family. The main problem is establishing the synapomorphies; it can be difficult sometimes to decide whether a certain character is plesiomorphic or apomorphic, especially when reversions may be involved. The subfamilies displaying more plesiomorphic characters seem to be Cleonyminae, Asaphinae, Spalangiinae and Diparinae, while the subfamilies Pireninae, Eunotinae, Colotrechninae and Pteromalinae seem to have more apomorphic traits. This confirms Bouček's statement (Bouček, 1988a) that Cleonyminae is probably one of the basal groups of pteromalids connecting it to the eupelmids, and disagrees with Dzhanokmen (Dzhanokmen, 2000), who considers the Pteromalinae as one of the most generalized groups of pteromalids. However, until monophyletic groups are established it is premature to make any considerations on the phyllogenetic relationships within 'Pteromalidae'.

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A FAUNISTIC REVIEW OF THE ROMANIAN MYMARIDAE AND MYMAROMMATIDAE (HYMENOPTERA CHALCIDOIDEA AND MYMAROMMATOIDEA)

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The paper brings faunistic data about the presence of 59 species of *Mymaridae* (*Hymenoptera, Chalcidoidea*) Romanian, and 1 specie of Romanian *Mymarommatidae* (*Hymenoptera, Mymarommatoidea*). All the species are presented under their present valid name with some synonymys. We also present two new species for the Romania's Fauna: *Gonatocerus ovicenatus* Leonard & Crosby and *Ooctonus flaviventris* Donev (Fig. 1), with a present distribution data in Romania.

Key words: *Mymaridae, Mymarommatidae,* faunistic review, distribution, Romania.

Rezumat: Analiza faunistica a familiilor Mymaridae si Mymarommatidae din Romania (*Hymenoptera, Chalcidoidea si Mymarommatoidea*). Lucrarea prezinta date faunistice despre prezenta a 59 de specii apartinand Familiei *Mymaridae* (*Hymenoptera, Chalcidoidea*) si o specie apartinand Familiei *Mymarommatidae* (*Hymenoptera, Mymarommatoidea*) in Romania. Toate speciile sunt prezentate sub denumirea lor valida actuala cu unele sinonimii. De asemenea, prezentam doua specii noi pentru Fauna Romaniei: *Gonatocerus ovicenatus* Leonard & Crosby and *Ooctonus flaviventris* Donev (Fig. 1), adaugand astfel si distributia lor actuala in Romania.

Cuvinte cheie: *Mymaridae, Mymarommatidae,* fauna, distributie, Romania.

Introducion

Studies of the Family *Mymaridae* and other chalcids from Romania, were carried out by: Radu, V. & Botoc, M. (1958, 1960); Botoc, M. (1959, 1962, 1963, 1964, 1965, 1972, 1974, 1975); Andriescu I. (1993, 1996); Dimitriu D.I. (2001); Pricop E. (2007, 2008). The only reference of *Palaeomymar anomalum* (Blood & Kryger, 1922**)** is given by Andriescu I. (1964). In the present day, in Romania's Fauna are cited a total of 59 valid species of *Mymaridae* and 1 specie from *Mymarommatidae*. The species of parasitic wasp - Family *Mymaridae*, are exclusively egg parasitoids; the biology of the species belonging to Family *Mymarommatidae* is still unknown. The distribution of this species: *Gonatocerus ovicenatus* Leonard & Crosby and *Ooctonus flaviventris* Donev (Fig. 1) is important for the future studies.

Material and methods

This paper is a result of the fauna investigation, all the species that we have collected, were collected with an entomological sweep-net and pan traps in grass - land vegetation, between 2005 – 2007, from some areas of the North-East of Romania (Pricop, 2007, 2008). In some cases the vegetal material, collected in the sweep – net, was examined with a stereomicroscope (a time consuming method), in other cases I used the insect pooter (aspirator) to collect the insects from the sweep – net, in the field (a less time consuming method). We have collected insects with pan traps as well, method recommended by Noyes, J. S. (2003).

The studied material was collected from areas predominated by plant species - grasses (*Fam. Gramineae*), species which are in abundance, depending on area, altitude and climate, the common ones, from which we have collected the material, in the Central and Eastern part of Romania are: *Alopecurus pratensis* L*., Agrostis capilaris* L*., Agropyron cristatum* (L.) Gaertn., *Agropyron repens* (L.) Beauv., *Briza media* L., *Bromus spp*., *Calamagrostis spp*., *Chrysopogon gryllus* (L.) Trin., *Cynodon dactylon* (L.) Pers., *Dactylis glomerata* L., *Digitaria sanguinalis* (L.) Scop., *Festuca pseudovina* Hack., *Fesuca rubra* L., *Festuca valesiaca* Schleich., *Festuca spp.*, *Lolium perenne* L., *Melica spp.*, *Nardus stricta* L., *Poa spp.* and *Phragmites australis* (Cov.); and other non – woody species of plants, vary rarely woody plants, associated with many species from above: *Achillea millefolium* L*., Achillea distans* Waldst. et Kit. ex Willd*., Alchemilla spp*., *Agimonia eupatoria* L., *Ajuga genevensis* L., *Arctium lappa* L., *Aristolochia clematitis* L., *Artemisia spp.*, *Asperula spp.*, *Bellis perennis* L., *Betonica officinalis* (L.) Trev., *Caltha palustris* L., *Campanula spp.*, *Capsella bursa - pastoris* L., *Cardaria draba* (L.) Desv., *Carduus spp.*, *Carex spp.*, *Carum carvi* L., *Centaurea cyanus* L., *Centaurea spp.*, *Centaurium spp.*, *Cichorium intybus* L., *Cicuta virosa* L., *Cirsium spp.*, *Conium maculatum* L., *Crataegus monogyna* Jacq., *Crepis spp*., *Daucus carota* L., *Dianthus spp*., *Dipsacus sylvestris* Hudson, *Dryopteris spp.*, *Echium vulgare* L., *Eryngium campestre* L., *Equisetum spp.*, *Euphorbia spp*., *Filipendula vulgaris* Moench., *Fragaria vesca* L., *Galium verum* L., *Galium mollugo* L., *Geranium pratense* L., *Geum urbanum* L., *Gentiana asclepiadea* L., *Gentiana spp*., *Hepatica trassilvanica* Fuss., *Heracleum spp., Hieracium pilosella* L*., Hieracium spp., Hypericum maculatum* Cr., *Hypericum perforatum* L., *Hypochoeris spp*., *Inula spp*., *Juncus spp.*, *Juniperus communis* L., *Knautia arvensis* (L.) Coulter, *Lamium spp., Leontodeon spp., Linaria vulgaris* Mil., *Luzula spp.*, *Lythrum salicaria* L., *Malva spp.*, *Marrubium vulgare* L., *Matricaria spp.*, *Medicago sativa*, *Melampyrum spp*., *Melilotus officinalis* (L.) Medik., *Mentha longifolia* (L.) Nath., *Nepeta cataria* L*., Nepeta spp., Ononis spp., Opopanax chironium* (L.) Koch, *Origanum vulgare* L., *Petasites spp*., *Phlomis spp*., *Plantago spp.*, *Potentilla anserina* L., *Potentilla spp.*, *Prunella vulgaris* L., *Pulmonaria mollis* Wulfen ex Hornem., *Ranunculus spp.*, *Ranunculus acris* L., *Rumex spp.*, *Salvia glutinosa* L., *Salvia nemorosa* L., *Salvia spp.*, *Sanicula europaea* L., *Sedum maximum* (L.) Hoffm., *Sedum spp*., *Silene spp*., *Sonchus oleraceus* (L.), *Stachys spp*., *Stellaria media* (L.) Vill., *Symphytum spp*., *Tanacetum vulgare* L., *Thymus spp*., *Teucrium spp.*, *Tragopogon pratensis* L., *Trifolium pretense* L., *Trifolium repens* L., Gou., *Tanacetum vulgare* L., *Telekia speciosa* Schreb., *Trifolium spp., Urtica dioica* L., *Verbascum spp*., *Veronica chamaedrys* L., *Veronica austriaca* L., *Veronica officinalis* L., *Vicia spp.*, *Viola spp.* and *Viola hirta* L.; identified with the help of the scientific literature published by Ciocarlan V. (2000) and Sarbu I. *et al.* (2001); a part of the identified plants are in the scientific collection of "*STEJARUL*" Biological Research Center from Piatra Neamt, some species from above are also important medicinal plants.

The specimens wrre mounted in *Faure's medium,* or pointed on cardboards (*dry mounted*) and examined with the stereomicroscope and an optical microscope. The examination of all the vegetal material (in alcohol - 70^0), with the stereomicroscope, collected in the sweep – net is a better method, compared with the insect pooter method (aspirator), because the smaller specimens (< 1 mm) are not escaping from the net, in case we decide to collect all the vegetal material. We have illustrated the habitus of the specimens utilizing microphotography's obtained whit a camera attached to the stereomicroscope.

Results and Discussion

At this stage of research in Romania there are mentioned 59 species of *Mymaridae* and one specie of *Mymarommatidae*. The purpose of this present paper is to be only a basis for further studies.

In this paper we also present two new species **(Fig. 1)** for the Romania's Fauna:

- *Gonatocerus ovicenatus* Leonard and Crosby: - 2♀ collected by Dr. Camelia Lisenchi-Murariu from *Medicago sativa* L. fields, on 5.07.2006, Cucorani – Botosani county; 3♀ coll. by Dr. C. Lisenchi-Murariu from *M. sativa* L. fields, on 2.09.2006, Cucorani – Botosani county; 1♀ coll. by Dr. C. Lisenchi-Murariu from *M. sativa* L. fields, Siminicea – Botosani, on 2.09.2006.
- *Ooctonus flaviventris* Donev: 1♀ coll. by Dr. C. Lisenchi-Murariu from *M. sativa* L. fields, Vorona - Botosani, on 2.10.2006.

Gonatocerus ovicenatus Leonard and Crosby

Ooctonus flaviventris Donev

Fig. 1 The habitus of: *G. ovicenatus* Leon. & Cros. - left side, *O. flaviventris* Donev – on the right side (original)

A list of species is given:

Family Mymaridae		
No.	**SPECIES**	**SOURCE**
1	***Alaptus fusculus* Walker, 1846** = *Alaptus foersteri* Soyka, 1939	Botoc (1963)
2	***Alaptus minimus* Westwood, 1839** **=** *Alaptus crassus* Kryger, 1950 = *Alaptus uncinatus* Kryger, 1950	Botoc (1963,1965)
3	***Alaptus pallidornis* Forster, 1856** = *Alaptus pallidicornis* Forster, 1856	Pricop (2007, 2008)

4	***Anagrus atomus* (Linnaeus, 1767)** = *Ichneumon atomus* Linnaeus, 1767	Botoc (1962, 1965, 1975); Pricop (2007, 2008)	
5	***Anagrus bakkendorfi* Soyka, 1946** = *Anagrus incarnatus fuscus* Botoc, 1963	Botoc (1963, 1965)	
6	***Anagrus breviphragma* Soyka, 1955** = *Anagrus longigaster* Soyka, 1956 = *Anagrus ovipositor* Soyka, 1956 = *Anagrus supremus* Soyka, 1956 = *Anagrus vacuipennis* Soyka, 1956 = *Anagrus silwoodensis* Walker, 1979	Pricop (2007, 2008)	
7	***Anagrus incarnatus* Haliday, 1833** = *Anagrus debilis* Förster, 1847 = *Anagrus flavus* Förster, 1847 = *Anagrus pallidus* Förster, 1847 = *Anagrus pallipes* Förster, 1861 = *Anagrus pallidipes* Dalla Torre, 1898 = *Anagrus hydrophilus* Ashmead, 1905 = *Anagrus incarnatosimilis* Soyka, 1956 = *Anagrus stenocrani* Walker, 1979 = *Anagrus mutans* Walker, 1979	Botoc (1960, 1962, 1965, 1975)	
8	***Anagrus similis* Soyka, 1955** = *Anagrus holci* Walker, 1979	Pricop (2007)	
9	***Anagrus subfuscus* Forster, 1847**	Botoc (1963, 1965)	
10	***Anaphes arenbergi* Debauche, 1948**	Botoc (1972, 1975)	
11	***Anaphes aries* Debauche, 1948**	Pricop (2007, 2008)	
12	***Anaphes brachygaster* (Debauche, 1948)** = *Patasson brachygaster* Debauche, 1948	Botoc (1965)	
13	***Anaphes calvescens* (Debauche, 1948)** = *Patasson calvescens* Debauche, 1948	Botoc (1965)	
14	***Anaphes diana* (Girault, 1911)** = *Anaphoidea diana* Girault, 1911 = *Patasson lameerei* (Debauche, 1948)	Botoc (1965); Pricop (2007, 2008)	
15	***Anaphes flavipes* (Forster, 1841)** = *Gonatocerus flavipes* Förster, 1841 = *Anaphes lemae* Bakkendorf, 1970	Botoc (1965, 1974)	
16	***Anaphes fuscipennis* Haliday, 1833** = *Anaphes pratensis* Forster 1847	Botoc (962, 1965, 1975); Pricop (2007)	
17	***Anaphes fuscipennis* Hal. *sensu* Debauche, 1948**	Pricop (2007, 2008)	
18	***Anaphes gauthieri* Debauche,1948**	Botoc (1965, 1974)	
19	***Anaphes latipterus* Botoc, 1962** = *Anaphes* (*Patasson*) *latipterus* Botoc, 1962	Botoc (1962, 1965)	
20	***Anaphes leptoceras* (Debauche, 1948)** = *Patasson leptoceras* Debauche, 1948	Pricop (2007, 2008)	
21	***Anaphes luna* (Girault, 1914)** = *Anaphoidea luna* Girault, 1914	Botoc (1958, 1965, 1975)	

22	***Anaphes maialis* (Debauche1948)** = *Patasson maialis* Debauche, 1948	Botoc (1965, 1974)
23	***Arescon dimidiata* (Curtis, 1832)** = *Arescon rufula* (Forster, 1847) = *Leimacis rufula* Förster, 1847	Botoc (1964, 1965); Pricop (2007)
24	***Camptoptera papaveris* Förster, 1856**	Botoc (1962, 1965, 1975); Pricop (2007, 2008)
25	***Camptoptera transilvanica* (Botoc, 1959)** = *Sphegilla transilvanica* Botoc, 1959	Botoc (1959)
26	***Cleruchus leptosoma* Debauche, 1948**	Botoc (1964, 1965)
27	***Cleruchus pluteus* Enock, 1909**	Botoc (1964, 1965)
28	***Erythmelus flavovarius* (Walker, 1846)** = *Erythmelus goochi* Enock, 1909 = *Panthus flavovarius* Walker, 1846 = *Erythmelus spinosus* Mathot, 1969	Botoc (1972, 1975); Andriescu (1993, 1996); Pricop (2007, 2008)
29	***Erythmelus lygivorus* Viggiani & Jesu 1985**	Pricop (2007)
30	***Erythmelus rex* (Girault, 1911)** = *Anthemiella rex* Girault, 1911 = *Parallelaptera rex* (Girault, 1911) = *Erythmelus margianus* S. Trjapitzin, 1993	Pricop (2007, 2008)
31	***Erythmelus soykai* (Donev, 1998)**	Pricop (2007)
32	***Gonatocerus ater* Förster, 1841** = *Lymaenon schmitzi* Debauche, 1948 = *Lymenon intermedius* Botoc, 1962 = *Lymaenon populi* Viggiani, 1969	Botoc (1962, 1965, 1975)
33	***Gonatocerus chrysis* (Debauche, 1948)** = *Lymaenon chrysis* Debauche, 1948 = *Gonatocerus gracilentus* Hellen, 1974	Botoc (1965, 1975); Pricop (2007, 2008)
34	***Gonatocerus litoralis* (Haliday, 1833)** = *Ooctonus litoralis* Haliday, 1833 = *Lymaenon paludis* Debauche, 1948 = *Lymaenon rhacodes* Debauche, 1948 = *Lymaenon arduennae* Mathot, 1969 = *Lymaenon cunctator* Mathot, 1969 = *Gonatocerus pulchellus* Hellén, 1974	Botoc (1960, 1965, 1975); Dimitriu (2001); Pricop (2007, 2008)
35	***Gonatocerus longicornis* Nees, 1834** = *Lymaenon terebrator* (Förster, 1847) = *Gonatocerus cicadellae* Nikol'skaya, 1951 = *Lymaenon britteni* Hincks, 1960 = *Lymaenon longiventris* Botoc, 1963	Botoc (1960, 1963, 1965, 1975); Dimitriu (2001); Pricop (2007, 2008)
36	***Gonatocerus ovicenatus* Leonard & Crosby 1915** = *Lymaenon tremulae* Bakkendorf, 1934	Pricop (2008)
37	***Gonatocerus pictus* (Haliday, 1833)** = *Gonatocerus flavus* Förster, 1841	Botoc (1965, 1975); Pricop (2007, 2008)
38	***Gonatocerus sulphuripes* (Förster, 1847)** = *Lymaenon crassipes* Debauche, 1948	Botoc (1958, 1963, 1964, 1965, 1975); Dimitriu

	= *Lymaenon synaptus* Debauche, 1948 = *Lymaenon alecto* Debauche, 1948	(2001); Pricop (2007, 2008)
39	***Gonatocerus thyrides* (Debauche, 1948)**	Botoc (1965); Dimitriu (2001)
40	***Litus camptopterus*** Novicky, 1953 = *Litus distinctus* Botoc, 1964	Botoc (1964)
41	***Litus cynipseus* Haliday, 1833** = *Litus krygeri* Kieffer, 1913	Botoc (1965, 1974); Pricop (2007, 2008)
42	***Mymar pulchellum* Curtis, 1832** = *Mymar spectabilis* Förster, 1856 = *Mymar venustum* Girault, 1911 = *Pterolinononyketra obenbergeri* Malac, 1943	Botoc (1960, 1965); Pricop (2007, 2008)
43	***Mymar taprobanicum* Ward, 1875** = *Mymarilla taprobanica* (Ward, 1875) = *Mymar tyndalli* Girault, 1912 = *Mymar antillanum* Dozier, 1937 = *Mymar indica* Mani, 1942 = *OgloblinielIa aegyptiaca* Soyka, 1950	Andriescu (1993, 1996); Pricop (2007)
44	***Ooctonus flaviventris* Donev, 1990**	Pricop (2008)
45	***Ooctonus hemipterus* Haliday, 1833** = *Ooctonus atroclavatus* Kieffer, 1913 = *Ooctonus hemipterus igneus* Debauche, 1948 = *Ooctonus soykai* Hincks, 1952	Pricop (2007, 2008)
46	***Ooctonus isotomus* (Mathot, 1969)**	Pricop (2007, 2008)
47	***Ooctonus notatus* Walker, 1846** = *Ooctonus heterotomus* Förster, 1847	Pricop (2007, 2008)
48	***Ooctonus vulgatus* Haliday, 1833** *Ooctonus wesmaeli* Debauche, 1948	Pricop (2007, 2008)
49	***Polynema flavipes* Walker, 1846** = *P. longulum* Forster, 1847	Botoc (1963, 1965, 1975)
50	***Polynema fumipenne* Walker, 1846** = *Polynema fumipennis* Walker, 1846	Botoc (1965, 1975)
51	***Polynema halidayi* Debauche, 1948**	Botoc (1963, 1965)
52	***Polynema laetum* Förster, 1847** = *Polynema laeta* Förster, 1847	Botoc (1965)
53	***Polynema mutabile* Botoc, 1963**	Botoc (1963, 1965)
54	***Polynema ovulorum* (Linnaeus, 1758)** = *Ichneumon ovulorum* Linnaeus, 1758 = *Pteromalus ovulorum* (Linnaeus, 1758)	Botoc (1962, 1965, 1975)
55	***Polynema pusillum* Haliday, 1833** = *Polynema pusillus* Haliday, 1833	Botoc (1972)
56	***Polynema tenue* Soyka, 1956** = *Polynema tenuis* Soyka, 1956	Andriescu (1993, 1996)
57	***Polynema valkenburgense* Soyka, 1931** = *Polynema valkenburgensis* Soyka, 1931	Botoc (1972, 1975)
58	***Stephanodes similis* (Förster, 1847)**	Botoc (1962, 1963, 1965,

	= *Stephanodes elegans* Enock, 1909 = *Polynema enockii* Girault, 1911 = *Stephanodes psecas* Girault, 1912 = *Polynema similis* Förster, 1847 = *Polynema isotoma* Debauche, 1949	1975); Pricop (2007, 2008)
59	***Stethynium triclavatum* Enock 1909** = *Stethynium faunum* Girault, 1911	Botoc (1964, 1965); Pricop (2007)

Family Mymarommatidae		
Nr.	**SPECIES**	**SOURCE**
1.	***Palaeomymar anomalum* (Blood & Kryger, 1922)** = *Mymaromma anomalum* (Blood & Kryger, 1922) = *Petiolaria anomala* Blood & Kryger, 1922	Andriescu (1964)

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FAUNA OF CUCKOO WASPS (HYMENOPTERA, CHRYSIDIDAE) IN THE INTERFLUVE OF THE PRUT AND DNIESTER RIVERS IN THE REPUBLIC OF MOLDOVA

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Abstract. The paper presents the first data on the fauna and diversity of chrysidid wasps in the Republic of Moldavia, between the Prut and Dniester rivers, as well as adjacent areas of Ukraine nearby Dniester, between 1986 and 1990. For the fauna of Moldavia 83 species and 7 subspecies of chrysidid wasps are cited. The locality and collection data of the material is specified

Keywords: Fauna, chrysidid wasps, species composition, distribution, Republic of Moldova.

Introduction

Chrysidid wasps are parasites of solitary bees of superfamily Apoidea, and of some digging and eumenid wasps of the families Sphecidae and Eumenidae. Parasiting on bees, pollinators of many higher plants and on wasps as entomophages, the chrysidid wasps are an important part of ecosystems in mountain and plain landscapes. Despite of valuable data on fauna and biology of chrysidid wasps in the Middle and Eastern Europe (Mocsary, 1889a.; Buysson, 1891-1896; Trautmann, 1927; Balthasar, 1951, 1954; Negru, 1955, 1958, 1959, 1960, 1968, 1975; Linsenmaier, 1959; Noskiewicz, Pulawski, 1958; Nikolskaja, 1978; Kilimnik, 1993; Vinokurov, 2003, 2004a, 2004б, 2004в), many regions still remains uninvestigated.

The fauna and specific structure of chrysidid wasps in the Republic of Moldova, until recently, remained poorly studied, that constrains the decision of the important fundamental and applied questions connected with the ecology of bees, as pollinators of plants and predatory wasps, as entomophages of many pest species of bugs and lepidopterans.

In this connection, the study of the fauna and the specific structure of chrysidid wasps between the Prut and Dniester rivers is up-to-date and necessary.

The aim of this paper is to complete data on fauna, the specific structure and distribution of the chrysidid wasps on the territory of the Moldavian Republic and adjoining areas of Ukraine.

Material and methods of research

The material was collected during the years 1986-1990 by the method of capture with a standard entomological net and by individual capture of chrysidid wasps from the places of their dwellings. There are more ecological complexes among chrysidid wasps.: geobionts- inhabitants of abrupt and flat argillo- arenaceous slopes and ravines in valleys of the rivers and streams; xylobionts-inhabitants of dry forest stand, stratobionts - captured on stones and stony taluses, and anthophylous - captured during the visit of blooming plants. During the research more than 1,000 individuals of chrysidid wasps were collected and analysed. Identification of the material was made by the author and verified by comparison with type specimens from the collections of Zoological Institute of the Russian Academy of Science (St.-Petersburg) and the National Museum of Czech

Republic (Prague). The material is stored in collections of the Zoological Institute of the Russian Academy of Science (St.-Petersburg) and in the author's personal collection.

The obtained data give us a representation about the fauna and specific diversity of chrysidid wasps in the Republic of Moldova and their distribution between the Prut and Dniester rivers.

The species composition of chrysidid wasps fauna

For the fauna of the Republic of Moldova, between the Prut and Dniester rivers,83 species and 7 subspecies of chrysidid wasps were found.

The list is given according to the system accepted in the Keys for the identification of insects of the European part of the former USSR (Nikol'skaya, 1978), and in terms of new views on the system of family Chrysididae (Semenov-Tian-Shanski, 1954a, 1967; Linsenmaier, 1959; Kimsey, Bohart, 1990).

Family Chrysididae
Subfamily **Hedychrinae**
Tribe **Elampini**

Genus ***Elampus*** **Spinola, 1806**

1.*E. ambiguus* Dahlb. (=*notozus* F.)– in the vicinity of Chişinău, Taraclia, Sadaclia, Grătieşti, Zaim, Căuşeni. Found from August 1 till August 22, unfrequent (13 specimens).
2.*E. bidens* F.– Cioburciu (Ştefan Vodă district), Grătieşti, Slobozia, Chişinău. Found from May 13 till July 14, unfrequent (8 specimens).
3.*E. cecchiana* Sem.- Chişinău. It was observed on July 14, rare (1 specimen).
4.*E. constrictus* F. - Chişinău, villages: Grătieşti, Hulboaca, Speia, Goian, Taraclia, Slobozia. It is met everywhere from May 13 till August 16. It is a common species (34 specimens).
5.***E. konowi*** Buyson.- Mogilyov-Podolsk (Vinnitsa region, Ukraine). It was observed on July 28.It is rarely met (3 specimens).
6.***E. panzeri*** F.- villages :Grătieşti , Hulboaca. It is met from May 27 till July 12, unfrequent (3 specimens).
7.*E. petri* Sem. - Chişinău, Grătieşti, Speia, Taraclia. Met in the first half of summer from June 1st till July 12, rarely (5 specimens).
8.*E. sanzi* Gogorza - villages :Chişinău, Zaim (Căuşeni area), Dubăsari. Met from May 16 till June 1 (3 specimens).
9.E. spina Lep.- Sălcuța and Căuşeni villages, Chişinău. Met from June 2 till June 23, rare (2 specimens).

Tribe **Omalini**
Genus ***Omalus*** **Panzer, 1801**

10.O. aeneus F.– Grigoriopol area, villages, Bularda (Călăraşi area), Sîngera, Chişinău. Met from May 16 till August 16, rare (4 specimens).
11.O. bidentulus Lep.- Chişinău, Grătieşti, Hulboaca, Speia, Bugeac, Pănăşeşti, Bularda, Blue (area Cahul), Sadaclia (Basarabeasca area). Met often from May 25 till September 18 (104 specimens).

12.O. miramae Sem.- Chişinău. Met from May 18 till September 2, rare (2 specimens).
13.O. zarudnii Sem.- Pănăşeşti, it was observed on July 16 (Korneey V.), 1 specimen, rare.

Genus ***Pseudomalus*** **Ashmead, 1902**

14.P. auratus(L.)– It is met on the whole territory of the Republic of Moldova, from April 20 till September 17 (34 specimens).
15.P. auratus virescens **(** Mocs.) -. Hulboaca village. (Criuleni area). It was found on June 13,rare.
16.P. bergi (Sem.)- Taraclia village (Vulcăneşti area). It was observed on June 9 (1 specimen), rare.
17.P. bogdanovii (Rad.)-Sadaclia (Basarabeasca area), it was observed on August 10, unfrequen (2 specimens).
18.P. borodini Sem.- Everywhere from May 18 till September 13. Frequent (22 specimens).
19.P. kuznetzovi Sem. Chişinău, Grătieşti (Criuleni area); from May 18 till July 15, unfrequent (6 specimens).
20.P. pusillus (F.)- Moroşeni village, Borogani village (Comrat area), Bugeac, Taraclia, Etulia (Vulcăneşti area), Grătieşti, Pănăşeşti, Hulboaca, Călăraşeuca, Bularda, Gruschevo, Troiţcoe. Frequent from May 18 till August 22 (60 specimens).
21.P. rutchenus (Sem.)- Chişinău, 1 individual, rare, it was captured on June 1.
22.P. violaceus (Scop.)- Chişinău, Bugeac, Gruschevo, Troiţcoe. It is met from June 1 till August 9 unfrequent (15 specimens).
Genus ***Philoctetes*** **Abeille 1879**

23.Ph. sareptanus Mocs.- Chişinău, it was observed on June 1 (1 specimen), rare.

Tribe **Holopygini**
Genus ***Holopyga*** **Dahlbom, 1845**

24.H. amoenula Dhlb.- The species is common throughout the investigated territory. It is found in Chişinău, Sălcuţa, Troiţcoe, lake Turunciuc, from June 2 till August 9, uinfrequent (7 specimens).
25.H. aureomaculata Abeille.- Chişinău, Hulboaca village, Monashi (Odessa Region, Ukraine), from June 13 till June 23 (3 specimens), rare.
26.H. baeckmanni Sem.- Chişinău, Ukraine (Odessa Region). It is observed from June 14 till June 25 (3 specimens), rare.
27.H. chrysonota F.- Chişinău, Sălcuţa village (Basarabeasca area). Met from June 6 till August 11, rare (3 specimens).
28.H. comosa Sem.- Chişinău, it was observed on May 25 (1 specimen), rare.
29.H. fervida F.- Chişinău, Tartaul (Cantemir area), Slobozia area, Goian, Hulboaca, Grătieşti. The species is met everywhere from June 25 till July 29 (34 specimens).
30.H. hirta Sem.- Chişinău. It was observed on June 1 (1 specimen), rare.
31.H. ovata Dhlb.- Chişinău, lake Turunciuc. Met rarely, it was observed on June 13 and 29 (2 specimens).

Genus ***Colpopyga*** **Semenov, 1954**

32.C. flavipes Eversm.- Goian village (Criuleni area). Met rarely, it was found on July 4 (1specimen).

Tribe **Hedychrini (** Mocs.)
Genus ***Hedychridium*** **Abeille, 1878**

33.H. ardens Latr.- Chişinău, Hulboaca village, Călăraşeuca, Monaschi (Odessa Region). Met everywhere from May 20 till September 5 (29 specimens).
34.H. coriaceum Dhlb.- met everywhere from May 13 till September 12, frequent (29 specimens).
35.H. elegantulum Buysson.- Chişinău, rare. 1 specimen was found on August 12.
36.H. femoratum Dhlb.- Chişinău, Hînceşti (formerly Kotovsk), Hulboaca village. Met from June 22 till July 19, rare (3 specimens).
37.H. integrum Dhlb.- Chişinău, Hulboaca village, Goian, Grătieşti. Met from May 20 till August 11, unfrequent (8 specimens).
38.H. purpurescens Dhlb.- Hulboaca village, Căuşeni, Călăraşeuca, Grigoriopol, Gruschevo. Met from May 16 till August 19, unfrequent (9 specimens).
39.H. zelleri Dhlb.- Chişinău, Hulboaca village, Costeşti, Leuşeni, Troițcoe, Pănăşeşti. Met from June 29 till September 5, everywhere (54 specimens). From May 20 till August 22, there were individuals of the black form (27 specimens).

Genus ***Hedychrum*** **Latreille, 1806**

40.H. cholodkovskii Sem. et Nik.- Chişinău, Goian village, Onişcani, Hulboaca. Met from July 2 till August 22, unfrequent (9 specimens).
41.H. gerstaeckeri Chevrier.- the species is met from June 10 till September 12, almost everywhere, frequent (38 specimens).
42.H. longicolle Abeille- met from July 19 till August 24, rare. We found 2 specimens in the Hulboaca village and Chişinău.
43.H. mithras Sem.- Chişinău, Grătieşti village. Met from June 17 till July 12 (2 specimens), rare.
44.H. intermedium Dhlb. - Chişinău, Hulboaca, Troițcoe, Pănăşeşti, Costeşti, of Mogilyov-Podolsk (Vinnitsa region, Ukraine). Often met from July 3 till September 5 (46 specimens).
45.H. nobile Scop.- Met from May 27 till September 2, everywhere (135 specimens).
46.H. virens Dhlb.- Gruschevo village. Met in August, rare (2 specimens).

Genus ***Euchrum*** **Semenov, 1954**

47.E. roseum Rossi - Chişinău, Hulboaca village, Gruschevo. Met from July 2 till September 2, frequent (12 specimens).
48.E. sculpturatum Abeille - Hulboaca village. It was observed on July 19th, rare (1 individual).

49.E. valesiense Linsenmaier - Hulboaca village, 1 specimen was found on July 19th. Rarely met.

Tribe **Chrysidini**
Genus ***Chrysidea*** **Bischoff, 1913**

50.Ch. pumila Klug. - Hulboaca village, Costeşti, Taraclia. Met from July 9 till August 9, unfrequent (5 specimens).
Genus ***Trichrysis*** **Lichtenstein, 1876**

51.T. cyanea (L.) (***Chrysis cyanea*** L.) -the species is met everywhere from May 12 till September 20. Frequent. (153 specimens).

Genus ***Chrysis*** **Linnaeus, 1761**

52.Ch. aestiva Dhlb.- Hulboaca village (Criuleni area). It was observed on July 5th (1 specimen), rare.
53.Ch. angustifrons Abeille. - Gruschevo village, Onişcani, Goian, of Hînceşti (formerly Kotovsk), Hulboaca, Grătieşti, Ştefan Vodă (formerly Suvorovo). Met from April 16 till August 6 (22 specimens), frequent.
54.Ch. bilobata Balth.- Goian village (Criuleni area). Rare (1 specimen).
55.Ch. chrysoscutellaris Lins.- Hulboaca village, Bugeac. Met from June 13 till July 12, rarely (3 specimens).
56.Ch, fasciata Oliv. (the form *zetterstedti* Dahlb.) - Monaschi village (Odessa Region) on June 14, it is rare (1 specimen).
57.Ch. frivaldsky Mocs.- Speia village. 1 specimen was found on June 1. Rarely met.
58.Ch.fulgida L.- Hulboaca village, it was observed on June 19-20 (2 specimens), rare.
59.Ch. glasunovi Sem.- Hulboaca village, on July 24 (1 specimen), rare.
60Ch.gracillima Forst.- Ştefan Vodă (formerly Suvorovo), it was observed on June 13 (1 specimen), rare.
61.Ch. grumorum Sem.- Chişinău, it was observed on July 31 (1 specimen), rare.
62.Ch. germari Wesm.- Chişinău, on June 20, rarely (1 specimen).
63.Ch. ignita L. - Chişinău, Hînceşti (formerly Kotovsk), Hulboaca village, Borogani (Comrat area), Grătieşti. Met from April 16 till August 11, quite often (9 specimens).
64.Ch. ignita impressa Schuck.- Hulboaca village, met from June 14 till July 19 (2 specimens), rare.
65.Ch. ignita mediadentata Lins.- Grătieşti village, it was observed on April 30 (1 specimen),rare.
66.Ch. inaequalis Dhlb.- Goian village, Gruschevo. Met from May 13 till July 24, unfrequent (6 specimens).
67.Ch. inaequalis placida Mocs.- Gruschevo village, Goian (3 specimens), rare.
68.Ch. indigotea D.-P.- Hulboaca village, Mogilev Podolsky (Ukraine). Met from May 27 till July 28, rare (3 specimens).
69.Ch. leachi Shuck. - the species is usually met everywhere from June 5 till September 20, frequent (45 specimens).
70.Ch. longula Abeille.- Goian village, it was observed on July 4 (1 specimen), rare.

71.Ch. mediata fenniensis Lins.- Hulboaca village, it was observed on May 20 (1 specimen), rare.
72.Ch. mediactris Dhlb.- Goian village, it was observed on July 4-9 (3 specimens), rare.
73.Ch. obtusidens D.-P.- Goian village, it was observed on July 4 (1 specimen), rare.
74.Ch. phryne Abeille.- Chişinău, Goian village, it was observed on June 6-12 (2 specimens), rare.
75.Ch. pyrrhina Dhlb.- Chişinău, Cociula village (Cantemir area). Met from June 18 till September 5, rare (2 specimens).
76.Ch. pulchella Spin.-. Bugeac village, met rarely. 1 specimen was found on June 17.
77.Ch. ramburi Dhlb.- Mogilev Podolsky (Ukraine), on July 27, rarely (1 specimen).
78.Ch. rutilans Oliv.- Gruschevo village, Goian, Hulboaca, Ştefan Vodă (formerly Suvorovo). Met from May 20 till July 24, unfrequent (15 specimens).
79.Ch. ruddi Shuck.- Grătieşti, Hulboaca villages. Bakta (Beregovsky area , Ukraine), met from April 30 till July 24 (3 specimens), rare.
80.Ch. scutellaris F **(=*Ch. calandra*** Sem.)- Gruschevo village, Goian. It was observed on June 6-9. Met rarely (2 specimens).
81.Ch. soror Dhlb. (= ***Ch. ariadne*** Mocs.)- Goian village, Costeşti, Gruschevo, Mogilev Podolsky (Ukraine). Met from June 6 till August 9, unfrequently (12 specimens).
82.Ch. splendidula Dhlb.- Hulboaca village, it was observed on May 14 (1 specimen), rare.
83.Ch. splendidula decore Mocs.- Goian, it was observed on June 6 (1 specimen), rare.
84.Ch. succincta L.- Hulboaca village, it was observed on August 23 (1 specimen), rare.
85.Ch. succincta sparsepunctata Buyss.- Hulboaca, Grătieşti, Cociula, met from April 16 till June 18 (5 specimens), unfrequent.
86.Ch. trimaculata F.- Grătieşti village, Gruschevo, Pănăşeşti, Onişcani. Met from April 15 till June 9 unfrequent (9 specimens).
87.Ch. viridula L.- Chişinău, Costeşti. Met from June 25 till August 9, rare (2 specimens).

Genus ***Chrysura*** **Dahlbom, 1845**
88.Ch. dichroa (Dhlb.)- Chişinău, Gruschevo village, Grătieşti, Ştefan Vodă (formerly Suvorovo), Goian, Hulboaca, Grigoriopol. Met from April 16 till July 24, frequent (50 specimens).
89.Ch. radians (Harris) =***Ch. bicolor*** (Lep.) - Gruschevo village on July 2, rare (1 specimen).

Genus ***Pseudospinolia*** **Linsenmaier, 1951**

90.P. neglecta Shuck.- in the vicinity of Hînceşti (formerly Kotovsk). It was found on June 22 (1 specimen). Rare.

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NEW AND RARE TRYPHONINAE AND CTENOPELMATINAE (HYMENOPTERA: ICHNEUMONIDAE) FOR THE ROMANIAN FAUNA

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Abstracts. In this paper the authors present 17 species of Ichneumonidae belonging to 11 genera of subfamilies Tryphoninae and Ctenopelmatinae, collected from different ecosystems of Romania. The species *Euryproctus albitarsis* Strobl, *Euryproctus plantator* Thunberg (tribe Euryproctini, subfamily Ctenopelmatinae) are new for the Romanian fauna. The other 15 species are rare for the Romania and for the European fauna, in general.

Key words: Tryphoninae, Ctenopelmatinae, Ichneumonidae, new species, Romanian fauna

Introduction

Ichneumonids represent a group of parasitoid entomophagous insects with an important role in limiting of populations of some main pests of agriculture and sylviculture. Their action contributes to the significant decrease of the damages produced by these pests, and to the maintenance of the ecological equilibrium in nature. This paper contributes to the knowledge of the biodiversity of the useful Romanian fauna.

Material and Methods

The researches were carried out during the months May and June of the year 2007, in different ecosystems: lawn (“Valea lui David”, Iaşi county) and forests (Zăiceşti, Guranda, Botoşani county and Roşcani, Iaşi county. Ichneumonids were collected by the entomological net, using those two classical methods: mowing and watching. Identification of the species was realized at the Olympus stereomicroscope.

Results and Discussions

The authors present the synopsis of 17 ichneumonid species, which comprises the place and the collecting data, known hosts, geographical distribution (table 1). We present a short diagnosis for the new species of the Romanian fauna.

Family **ICHNEUMONIDAE** Latreille, 1802

Subfamily **TRYPHONINAE**, Shuckard, 1840
Tribe **Exenterini** Förster, 1869
I. Genus **ERIDOLIUS** Förster, 1869

1. ***Eridolius similis*** Holmgren 1857, ♀

Material: 1 ♀, 15. VI. 2007, natural reserve of “Valea lui David”, Iaşi county.

Length = 5 – 6,5 mm.

<u>Hosts</u>: unknown.

<u>Geographical distribution</u>: Sweden, Norway, Finland, France, Russia (St. Petersburg, Moscova, Murmansk, Iakuţk, Magadansk, Buriatia), Azerbaidjan, Kirghistan. In Romania it is a very rare species, being previously recorded from Capra valley, Argeş county,

Călian forest, Dorobanți village, Nicşeni commune, Botoşani county (M. Constantineanu, R. Constantineanu, Irinel Constantineanu, 2000).

2. ***Eridolius bimaculatus*** Holmgren 1855, ♀

Material: 1 ♀, 15. VI. 2007, natural reserve of "Valea lui David", Iaşi county.

Length = 5 mm.

Hosts: *Pteronidea bergmani* Dahlb. (Hym., Tenthredinidae).

Table 1. Ichneumonid species and their hosts in some praticolous and forest ecosystems

No	Species	Hosts	Distribution degree in Romania
1	Subfam. **Tryphoninae**, Shuckard ***Eridolius similis*** Holmgr.	unknown	●
2.	***Eridolius bimaculatus*** Holmgr.	*Pteronidea bergmani* Dahlb. (Hym., Tenthredinidae)	■
3.	***Exenterus abruptorius*** Thunb.	*Diprion pini* L., *D. simile* Htg., *Microdiprion pallipes* Fall., *Neodiprion sertifer* Geoffr., *Gilpinia polytoma* Hart., *G. socia* Kl., *G. hercyniae* Htg. (Hym., Diprionidae), *Periclista pubescens* Zadd. (Hym., Tenthredinidae)	■
4.	***Kristotomus laticeps*** (Grav.)	*Pteronidea ribesii* (Scop.) (Hym., Tenthredinidae).	●
5.	***Ctenochira angustata*** Rom.	unknown	●
6.	***Ctenochira arcuata*** (Holmgr.)	unknown	■
7.	Subfam. **Ctenopelmatinae**, Förster ***Euryproctus albitarsis*** Strobl.	unknown	◙
8.	***Euryproctus plantator*** Thunb.	unknown	◙
9.	***Sychnoleter geniculosus*** Grav.	*Selandria serva* F. and *Selandria sixi* Voll. (Hym., Tenthredinidae)	■
10.	***Hadrodactylus femoralis*** Holmgr.	unknown	■
11.	***Hadrodactylus thomsoni*** Schm.	*Dolerus madidus* Kl. (Hym., Tenthredinidae)	●
12.	***Mesoleptidea prosoleuca*** Grav.	*Tenthredo scrophulariae* L., *Tenthredo atra* L. and *Tenthredo ferruginea* Schrank (Hym., Tenthredinidae)	●
13.	.***Mesoleptidea melanobasis*** (Kriechb.)	unknown	●
14.	***Priopoda stictica*** F.	*Empria candidata* Fall. (Hym.,	●

		Tenthredinidae) and *Arge ustulata* L. (Hym., Argidae)	
15.	***Sympherta ambulator*** Thunb.	*Rhogogaster punctulata* Klug. and *Tenthredo mesomelas* L. (Hym., Tenthredinidae)	■
16.	***Trematopygus ruficornis*** Holmgr.	unknown	●
17.	***Trematopygus vellicans*** Grav.	unknown	●

Legend: ◙ new species for the Romania's fauna; ● very rare species; ■ rare species

Geographical distribution: Center and Northern Europe, Russia (St. Petersburg). In Romania it is a rare species, being previously recorded from the Piatra Mare mountain, Timişul de Jos commune, Braşov county, natural reserve "Codrul Secular Slătioara", Suceava county; Durău, Hangu commune, Neamț county (M. Constantineanu, R. Constantineanu, Irinel Constantineanu, 2000).

II. Genus **EXENTERUS** Hartig, 1837

3. ***Exenterus abruptorius*** Thunberg, 1822, ♀

Material: 1 ♀, 15. VI. 2007, natural reserve "Valea lui David", Iaşi county.

Length = 8 - 10 mm.

Hosts: *Diprion pini* L., *D. simile* Htg., *Microdiprion pallipes* Fall., *Neodiprion sertifer* Geoffr., *Gilpinia polytoma* Hart., *G. socia* Kl., *G. hercyniae* Htg. (Hym., Diprionidae), *Periclista pubescens* Zadd. (Hym., Tenthredinidae).

Geographical distribution: Central and Northern Europe, Estonia, Ukraine, Russia (St. Petersburg, Novgorod, Vladimirsk, Voronej, Rostov, Saratov), Georgia, Coreea, Japan. In Romania it is a very rare species, being previously recorded only in Dumbrava forest, Sibiu county (M. Constantineanu, R. Constantineanu, Irinel Constantineanu, 2000).

III. Genus **KRISTOTOMUS** Mason, 1962

4. ***Kristotomus laticeps*** (Gravenhorst, 1829), ♀♂

Material: 1 ♀, 15. VI. 2007, natural reserve "Valea lui David", 1 ♂, 14. VI. 2007, Roşcani forest, Iaşi county.

Length = 6,5 - 8 mm.

Hosts: *Pteronidea ribesii* (Scop.) (Hym., Tenthredinidae).

Geographical distribution: Euro-siberian species. Belgium, England, France, Germany, Sweden, ex-Czechoslovakia, Ukraine, Byelorussia, Russia (St. Petersburg, Volgograd), Mongolia. In Romania it is a rare species, being previously recorded from Saschiz, Mureş county, Ineu, Arad county and Pângăraţi, Neamț county (M. Constantineanu, R. Constantineanu, Irinel Constantineanu, 2000).

Tribe **Tryphonini** Shuckard, 1840

IV. Genus **CTENOCHIRA** Förster, 1855

5. ***Ctenochira angustata*** Roman 1909, ♂

Material: 1 ♂, 15. VI. 2007, natural reserve "Valea lui David", Iaşi county.

Length = 7 mm.

Hosts: unknown.

Geographical distribution: Sweden, Finland, Norway, Russia (valley of the upper course of the Enisei river), Mongolia. In Romania it is a very rare species, being previously recorded on the valley of the Buda creek, Argeş county; Prislop, Cisnădioara commune, Sibiu county (M. Constantineanu, R. Constantineanu, Irinel Constantineanu, 2000).

6. ***Ctenochira arcuata*** (Holmgren, 1855), ♀♂

Material: 1 ♀ and 1 ♂, 15. VI. 2007, Zăiceşti forest, Botoşani county.

Length = 5 - 6 mm.

Hosts: unknown.

Geographical distribution: Forest species. Central and Northern Europe, Russia (Arhanghelsk, Volgograd, Murmansk, Komi), Armenia, Northern Mongoliei. In Romania it is a rare species, being previously recorded from Ciocanu, Dâmbovicioara commune, Argeş county; Pojorâta, Suceava county; Ceahlău mountains, Neamț county (M. Constantineanu, R. Constantineanu, Irinel Constantineanu, 2000).

Subfamily **CTENOPELMATINAE**, Förster, 1869
Tribe **EURYPROCTINI** Thomson, 1883
V. Genul **EURYPROCTUS** Holmgren, 1857

7. ***Euryproctus albitarsis*** Strobl, 1903, ♂

Material: 1 ♂, 14. V. 2007, Zăiceşti forest, Botoşani county.

♂. Head and thorax fine rugged, mat. Head obviously narrowed beyond eyes.

Clypeus shiny, with rounded fore edge. Notauli weakly. Propodeum areolated. Areolet small, pedicled. Nervulus interstitial; nervellus broken in the middle. Legs are robust. Tergite 1 long and slender, petiole mat, postpetiole shiny; the other tergite smooth and shiny; transversally, beginning with the third tergite.

Black. White are: cheeks, scape, the antennae ring, ventral side of trochanters, the apex of fore femorae, the base of the middle and hind femorae, middle tibiae almost entirely, fore tarsi and a ring on hind tarsi. Red are: antennae, tergites 2 – 4, the hind edge of the tergite 1, middle part of fore femorae and the apex of fore and middle tibiae. Hind tibiae are tricolour: white, red and black. Clipeus and mandibles black. Wings are grey, stigma dark brown. The female unknown.

Length = 7 mm.

Hosts: unknown.

Geographical distribution: Austria, Germany. **New species for the Romania's fauna.**

8. ***Euryproctus plantator*** Thunberg, 1822, ♀♂

Synonym:

1857 *Euryproctus tuberculatus* Holmgren, 1857, ♀

Material: 1 ♀, 14. V. 2007, Guranda forest, Botoşani county; 1 ♂, 15. VI. 2007, natural reserve "Valea lui David", Iaşi county.

♀. Body fine rugged. Head not narrowed beyond eyes. Propodeum areolated.

Areolet present. Nervellus broken above the middle. Tergite 1 weakly compressed, with strong prominent spiracles, postpetiole widened gradually behind.

Black. Antennae with white ring; its ventral side reddish. Stigma yellowish. Tibiae, tarsi and fore femorae are red, hind tibiae with blackish apex; hind tarsi with white ring. Tergites 1 – 4 are red.

Length = 10 - 12 mm.

Hosts: unknown.

Geographical distribution: Northern and Western Europe. **New species for the Romanian fauna.**

VI. Genus **SYCHNOLETER** Förster, 1868

9. ***Sychnoleter geniculosus*** Gravenhorst, 1829, ♀♂

Material: 1 ♀, 14. V. 2007, Guranda forest, Botoşani county; 1 ♂, 14. VI. 2007, Drislea forest, Botoşani county, 1 ♂, 14. VI. 2007, Roşcani forest, Iaşi county.

Length = 8 - 10 mm.

Hosts: *Selandria serva* F. and *Selandria sixi* Voll. (Hym., Tenthredinidae).

Geographical distribution: Northern and Central of Europe, Russia (St. Petersburg, Moscova). In Romania it is a rare species, being previously recorded from Uihei, Biled commune, Timiş county, Tăşnad, Satu Mare county, Saschiz, Mureş county, Comana, Ilfov county (C. Pisică, 2001).

VII. Genus **HADRODACTYLUS** Förster, 1855

10. ***Hadrodactylus femoralis*** Holmgren, 1855, ♀♂

Material: 1 ♀ şi 1 ♂, 15. VI. 2007, natural reserve "Valea lui David", Iaşi county.

Length = 8 - 9,5 mm.

Hosts: unknown.

Geographical distribution: Sweden, Germany. In Romania it is a rare species, being previously recorded from Rus, Sălaj county, Postăvarul mountain, Sebeşului mountains and Saschiz, Mureş county (C. Pisică, 2001).

11. ***Hadrodactylus thomsoni*** Schmiedeknecht, 1913, ♀♂

Material: 1 ♀, 15. VI. 2007, natural reserve "Valea lui David", Iaşi county; 1 ♂, 14. V. 2007, Roşcani forest, Botoşani county.

Length = 9,5 mm.

Hosts: *Dolerus madidus* Kl. (Hym., Tenthredinidae).

Geographical distribution: Northern and Central of Europe, Russia (St. Petersburg, Moscova). In Romania it is a very rare species, being previously recorded only from Râu de Mori, Hunedoara county (C. Pisică, 2001).

VIII. Genul **MESOLEPTIDEA** Viereck, 1912

12. ***Mesoleptidea prosoleuca*** Gravenhjorst, 1820, ♀

Material: 1 ♀, 15. VI. 2007, natural reserve "Valea lui David", Iaşi county.

Length = 9 mm.

Hosts: *Tenthredo scrophulariae* L., *Tenthredo atra* L. şi *Tenthredo ferruginea* Schrank (Hym., Tenthredinidae).

Geographical distribution: Northern and Central of Europe, Ukraine, Russia (St. Petersburg, Moscow, Iaroslavsk, Briansk, Samara). In Romania it is a very rare species, being previously recorded from Timiş, Bistriţa – Năsăud and Braşov counties (C. Pisică, 2001).

13. ***Mesoleptidea melanobasis*** (Kriechbaumer, 1896, ♂

Material: 1 ♂, 15. VI. 2007, natural reserve "Valea lui David", Iaşi county.

Length = 9 mm.

Hosts: unknown.

Geographical distribution: Belgium. In Romania it is a very rare species, being previously recorded only from natural reserve "Hârboanca", Vaslui county (M. Constantineanu, L. Ţâţan, 1976 – 1977).

IX. Genus **PRIOPODA** Holmgren, 1855

14. ***Priopoda stictica*** Fabricius, 1789, ♂

Material: 1 ♂, 15. VI. 2007, natural reserve "Valea lui David", Iaşi county.

Length = 11, 5 mm.

Hosts: *Empria candidata* Fall. (Hym., Tenthredinidae) and *Arge ustulata* L. (Hym., Argidae).

Geographical distribution: Europe and Northern Africa. In Romania it is a very rare species, being previously recorded from Ineu, Arad county, Secu and Buhalniţa, Suceava county (C. Pisică, 2001).

X. Genus **SYMPHERTA** Förster, 1868

15. ***Sympherta ambulator*** Thunberg, 1822, ♀

Material: 1 ♀, 15. VI. 2007, natural reserve "Valea lui David", Iaşi county.

Length = 9 mm.

Hosts: *Rhogogaster punctulata* Klug. and *Tenthredo mesomelas* L. (Hym., Tenthredinidae).

Geographical distribution: Northern and Central of Europe, Russia (St. Petersburg, Pskov, Poltava, Iakutzk), Byelorussia. In Romania it is a rare species, being previously recorded from Gurahonţ, Arad county; Ileanda Mare, Cluj county and Arcuş, Covasna county (C. Pisică, 2001).

XI. Genus **TREMATOPYGUS** Holmgren, 1855

16. ***Trematopygus ruficornis*** Holmgren, 1855), ♀

Material: 1 ♀, 15. VI. 2007, natural reserve "Valea lui David", Iaşi county.

Length = 9 mm.

Hosts: unknown.

Geographical distribution: Northern and Center of Europe, Russia (St. Petersburg, Pskov, Poltava, Iakutzk), Bielorusia. In Romania it is a very rare species, being previously recorded only from Bucegi mountains (C. Pisică, 2001).

17. ***Trematopygus vellicans*** Gravenhorst 1829, ♀

Material: 1 ♀, 15. VI. 2007, natural reserve "Valea lui David", Iaşi county.

Length = 9 mm.

Hosts: unknown.

Geographical distribution: Northern and Central of Europe, Russia (St. Petersburg, Pskov, Poltava, Iakuţk), Byelorussia. In Romania it is a very rare species, being previously recorded only from Bucegi mountains (C. Pisică, 2001).

Conclusions

1. The authors present 17 ichneumonid species belonging to 11 genera of the subfamilies Tryphoninae and Ctenopelmatinae (Hymenoptera: Ichneumonidae), collected from different ecosystems of Romania.

2. The species *Euryproctus albitarsis* Strobl, *Euryproctus plantator* Thunberg (tribe Euryproctini, subfamily Ctenopelmatinae) are new for the Romanian fauna. The other 15 species are rare for the Romania and for the European fauna, in general.

3. The hosts of the ichneumonid species presented in this paper belong to the families Diprionidae, Tenthredinidae and Argidae (Hymenoptera).

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Lucrările Simpozionului „*Entomofagii şi rolul lor în păstrarea echilibrului natural*"
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DIVERSITY OF THE BRACONID WASPS (HYMENOPTERA: BRACONIDAE) COLLECTED FROM THE VALEA LUI DAVID NATURAL RESERVE (IAŞI)

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Abstracts. In this paper the author presents data regarding the diversity of the braconid wasps collected in 2006 from the Valea lui David natural reserve. We have identified 25 species belonging to 14 genera and 6 subfamilies (Rogadinae, Braconinae, Macrocentrinae, Agathidinae, Cheloninae, Microgasterinae).

Keywords: braconid wasps, Valea lui David natural reserve, diversity.

Rezumat. Diversitatea braconidelor (Hymenoptera: Braconidae) colectate din rezervaţia naturală Valea lui David (Iaşi)
Lucrarea prezintă câteva date privind diversitatea braconidelor colectate din rezervaţia naturală Valea lui David, Iaşi. În perioada mai – septembrie 2006 au fost colectaţi un număr de 156 de indivizi ce aparţin la 25 de specii, 14 genuri şi 6 subfamilii (Rogadinae, Braconinae, Macrocentrinae, Agathidinae, Cheloninae, Microgasterinae). Subfamiliile cu abundenţa cea mai mare au fost: Braconinae (29,4%), Cheloninae (26,9%) şi Microgasterinae (17,3%). Celelalte subfamilii prezintă o abundenţă mai redusă: Rogadinae (7,6%), Macrocentrinae (6,4%), Agathidinae (12,1%). Speciile dominate în zona studiată sunt: *Bracon urinator* F. (8,9%) şi *Protapanteles lateralis* Hal. Speciile cu abundenţa cea mai scazută sunt *Vipio terrefactor* Vill. (0,6%), *Iphiaulax mactator* Klug. (0,6%) şi *Coeloides rossicus* Kok. (0,6%). Dinamica lunară prezintă un punct de maxim în luna iulie. Diversitatea specifică cea mai mare a fost înregistrată în luna iulie când au fost colectate un număr de 12 specii de himenoptere braconide.

Cuvinte cheie: braconide, Valea lui David, diversitate.

Introduction

The natural reserves represent an important area with a great diversity of insects and among them the parasitic wasps are of great importance in maintaining the natural equilibrium in the ecosystem. Regarding the braconid wasps fauna from the Valea lui David natural reserve there is only one study made by Lăcătuşu M. and Filipescu C. (1970) in which they listed 18 species collected from this area, with no ecological data.

Materials and methods

The biological material used in this study was collected with the entomological net by sweeping the vegetation. The samples were collected each month during May – September 2006, each sample is made of 100 collections. In order to make the synecological analysis we have calculated the following ecological indexes: abundance (A), constance (C), dominance (D) and the ecological significance indicator (W).

Results and discussion

During May – September 2006 we have collected 156 specimens of braconid wasps, belonging to 25 species, 14 genera and 6 subfamilies (Rogadinae, Braconinae, Macrocentrinae, Agathidinae, Cheloninae, Microgasterinae) (Tab. 1). The most abundant subfamilies are: Braconinae (29.4%), Cheloninae (26.9%) and Microgasterinae (17.3%) (Tab. 1, Fig. 5). These subfamilies are represented by species with a large ecological spectrum and with a large trophic spectrum regarding their host preferences. The others subfamilies present a reduced abundance: Rogadinae (7.6%), Macrocentrinae (6.4%), Agathidinae (12.1%) (Fig. 5).

The most abundant species for this area are: *Bracon urinator* F. (8.9%) and *Protapanteles lateralis* Hal. (7.6%) (Tab.1). *Bracon urinator* F. it is known as a parasite of the weevils that develops in the asteraceae flowers, *Protapanteles lateralis* Hal. is a parasite of a great number of lepidopteran larvae.

The less abundant specieis are: *Vipio terrefactor* Vill. (0.6%), *Iphiaulax mactator* Klug. (0.6%), and *Coeloides rossicus* Kok. (0.6%) (Tab. 1)

From the point of view of constancy, 4 species are euconstant, 9 species are constant, 6 species are accessory and 6 species are accidental (Tab. 2, Fig. 1).

Regarding the dominance we have identified 10 dominant species , 9 subdominant species, 3 recedent species and 3 subrecedent species (Tab. 2, Fig. 2).

The ecological significance index (W) shows the presence of 4 characteristic species, 15 accessory species and 6 accidental species (Tab. 2, Fig. 3).

The numerical dynamics for the period of collections of the braconid wasps reveals that the maximum number of species was recorded in July, and the minimum number of species was collected in May (Fig. 4).

Also in July we have observed the greatest number of species, 16 species.

Conclusions

During May – September 2006, from the Valea lui David natural reserve we have collected 156 specimens of braconid wasps (Hymenoptera: Braconidae) belonging to 25 species, 14 genera and 6 subfamilies (Rogadinae, Braconinae, Macrocentrinae, Agathidinae, Cheloninae, Microgasterinae). The most abundant subfamily is Braconinae (29.4%), and the less abundant is Macrocentrinae (6.4%). The most abundant species for this area are: *Bracon urinator* F. (8.9%) and *Protapanteles lateralis* Hal. (7.6%). The less abundant species are: *Vipio terrefactor* Vill. (0.6%), *Iphiaulax mactator* Klug. (0.6%), and *Coeloides rossicus* Kok. (0.6%). The synecological analysis shows a great number of euconstant and constant species (13 species) and a great number of dominant and subdominant species (19). The greatest number of specimens and species was recorded in July.

Table 1. The diversity of the braconid wasps collected from Valea lui David natural reserve during May – September 2006

No.	Taxa	May		June		July		August		September		Total	
		A	**D(%)**	**A**	**D(%)**	**A**	**D(%)**	**A**	**D(%)**	**A**	**D(%)**	**A**	**D(%)**
	Rogadinae											**12**	**7.6**
1	*Rogas unipunctator* Thunb			2	5.7	2	4.5	1	3.1			5	3.2
2	*Rogas ruficeps* Tel.	1	5.8			2	4.5			2	7.1	5	3.2
3	*Rogas reticulator* Nees.					2	4.5					2	1.2
	Braconinae											**46**	**29.4**
4	*Vipio terrefactor* Vill.					1	2.2					1	0.6
5	*Glyptomorpha discolor* Thunb	2	11.7	1	2.8			1	3.1			4	2.5
6	*Glyptomorpha dispar* Tobias			1	2.8			3	9.3			4	2.5
7	*Iphiaulax mactator* Klug.					1	2.2					1	0.6
8	*Iphiaulax impeditor* Kok.					2	4.5					2	1.2
9	*Coeloides rossicus* Kok.	1	5.8									1	0.6
10	*Ipobracon rector* Thunb.	3	17.6	2	5.7			3	9.3			8	5.1
11	*Bracon urinator* F.			5	14.2	3	6.8	4	12.5	2	7.1	14	8.9
12	*Bracon hebetor* Say.	2	11.7	3	8.5	3	6.8			3	10.7	11	7
	Macrocentrinae											**10**	**6.4**
13	*Macrocentrus linaeris* Nees			1	2.8	3	6.8					4	2.5
14	*Macrocentrus collaris* Spin.	2	11.7	3	8.5					1	3.5	6	3.8
	Agathidinae											**19**	**12.1**
15	*Agathis breviseta* Nees.	4	23.5	2	5.7	2	4.5					8	5.1
16	*Agathis glaucoptera* Nees.			4	11.4	4	9	2	6.2	1	3.5	11	7
	Cheloninae											**42**	**26.9**
17	*Chelonus oculator* Panz.			1	2.8			5	15.6	1	3.5	7	4.4
18	*Chelonus obscuratus* H-Sch.			1	2.8	4	9	6	18.7			11	7
19	*Chelonus seticornis* Thomps.	1	5.8			4	9	3	9.3	3	10.7	11	7
20	*Chelonus pannonicus* Szepl.					6	13.6	2	6.2			8	5.1

21	*Phanerotoma acuminata* Szepl.	1	5.8	2	5.7			2	6.2			5	3.2
	Microgasterinae											**27**	**17.3**
21	*Apanteles parasitellae* Bouche					3	6.8			5	17.8	8	5.1
23	*Protapanteles thompsoni* Lyle					2	4.5			3	10.7	5	3.2
24	*Protapanteles triangulator* Wesm.									2	7.1	2	1.2
25	*Protapanteles lateralis* Hal.			7	20					5	17.8	12	7.6
	Total	**17**	10.8	**35**	22.4	**44**	28.2	**32**	20.5	**28**	17.9	**156**	

Table 2. The ecological indicators: abundance (A). constance (C). dominance (D) and ecological significance indicator (W)

No.	Species	A	C		D		W	
			%	class	%	class	%	class
1	*Bracon urinator* F.	14	80	C4	8.9	D4	7.1	W_4
2	*Protapanteles lateralis* Hal.	12	40	C2	7.6	D4	3	W_3
3	*Chelonus obscuratus* H-Sch.	11	60	C3	7	D4	4.2	W_3
4	*Chelonus seticornis* Thoms.	11	80	C4	7	D4	5.6	W_4
5	*Agathis glaucoptera* Nees.	11	80	C4	7	D4	5.6	W_4
6	*Bracon hebetor* Say.	11	80	C4	7	D4	5.6	W_4
7	*Apanteles parasitellae* Bouche	8	40	C2	5.1	D4	2	W_3
8	*Chelonus pannonicus* Szepl.	8	40	C2	5.1	D4	2	W_3
9	*Agathis breviseta* Nees.	8	60	C3	5.1	D4	3	W_3
10	*Ipobracon rector* Thumb.	8	60	C3	5.1	D4	3	W_3
11	*Chelonus oculator* Panz.	7	60	C3	4.4	D3	2.6	W_3
12	*Macrocentrus collaris* Spin.	6	60	C3	3.8	D3	2.2	W_3
13	*Protapanteles thompsoni* Lyle	5	40	C2	3.2	D3	1.2	W_3
14	*Phanerotoma acuminata* Szepl.	5	60	C3	3.2	D3	1.9	W_3
15	*Rogas unipunctator* Thunb.	5	60	C3	3.2	D3	1.9	W_3
16	*Rogas ruficeps* Tel.	5	60	C3	3.2	D3	1.9	W_3
17	*Glyptomorpha discolor* Thunb.	4	60	C3	2.5	D3	1.5	W_3
18	*Glyptomorpha dispar* Tobias	4	40	C2	2.5	D3	1	W_3
19	*Macrocentrus linaeris* Nees	4	40	C2	2.5	D3	1	W_3
20	*Protapanteles triangulator* Wesm.	2	20	C1	1.2	D2	0.2	W_2
21	*Ipiaulax impeditor* Kok.	2	20	C1	1.2	D2	0.2	W_2
22	*Rogas reticulator* Nees	2	20	C1	1.2	D2	0.2	W_2
23	*Vipio terrefactor* Vill.	1	20	C2	0.6	D1	0.1	W_2
24	*Iphiaulax mactator* Klug.	1	20	C2	0.6	D1	0.1	W_2
25	*Coeloides rossicus* Kok.	1	20	C2	0.6	D1	0.1	W_2

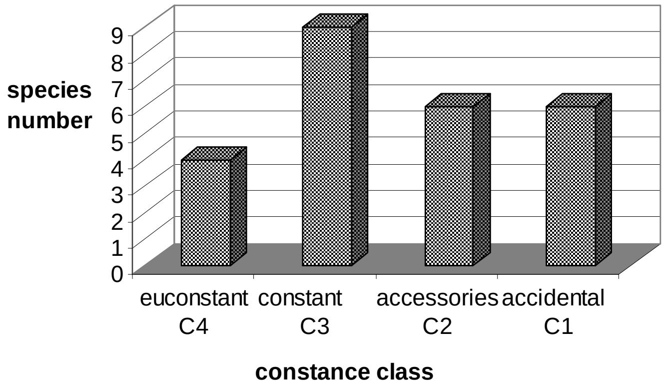

Fig.1 The constance (C) of the braconid species collected from Valea lui David

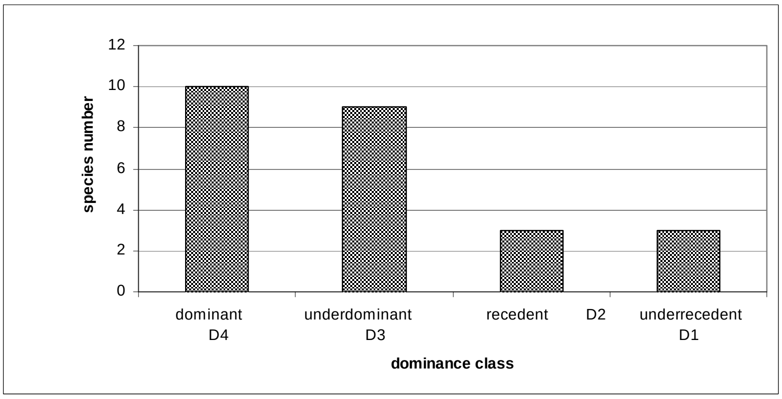

Fig. 2 The dominance (D) of the braconid species collected from Valea lui David

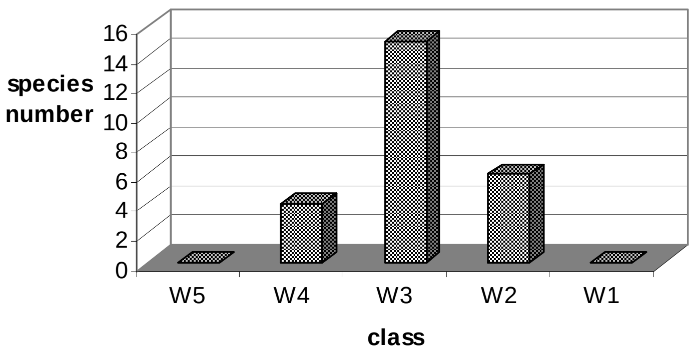

Fig. 3 The ecological significance index (W) for the braconid species collected from Valea lui David

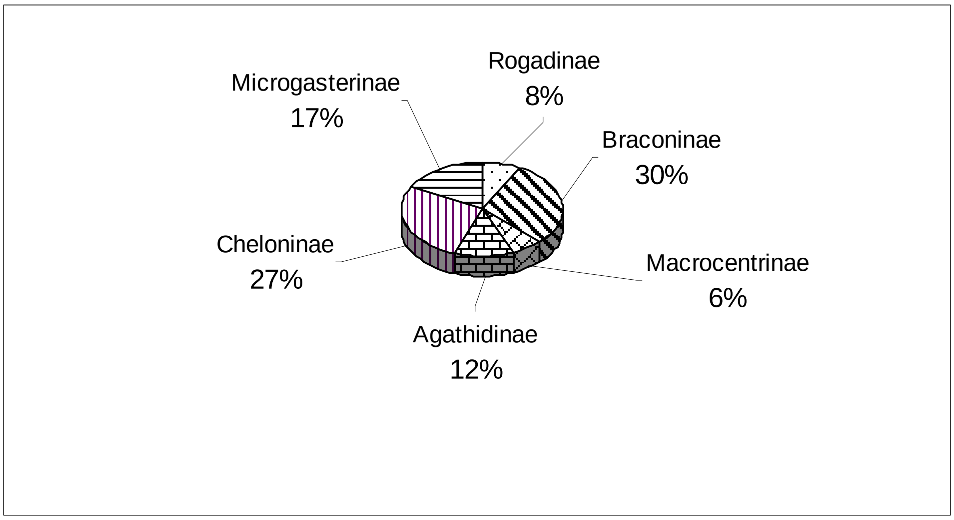

Fig 4 The taxonomic spectrum of the braconid species collected from Valea lui David

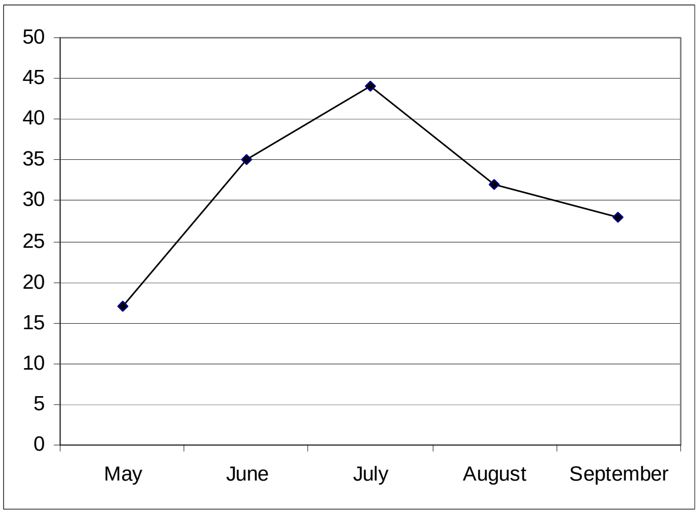

Fig. 5 The dynamics of the braconid wasps collected from the Valea lui David

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BRACONID WASPS (HYMENOPTERA: BRACONIDAE) PARASITOIDS OF LEAF-MINING INSECTS COLLECTED FROM HÂRBOANCA AND BĂLTENI NATURE FORESTRY RESERVES (VASLUI)

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Abstracts. This paper presents 23 species of braconid wasps, belonging to 8 subfamilies (Braconinae, Rogadinae, Gnaptodontinae, Orgilinae, Microgasterinae, Doryctinae, Alysiinae, Opiinae), parasitoids reared from 25 species of leaf-mining insects, belonging to 3 orders: Lepidoptera (16 species), Hymenoptera (2 species), Diptera (7 species), collected from two nature forestry reserves Hârboanca and Bălteni (Vaslui County). 3 species of braconid wasps are recorded for the first time for Romania’s fauna: *Bracon nigratus* Wesm.; *Bracon minunator* (F.); *Shawiana foveolator* (Thoms.). The following host – parasitoid relationship are new to Romania: *Antispila treitschkiella* Fischer with *Shawiana foveolator Thoms*; *Coleophora limosipennella* Duponchel with *Bracon nigratus* Wesm; *Millieria dolosalis* Heydenreich with *Bracon minunator* (F.).

Keywords: braconid wasps, leaf-mining insects, parasitoids, Hârboanca and Bălteni nature forestry reserves.

Rezumat. Braconide (Hymenoptera: Braconidae) parasite în insecte miniere colectate din rezervatiile forestiere Hârboanca şi Bălteni.
Autorii prezintă 23 de specii de braconide parazite în 25 de specii de insecte miniere colectate în perioada 2005-2007 din rezervaţiile forestiere Hârboanca şi Bălteni. Insectele miniere din care au fost obţinute braconide, aparţin la 7 familii şi 3 ordine: Coleoptera - Gracillariidae (8 specii), Coleophoridae (3 specii), Choreutidae (1 specie), Tischeriidae (2 specii), Heliozelidae (2 specii); Hymenoptera – Tenthredinidae (2 specii); Diptera – Agromyzidae (7 specii). Speciile de braconide obţinute din insectele miniere colectate aparţin la 8 subfamilii: Braconinae (3 specii), Rogadinae (1 specie), Gnaptodontinae (1 specie), Orgilinae (1 specie), Microgasterinae (9 specii), Doryctinae (2 specii), Alysiinae (5 specii), Opiinae (1 specie). Speciile de braconide cu abundenţa cea mai mare sunt: *Protapanteles callidus* Hal. (19 indivizi), *Colastes braconius* Hal. (13 indivizi) şi *Exotela crysotegula* Tobias (9 indivizi). Următoarele relaţii gazdă-parasitoid sunt noi pentru Romania: *Antispila treitschkiella* Fischer cu *Shawiana foveolator* (*Thoms*); *Coleophora limosipennella* Duponchel cu *Bracon nigratus* Wesm; *Millieria dolosalis* Heydenreich cu *Bracon minunator* (F.). 3 specii de braconide le cităm ca noi pentru fauna României: *Bracon nigratus* Wesm.; *Bracon minunator* (F.); *Shawiana foveolator* (Thoms.).

Cuvinte cheie: braconide. insecte miniere, parazitoizi, rezervaţiile forestiere Hârboanca şi Bălteni.

Introduction

The braconid wasps represent a group of parasitoid insects with an important role in maintaining the ecological equilibrium in nature and especially in forestry ecosystems. Some leaf-mining insects are regarded as pests in forestry ecosystems. Until now several studies cited some braconid wasps reared from leaf-mining insects in Romania’s fauna (Lăcătuşu and Drăghia, 1977), (Andriescu et al, 1987, 1988, 1991), (Cojocaru, 1993, 1995). The natural reserves, such as Hârboanca and Bălteni, can be considered as areas hosting a great diversity of insects and parasitoids insects.

Materials and methods

Braconid wasps were reared in laboratory from leaf-mining insects larvae collected between 2005 - 2007. The biological material, mined leaves, was collected from different herbaceous and woody plants, brought in laboratory and kept in specific conditions of temperature and humidity in plastic recipients. We also studied the relationships between the plant hosts, leaf-mining larvae and braconid parasitoids.

The Forest and Botanical Reserve of Bălteni is situated at approximately 10 km from the city of Vaslui, and 1.5 km SE from the Bălteni rail- way station. The protected area is now of 18.8 ha. This nature reserve is placed in the floodable basin of Bârlad River, and it has numerous micro-depressions, which leads sometimes to be temporarily flooded, thus creating high-humidity climatic conditions, that explains the existence of numerous higrophylous and hydrophylous elements. The woody vegetation of this forest reserve is characterized by the mix of oak-tree species specific to riverbank areas and maple-tree species: *Quercus robur* L., *Q. petraea* Liebl., *Fraxinus angustifolia* Vahl., *F. excelsior* L., *Tilia tomentosa* Mnch., *Carpinus betulus* L., *Acer campestre* L., *Ulmus minor* Mill. etc. The shrubs layer is composed of *Acer tataricum* L., *Viburnum lantana* L., *Cornus mas* L., *Corylus avellana* L., *Crataegus monogyna* Jacq. etc. The herbaceous layer is represented by the species: *Brachypodium sylvaticum* Beauv., *Viola jordanii* Hanry, *Euonymus nana* Bieb., *Fritillaria meleagris* L., *Leucojum aestivum* L., *Tulipa biebersteiniana* Schult. & Schult. fil. etc. (Dobrescu, 1969).

The Hârboanca forest is situated on the right-side slope of the Bârlad Valley and it represents a typical vegetation island very common in the past in the Central Moldavian Plateau. This forestry reserve is situated in the intermediary area between forests and sylvosteppe. The trees level is composed of *Quercus robur* L., *Q. petraea* Liebl., *Fraxinus angustifolia* Vahl., *F. excelsior* L., *Tilia tomentosa* Mnch., *T. plathyphyllos* Scop., *Carpinus betulus* L., *Quercus pedunculiflora* C. Koch., *Acer campestre* L., *Ulmus minor* Mill. etc., while the bush layer is represented by *Acer tataricum* L., *Viburnum lantana* L., *Cornus mas* L., *Corylus avellana* L., *Crataegus monogyna* Jacq., *Amygdalus nana* etc. The herbaceous flora is dominated by *Brachypodium sylvaticum* Beauv., *Viola jordanii* Hanry, *Dianthus membranaceus* Borb., *Inula ensifolia* L., *Iris hungarica* W. and K., *I. brandzae* Prod., *Cytisus austriacus* L. (Dobrescu, 1969).

Results and Discussion

During our studies we have indentified 39 species of leaf-mining insects from the Bălteni forest and 60 species of leaf-mining insects from Hârboanca forest (Stolnicu, 2007). From these species, 25 species are parasitized by 23 species of braconid wasps (Tab. 1). The leaf-mining insects that we have found to be hosts of braconid wasps, belong to 7 families and 3 orders: Coleoptera - Gracillariidae (8 species), Coleophoridae (3 species), Choreutidae (1 species), Tischeriidae (2 species), Heliozelidae (2 species); Hymenoptera – Tenthredinidae (2 species); Diptera – Agromyzidae (7 species) (Tab. 1). The most numerous leaf-mining larvae parasitized by braconid wasps are lepidopteran and dipteran.

From the collected leaf-mining larvae we have reared 23 species of braconid wasps belonging to 8 subfamilies: Braconinae (3 species), Rogadinae (1 species), Gnaptodontinae (1 species), Orgilinae (1 species), Microgasterinae (9 species), Doryctinae (2 species), Alysiinae (5 species), Opiinae (1 species) (Tab. 2). The most abundant species of braconid wasps reared from leaf-mining insects are: *Protapanteles callidus* Hal. (19 specimens), *Colastes braconius* Hal. (13 specimens) and *Exotela crysotegula* Tobias (9 specimens). The recorded plant host – leaf-mining insects and host-parasitoid relationships are presented in Tab. 1.

The following host – parasitoid relationship are new to Romania:

Antispila treitschkiella Fischer with *Shawiana foveolator* (*Thoms*)
Coleophora limosipennella Duponchel with *Bracon nigratus* Wesm
Millieria dolosalis Heydenreich with *Bracon minunator* (F.)

From the faunistic point of view we mention 3 species of braconid wasps that are recorded for the first time in Romania's fauna: *Bracon nigratus* Wesm.; *Bracon minunator* (F.); *Shawiana foveolator* (Thoms.).

Table 1 The host parasitoid relationship

No.	Locality /date	Host Plant	Host leaf-mining insect	Braconid parasitoid	A
			Ord. Lepidoptera Fam. Gracillariidae		
1	Hârboanca 16.11.2005	*Robinia pseudoacacia*	*Parectopa robiniella* Clemens	*Apanteles merula* Reinh.	1
2	Hârboanca 29.08.2005 16.11.2005 28.06.2006 20.07.2006 4.10.2006 Bălteni 28.09.2005 4.07.2006	*Ulmnus minor*	*Phyllonorycter schreberella* Fab.	*Colastes braconius* Hal.	1 3
3	Hârboanca 17.07.2007 15.08.2007	*Viburnum lantana*	*Phyllonorycter lantanella* Schrank	*Protapanteles callidus* Hal.	5
4	Hârboanca 29.08.2005 4.10.2006 Bălteni 17.09.2006	*Prunus spinosa*	*Phyllonorycter spinicolella* Zeller	*Protapanteles callidus* Hal.	4
5	Bălteni 9.07.2005 15.06.2005 18.07.2005	*Acer platanoides*	*Phyllonorycter platanoidella* Joannis	*Protapanteles callidus* Hal.	8
6	Hârboanca 17.09.2006 14.05.2007	*Tilia platyphyllos*	*Phyllonorycter issikii* Kumata	*Gnaptodon pumilio* Nees	1
				Orgilus obscurator Nees	1
7	Hârboanca 4.10.2006	*Acer campestre*	*Phyllonorycter acerifoliella* Zeller	*Deuterixys carbonarius* Wesm	1
8	Hârboanca 20.07.2006	*Quercus petraea*	*Phyllonorycter quercifoliella* Zeller	*Protapanteles callidus* Hal.	1
			Fam. Coleophoridae		
9	Hârboanca 30.05.2007	*Lamium album*	*Coleophora balotella* Fischer	*Pseudovipio umbraculator* Nees	3

10	Hârboanca 12.05.2006	*Malus sylvestris*	*Coleophora coracipennella* Hübner	*Protapanteles immunis* Hal.	1
11	Hârboanca 30.05.2007 23.09.2007 4.10.2006	*Ulmus minor*	*Coleophora limosipennella* Duponchel	*Bracon nigratus* Wesm	2
				Microgaster hungarica Szepligeti	1
			Fam. Choreutidae		
12	Bălteni 18.07.2005 18.08.2005	*Aristolochia clematitis*	*Millieria dolosalis* Heydenreich	*Bracon minunator* F.	6
			Fam. Tischeriidae		
13	Hârboanca 29.08.2005	*Prunus spinosa*	*Coptotriche gaunacella* Duponchel	*Protapanteles callidus* Hal.	1
14	Bălteni 4.07.06	*Rubus caesius*	*Coptotriche marginea* Haworth	*Apanteles circumscriptus* Nees	1
			Fam. Heliozelidae		
15	Hârboanca 4.10.2006	*Cornus mas*	*Antispila treitschkiella* Fischer	*Shawiana foveolator Thoms.*	1
16	Hârboanca 20.07.2006	*Quercus petraea*	*Heliozela sericiella* Haworth	*Protapanteles vitripennis* Curtis	1
			Ord. Hymenoptera Fam. Tenthredinidae		
17	Hârboanca 12.05.2006	*Acer campestre*	*Heterarthrus aceris* Kaltenbach	*Protapanteles lateralis* Hal.	1
18	Bălteni 16.11.2005	*Geum urbanum*	*Metallus lanceolatus* Thom.	*Rogas modestus* Reinh	1
			Or. Diptera Fam. Agromyzidae		
19	Bălteni 18.07.2005 Hârboanca 18.07.2005	*Lycopus exaltatus*	*Phytomyza lycopi* Nowakowski	*Exotela crysotegula* Tobias	6
20	Hârboanca 17.06.05	*Lamium purmpureum*	*Phytomyza obscura* Hendel	*Exotela crysotegula* Tobias	3
21	Hârboanca 17.06.2005 17.08.2005 Bălteni 9.07.2005 18.08.2005	*Arctium lappa*	*Phytomyza lappae* Goureau	*Exotela sulcata* Tobias	5
22	Hârboanca 9.07.2005 18.07.2005 Bălteni 18.07.2005	*Onobrychis viciifolia*	*Liriomyza congesta* (Becker)	*Dacnusa pubescens* Curt.	3
				Opius xyloster Marsh.	1

23	Hârboanca 4.10.2006	*Brachypodium sylvaticum*	*Chromatomyia nigra* (Meigen)	*Dacnusa maculipes* Thoms.	1
24	Hârboanca 29.08.2005	*Clinopodium vulgare*	*Chromatomyia horticola* (Goureau)	*Dacnusa maculipes* Thoms	1
25	Hârboanca 26.08.2005 16.09.2005	*Stellaria holostea*	*Amauromyza flavifrons* (Meigen)	*Agonia adducta* (Hal.)	1
				Microgaster auriculata Fab.	1

Table 2 Braconid wasps reared from leaf-mining insects collected from Bălteni and Hârboanca forests

No.	Subfamily	Species	A
1	Braconinae	*Pseudovipio umbraculator* Nees	3
2		*Bracon nigratus* Wesm	2
3		*Bracon minunator* F.	6
4	Rogadinae	*Rogas modestus* Reinh	1
5	Gnaptodontinae	*Gnaptodon pumilio* Nees	1
6	Orgilinae	*Orgilus obscurator* Nees	1
7	Microgasterinae	*Deuterixys carbonarius* Wesm	1
8		*Apanteles merula* Reinh.	1
9		*Protapanteles immunis* Hal.	1
10		*Protapanteles callidus* Hal.	19
11		*Protapanteles lateralis* Hal.	1
12		*Apanteles circumscriptus* Nees	1
13		*Protapanteles vitripennis* Curtis	1
14		*Microgaster hungarica* Szepligeti	1
15		*Microgaster auriculata* Fab.	1
16	Doryctinae	*Colastes braconius* Hal.	13
17		*Shawiana foveolator* (Thoms.)	1
18	Alysiinae	*Exotela crysotegula* Tobias	9
19		*Exotela sulcata* Tobias	5
20		*Dacnusa pubescens* Curt.	3
21		*Dacnusa maculipes* Thoms.	1
22		*Agonia adducta* Hal.	1
23	Opiinae	*Opius xyloster* Marsh.	1

Conclusions

In our studies between 2005-2007 we have identified 23 species of braconid wasps as parasitoids of 25 species of leaf-mining insects collected from woody and herbaceous plants from Hârboanca and Bălteni nature forestry reserves. The identified species of braconid wasps belong to 8 subfamilies: Braconinae (3 species), Rogadinae (1 species), Gnaptodontinae (1 species), Orgilinae (1 species), Microgasterinae (9 species), Doryctinae (2 species), Alysiinae (5 species), Opiinae (1 species). The most abundant species of braconid wasps reared from leaf-mining insects are: *Protapanteles callidus* Hal. (19 specimens), *Colastes braconius* Hal. (13 specimens) and *Exotela crysotegula* Tobias

(9 specimens). The following host – parasitoid relationship are new to Romania: *Antispila treitschkiella* Fischer with *Shawiana foveolator* (*Thoms*); *Coleophora limosipennella* Duponchel with *Bracon nigratus* Wesm; *Millieria dolosalis* Heydenreich with *Bracon minunator* (F.). 3 species of braconid wasps are recorded for the first time in the Romania's fauna: *Bracon nigratus* Wesm.; *Bracon minunator* (F.); *Shawiana foveolator* (Thoms.).

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Lucrările Simpozionului „*Entomofagii şi rolul lor în păstrarea echilibrului natural*”
Universitatea „Al.I. Cuza” Iaşi, 2008

ASPECTS OF THE ANT BIODIVERSITY IN THE MARINE SAND DUNES NATURE RESERVE, AGIGEA, CONSTANTA

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Abstracts. A list of ant species collected in the “marine sand dunes nature reserve Agigea” is given, with notes to a small scale test regarding a collecting method using colored water traps.

Key words: ant, nature reserve, coloured traps.

Prezentăm o listă cu speciile de furnici colectate în rezervaţia mai sus menţionată, cu unele observaţii asupra metodei de colectare a furnicilor cu ajutorul capcanelor cu lichid colorate.

Cuvinte cheie: furnici, rezervaţie naturală, capcane colorate.

Introduction

The Agigea nature reserve is the only one of marine sand dunes in Romania. This type of habitat is characterized by: altitude 2–5 m, T = 11–10.5°C, P = 400–500 mm; bed rock: sand deposits, sometimes with lime rocks in depth; soil: shifting sands or sands in the process of fixation, very dry. The reserve is situated on the plateau of a relative high shoreline, with the following coordinates: long. 44°05’18.66’’N, lat. 28°38’36.50’’E and has a 2m general altitude. It mainly consists of a sandy area of approximately 5 ha, at about 50 m distance from the sea. The vegetation subscribes to the following association: *Ephedro – Caricetum colchicae* (Prodan 1939 n.n. Morariu 1959) Sanda and Popescu 1973 (Syn.: As. *Ephedra distachya* and *Carex ligerica* (Prodan 1939, Morariu 1959).

Material and methods

The ants that are the subject of this paper were collected during 2004-2008 as part of the PhD thesis *“The diversity of ants (Insecta, Hymenoptera, Formicidae) in România, ecological and ethological aspects”*. The ants were sampled either with the aid of a sweep net or by active nest searching and than captured in an aspirator.

In 2005 at a point in the reserve where the typical grassland vegetation was nearing an area with trees and shrubs (chosen in order to have a better coverage of ants preferring different microhabitats) a number of 72 colored traps (plastic picnic plates) were laid on the ground (24 yellow, 24 blue, 24 green) in a randomized pattern (Figure 1).

This type of traps work on the following principle: either attracting insects interested in flowers or by retaining ground foraging insects in the same way as a pitfall trap. The actual trapping is done by the liquid in the plates, basically water with a surfactant agent (detergent) that reduces the surface tension and drowns the insect.

The ants were than killed with ether and kept in 70% alcohol to be determined later. The following keys and records were used: key and list of Iberian ants (Collingwood, 1976)key and descriptions for the ants of western and northern Europe (Bernard, 1968, a), key and list for the Balkan ants (Agosti & Collingwood, 1987) record of *Formica glauca* in Poland (Czechowska *et al.*, 2004) ,list of the ants of Romania (Markó *et al*., 2006, a).

Figure 1. The layout of the coloured traps.

Table 1. Species collected with the coloured traps. Number of individuals/colour/species.

No.	species	yellow	green	blue	total
1	Lasius niger (Linnaeus 1758)	0	0	7	7
2	Lasius brunneus (Latreille 1798)	6	0	0	6
3	Lasius alienus (Förster 1850)	5	0	0	5
4	Lasius emarginatus (Olivier 1792)	1	3	39	43
5	Formica cunicularia (Latreille 1798)	1	1	0	2
6	Plagiolepis pygmaea (Latreille 1798)	2	0	0	2
7	Tapinoma ambiguum (Emery 1925)	16	13	4	33
8	Temnothorax interruptus (Schenk 1852)	3	1	0	4
9	Temnothorax kraussei (Emery 1916)	1	0	0	1
10	Solenopsis fugax (Latreille 1798)	1	0	0	1
11	Pheidole pallidula	0	1	0	1
	total	35	19	51	105

Results and Discussion

In total ,16 ant species were collected in the reserve The ants belong to 3 subfamilies: *Formicinae*, *Dolichoderinae* and *Myrmicinae*. All of them are species that were expected to be found in the area under discussion. The species are the following:

1. *Cataglyphis aenescens* Nylander 1849

Nests in open soil, predatory ant; throughout steppe, deserts and semi deserts in the Palearctic.

2. *Camponotus piceus* Leach 1825

Nests in soil rarely in woodland areas, it prefers open sandy, and clay soil; east Palearctic, Near East, North Africa.

3. *Lasius niger* Linnaeus 1758

Nests in wood, in the ground with soil mounds, under stones; adapted to varied environments, wet or slightly dry, open fields or woodland areas; mostly nocturnal, it raises different homoptera; east Palearctic, Near East.

4. *Lasius alienus* Forster 1850

It prefers to nest under stones, in bare earth, open spaces, slightly dry, warm habitats; throughout Eurasia.

5. *Lasius brunneus* Latreille 1798

Nests mainly in woodlands, under tree bark, in wood; Europe, Russia without northern side.

6. *Lasius emarginatus* Olivier 1792

Nests in various habitats, mostly xerotermous woodland; Europe, Asia, North Africa.

7. *Formica cunicularia* Latreille 1798

Nests as small families, in soil, prefers open spaces, meadows, cultivated land, beaches, rarely woodland; throughout Eurasia minus the extreme north and south.

8. *Plagiolepis pygmaea* Latreille 1798

Nests in open xerotermous habitats, under stones or directly in the soil; Europe, Near East.

9. *Tapinoma ambiguum* Emery 1925

Nests in open xerotermous habitats, under stones; Europe, east and south Russia.

10. *Temnothorax interruptus* Schenk 1852

Nests in warm, dry habitats with xerofilous vegetation; Europe, North Africa.

11. *Temnothorax tuberum* Fabricius 1775

Nests in stony habitats, with sparse vegetation; the whole Europe.

12. *Temnothorax kraussei* Emery 1916 (new species for Romania's fauna, (personal unpublished data)

Common species in the Mediterranean region as high as 900 m above sea level, nests under tree bark or in stone crevasses.

13. *Solenopsis fugax* Latreille 1798

Nests under stones, sometimes in stone crevasses, big families; mid and southern Europe.

14. *Myrmica lonae* Finzi 1926

Nests under stones, sandy soil; common in the Mediterranean region.

15. *Messor* cf. *structor* Schlick-Steiner & al. 2006

Mid and Southern Europe, Near East, steppes in Kazakhstan.

16. *Pheidole pallidula*

Nests under stones; southern Europe, North Africa, Near East.

The coloured trap experiment yielded 11 species.

There appears to be a preference for colour in the case of some ant species: *Lasius emarginatus* Olivier 1792 had 39 individuals that fell in the blue traps and only 1 individual in a yellow trap, 3 individuals in green traps.

The highest diversity of species is accounted from the yellow traps, a predictable result given the fact that most ants are opportunistic omnivores which collect nectar and other sweet exudates of different flowers and plants. This type of yellow trap is frequently used for capturing flying micro hymenoptera, and other flower feeding insects.

Conclusions

A number of 16 ant species is reported from the Agigea nature reserve, Constanta. 11 of these species were also sampled during a small scale test of collecting ants with the aid of coloured water traps. The results of this experiment are questionable and a more ample study on this matter will be undertaken. The territorial nature of most ant families makes it difficult to asses the colour preference of any given species as long as all the colours are not available inside the families foraging territory, and it is possibly the most important factor in the distribution of species and individual ants in the above mentioned traps.

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Lucrările Simpozionului „*Entomofagii şi rolul lor în păstrarea echilibrului natural*"
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CONTRIBUTION TO THE KNOWLEDGE OF PENTATOMOIDEA SPECIES (HETEROPTERA, PENTATOMOIDEA) OF IASI COUNTY

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Abstracts. In this paper we present 23 species of the superfamily Pentatomoidea, collected from Iasi County. They belong to the families Plataspidae, Scutelleridae, Cydnidae, Pentatomidae. The species *Cantophorus dubius* (Scopoli, 1763), *Aposciocoris macrocephalus* (Fieber, 1851), *Sciocoris distinctus* (Fieber, 1851) *Eusarcoris fabricii* (Kirkaldy, 1904) and *Picromerus bidens* (Linné, 1758) founded in Iasi county, are new for this area.

Keywords: Heteroptera, Pentatomoidea, Iasi county, Romania, species new to Iasi County

Introduction

Pentatomoidea are a superfamily of bugs with the body covered in a strong cuticula. The antennae are made up of five joints. They present 2 ocelli. Scutellum is triangular, shorter than the abdomen or covering the whole abdomen. Many of the species feed on plants, some of them damaging the croplands (Eurydema *ornatum*, *Eurydema oleraceum* feeds on Brassicaceae, *Aelia acuminata, Aelia rostratum, Eurygaster maura* attack species of Poaceae). But there are also predator species, like *Picromerus bidens, Zicrona coerulea*, that feed on other insects.

Great contribution in this field of study had Sienkiewicz I. and Montandon A.L.. A major contribution to the studies of Pentatomoidea group from Moldova was brought by Montanton` s work in the field. The most recent studies made on this group were completed by Béla Kis, who focused his attention on the south, south-west and central areas of the country. This explains the lack of studies on the Pentatomoidea group, in the east part of Romania, including Iasi county.

Material and Methods

The entomological material was collected from Iasi County (Barnova forest, Botanical Garden, Ciric area). Almost all the species were collected with the entomological net, sweeping through vegetation and were kept in alcohol until were mounted on cards. The mounting was made in such manner that the taxonomical characters were easy to observe. This way, the bugs were better preserved.

Most of the species were collected by author. The ones collected by other persons are mentioned in the text, with the name of the persons being specified between brackets.

Results and Discussions

Family Plataspidae

Coptosoma scutellatum (Geoffroy, 1785)

Material examined: 10♂ 6♀, 28.06.2007, Ciric; 3♂ 8♀, 5.07.2007, Botanical Garden; 24♂ 26♀, 9.07.2007, Botanical Garden; 25♂ 20♀, 18.07.2007, Barnova; 4♀, 18.08.2008, Barnova; 2♂ 3♀, 9.07.2008, Botanical Garden; 2♂ 1♀ , 29.07.2008, Botanical Garden.

Known distribution in Romania: founded in all geographical areas of the country excepting high altitudes (Kis, 1984).

Biology: prefers species of Coronilla and Ononis (Kis, 1984).

Family Cydnidae

Subfamily Sehirinae

Cantophorus dubius (Scopoli, 1763)

Material examined: 1♂, 5.07.2007, Botanical Garden.

Known distribution in Romania: frequently found in Transilvania (Kis, 1984), found for the first time in Iasi county.

Biology: frequently found in grasslands, prefers species of Thesium (Kis, 1984).

Tritomegas bicolor (Linné, 1758)

Material examined: 1♀, 7.05.2008, Botanical Garden; 1♀, 9.05.2008, Ciric.

Known distribution in Romania: common species in all country`s areas (Kis, 1984).

Biology: prefers species of Lamiaceae (Stachys, Lamium, Ballota, etc.) (Kis, 1984).

Family Scutelleridae

Subfamily Eurygasterinae

Eurygaster maura (Linné, 1758)

Material examined: 1♀, 9.07.2007, Botanical Garden; 6♂ 7♀, 18.07.2007, Barnova; 6♂ 3♀, 7.05.2008, Botanical Garden; 1♀, 10.05.2008, Ciric; 5♂ 3♀, 29.07.2008, Botanical Garden.

Known distribution in Romania: large range of spreading (Kis, 1984).

Biology: lives on different species of Poaceae (Kis, 1984).

Family Pentatomidae

Sufamily Podopinae

Graphosoma lineatum (Linné, 1758)

Material examined: 2♀, 18.08.2007, Barnova; 1♂, 29.07.2008, Botanical Garden; 3♂ 6♀, 12.08.2008, Botanical Garden.

Known distribution in Romania: large range of spreading (Kis, 1984).

Biology: prefers species of Apiaceae (Kis, 1984).

Subfamily Pentatominae

Aposciocoris macrocephalus (Fieber, 1851)

Material examined: 1♀, 28.06.2007, Ciric; 1♂, 7.05.2008, Botanical Garden; 2♂ 4♀, 29.07.2008, Botanical Garden.

Known distribution in Romania: sporadically found in the south of the country, (Kis, 1984), new regional record for Iasi county.

Biology: found in grasslands (Kis, 1984).

Sciocoris distinctus (Fieber, 1851)

Material examined: 3♂, 26.09.2007, Botanical Garden.

Known distribution in Romania: very rare species, found in Bucuresti and Comana (Giurgiu) (Kis, 1984), Found for the first time in iasi county.

Biology: lives in the steppic regions, at the edge of the forest, at the base of different plants (Derjanschi, 2005).

Aelia acuminata (Linné, 1758)

Material examined: 5♂ 3♀, 28.06.2007, Ciric; 2♂ 3♀, 9.07.2007, Botanical Garden; 7♂ 5♀, 18.07.2007, Barnova; 2♂ 2♀, 18.08.2007, Barnova; 1♂ 2♀, 28.09.2007, Botanical Garden; 3♂ 3♀, 7.05.2008, Botanical Garden; 8♂ 2♀, 10.05.2008, Ciric; 1♀, 30.06.2008, Botanical Garden; 3♂ 6♀, 29.07.2008, Botanical Garden.

Known distribution in Romania: large range of spreading (Kis, 1984).

Biology: lives on different species of Poaceae (Kis, 1984).

Aelia rostrata (Boheman, 1852)

Material examined: 6♂ 6♀, 18.07.2007, Barnova.

Known distribution in Romania: common species in all country`s areas (Kis, 1984).

Biology: lives on different species of Poaceae (Kis, 1984).

Eusarcoris aeneus (Scopoli, 1763)

Material examined: 1♀, 9.07.2007, Botanical Garden; 2♂ 1♀, 18.07.2007, Barnova; 2♂, 26.09,2007, Botanical Garden.

Known distribution in Romania: it is a frequently species founded in all country`s areas (Kis, 1984).

Biology: prefers Lamiaceae (Stachys, Prunella) (Kis, 1984).

Eusarcoris fabricii (Kirkaldy, 1904)

Material examined: 1♀, 18.07.2007, Barnov.

Known distribution in Romania: more frequently in the north and central parts of the country (Kis, 1984), new regional record for Iasi county.

Biology: prefers moistured and shady places, it can be found at the edge of the forest (Kis, 1984).

Stagnomus amoenus (Brullé, 1832)

Material examined: 1♂, 9.07.2007, Botanical Garden; 2♂, 30.06.2008, Botanical Garden; 1♀ 1♂, 9.07.2008, Botanical Garden.

Known distribution in Romania: it can be found in a specific locations: Cluj-Napoca, Turda (Cluj), Zau de Campie, Mihesu de Campie, Barbosi (Mures), Sibiu, Ocna Sibiului (Sibiu), Bucovat (Dolj), Bucuresti , Comana (Giurgiu), Peris (Ilfov), Caraorman (Tulcea), Barlad (Vaslui), Iasi (Iasi) (Kis, 1984).

Biology: found on grasslands, at the edge of the forest on different plants (Veronica, Salvia, Cistus, etc.) (Kis, 1984).

Rubiconia intermedia (Wolff, 1811)

Material examined: 1♀, 9.07.2007, Botanical Garden; 4♂ 5♀, 18.07.2007, Barnova; 1♂ 1♀, 28.09.2007, Botanical Garden; 1♂, 30.06.2008, Botanical Garden; 2♂, 29.07.2008, Botanical Garden.

Known distribution in Romania: large range of spreading (Kis, 1984).

Biology: it can be found in the mountains and the hills of the country (Kis, 1984).

Holcosthetus vernalis (Wolff, 1804)

Material examined: 1♂, 18.07.2007, Barnova; 2♂, 26.09.2007, Botanical Garden.

Known distribution in Romania: large range of spreading (Kis, 1984).

Biology: lives in grasslands at the edge of the forest, on different plants (Verbascum, Medicago, Trifolium, Brassica, Lepidium, etc.) (Kis, 1984).

Carpocoris purpureipennis (De Geer, 1773)

Material examined: 1♀, 28.06.2007, Ciric; 2♂, 9.07.2007, Botanical Garden; 3♂ 6♀, 18.07.2007, Barnova; 1♂, 18.08.2007, Barnova; 1♂ 1♀, 28.09.2007, Botanical Garden; 1♀, 9.07.2008, Botanical Garden; 2♀, 29.07.2008, Botanical Garden; 1♀, 12.08.2008, Botanical Garden.

Known distribution in Romania: frequently founded, is the most common species of the genera Carpocoris (Kis, 1984).

Biology: lives in various habitats: in grasslands, croplands, on different plants (Cirsium, Daucus, Carduus, Galium, etc.) (Kis, 1984).

Dolycoris baccarum (Linné, 1758)

Material examined: 1♀, 28.06.2007, Ciric; 2♂ 1♀, 9.07.2007, Botanical Garden; 7♂ 2♀, 18.07.2007, Barnova; 1♂ 1♀, 18.08.2007, Barnova; 1♀, 28.09.2007, Botanical Garden; 1♀, 10.05.2008, Ciric; 1♂, 30.06.2008, Botanical Garden.

Known distribution in Romania: frequently found in the south of Romania, in the rest of the country live in patchy habitats (Kis, 1984).

Biology: it is a xerotermofile species, lives on species of Artemisia, Euphorbia, Centaurea (Kis, 1984).

Piezodorus lituratus (Fabricius, 1794)

Material examined: 1♂, 9.07.2007, Botanical Garden; 1♀, 29.07.2008, Botanical Garden.

Known distribution in Romania: common species in all country`s areas (Kis, 1984).

Biology: lives in steppic habitats on different herbs (Genista, Medicago, Melilotus, Vicia, etc.) (Kis, 1984).

Rhaphigaster nebulosa (Poda, 1761)

Material examined: 1♀, 1.10.2007, Copou (leg. Chiriac N.).

Known distribution in Romania: common species in all country`s areas (Kis, 1984).

Biology: lives in trees canopy (Quercus, Populus, Salix, Corylus, etc.) (Kis, 1984).

Pentatoma rufipes (Linné, 1758)

Material examined: 12♂ 10♀, 18.07.2007, Barnova; 1♂ 2♀, 18.08.2008, Barnova.

Known distribution in Romania: large range of spreading (Kis, 1984).

Biology: lives in trees canopy (Quercus, Fagus, Acer, Carpinus, Tilia, etc.) (Kis, 1984).

Eurydema ornatum (Linné,1758)

Material examined: 2♀,18.07.2007, Barnova; 1♂, 10.05.2007, Ciric.

Known distribution in Romania: large range of spreading (Kis, 1984).

Biology: lives on different species of Brassicaceae (Kis, 1984).

Eurydema oleraceum (Linné, 1758)

Material examined: 2♂ 1♀, 28.06.2007, Ciric; 2♂ 1♀, 18.07.2007, Barnova, 1♂, 7.05.2008, Botanical Garden; 5♂ 3♀, 10.05.2008, Ciric; 1♂ 1♀, 29.07.2008, Botanical Garden.

Known distribution in Romania: large range of spreading (Kis, 1984).

Biology: lives on different species of Brassicaceae (Kis, 1984).

Subfamily Amyotinae

Picromerus bidens (Linné, 1758).

Material examined: 1♀, 26.09.2007, Botanical Garden; 1♀, 7.05.2008, Botanical Garden.

Known distribution in Romania: founded more frequently in the mountains areas, founded for the first time in Iasi county (Kis, 1984).

Biology: lives in the trees canopy, prefers forests of deciduous trees (Kis, 1984).

Zicrona coerulea (Linné, 1758)

Material examined: 1♀, 12.04.2008, Ciric (leg. Chiriac N.).

Known distribution in Romania: it can be found in all country`s areas (Kis, 1984).

Biology: lives in grasslands, orchards, swampy places (Kis, 1984).

Conclusions

During this study of the superfamily Pentatomoidea in Iasi County, Romania, 23 species have been identified. They belong to the families Plataspidae, Scutelleridae, Cydnidae and Pentatomidae. The species I found in Iasi county correspond with the ones found in the rest of the country and most of them have been founded already. From the family of Plataspidae, in Romania were identified 2 species, of which one was located in Iasi county, species presence also confirmed by my studies. From the family of Cydnidae, in Romania were identified 27 species. 3 were founded in Iasi county, of which I also found 1, but I also registered a new species for this region (*Cantophorus dubius*, Scopoli, 1763). From the family of Scutelleridae, in Romania were identified 23 species. 4 were founded in Iasi county, species presence also confirmed by my studies. From the family of Pentatomidae, in Romania were identified 77 species. 18 species were founded in Iasi county, of which I also found 15, but I also registered 4 new species for this region

(*Aposciocoris macrocephalus*, Fieber, 1851; *Sciocoris distinctus,* Fieber, 1851; *Eusarcoris fabricii*, Kirkaldy, 1904 and *Picromerus bidens*, Linné,1758)

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Lucrările Simpozionului „*Entomofagii şi rolul lor în păstrarea echilibrului natural*”
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CONTRIBUTIONS TO THE KNOWLEDGE OF THE DIVERSITY OF THE PAPILIONIDE (INSECTA: LEPIDOPTERA: PAPILIONOIDEA: PAPILIONIDAE) FROM ROMANIA'S FAUNA

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Abstract. The paper introduces into the scientific circle data about the species of Papilionidae preserved in the entomological heritage of the Natural Sciences Section of the Museum of Oltenia, Craiova. The specimens have been collected by the department specialists during 1951 – 2008 from 32 sites in 5 counties of Oltenia and in other 5 counties in Romania. The collections preserve 5 of the 6 species present in Romania's fauna. 3 species are mentioned in Annex 4^{A} (Species of community interest. Species of animals and plants that require strict protection) of Emergency Ordinance no.57/2007 regarding the regime of protected natural areas, conservation of natural habitats of wild flora and fauna: *Zerynthia (Zerynthia) polyxena* (Denis & Schiffermüller, 1775)**,** *Parnassius apollo jaraensis* (Kertész, 1922), *P. mnemosyne* (Linnaeus 1758). All species present varying degrees of endangerment: CR - *Parnassius apollo jarensis* Kertesz 1922*,* EN - *Papilio machaon* Linnaeus 1758, *Zerynthia (Zerynthia) polyxena* (Denis & Schiffermüller 1775), VU - *Iphiclides podalirius* (Linnaeus 1758), NT - *Parnassius mnemosyne* (Linnaeus 1758). These data come to complete the knowledge of the diversity of this group of insect the fauna of Romania.

Key words: Papilionidae, diversity, entomological heritage, Museum of Oltenia , Craiova

Rezumat. Contribuţii la cunoaşterea diversităţii papilionidelor (Insecta: Lepidoptera: Papilionoidea: Papilionidae) din fauna României.
Lucrarea introduce în circuitul ştiinţific date referitore la speciile de papilionidae conservate în patrimoniul entomologic al Secţiei de Ştiinţele Naturii a Muzeului Olteniei Craiova, colectate da către specialiştii secţiei în perioada anilor 1951 – 2008, în 32 de situri din cele 5 judeţe ale Olteniei şi alte 5 judeţe din România. Colecţiile conservă 5 specii din cele 6 prezente în fauna României. 3 specii sunt menţionate în Anexa 4^{A} (Specii de interes comunitar. Specii de animale şi de plante care necesită o protecţie strictă) a Ordonanţei de Urgenţă nr. 57/2007 privind regimul ariilor naturale protejate, conservarea habitatelor naturale, a florei şi faunei sălbatice: *Zerynthia (Zerynthia) polyxena* (Denis & Schiffermüller, 1775), *Parnassius apollo jaraensis* (Kertész, 1922), *P. mnemosyne* (Linnaeus 1758). Toate speciile prezente au grade diferite de periclitare: CR - *Parnassius apollo jarensis,* EN - *Papilio machaon* Linnaeus 1758, *Zerynthia (Zerynthia) polyxena* (Denis & Schiffermüller 1775), VU - *Iphiclides podalirius* (Linnaeus 1758), NT - *Parnassius mnemosyne* (Linnaeus 1758). Aceste date vin să completeze cunoştinţele privind diversitatea acestui grup de insecte în fauna României.

Cuvinte cheie: Papilionidae, diversitate, patrimoniu entomologic, Muzeul Olteniei Craiova.

Introduction

The knowledge of the fauna and flora diversity has become a priority issue in Romania. In this context, it is well-known the importance of museum collections in the knowledge of the flora and fauna diversity. Often museums are the only institutions that preserve evidence of the existence of the extinct species, being true "data banks" of nature. The formation of museum collections is the result of the research work of museographers in natural and anthropic ecosystems. Due to the complexity of museum activities and to the absence of specialists from museums specialized in certain groups of animals and plants, not all the scientific data held by the museum pieces may be scientifically processed and placed immediately in scientific information. Sometimes decades pass until the data of the collected species are processed and then one can discover new or rare species reported in the studied area and also, new species for the country.

The formation of entomological collections of the Natural Science Section of the Museum of Oltenia began in 1951. Now, they exceed 54,000 pieces and preserve species from 18 orders of insects. The lepidoptera follows the Coleoptera which are prevailing in the entomological heritage. Because of the missing data in the paper Rakosy *et al.* (2003) regarding the species preserved in the entomological collections of the Natural Science Section of the Museum of Oltenia, we have proposed to introduce these data in informational circuit. These data will complete the informations about the diversity of Lepidotera fauna from Romania.

Up to now, there have been published the Lepidoptera preserved in the collections purchased by the museum: „M. Peiu" (Chimişliu, 1989), „I. Firu" (Chimişliu, 1996, Chimişliu, 2006) and also „I. Stănoiu" (Chimişliu & Goga, 2005). They still remained unpublished Lepidoptera collected by museum specialists in the research undertaken in the ecosystems of Oltenia. This paper is a first step in this regard.

Material and Method

The paper deals with the species of the Papilionidae family (118 specimens), preserved in the scientific entomological collections of Natural Science Section of the Museum of Oltenia , from collection carried out by the department specialists during 1951 – 2008 from 32 sites in 5 counties of Oltenia and in other 5 counties of Romania. Most species come from the county of Dolj, however.

The species identification was made according to Lampert (1923), Niculescu (1961), Stănoiu *et al.* (1979). Nomenclature and taxonomy of species are in accordance with the taxonomic system of Fauna Europaea. For each species, there were recorded previous mention in the museum heritage, number of the studied specimens, collection sites in alphabetical order of names and dates of collection, in order of the months and years of collection, IUCN species status, the Romanian legislation that protects the species. New reported sites are written with normal characters, the sites already mentioned in previous paper which was not found in the analyzed material are written with **Bold** characters and the ones found in the analyzed material are written with *Italic* characters.

Abbreviations used:
Endangerment degree according to IUCN practice: CR –Critically endangered taxons, EN – Endangered taxons; VU –Vulnerable taxons, NT - Near threatened taxons.
Counties: BH – Bihor; BV – Braşov; dj – Dolj; GJ – Gorj; IS – Iaşi; MH – Mehedinți; OT – Olt; SV – Suceava; VL – Vâlcea; VS – Vaslui.

Results and Discussion

After processing the material I have identified 32 collection sites from 10 counties of Romania.

Collection sites

1. **Baia de Aramă** MH
2. **Bârseşti** VS
3. **Beiuş** BH
4. **Breazu** IS
5. Bucovăț DJ
6. **Bugiuleşti, VL**
7. **Călimăneşti** VL
8. **Căpreni GJ**
9. Cheile Sohodol GJ
10. **Corabia** OT
11. *Craiova* DJ
12. Craiova-Gr. Bot. DJ
13. Craiova (Parcul Romanescu)
14. Desa DJ
15. **Făgăraşi** BV
16. *Fărcaşu* DJ
17. Filiaşi DJ
18. Ghercești DJ
19. Leamna DJ
20. Mofleni DJ
21. *Munții Rarău* SV
22. Negoi DJ
23. *Novaci* GJ

24. **Pădurea Cobia-Segarcea** DJ
25. Racovița VL
26. Radovan DJ
27. Răcari DJ
28. Secui DJ
29. **Sânpetru** BV
30. Şimnic DJ
31. Vâlcom DJ
32. Valea Cheii VL

There have been identified 5 of the 6 species present in Romania's Fauna: *Iphiclides podalirius* (Linnaeus 1758), *Papilio machaon* Linnaeus 1758, *Parnassius apollo jarensis* Kertesz 1922, *P. mnemosyne* (Linnaeus 1758) şi *Zerynthia (Zerynthia) polyxena* (Dennis & Schiffermüller 1775)**.** The missing species is *Zerynthia (Allancastria) cerisy* (Godart 1824)

It should be mentioned that from the 5 species identified, 3 are listed in Annex no. 4^{A} (Species of community interest. Species of animals and plants that require strict protection) of the Emergency Ordinance no.57/2007 regarding the regime of protected natural areas, conservation of natural habitats of wild flora and fauna: *Zerynthia polyxena* (Denis & Schiffermüller, 1775), *Parnassius apollo jaraensis* (Kertész, 1922), *P. mnemosyne* (Linnaeus 1758).

The best represented in museum heritage is the species *Iphiclides podalirius* (54 specimens), followed by the species *Papilio machaon* (36 specimens) and *Parnassius mnemosyne* (10 specimens). *Zerynthia (Zerynthia) polyxena* is present in 5 specimens collected from different sites and different years and this comes to confirm the rarity of this species in nature. In the same situation is *Parnassius apollo jaren* represented only by one specimen from Rarău Mountains.

As degrees of endangerment according to IUCN practice (Rakosy *et al,* 2003), there have been identified: one critical endangered species (CR) **(***Parnassius apollo jarensis),* 2 endangered species (EN) (*Papilio machaon şi Zerynthia (Zerynthia) polyxena),* one vulnerable species (VU) (*Iphiclides podalirius)* and one near threatened species (*Parnassius mnemosyne*).

From a total of 32 collection sites, 17 are now mentioned for the first time, 11 were mentioned previously and there were not found in the present material and 4 sites were mentioned previously and there were also found in the present material.

Next we present the identified species:

Superfamily PAPILIONOIDEA
Family PAPILIONIDAE

Subfamily Papilioninae

Iphiclides podalirius (Linnaeus 1758)

Material published: Bârseşti (Chimişliu, 1989); Bugiuleşti, Căpreni, Craiova, Fărcaşu, Novaci, Sânpetru (Chimişliu, 2006); Baia de Aramă (MH), Călimăneşti, Novaci, Pădurea Cobia- Segarcea (Chimişliu & Goga, 2005).

Material examined - 54 specimens**:** Bucovăț – 17.07.1967, 19.06.1968, 15.04.1968, 21.07.1980, 03.07.2001, 10.07.1982, Cheile Sohodol – 18.07.1990, 31.07.1994, 20.07.1999, 28.06.2000, Craiova - 05.08.1951, 09.08.1951, 28.06.1958, 21.07.1960, 14.07.1967, 15.06.1991, Craiova- Gr. Bot. – 03.07.1982, 28.07.1989, Craiova (Parcul Romanescu) – 4 specimens 24.06.2003, Desa – 23.07.1989, Fărcaşu – 26.06.1971, Leamna – 05.07.1965, Mofleni - 17.06.1962, Negoi – 16.06.1993, 03.08.1998, Racoviţa – 15.07.1982, Radovan – 16.07.2003, Secui – 18.06.2007, 10.06.2008; Şimnic – 07.07.2004, Vâlcom – 20.07.1990.

IUCN status: VU.

In the Catalog of Lepidoptera from Romania (Rakosy *et al.,* 2003) is recorded the presence of this species in the Oltenia fauna only for the period from 1981 to 2001. Our museum collections have been preserving this species since 1951.

This species is reported in Oltenia's fauna since 1929 from Piatra Cloşani (Marcu, 1929), and later from Tâmbureşti and Ogrin (Bobîrnac & Sanda, 1964).

Papilio machaon Linnaeus 1758

Material published: Bârseşti (Chimişliu, 1989); Craiova, Făgăraşi (Chimişliu**,** 2006); Baia de Aramă, Călimăneşti, Corabia, Craiova (Chimişliu & Goga, 2005).

Material examined – 36 specimens**:** Cheile Sohodol 20.07.1968, 26.08.1996, 27.07.1999, 31.07.1994, 14.08.2001, 31.06.2001, 28.06.2002, 11.08.2004, 5 specimens - 05.08.2003; Craiova – 05.08.1951, 01.08.1958, 28.06.1958, Craiova (Parcul Romanescu) – 24.06.2003, Desa - 05.08.1982, Filiaşi – 27.06.1992, Gherceşti – 02.05.1993, Negoi - 10.08.1986, Răcari – 25.07.1998, 16.04.2000.

IUCN status: EN

Like the previous species, in the Catalog of Lepidoptera from Romania (Rakosy *et al.,* 2003) is recorded the presence of this species in the fauna of Oltenia only for the period from 1981 to 2001. In the museum collection we have specimens collected since 1958.

The species is mentioned for the first time in Oltenia's fauna in 1929 at Oslea (Marcu, 1929).

Subfamily Parnassiinae

Parnassius apollo jarensis Kertesz 1922

Material published: Beiuş (Chimişliu, 1989), Munții Rarău (Chimişliu & Goga, 2005).

Material examined: 1 specimen Rarău Mountains - 06.06.1952.

IUCN status: CR

Protective measures in Romania: present in Annex no. 4^{A} of the Emergency Ordinance no.57/2007.

Parnassius mnemosyne (Linnaeus 1758)

Material published: Breazu (Chimişliu, 1989), Novaci (Chimişliu, Goga, 2005).

Material examined - 12 specimens: Bucovăț - 07.05.2000, Craiova – 05.07.1990, Cheile Sohodol - 17.06.1965, 28.07.1994, 17.08.2002, 14.05.2003, 15.08.2003, Valea Cheii - 30.06.2008.

IUCN status: NT

Protective measures in Romania: present in Annex no. 4^{A} of the Emergency Ordinance no.57/2007.

According to data held by the species preserved in museum collections, this species is present in Oltenia's fauna since 1965. Rakosy *et al.* (2003) mention it during 1981 – 2001. It was reported in 1966 in Valea Sohodolului (Bobîrnac *et al.,* 1966).

Zerynthia (Zerynthia) polyxena (Denis & Schiffermüller 1775)

Published material: without collection dates **(**Chimişliu & Goga, 2005).

Examined material - **5** specimens: Desa – 16.04.1990, Filiaşi – 27.06.1992, Răcari – 16.04.2000, 30.04.2001, Secui – 20.04.2008.

IUCN status: EN

Protective measures in Romania: present in Annex no. 4^{A} of the Emergency Ordinance no.57/2007.

Conclusions

Family Papilionidae is represented in the Museum heritage of Oltenia by 5 of the 6 species present in Romania's Lepidoptera fauna.

The heritage museum preserves relatively few specimens of this family (166 specimens: 118 from collections, 19 specimens preserved in the Entomological Collection „I. Firu", 18 specimens in the Donation „I. Stănoiu"şi 11 specimens in the entomological collection „M. Peiu").

Due to the fact that all the presented species have different degrees of endangerment, their presence in the museum heritage, along with other rare or threatened with extinction species, enhance the scientific value of our heritage.

The species of Papilionidae family preserved in the museum heritage come not only from Oltenia's fauna, but also from the fauna of other 5 counties of Romania: Bihor, Braşov, Iaşi, Suceava şi Vaslui.

For species conservation and maintenance of their diversity, we believe it is necessary to implement a series of protective measures such as: knowledge of area, conservation and protection of the prefered biotope by endangered species, avoiding treatment with chemicals in ecosystems, prohibiting the collection of species to collectors.

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Lucrările Simpozionului „*Entomofagii şi rolul lor în păstrarea echilibrului natural*”
Universitatea „Al.I. Cuza” Iaşi, 2008

THE DIVERSITY AND MAIN ECOLOGICAL REQUIREMENTS OF THE EPIGEIC SPECIES OF CARABIDAE (COLEOPTERA, CARABIDAE) IN THE ECOSYSTEM CROP OF SUGAR BEET FROM MOLDAVIA, 1981-2001

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Abstracts. This paper deals with some aspects relating to epigeic ground beetles of the ecosystem crop of sugar beet in Moldavia (1981-2001). It presents alfa diversity variation of species of Carabidae, relative abundance and the index of Shannon diversity of coenoses , evenness and the main ecological requirements of the species, regarding reproduction, moisture, biotopes, food and geographical distribution.

Key words: Sugar beet crop, Carabidae, alpha diversity, gamma diversity, relative abundance, dominance, Shannon index, evenness

Diversitatea si cerințele ecologice principale ale speciilor epigee de Carabidae (Coleoptera, Carabidae) în ecosistemul culturii de sfeclă de zahăr din Moldova, 1981-2001

Rezumat. Lucrarea include aspecte ecologice asupra speciilor de carabide epigee colectate din 9 localități ale ecosistemul culturii de sfeclă de zahăr din Moldova: Corod, 1983; Pogoneşti,1983; Căbeşti,1983 Lețcani,1981,1982; Paşcani,1981; Roman,1992; Truşeşti,2001; Botoşani 2001. Pentru colectarea speciilor s-au folosit câte 12 capcane în fiecare localitate (staționar) în intervalul de timp 1981-2001, extrăgându-se, în total, 23.293 indivizi care aparțin la 15 subfamilii, 21 genuri şi 55 de specii de Carabidae.
Variația numerică a Alfei diversitate a fost cuprinsă între 7 si 25 specii, iar gama diversitate (colectarea carabidelor din acelaşi fel de cultură, dar localități diferite) a fost de 55 de specii. Media valorilor Indicelui Shannon a fost 1,63 (limite 0.48-2,51) ,iar media valorilor echitabilității a fost 39,56 % (limite 17 – 58 %).
Principalele cerințe ecologice (reproducere, umiditate, biotopi, hrană, distribuție geografică) ale cenozei de carabide în ecosistemul culturii de sfeclă de zahăr din Moldova se caracterizează prin predominarea speciilor cu reproducere în primăvara (65 %), mezofile, (69 %), cu preferințe pentru biotopii stepe – culturi (36 %), culturi (20 %) , pantofage (47 %) si zoofage (42 %), distribuite preponderent zoo-geografic Europene (34 %) si Vest-Palearctice (24 %).

Introduction

Maize, wheat and potato are the main crops for the food of people in Moldavia. Zoocoenoses in agricultural crops are determined by an assemblage of abiotic and biotic factors in interaction with the respective monocrops (wheat, maize, potato, lucerne, sugar beet etc.). Sugar beet is cultivated mainly for obtaining sugar.

“Carabidologists current trend is to know in detail the status of populations of carabids of agroecosystems and increase their potential as biocontrol agents, to determine which agricultural practice can positively influence the populations of Carabidae to increase their effective.” (Neculiseanu, 2003). This paper synthesizes a carabidologic material collected from 9 localities where sugar beet was cultivated, belonging to the counties of Galați, Vaslui, Iaşi, Bacău, Neamț, and Botoşani, in the period 1981 -2001, Moldavia.

Material and Methods

For the collection of carabids the pitfalls method was used with a preserving liquid protected against precipitations. This method allows the collection of qualitative and quantitative material in a time period established by scientist to obtain data on relative dominance of the species, their constancy, coenosis diversity and dynamics of carabids in connection with the characteristics of biotope, comparisons between collection localities and discussion of results

The localities, of which the material was collected, were: Corod, 1983 (Galați County); Pogoneşti,1983; (Vaslui County); Căbeşti,1983; (Bacău County); Lețcani, 1981, 1982; Paşcani, 1981; (Iasi County); Roman, 1992; (Neamț County); Truşeşti, 2001; Botoşani, 2001 (Botosani County).

The material was collected in the interval of years 1983- 2001 May, June, July, August, September.

For the collection of the individuals of carabids, 12 pitfalls were used in each locality in order to collect the subrecedent, recedent, subdominant, dominant and eudominant species of Carabidae.

Each pitfall had a volume of 700 cubic centimeters, 7 centimeters in diameter, 10 in height, being protected from precipitations.

The pitfalls were placed in the ecosystem crop of sugar beet at the beginning of the month of May. The pitfalls were set on three rows, each row having four pitfalls. The distance among rows and pitfalls was of five meters.

As preserving liquid we used a saturated solution of salt (250 grams per one liter of water). Each pitfall contained 300 mililiters solutions.

The pitfalls functioned in the ecosystem a number of 134 days (limits: 97-168 days) (May, June, July, August, September).

Collection of material

In the temperate zone, the climate influences the activity of the ectothermic invertebrates. To know the specific variation of diversity and variation of the number of individuals belonging to each species of Carabidae, the characteristics of dynamics, we have collected material twice a month.

The first collection was made around the middle of each month , and the second one at the end of each month. The material was collected from each pitfall, recording the main data, (locality, the number of the pitfall, date of collection). In the entire period, the number of collections on localities ranged between 8 and 16.

Table. 1.General dates about the collection of the entomological material from the ecosystem crop of sugar beet in the localities of Moldavia, 1981 -2001

	Localities	Pitfalls	Time of operation	Total days of operation	Total collections
1	Corod, 1983	12	May 26 –September 30	128	15
2	Pogoneşti, 1983	12	April 15 – September 30	168	16
3	Căbeşti.1983	12	April 25 aprilie- September 30	159	16
4	Letcani, 1981	12	May 10 – September 30	144	14
5	Letcani,1982	12	May 5 – September 30	149	14
6	Paşcani,1981	12	May 10- September 10	124	13

7	Roman,1992	12	May 15- August 20	97	9
8	Truşeşti, 2001	12	May 1 - August 30	123	8
9	Botoşani, 2001	12	May 20 – September 15	119	8

Determination of scientific material

Determination of the species, their nomenclature and classification of the family Carabidae in subfamilies was made in accordance with Freude H. and coll.,1974.

The aim and objectives of the paper

Moldavia, by its position and pedo-climatic characteristics, is a zoogeographical region of Romania. The purpose of collecting material of carabids was to give a response to a number of objectives at the level of the carabids family in the context of ecological conditions of Moldavia in the concrete conditions of the ecosystem crop of sugar beet, that is :

Taxonomic diversity of the epigeic family of Carabidae (subfamilies, genera, species), the variation of the Shannon diversity Index, evenness.

Knowledge of the concrete variation of values of the relative abundance of species of Carabidae in sugar beet crop of Moldavia;

Knowledge of the concrete values of some ecological parameters of the species of Carabidae in concrete conditions of the ecosystem crop of sugar beet from Moldavia (dominance, evenness) **Characterisation of the coenoses of** Carabidae in the ecosystem of sugar beet crop, relating to: the type of reproduction, preference for moisture, biotope, the regime of food, geographical distribution.

For the characterization of the carabid coenoses (carabid communities) we have used the following parameters: relative abundance, ecological requirements (time of reproduction, preference for moisture, biotope, food and geographical distribution), Shannon diversity index, evenness. The nomenclature of the species was used according to Freude, Harde, Lohse 1974 .

To characterize the coenoses of ground beetles in the ecosystem crop of sugar beet from Moldavia , referring to reproduction, preferences for humidity, biotopes, food regime, geographical distribution, I used my personal observation in the field and information from the literature. (Petrusenko,C.B.1970), (Petrusenko, C.B and Petrusenko O.A. 1972), (Turin and coll. 1991, 2003), (Neculiseanu 1991, 2003), (Šustek, 2000). I also used some information and verifications received from Šustek and Neculiseanu (2003).

Results obtained

Our results are summarized and synthetized in tables and figures.

Table 2. General table of Subfamilies of the family Carabidae, their relative abundance and dominance in the ecosystem crop of sugar beet, Moldavia.

	Name of the subfamilies	**Genera**	**Species**	**Relative abundance**	**%**
1	Cicindelinae	1	1	2	0.01
2	Carabinae	2	**5**	253	**1.09**
3	Scaritinae	1	2	47	0.20

4	Broscinae	1	1	38	0.16
5	Trechinae	1	1	11	0.05
6	**Bembidiinae**	**1**	2	**380**	1.63
8	**Anisodactylinae**	**1**	2	**657**	2.82
9	**Harpalinae**	**4**	**15**	**10.175**	**43.69**
10	Stenolophinae	1	1	15	0.06
11	**Pterostichinae**	**5**	**12**	**11.407**	**48.98**
12	Zabrinae	2	10	218	0.94
15	Brachininae	1	3	88	0.38
	Total	**21**	**55**	**23.291**	**100.0**

Table 3. Variation in the number of species and individuals in the carabids collected from the ecosystem crop of sugar beet, Moldavia, 1983 - 2001
Legend: **1**. Corod, 1983; **2.**Pogoneşti, 1983; **3**. Căbeşti, 1983; **4**. Leţcani, 1981; **5**. Leţcani, 1982; **6**. Roman,1992; **7**. Paşcani, 1981. **8.** Truşesti,2001; **9**. Botoşani, 2001

	Name of species	1	2	3	4	5	6	7	8	9	Total	%
1	Cicindela germanica L.	-	-	-	-	-	-	2	-	-	2	0.01
2	Calosoma auropunctatum Hbst	12	11	7	22	-	8	-	-	-	60	0.26
3	Carabus cancellatus Illig.	-	-	-	-	-	-	1	7	-	8	0.03
4	C.scabriusculus Ol.	-	-	-	43	4	16	1	-	-	64	0.27
5	C.scheidleri Pz.	-	-	-	-	-	-	9	-	-	9	0.04
6	C.besseri F.-W.	-	-	1	105	2	-	-	4	-	112	0.48
7	Clivina fossor L.	-	-	1	19	4	5	15	-	1	45	0.19
8	C. contracta	-	-	-	-	-	-	2	-	-	2	0.01
9	Broscus cephalotes L.	-	-	2	-	-	33	1	1	1	38	0.16
10	Trechus quadristriatus Schrank	-	-	-	7	4	-	-	-	-	11	0.05
11	Bembidion lampros Hbst.	-	-	-	187	14	82	38	-	-	321	1.38
12	B.quadrimaculatum L.	-	-	-	1	-	15	43	-	-	59	0.25
13	Anisodactylus signatus Pz.	-	-	-	124	8	19	335	166	5	657	2.82
14	A.binotatus F.	-	-	-	-	-	-	-	1	-	1	0.
15	Ophonus sabulicola Pz.	-	-	-	-	-	-	-	1	-	1	0
16	O.diffinis Dej.	-	-	-	-	-	-	-	-	1	1	0
17	Metophonus punctatulus	-	-	-	27	2	-	-	-	-	29	0.12
18	Metophonus azureus F.	-	-	-	-	-	-	-	1	-	1	0
19	M.puncticeps Stephens	-	-	-	-	-	-	-	2	-	2	0.01
20	Pseudophonus rufipes De Geer	1865	1376	710	1741	442	367	675	863	85	8124	34.88
21	P.griseus Pz.	45	-	3	-	-	-	-	2	-	50	0.21

22	Harpalus calceatus Duft.	-	-	-	-	-	-	-	14	-	14	0.06
23	H.aeneus F.	12	-	11	65	20	18	12	4	3	145	0.62
24	H.dimidiatus Rossi	-	-	1	-	-	-	-	-		1	0
25	H.distinguendus Duft.	5	25	5	59	7	5	1	1230	5	1342	5.76
26	H.atratus Latreille	-	-	1	-	-	-	-	-	-	1	0
27	H.latus L.	-	20	-	-	-	-	-	2	-	22	0.09
28	H.politus Dej.	5	-	-	-	-	-	-	-	-	5	0.02
29	H.tardus Pz.	432	-	2	2	-	-	-	1	-	437	1.88
30	Acupalpus meridianus L.	-	-	-	3	4	7	1	-	-	15	0.06
31	Poecilus striatopunctatus Duft..	-	-	-	-	-	-	-	1	-	1	0
32	Poecilus cupreus L.	1	-	14	3609	381	274	5293	-	28	9600	41.22
33	P. lepidus Leske	-	-	-	-	-	-	-	1	-	1	0
34	P. sericeus F.- W.	92	38	16	323	75	-	-	-	-	544	2.34
35	Pterostichus melanarius Illig.	-	-	1	10	-	15	369	9	220	624	2.68
36	Pt. melas Creutz.	-	-	2	-	2	-	-	4	-	8	0.03
37	Pt. macer Marscham	-	-	1	-	-	-	-	-	22	23	0.10
38	Calathus fuscipes Goeze	-	-	-	-	-	4	3	2	1	10	0.04
39	C.melanocephalus L.	-	-	-	1	-	-	1	-	-	2	0.01
40	Dolichus halensis Schaller	316	-	23	214	-	-	1	4	-	558	2.40
41	Agonum micans Nicolai	-	-	-	-	-	-	1	-	-	1	0
42	Agonum dorsalis Pontoppidan	-	-	-	34	1	-	-	-	-	35	0.13
43	Zabrus tenebrioides L.	8	2	13	2	136	5	-	-	-	166	0.71
44	Zabrus spinipes F.	-	-	-	1	-	-	-	-	-	1	0
45	Amara aulica Pz.	-	-	-	-	-	1	-	-	-	1	0
46	Amara familiaris Duft.	-	-	-	1	-	-	-	-	-	1	0
47	Amara eurynota Pz.	-	-	-	1	-	-	-	-	-	1	0
48	A.similata Gyll.	-	-	2	-	-	5	-	-	-	7	0.03

49	A. aenea De Geer	-	-	-	-	2	2	-	-	-	4	0.02
50	A.ovata F.	-	1	-	-	-	10	-	-	-	11	0.05
51	A.convexior Stephens	2	-	-	-	-	-	-	-	-	2	0.01
52	A.equestris Duft.	23	-	1	-	-	-	-	-	-	24	0.10
53	Brachinus explodens Duft.	-	-	-	-	-	-	-	9	-	9	0.04
54	Br. crepitans L.	-	-	-	19	2	-	9	19	28	77	0.33
55	Brachinus psophia Serv.	-	-	-	-	-	2	-	-	-	2	0.01
	Total species	**13**	**7**	**20**	**25**	**18**	**20**	**22**	**23**	**12**	**55**	
	% of the total species	**23.64**	**12 73**	**36.36**	**45.45**	**32.73**	**36.36**	**38.18**	**41.82**	**21.82**		
	Total number of individuals	**2818**	**1473**	**817**	**6620**	**1110**	**893**	**6813**	**2348**	**400**	**23.292**	
	% of total	**12.10**	**6.32**	**3.51**	**28.42**	**4.77**	**3.83**	**29.25**	**10.08**	**1.72**	**100.00**	

Table 4 Percentage variation of the number of individuals of species collected from the ecosystem crop of sugar beet, Moldavia,1981-2001
Legend.**1**. Corod, 1983; **2**. Pogoneşti, 1983; **3**. Căbeşti, 1983; **4**. Leţcani, 1981; **5**. Leţcani, 1982; **6**. Roman, 1992; **7**. Paşcani, 1981. **8**. Truşesti, 2001; **9**. Botoşani, 2001

	Name of species	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
1	Cicindela germanica L.	-	-	-	-	-	-	0.03	-	-
2	Calosoma auropunctatum Hbst	0.43	0.75	0.86	0.33	-	0.90	-	-	-
3	Carabus cancellatus Illig.	-	-	-	-	-	-	0.01	0.30	-
4	C.scabriusculus Ol.	-	-	-	0.65	0.36	1.79	0.01	-	-
5	C.scheidleri Pz.	-	-	-	-	-	-	0.13	-	-
6	C.besseri F.-W.	-	-	0.12	1.59	0.18	-	-	0.17	-
7	Clivina fossor L.	-	-	0.12	0.29	0.36	0.56	0.22	-	0.25
8	C. contracta	-	-	-	-	-	-	0.03	-	-
9	Broscus cephalotes L.	-	-	0.24	-	-	3.70	0.01	0.04	0.25
10	Trechus quadristriatus Schrank	-	-	-	0.11	0.36	-	-	-	-
11	Bembidion lampros Hbst.	-	-	-	2.82	1.26	9.18	0.56	-	-
12	B.quadrimaculatum L.	-	-	-	0.02	-	1.68	0.63	-	-
13	Anisodactylus signatus Pz.	-	-	-	1.87	0.72	2.13	4.92	7.07	1.25
14	A.binotatus F.	-	-	-	-	-	-	-	0.04	-
15	Ophonus sabulicola Pz.	-	-	-	-	-	-	-	0.04	-
16	O.diffinis Dej.	-	-	-	-	-	-	-	-	0.25
17	Metophonus punctatulus	-	-	-	0.41	0.18	-	-	-	-
18	Metophonus azureus F.	-	-	-	-	-	-	-	0.04	-
19	M.puncticeps Stephens	-	-	-	-	-	-	-		-
20	Pseudophonus rufipes De Geer	66.18	93.41	86.90	26.30	39.82	41.10	9.91	36.75	21.25
21	P.griseus Pz.	1.60	-	0.37	-	-	-	-	0.09	-
22	Harpalus calceatus Duft.	-	-	-	-	-	-	-	0.60	-

23	H.aeneus F.	0.43	-	1.35	0.98	1.80	2.02	0.18	0.17	0.75
24	H.dimidiatus Rossi	-	-	0.12	-	-	-	-	-	
25	H.distinguendus Duft.	0.18	1.70	0.61	0.89	0.63	0.56	0.01	52.39	1.25
26	H.atratus Latreille	-	-	0.12	-	-	-	-	-	-
27	H.latus L.	-	1.36	-	-	-	-	-	0.09	-
28	H.politus Dej.	0.18	-	-	-	-	-	-	-	-
29	H.tardus Pz.	15.33	-	0.24	0.03	-	-	-	0.04	-
30	Acupalpus meridianus L.	-	-	-	0.05	0.36	0.78	0.01	-	-
31	Poecilus striatopunctatus Duft..	-	-	-	-	-	-	-	0.04	-
32	Poecilus cupreus L.	0.04	-	1.71	54.55	34.32	30.68	77.69	-	7.00
33	P. lepidus Leske	-	-	-	-	-	-	-	0.04	-
34	P. sericeus F.- W.	3.26	2.58	1.96	4.88	6.76	-	-	-	-
35	Pterostichus melanarius Illig.	-	-	0.12	0.15	-	1.68	5.42	0.38	55.00
36	Pt. melas Creutz.	-	-	0.24	-	0.18	-	-	0.17	-
37	Pt. macer Marscham	-	-	0.12	-	-	-	-	-	5.50
38	Calathus fuscipes Goeze	-	-	-	-	-	0.45	0.04	0.09	0.25
39	C.melanocephalus L.	-	-	-	0.02	-	-	0.01	-	-
40	Dolichus halensis Schaller	11.21	-	2.82	3.23	-	-	0.01	0.17	-
41	Agonum micans Nicolai	-	-	-	-	-	-	0.01	-	-
42	Agonum dorsalis Pontoppidan	-	-	-	0.51	0.09	-	-	-	-
43	Zabrus tenebrioides L.	0.28	0.14	1.59	0.03	12.25	0.56	-	-	-
44	Zabrus spinipes F.	-	-	-	0.02	-	-	-	-	-
45	Amara aulica Pz.	-	-	-	-	-	0.11	-	-	-
46	Amara familiaris Duft.	-	-	-	0.02	-	-	-	-	-
47	Amara eurynota Pz.	-	-	-	0.02	-	-	-	-	-
48	A.similata Gyll.	-	-	0.24	-	-	0.56	-	-	-
49	A. aenea De Geer	-	-	-	-	0.18	0.22	-	-	-

50	A.ovata F.	-	0.07	-	-	-	1.12	-	-	-
51	A.convexior Stephens	0.07	-	-	-	-	-	-	-	-
52	A.equestris Duft.	0.82	-	0.12	-	-	-	-	-	-
53	Brachinus explodens Duft.	-	-	-	-	-	-	-	0.38	-
54	Br. crepitans L.	-	-	-	0.29	0.18	-	0.13	0.81	7.00
55	Brachinus psophia Serv.	-	-	-	-	-	0.22	-	-	-
	Total species	**13**	**7**	**20**	**25**	**18**	**20**	**22**	**23**	**12**

Table 5. Variation of the Shannon index values, evenness and the number of species in the ecosystem crop of sugar beet in Moldavia, 1981-2001

	Collecting site	No of species	Shannon index	Evenness %
1	Corod, 1983	13	1.61	43
2	Pogonesti,1983	**7**	**0.48**	**17**
3	Cabesti,1983	20	1.01	23
4	Letcani, 1981	25	2.06	44
5	Letcani, 1982	18	2.18	52
6	Roman,1992	20	**2.51**	**58**
7	Pascani,1981	22	1.23	28
8	Trusesti, 2001	23	1.60	35
9	Botosani, 2001	12	2.01	56

Tabel .6. Main ecological requirements of the species of Carabidae in the ecosystem crop of sugar beet, in Moldavia, 1981-2001

Legend.1. Reproduction type ; **2.** Moisture preference ; **3.** Biotope preference ;**4 .** Food regime **; 5.** Zoogeographical distribution

Sp = Spring; A = Autumnal ; S = Summer ; H= Hygrophilous; H-M = Hygro-mesophilous; M = Mesophilous ; M-X =Meso-xerophilous ; M-h = Meso-halophilous; X= Xerophilous; F = Forest ; St = Steppe ; Eu = Eurytopic ; Ols = Open landscape; Cr = Crops; Z = Zoophag ; P = Pantophag ; Fit= Phytophag; Wp = West Palaearctic ; Pl = Palaearctic ; E = European ; Em = Euromediterranian ; Ec = Euro-caucasian ; Es= Euro-siberian ; EstE = East- European;

	Name of species	**1**	**2**	**3**	**4**	**5**
1	Cicindela germanica L.	Sp	M	St,Cr	Z	Wp
2	Calosoma auropunctatum Hrbst	Sp	M	St,Cr	Z	Wp
3	Carabus cancellatus Illig.	Sp	M	F	Z	Pl
4	C.scabriusculus Ol.	Sp	M-X	St,Cr	Z	EsE
5	C.scheidleri Pz.	A	M	F,Eu	Z	E
6	C.besseri F.-W.	A	M	St,Cr	Z	EstE
7	Clivina fossor L.	Sp	M	Rip	Z	Pl
8	C. contracta	Sp	M	St	Z	Ec
9	Broscus cephalotes L.	Sp	X	St,Cr	Z	E
10	Trechus quadristriatus Schrank	A	M	St,Cr	Z	Wp
11	Bembidion lampros Hbst.	Sp	M	Cr	Z	Hl
12	B.quadrimaculatum L.	Sp	M	St,Cr	Z	Wp
13	Anisodactylus signatus Pz.	Sp	M	Cr	P	Pl
14	A.binotatus F.	A	M	Cr, St.	Fit	Es
15	Ophonus sabulicola Pz.	A	M	Cr, St.	Fit	Es

16	O.diffinis Dej.	A	M	St,Cr	Fit	Em
17	Metophonus punctatulus	A	X	St	P	Wp
18	Metophonus azureus F.	A	M	Cr,St	Fit	Wp
19	M.puncticeps Stephens	A	M	Cr	Fit	Wp
20	Pseudophonus rufipes De Geer	A	M-X	Ols	P	Wp
21	P.griseus Pz.	A	M-X	Ols	P	Pl
22	Harpalus calceatus Duft.	Sp	M-X	Cr	P	Pl
23	H.aeneus F.	Sp	M-X	Cr	P	Pl
24	H.dimidiatus Rossi	A	M	St	P	Em
25	H.distinguendus Duft.	Sp,S	M	Ols	P	Pl
26	H.atratus Latreille	Sp	M-X	F	P	M,.Ec
27	H.latus L.	A	M	F, St	P	Pl
28	H.politus Dej.	Sp	M	Ols	P	Wp
29	H.tardus Pz.	Sp	M-X	St	P	Es
30	Acupalpus meridianus L.	Sp	M	Cr	P	E
31	Poecilus striatopunctatus Duft..	Sp	H-M	Cr	Z	Wp
32	Poecilus cupreus L.	Sp	M	Cr	Z	Wp
33	P. lepidus Leske	A	M-X	Cr	Z	Es
34	P. sericeus F.- W.	Sp	M	St,Cr	Z	Wp
35	Pterostichus melanarius Illig.	Sp	M	F,Cr	Z	Wp
36	Pt. melas Creutz.	Sp	M-X	F	Z	Ec
37	Pt. macer Marscham	Sp	M	Cr	Z	Wp
38	Calathus fuscipes Goeze	A	M	Eu	P	Wp
39	C.melanocephalus L.	A-Sp	M	Eut	P	Pl
40	Dolichus halensis Schaller	A	M	Cr	P	Pl
41	Agonum micans Nicolai	Sp	H	Rip	Z	Es
42	Agonum dorsalis Pontoppidan	Sp	H-M	St,Cr	Z	Wp
43	Zabrus tenebrioides L.	A	M	Cr	Fit	Ec
44	Zabrus spinipes F.	A	M	St	Fit	Ec
45	Amara aulica Pz.	Sp	M	St.Cr	P	Wp
46	Amara familiaris Duft.	Sp	M	Cr	Fit	Wp
47	Amara eurynota Pz.	Sp	M	Cr	P	Wp
48	A.similata Gyll.	Sp	M	F,st	P	Wp
49	A. aenea De Geer	Sp	M	Cr	Fit	Wp
50	A.ovata F.	Sp	M	F	P	Pl
51	A.convexior Stephens	Sp	M	Cr	P	Es
52	A.equestris Duft.	Sp	St	Cr	P	Es
53	Brachinus explodens Duft.	Sp	M-X	St,Cr	Z	E.md
54	Br. crepitans L.	Sp	M-X	St,Cr	Z	Wp
55	Brachinus psophia Serv.	Sp	M-h	St,Cr	Z	Es

Table 7. Types of reproduction of carabids in the ecosystem crop of sugar beet, Moldavia
Legend: **1.** .Spring**;** **2.** Spring -Summer; **3**. Autumnal-, **4**. Autumnal-Spring **5**., Total species

	1	**2**	**3**	**4**	**5**
No of species	35	1	18	1	55
% of total	63.64	1.82	32.73	1.82	100.0

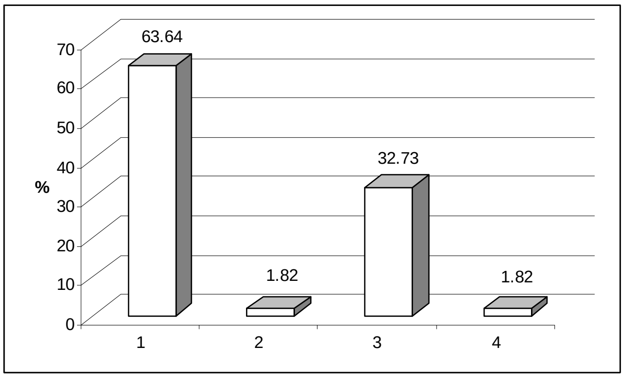

Fig. 1. The types of reproduction of the species of carabids in the ecosystem crop of sugar beet in Moldavia (Legend table 7)

Table 8. General moisture preferences of the species of carabids in the ecosystem crop of sugar beet , in Moldavia
Legend: 1. Hygrophilous;**2**. Hygro-mesophilous, **3.** Mesophilous; **4**. Meso-xerophilous; **5**. Meso-halophilous **6**. Xerophilous, **7.** Total species

	1	**2**	**3**	**4**	**5**	**6**	**7**
No of species	1	2	38	11	1	2	55
% of total	1.82	3.64	69.09	20	1.82	3.64	100.0

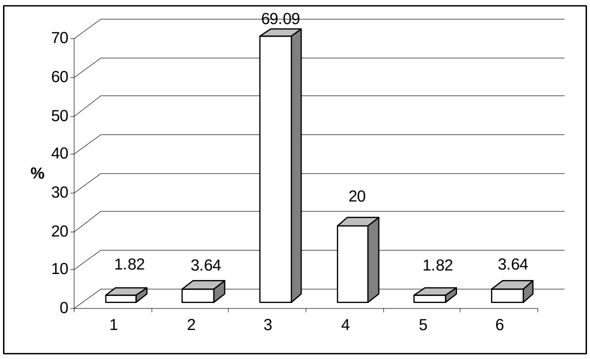

Fig. 2. General preferences to moisture of the species of carabids in the ecosystem crop of sugar beet in Moldavia (Legend in table 8).

Table 9.General biotope preferences of the species of carabids in the ecosystem crop of sugar beet, in Moldavia

Legend: 1. Forest; **2**. Forest-Steppe; **3**. Forest-crops; **4**. Steppe**; 5.** Steppe-crops; **6.** Crops; **7.** Open land escape; **8**. Ripicol; **9.** Eurytopic; **10.** Total species

	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**I0**
No of species	4	2	1	5	17	17	4	2	3	55
% of total	7.27	3.64	1.82	9.09	30.91	30.91	7.27	3.64	5.45	100.0

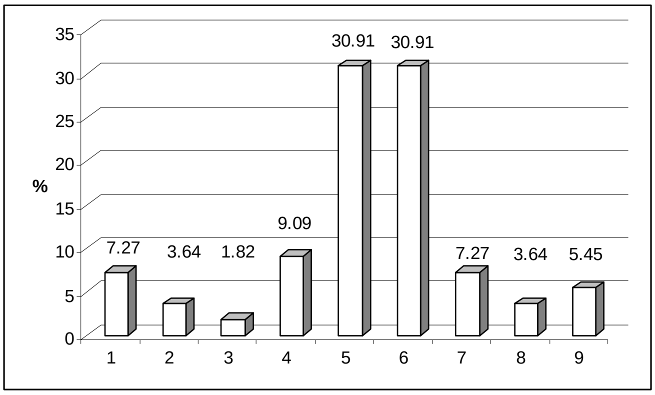

Fig. 3. General preferences to biotope of the species of carabids in the ecosystem crop of sugar beet in Moldavia (Legend in table 9)

Table 10. General trophic regime of the species of carabids in the ecosystem crop of sugar beet, in Moldavia ,1981-2001

Legend: 1. Zoophags; **2**. Pantophags; **3**. Phytophags; **4.** Total species

	1	**2**	**3**	**4**
No of species	24	22	9	55
% of total	43.64	40.00	16.36	100.0

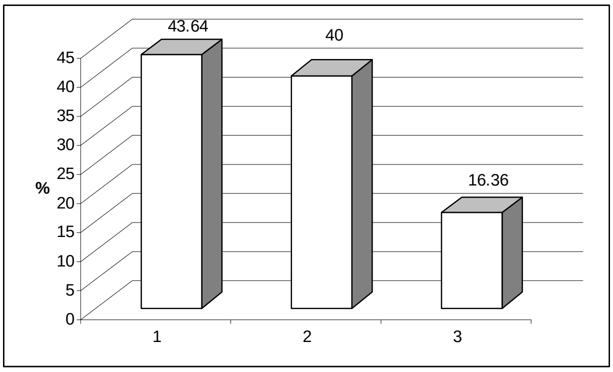

Fig. 4 General trophic regime of the species of carabids in the ecosystem crop of sugar beet in Moldavia (Legend in Table 10)

Table 11.General geographical distribution of the species of carabids i n the ecosystem crop of sugar beet, in Moldavia,1981-2001

Legend: **1.** Palaearctic; **2**. West Palaearctic ; **3**. European; **4**. Euro-caucasian; **5**. Euro-sibirian; **6.** Mediterannean; **7.** East-European, **8**. Holarctic**, 9.** Total species

	1	2	3	4	5	6	7	8	9
No of species	11	22	3	5	8	3	2	1	55
% of total	20	40.00	5.45	9.09	14.55	5.45	3.64	1.82	100.0

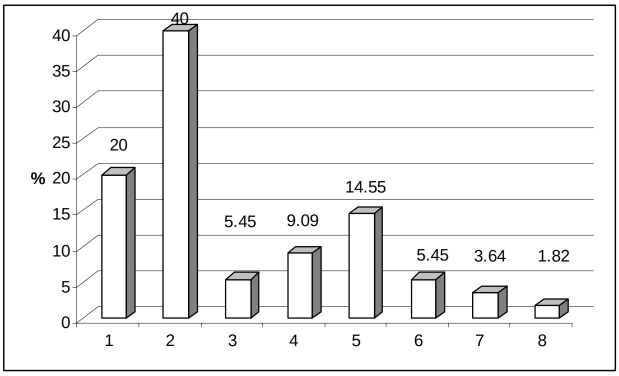

Fig. 5. General geographical distribution of the species of carabids in the ecosystem crop of sugar beet in Moldavia (Legend in Table 10).

Discussions

Nature is in a permanent movement, functioning as a whole and its components are in interaction. Variation of ecological phenomena within certain limits is a general trait in any ecosystem. Scientific results of this paper show that the number of species (alpha diversity), the number of individuals, Shannon diversity index, evennes show local variations as a result of local ecological determinism.

In the ecosystem crop of sugar beet from Moldavia, annual and local variations of the number of species (alfa diversity) was between 7 species (Pogoneşti, 1983) and 25 species (Lețcani , 1981) and the gama diversity had the value of 55 species. There is a close connection between ecodiversity and biodiversity, according to biocoenotic principles of THIENEMANN

The total number of individuals collected from each sugar beet crop presented a strong variation between 400 specimens (Corod, 1983) (1.72 % in comparison with the total number collected from all the sites) and 6,813 (Paşcani, 1981) (29.25 %). The soil on which the sugar beet was cultivated was alluvial, more humid. The species **Poecilus cupreus** (mesophilous) collected from this site represented 77.70 %(Tables 3,4). Also, a strong variation presented the number of individuals within dominant species. For example, **Pseudophonus rufipes** between 9.91 % (863 specimens), Paşcani (1981) and 93.41 % (1376 specimens , Pogoneşti, 1983). (Tables 3, 4)

The species well represented, at the level of individuals:, that is, dominant or eudominant, are: *Pseudophonuxs rufipes, Poecilus cupreus* and *Pterostichus melanarius* (only in two sites) (Paşcani, 1981 and Botoşani, 2001). (Table 3, 4). This situation can be explained ecologically by two factors: soil moisture and food for species. Sugar beet (Beta vulgaris) is a mesophilous plant and due to its ecological requirements is cultivated in more humid area with pedoclimatic favourable conditions.

The synthetic relationships between the number of species and the number of individuals (total and for each species) are shown numerically by the Shannon diversity index**.** (Table 5) Normally, the values of this index range from 1.50 to 3.50. Our results show that the local Shannon index had values between 0.48 and 2.51, both values are below the limits of normal variation, the lower and upper. (Table 5). The local Shannon index values are determined by the number of species and in particular by the value of evenness. The smallest values of the species, of the Shannonn index and evenness were in the locality Pogoneşti, 1983. The evenness was 17 % due to the fact that the number of individuals of the species *Pseudophonus rufipes* represented 93.41% of the total individuals collected. (Tables 3, 4)

As for reproduction seasons of carabids in the sugar beet crop ecosystem in the climatic conditions of Moldavia (south, centre, north), we classified the species in four groups: *Spring, spring-summer, autumnal and autumnal-* spring. Out of the mentioned groups, two groups are dominant: The class of spring species (35 species, 63.64 %) and autumnal species (18 species, 32.73%) are dominant (Table 7, Fig. 1). The predominance of these two groups is in accordance with the conclusion of Neculiseanu for the whole Republic of Moldavia (Neculiseanu, 2003) and other papers of ours, published , referring to winter wheat, maize , potatoes crops for Moldavia (Varvara, Bulimar , 2002; Varvara, Zamfirescu, 2008; Varvara, 2005, Varvara, 2001) and for deciduous and coniferous ecosystems from Moldavia, clearings from deciduous forests of Moldavia that the spring species are dominant in variable proportion according to local conditions , followed by the autumnal species. (Varvara ,2005). The proportions of the reproductive classes in a coenosis of carabids is an ecological and evolutionary result connected with temperature, food, competition .

According to Neculiseanu (2003, pg 131-137), the species with the breeding in the spring-summer winter in the adult stage, their life cycle lasts one or two years. The laying of the eggs take place in the months of April –August, and the period of appearance of larvae, pupae and young adults corresponds to the months of May-September. The species breeding in the autumn- summer winter in the larva stage and partly as adults, their life cycle lasts one year, two or three years.

Temperature and moisture are the main variable physical (ecological) factors of the environment influencing the activity and distribution of ground beetles in their biotope and habitats. As for humidity, we arranged the species in six groups:*Hygrophilous, hygro-mesophilous,* m*esophilous,, meso-halophilous, meso-xerophilous and xerophilous species*. The preference of the individuals of a species for a particular range of an environmental factor is according to their preferendum.Most individuals of a species is found in the optimum preferendum of that species. Few individuals of the same species are found at the low and maximum condition of that factor, as the curve of the law of tolerance shows us.

Of our results obtained, 38 species (69.09 %) are *mesophylous*, 11 species (20%) are *meso-xerophilous*. (Table 7, Fig.2). These results and others from our published papers support the conclusion that in sugar beet crop, agricultural ecosystems (winter wheat, potatoes, clover crops, sugar beet), deciduous forests, the majority of species are mesophilous in variable proportion according to local conditions, followed by meso-xerophilous species.

With reference to preferred biotopes, in accordance with the present results, we grouped species in 9 classes: *forest species, forest-steppe, forest-crops, steppe, steppe-crops, crops, open landscape, ripicol* and *eurytopic.* The steppe-crops species and species of crops occupy the same percentage of 30.91 %, each group, respectively 17 species. (Table 9, Fig 3). The coenoses. of carabids in the ecosystem crop of sugar beet and other ecosystems (maize, potatoes, winter wheat , clover , etc.) are made from a mixture of species that can find habitats to live and survive in these cultures.

The food regime of the species of carabids in the sugar beet crop is predominantly zoophagous, that is 24 species (43.64 %) and pantophagous (22 species, 40%), 9 species (16.36 %) are phytophagous. (Table 10, Fig. 4). Predation is primarily of insects on the soil surface. The predomination of the zoophagous species was also found in the forest ecosystems and agricultural ecosystems (Varvara 2004, 2005 (a.b.c)).

In regarding the geographical distribution of species of Carabidae found in the ecosystem crop of sugar beet in Moldavia, the results are shown in table 11 and figure 5. The species have been classified in 8 classes.: *Palaearctic, West Paalearctic,, European, Euro-caucasian, Euro-sibirian, Mediterranian, East-European Holarctic* .Out of these classes, three classes are dominant.: they are .*West Palaearctic*, 22 species (40 %), *Palaeacrtic* (11 species (20 %) and *Eurosibirian,* 8 species (14.55 %). (Table 11, Fig 5). These three groups of species were also found in the clover crop from north Moldavia.

So, of those said above, we can characterize the species of carabids occuring in the ecosystem crop of sugar beet in Moldavia as mostly *spring, mesophilous, steppe-crops and crops species, zoophagous,panthophagouis,West Palaearctic, Palaearctic, and Euro-sibirian species.*

Theoretically, the alpha and gamma diversity of epigeic fauna of ground beetles in the ecosystem crop of sugar beet in Moldavia should be richer , if there are applied and other methods of collecting of these coleopterans.

Conclusions

Collections and logical analyses of the classes of ecological requirements of the family Carabidae in the ecosystem crop of sugar beet as to type of reproduction, humidity, biotope, food regime and geographical preferences confirm the deductions:

In the crops of sugar beet in Moldavia, the following subfamilies of Carabidae prevail. In the order of their relative abundance and percentage, they are.:*Pterostichinae, Harpalinae and Anisodactilinae*.

Shannon index varies strongly (0.48 - 2.51) ,being under normal limits of variation (1.50-3.50). Evenness had variations between 17% and 58% .

On average, 35 species (63.64%) are reproduced in the spring, 18 species (32.73%) are reproduced in the autumn.

38 species (69.09 %) are *mesophylous* ,11 species (20 %) are *meso-xerophilous*.

17 species (30.91 %) are steppe-crops species and other 17 species (30.91) are crops species

The food regime is predominantly zoophagous, that is, 24 species (43.64 %) and pantophagous 22 species (40. %) .

Zoogeographically, three classes are dominant.: *West Palearctic*, (22 species, 40%), *Palaearctic* (11 species , 20%) and *Euro-sibirian* (8 species , 14.55 %).

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BIODIVERSITY OF THE CHRYSOMELIDAE SPECIES (*COLEOPTERA*, *CHRYSOMELIDAE*) IN THE CIRIC FOREST - IAŞI

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Abstracts. The Ciric forest is situated near the city of Iasi and it has a surface of 252 hectares, containing trees and also indigenous shrubs, as well as exotic essences. During 2006-2007 we have collected from this area, mainly through the vegetation filtering technique, 254 individuals belonging to the *Chrysomelidae* family, *Coleopterai* order. After processing the material collected, we identified 23 genera and 42 species of chrysomelidae. Among the eudominant and dominant species, we could mention the following: *Chrysolina fastuosa*, *Clytra quadripunctata*, *Cryptocephalus sericeus*, *Chrysolina polita*, *Gastrophysa polygoni*, *Chrysomela populi*, *Agelastica alni* and *Cassida viridis*. Among the rarities, we have to mention *Cassida atrata* seen for the first time in the Moldavian entomofauna. For every species, we have calculated the abundance, the constancy, the dominance and the ecological significance index. We have also established the percentage reports of the chrysomelidae collected according to the zoogeographical distribution

Key-words: The Ciric forest, biodiversity, *Chrysomelidae.*

Biodiversitatea crisomelidelor (*Coleoptera*, *Chrysomelidae*) din Pădurea Ciric-Iaşi.

Rezumat. Pădurea Ciric este localizată în vecinătatea Municipiului Iaşi, ocupă o suprafaţă de 252 ha şi are în componenţa ei atât arbori şi arbuşti indigeni, cât şi esenţe exotice. În perioada 2006-2007 au fost colectate din această zonă în principal prin filetarea vegetaţiei un număr de 254 de indivizi ce aparţin familiei *Chrysomelidae*, ordinul *Coleoptera*. În urma prelucrării materialului recoltat au fost identificate 23 genuri şi 42 specii de crisomelide. Dintre speciile eudominante şi dominante menţionăm pe *Chrysolina fastuosa*, *Clytra quadripunctata*, *Cryptocephalus sericeus*, *Chrysolina polita*, *Gastrophysa polygoni*, *Chrysomela populi*, *Agelastica alni* şi *Cassida viridis*. Dintre rarităţi evidenţiem specia *Cassida atrata* semnalată pentru prima dată în entomofauna Moldovei. La fiecare specie s-au calculat abundenţa, constanţa, dominanţa şi indicele de semnificaţie ecologică. Au fost stabilite şi raporturile procentuale ale crisomelidelor colectate după răspândirea zoogeografică. Din punct de vedere zoogeografic, se constată faptul că predomină elementele euro-siberiene şi palearctice datorită climatului temperat continental tipic întâlnit în zona municipiului Iaşi. Pentru *Cassida atrata* se indică principalele caracteristici morfologice şi se prezintă date legate de ecologia ei.

Cuvinte cheie: Pădurea Ciric, biodiversitate, *Chrysomelidae.*

Introduction

The Ciric forest, situated around the Ciric Recreation Lake, has a surface of 252 ha, representing trees, indigenous shrubs, as well as exotic essences. Among the predominant species, we can enumerate: the American maple tree (*Acer negundo*), the oak (*Quercus robur*), the locust tree (*Robinia pseudacacia*) and the ash (*Fraxinus ornus*). Rarely, we could notice the Penssylvania ash (*Fraxinus penssylvanica*), the elm (*Ulmus foliacea*), the big-leaf linden tress (*Tilia platyphylos*), the maple tree (*Acer platanoides*), the Tatar maple tree (Acer *tataricum*), the common chestnut-tree (*Aesculus hippocastanum*), the tree of heaven (*Ailanthus altissima*), the evergreen oak (*Quercus petraea*), the prunus mahaleb (*Padus mahaleb*), the sweet willow (*Eleagnus angustifolia*), the honey locust (*Gleditschia triacanthos*), the pagoda tree (*Sophora japonica*), the Southern catalpa (*Catalpa bignonioides*). The shrubs have a sporadic presence, being represented by the spindle-tree (*Evonymus europaea*), the common elder (*Sambucus *nigra*), the common hazel (*Corylus avellana*), the common hawthorn (*Crataegus monogyna)*, the blackthorn (*Prunus spinosa*), the dog rose (*Rosa canina*), the wayfaring tree (*Viburnum lantana*), the indigobush (*Amorpha fruticosa*), the staghorn sumac (*Rhus typhina*). The herbaceous strata are diversified, being represented by *Carex pilosa*, *Melisa uniflora*, *Brachypodium silvaticum*, *Poa nemoralis*, *Viola alba*, *Geum urbanum*, *Genista tinctoria*.

Materials and methods

There have been five screw-cuttings of the herbaceous strata cut at a fifteen day interval, between May and June and in the first decade of the month of July. At every screw-cutting, we have accomplished 50 "mows", with a 30 cm diameter of the screw-cutting. The species on the trees and the shrubs were collected manually and through agitating the branches. For each species, we have calculated the main ecological indices: the abundance (A), the constancy (C), the dominance (D) and the ecological significance index (W).

Results and discussions

After processing the collected materials, we had 254 *Chrysomelidae*, belonging to 23 genera and 42 species, as follows:

Donacia clavipes **(FABRICIUS, 1793)** We can see it in the Northern area of the Central European Palaearctic all the way to Siberia, in the common reed near the marshes and the rivers. Host plants: *Phragmites communis* and *Baldingera arundinacea*.

Plateumaris braccata **(SCOPOLI, 1772)** It is spread throughout Europe, the Caucasian area, Turkestan and Siberia. In the plain and hills areas, in May-June. The host plant is *Phragmites communis.*

Plateumaris sericea **(LINNAEUS, 1761)** Euro-Siberian species, spread toward the East all the way to Japan. It lives on several aquatic plants, such as *Iris sp*., *Carex sp*., *Alisma sp*. and on different aquatic graminaceae from May to July.

Lilioceris lilii **(SCOPOLI, 1763)** it is spread throughout the whole Palaearctic region, from the Atlantic to the Pacific, and also in the Near East and North Africa. The main host plant is *Lilium candidum*, but it is also met on other plants of the same species (*L. auratum*, *L. giganteum*, *L. martagon* şi *L. tigrinum*).

Clytra quadripunctata **(LINNAEUS, 1758)** Euro-Siberian species, met in the plain and hill areas. The host plants are species of the *Crataegus*, *Quercus*, *Betula*, *Salix* genera.

Smaragdina salicina **(SCOPOLI, 1763)** Euro-Siberian element, it can get along the East side until the Japanese area. From the plains to the mountains, it is common and it can be seen in May and June on species of *Crataegus*, *Salix* şi *Rumex*.

Smaragdina xanthaspis **(Germar, 1824)** Spread in the Central and Southern Europe, in Syria, Asia Minor and the southern half of Russia. It can be observed on different trees and shrubs (*Crataegus sp*., *Quercus sp*., *Salix. sp*., *Betula sp*.), in May and June.

Pachybrachys hieroglyphicus **(LAICHARTIG, 1781)** Euro-Siberian species, comună de la sfârşitul lui aprilie până la sfârşitul lunii iunie pe specii de *Salix*.

Cryptocephalus bilineatus **(LINNAEUS, 1767)** Species spread towards the Palaearctic region, it can get along the East side until the Japanese area. Common in the plains and in the mountains, from May to July, on different umbelliferae.

***Cryptocephalus ocellatus* (DRAPIEZ, 1819)** It is spread in the Central Europe, the Southern and Eastern Europe, Asia Minor and the Caucasian area. On humid lawns, in May and July, on species like *Salix*, more rarely on *Populus sp*, *Corylus sp*. and *Betula sp*.

***Cryptocephalus querceti* (SUFFRIAN, 1848)** From the Central Europe to Asia Minor, in the plains and hills, on species like *Quercus* and *Betula*.

***Cryptocephalus hypochoeridis* (LINNAEUS, 1758)** Euro-Siberian element. Common from the plains to the mountains, from the beginning of June until the end of August, mainly on species asteraceae.

***Cryptocephalus moraei* (LINNAEUS, 1758)** European species, frequent in May-July *Hypericum sp* and *Sarothammis scoparium*.

***Cryptocephalus sericeus* (LINNAEUS, 1758)** Euro-Siberian element, common in May-August, from the plains to the mountains, on asteraceae flowers and of spontaneous umbelliferae.

***Cryptocephalus vittatus* (FABRICIUS, 1775)** Species spread in the Southern and in the South-East Europe. In June and July *Chrysanthemum leucanthemum* and on *Sarothammis scoparium.*

***Chrysolina marginata* (LINNAEUS, 1758)** Euro-Asian species, spread in the Central and Southern Europe, the Caucasian area and in the Central Asia. It lives on species of *Chrysanthemum*, *Artemisia* and *Achillea.*

***Chrysolina limbata* (FABRICIUS, 1775)** Central-European element. Common in the plains and on the hills, mainly on *Plantago sp.*

***Chrysolina polita* (LINNAEUS, 1758)** Spread in the whole Europe, the Eastern part of the Mediteranean region and in Siberia. Common from May to August, in the plain and hills, in humid places. Most species, met on *Mentha aquatica*, *Lycopus europaeus*, *Nepeta cataria*, *Glechoma hederacea*, *Salvia pratensis*, as well as on species of *Melissa* and *Origanum*.

***Chrysolina fastuosa* (SCOPOLI, 1763)** Euro-Asiatic species. On the humid fields near the waters, on *Urtica sp*., *Lamium sp.* and *Galeopsis sp.*

***Chrysolina herbacea* (DUFTSCHMIDT, 1825)** Spread from the Iberian Peninsula to Asia Minor, the Southern part of Russia and the Middle East. Common from the plains to the mountains, mainly on *Mentha* and on other lipped plants.

***Oreina caerulea* (OLIVIER, 1790)** Central-European element. The host plant is *Centaurea jacea.*

***Colaphus sophiae* (SCHALLER, 1783)** Species spread in the Central and Eastern Europe, as well as in Asia Minor. In the plains and hills, in May and June on *Sisymbrium sophia*, *Raphanus raphanistrum* and *pe Synapis sp*.

***Gastrophysa polygoni* (LINNAEUS, 1758)** Palaearctic element. We can meet it from the plains to the mountains, from April until August on *Polygonum aviculare* and *P. convolvulus*, on species of *Rumex,* as well as on *Fagopyrum vulgare*.

***Gastrophysa viridula* (DE GEER, 1775)** Holarctic species. In the plain region, we usually see it on *Rumex* and *Polygonum*, and in the mountain area on *Rumex alpinus*.

***Hydrotassa marginella* (LINNAEUS, 1758)** Euro-Siberian element. In the plain area, in humid places, on *Ranunculus sp*. and on *Caltha palustris.*

***Chrysomela* populi (LINNAEUS, 1758)** It is present in the whole Palaearctic region. From the plains to the mountains, in April-August on species of *Salix.*

***Chrysomela saliceti* (SUFFRIAN, 1851)** Central-European element. In the river meadows from the plains area, on different species of *Salix.*

Phaedon cochleariae **(FABRICIUS, 1792)** Species spread in Europe and Asia Minor. On humid fields, in the plains and hills regions. The host plants are *Nasturtium officinale*, *Rorippa amphibia*, *Veronica beccabunga*, *Armoracia rusticana*.

Prasocuris junci **(BRAHM, 1791)** From Central Europe to the Caucasian area and Armenia. Frequent in humid places on *Veronica beccabunga* and on *Anagalis aquatica*.

Phratora vitelinae **(LINNAEUS, 1758)** Holarctic element. In the plains and hills, frequent on species such as *Populus* and *Salix.*

Xanthogaleruca luteola **(MÜLLER, 1776)** Species spread in the largest areas of the Palaearctic region. From April to October, on *Ulmus campestris*.

Galerucella calmariensis **(LINNAEUS, 1767)** Species spread in the largest areas of the Palaearctic region, from Europe to Algeria and Siberia.

Galeruca tanaceti **(LINNAEUS, 1758)** Holarctic species. From the plains to the mountains, being seen on *Achillea millefolium, Chrysanthemum vulgare* and on *Cirsium sp., Stellaria sp*., *Cardamine sp*.

Lochmaea caprea **(LINNAEUS, 1758)** Species spread in the largest areas of the Palaearctic region, from Europe to Japan. It is seen in the plains and on the hills, on species like *Salix*, *Populus* and *Betula.*

Euluperus xanthopus **(DUFTSCMIDT, 1825)** Pontic species. We do not know its host plant.

Agelastica alni **(LINNAEUS, 1758)** Palaearctic element. In the plains and on the hills, from April to August on *Alnus glutinosa* and *A. incana*.

Cassida ferruginea **(GOEZE, 1777)** Euro-Siberian element. The host plant is *Pulicaria dyssenterica*.

Cassida vibex **(LINNAEUS, 1767)** Palaearctic. From April to October, in the plains and on the hills on *Chrysanthemum vulgare*, *Cirsium arvense* and *C. palustre*, *Carduus sp*., *Achillea sp.*

Hypocassida subferuginea **(SCHRANK, 1766)** Species spread in almost all the Palaearctic region. It is seen in the plains and on the hills, especially on sandy fields in May and July on different species on *Convolvulus.*

After collecting and determining the entomologic material, we did the synecological analysis whose data are presented in table 1. We calculated the abundance (A), the constancy (C), the dominance (D) and the ecological significance index (W).

According to the abundance, the species having the greatest values are *Chrysolina fastuosa* 26 specimens collected; *Cassida viridis* 23 individuals and *Gastrophysa polygoni* with 21 specimens.

Among the synthetic indexa presented, the ecological significance index is the most important, as it relieves in the best manner the elements in the biocoenosis. The species with the greatest value (W5) is *Chrysolina fastuosa* (10. 24%), and of the constant species (W4) we can mention *Gastrophysa polygoni* (8.27%), *Cassida viridis* (6.34) and *Clytra quadripunctata* (5.67%).

From the accessory species, we can enumerate the following: *Plateumaris braccata*, *P. sericea*, *Smaragdina xanthaspis*, *Pachybrachys hieroglyphicus*, *Cryptocephalus ocellatus*, *Cr. querceti*, *Cr. biguttatus*, *Cr. moraei*, *Cr. sericeus*, *Chrysolina marginata*, *Ch. polita*, *Oreina caerulea*, *Gastrophysa viridula*, *Hydrotassa marginella*, *Chrysomela populi*, *Chr. saliceti*, *Xanthogaleruca luteola*, *Galerucella calmariensis*, *Lochmaea caprea*, *Agelastica alni*, *Cassida ferruginea*, *C. vibex* şi

Hypocassida subferuginea. We can see that the accessory species are the most numerous, representing 54. 7% of the total number of species.

The accidental species are represented by *Donacia clavipes*, *Smaragdina salicina*, *Lilioceris lilii*, *Smaragdina salicina*, *Cryptocephalus bilineatus*, *Cr. hypochoeridis*, *C. vittatus*, *Chrysolina limbata*, *Ch. herbacea*, *Colaphus sophiae*, *Phaedon cochleariae*, *Prasocuris junci*, *Phratora vittelinae*, *Galeruca tanaceti*, *Euluperus xanthopus* and *Cassida attrata*.

From the point of view of the zoogeographical analysis, we can see the predominance of the Palaearctic elements (28.57) and also the Euro-Siberian ones (26. 19%), that represent, put together, more that the half of species here. The high numbers of the Euro-Siberian elements is correlated with the existence of the temperate-continental climate typical for the Ciric forest. Nevertheless, we can notice the Southern and Eastern European presence of the *Cryptocephalus vittatus* and of the Pontic species *Euluperus xanthopus*. The data referring to the geographical distribution of the chrysomelidae in the Ciric forest are presented in Table 2, and also in Fig.1, 2.

Table 1 Main ecological indexes of the chrysomelidae collected in the Ciric forest.

No.	Species	A	C	D	W
1	*Donacia clavipes*	2	10	0.79	0.07
2	*Plateumaris braccata*	3	30	1.18	0.35
3	*P. sericea*	3	30	1.18	0.35
4	*Lilioceirs lilii*	1	10	0.39	0.03
5	*Clytra quadripunctata*	18	80	7.09	5.67
6	*Smaragdina salicina*	1	10	0.39	0.03
7	*S. xanthaspis*	2	20	0.79	0.15
8	*Pachybrachys hieroglyphicus*	9	50	3.54	1.77
9	*Cryptocephalus bilineatus*	1	10	0.39	0.03
10	*Cr. ocellatus*	6	40	2.36	0.94
11	*Cr. querceti*	2	20	0.79	0.14
12	*Cr. biguttatus*	3	30	1.18	0.33
13	*Cr. hypochoeridis*	1	10	0.39	0.03
14	*Cr. moraei*	6	60	2.36	1.41
15	*Cr. sericeus*	15	70	5.91	4.13
16	*Cryptocephalus vittatus*	1	10	0.39	0.03
17	*Chrysolina marginata*	5	40	1.97	0.78
18	*Ch. limbata*	1	10	0.39	0.03
19	*Ch. polita*	14	70	5.51	3.85
20	*Ch. fastuosa*	26	100	10.24	10.24
21	*Ch. herbacea*	1	10	0.39	0.03
22	*Oreina caerulea*	3	20	1.18	0.23
23	*Colaphus sophiae*	1	10	0.39	0.03
24	*Gastrophysa polygoni*	21	100	8.27	8.27
25	*G. viridula*	4	30	1.57	0.47
26	*Hydrotassa marginella*	5	40	1.97	0.78
27	*Chrysomela populi*	19	60	7.48	4.48
28	*Phaedon cochleariae*	1	10	0.39	0.03

29	*Prasocuris junci*	1	10	0.39	0.03
30	*Chrysomela saliceti*	11	50	4.33	2.16
31	*Phratora vitelinae*	1	10	0.39	0.03
32	*Xanthogaleruca luteola*	9	40	3.54	1.41
33	*Galerucella calmariensis*	12	60	4.72	2.83
34	*Galeruca tanaceti*	1	10	0.39	0.03
35	*Lochmaea caprea*	6	30	2.36	0.70
36	*Euluperus xanthopus*	1	10	0.39	0.03
37	*Agelastica alni*	17	60	6.69	4.01
38	*Cassida ferruginea*	8	50	3.15	1.57
39	*C. vibex*	5	40	1.97	0.78
40	*C. viridis*	23	70	9.06	6.34
41	*C. attrata*	1	10	0.39	0.03
42	*Hypocassida subferuginea*	4	30	1.57	0.47

Table 2 Numerical and percentage repartition of the zoogeographical categories

No.	Zoogeographical Category	No. species	%
1	Palaearctic	12	28.57
2	Euro-Siberian	11	26.19
3	Europe and Minor Asia	8	19.04
4	Central-European	3	7.14
5	Holarctic	3	7.14
6	Euro-Asian	2	4.76
7	European	1	2.38
8	Southern-Eastern European	1	2.38
9	Pontic	1	2.38

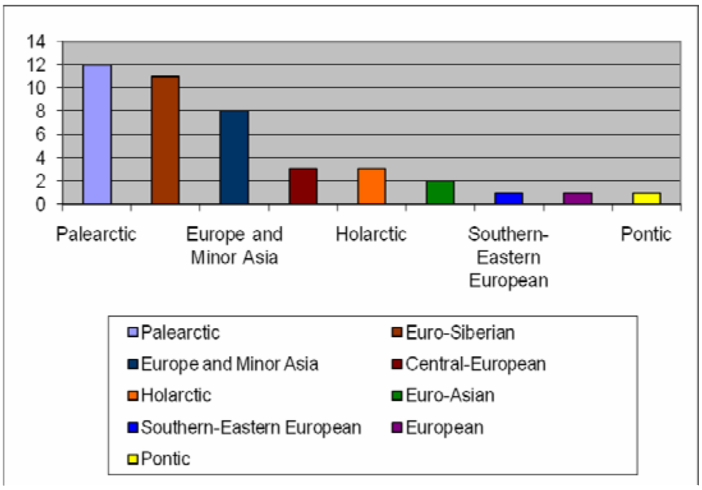

Fig. 1 Numerical repartition of the zoogeographical categories

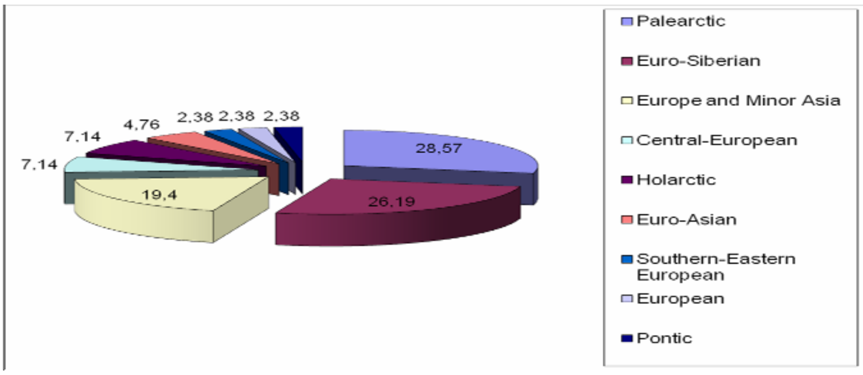

Fig. 2 Percentage repartition of the zoogeographical categories

As a new element, we present the ***Cassida attrata*** species **(FABRICIUS. 1787).** seen for the first time in the Moldavian entomofauna, for which we present the diagnosis, data on its biology and its geographical distribution.

Flattened, oval body, black, one-coloured. The anterior margin of the body has two symmetrical median reddish-brown stains, in form of a semicircle, and the posterior part of the body is strongly turned up. The elytra with lateral margins ± parallel in their ante-median half, in the posterior one they are largely rounded and leaned. The join of the elytra with small points, the join angle is lengthened and bended downwards. The surfaces of the elytra present pointed rugosities, irregular, between the points we can see longitudinal interrupted bottom hulls: length=6-9 mm. width 4-6 mm.

Fig. 3 *Cassida atrata* (Fabricius. 1787)

Spread in Eastern and Southern Europe, in the plains and on the hills. It feeds itself with *Salvia pratensis* and *glutinosa.* In the Romanian entomofauna it has been signaled in Dobruja by Fleck (1906) and Montandon (1908). We collected a single specimen by mowing the vegetation with the entomologic net.

Conclusion

The entomofauna of the chrysomelidae collected in the Ciric forest (Iasi County) is characterized by a relatively high degree of the biodiversity, due to the vegetation diversity that we can notice in the area.

From the zoogeographical perspective, we see that the Euro-Siberian and the Palaearctic elements are dominant because of the typical temperate-continental climate that we observe in the area of Iaşi. For *Cassida atrata* we indicate the main morphological characteristics and we present the data regarding its ecology.

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THE ORTHOPTERA (INSECTA: ORTHOPTERA) FROM MOLDAVIA (ROMANIA): CHECKLIST AND SOME ECOLOGICAL ASPECTS

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Abstract. In Romania there are known 182 species of Orthoptera, 127 of those being encountered in Moldavia - the richest region in Orthoptera species from our country. A particular case is the hybrid between the species *Chorthippus albomarginatus* and *Chorthippus oschei.* Some other interesting species have been recorded recently in Moldavia (like *Xya pfaendleri* in the southern part, *Epacromius coerulipes* in the eastern part etc.) and the status of the species *Isophya pyrenaea/kraussii* from northern Moldavia has been clarified. Both this species and *Isophya stysi* have the eastern limit of their areal in Moldavia.

Key words: Orthoptera, Moldavia, faunistics, ecology.

Rezumat. Ortopterele (Insecta: Orthoptera) din Moldova (România): lista speciilor şi câteva aspecte ecologice.
În România sunt cunoscute până în prezent 182 specii de ortoptere, dintre care 127 specii au fost întâlnite în Moldova - cea mai bogată regiune în acest sens din țara noastră. Un caz aparte îl constituie hibridul dintre speciile *Chorthippus albomarginatus* şi *Chorthippus oschei*. Alte câteva specii interesante au fost întâlnite recent în Moldova (de exemplu *Xya pfaendleri* în zona sudică, *Epacromius coerulipes* în zona estică etc.), iar situația speciei *Isophya pyrenaea/kraussii* din nordul Moldovei a fost clarificată. În Moldova, această specie şi *Isophya stysi* se află la limita estică a arealului.

Cuvinte cheie: Orthoptera, Moldova, faunistică, ecologie.

Introduction

The historical region Moldavia is placed in the North-Eastern part of Romania. The Moldavian Plateau is formed by many hills and is bordered by the Oriental Carpathians in the West, the Prut river in the East and the Baragan Plain towards the South. The climate is temperate-continental, with weak Mediterranean influences in the South. The hydrographical system consists of two main rivers (Siret and Prut) and some smaller rivers like Suceava, Moldova, Bistrița, Trotuş and Buzău. In the eastern and north-eastern Romania, one can find deciduous and resinous forests, glades, xerophilous, mesophilous and hygrophilous grasslands and meadows.

The Orthoptera from Moldavia were studied by O. Marcu (1936), C. V. Mîndru (1954, 1956, 1958, 1960, 1961, 1967, 1979, 1980), B. Kis (1979), K. Worschech (1998), F. Togănel (1997, 1999), C. Iuşan & I. Oltean (2003), I. Iorgu & E. Pisică (2007, 2008).

Material and methods

We have begun the studies on the Orthoptera in Moldavia since 2001 and so far 112 species were encountered belonging to six families and 59 genera (Tettigoniidae - 42 species, 19 genera, Gryllidae - seven species, six genera, Gryllotalpidae - one species, one genus, Tridactylidae - two species, one genus, Tetrigidae – eight species, one genus and Acrididae - 52 species, 31 genera. We have found nine new reports for this region. Our studies were conducted in 136 stationeries covering all the major vegetation units in Moldavia.

For the identification of Orthoptera specimens we used the keys of B. Kis (1976, 1978). The systematic order was made according to D. C. Eades & D. Otte's *Orthoptera Species File Online* (accessed on the 22nd of October 2008).

Results and discussions

The distribution of Orthoptera in habitats from Moldavia is uniform in meso-xerophilous, mesophilous habitats with 78 species and in hygro-mesophilous habitats with 73 species, respectively. These are followed by xerophilous habitats with 66 species and hygrophilous habitats with 33 species. There is also only one synantropic species *Acheta domesticus* which was found in an old house in Pascani (Is) (Fig. 1).

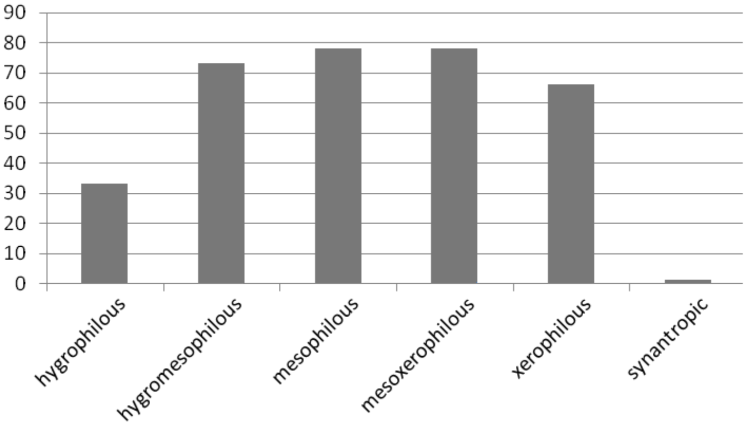

Fig. 1. The distribution of Orthoptera of Moldavia according to habitat type.

From the 112 species found in Moldavia (Table 1) eleven of them are euribiont species found in all habitat types (excepting synantropic category): *C. fuscus, R. nitidula, T. viridissima, T. caudate, M. bicolor, Metrioptera fedtschenkoi vasilii, X. variegata, T. subulata, T. tenuicornis, T. undulata, C. parallelus.*

Table 1. The checklist of Orthoptera species found in Moldavia

No.	Species	Ecological preference						Species' distribution in Moldavia
		Hygrophilous	Hygro-mesophilous	Mesophilous	Meso-xerophilous	Xerophilous	Synantropic	
Suborder Ensifera Superfamily Tettigonioidea Family Tettigoniidae Subfamily Phaneropterinae								
1.	*Phaneroptera falcata*	-	-	+	+	-	-	widely distributed in Moldavia, it lives in forest fringes, glades; sometimes it can be seen in corn fields, wine yards etc.
2.	*Phaneroptera*	-	-	-	+	+	-	it can be encountered in the Eastern and especially in the

No.	Species	Ecological preference						Species' distribution in Moldavia
		Hygrophilous	Hygro-mesophilous	Mesophilous	Meso-xerophilous	Xerophilous	Synantropic	
	nana							South-Eastern parts of Moldavia, having the same way of life as *P. falcata*.
3.	*Leptophyes albovittata*	-	+	+	+	+	-	it is a common species in Moldavia, rare only in the high mountains (Călimani, Giumalău, Rarău - Sv., Ceahlău - Nt.).
4.	*Isophya zubowskii*	-	+	+	+	-	-	it is a species known from Eastern Moldavia.
5.	*Isophya camptoxypha*	-	+	+	-	-	-	a typical mountain species, frequent in the Oriental Carpathians.
6.	**Isophya kraussii*	-	+	+	-	-	-	rare species, it has been found near Suceava, at Adâncata Forest.
7.	**Isophya stysi*	-	+	+	-	-	-	rare species, known from the Oriental Carpathians (Găineşti - Sv, surroundings of the Izvorul Muntelui lake, Piatra Neamţ, Agapia - Nt) and Codrii Pascanilor - Is. Probably Codrii Pascanilor is the Easternmost border of this Carpathian species distribution area.
8.	*Barbitistes constrictus*	-	+	+	-	-	-	rare species, with low number of individuals, distributed in some forest fringes and glades (Rarău - Sv., Agapia - Nt., Codrii Paşcanilor, Bârnova - Is.).
9.	*Poecilimon schmidtii*	-	+	+	-	-	-	very rare species, it has been found in the forests: Agapia, Ceahlău - Nt., Bârnova, Codrii Paşcanilor - Is., Hârboanca - Vs.
10.	*Poecilimon fussii*	-	+	+	+	+	-	a frequent species in the meadows and lawns of Central and Eastern Moldavia, rare in the Oriental Carpathians.
11.	*Poecilimon brunneri*	-	-	-	+	+	-	rare, it can be seen in the high lawns from the Eastern part of this region.
12.	*Polysarcus denticauda*	-	+	+	-	-	-	it is a very rare species, it has been found only at Ceahlău Mountain.
Subfamily Saginae								
13.	*Saga pedo*	-	-	-	+	+	-	a rare species, it is distributed especially in the Eastern Moldavia: Pascani, David's Valley, Horleşti, Mârzeşti, Bârnova - Is., Oancea, Hanu Conachi - Gl.
Subfamily Conocephalinae								
14.	*Conocephalus fuscus*	+	+	+	+	+	-	it is one of the most common Orthoptera species in Moldavia, rare only in the high mountains.
15.	*Conocephalus dorsalis*	+	+	-	-	-	-	rather a rare species, localized on some hygrophilous areas in Moldavia.
16.	*Conocephalus hastatus*	-	-	-	+	+	-	it has been found only in the South-Eastern Moldavia, in the forests near Galaţi.
17.	*Ruspolia nitidula*	+	+	+	+	+	-	rare in Western Moldavia, but more frequent in the Eastern and Southern parts.
Subfamily Meconematinae								
18.	*Meconema thalassinum*	-	-	+	+	-	-	a typical forest species, arboricolous and arbusticolous.
Subfamily Tettigoniinae								
19.	*Tettigonia cantans*	+	+	+	-	-	-	a mountain species, frequent in the Oriental Carpathians and rare in some forests from Moldavian Plateau: Adâncata - Sv., Humosu, Bârnova - Is.
20.	*Tettigonia viridissima*	+	+	+	+	+	-	very common in Moldavia.
21.	*Tettigonia caudata*	+	+	+	+	+	-	common in Central, Eastern and Southern Moldvia, very rare in the mountains.
22.	*Gampsocleis*	-	+	+	+	+	-	rare and localized in the eastern part of this region.

No.	Species	Ecological preference						Species' distribution in Moldavia
		Hygrophilous	Hygro-mesophilous	Mesophilous	Meso-xerophilous	Xerophilous	Synantropic	
	glabra							
23.	*Decticus verrucivorus*	-	+	+	+	+	-	a frequent species in Moldavia, but with bigger populations in the Eastern part and in the Oriental Carpathians.
24.	**Decticus albifrons*	-	-	-	+	+	-	very rare, it has been found only at David's Valley, near Iaşi.
25.	*Metrioptera brachyptera*	+	+	+	-	-	-	this is a mountain species, it has been found in the Oriental Carpathians, sometimes in high numbers (Găineşti, Rarău - Sv.).
26.	*Metrioptera bicolor*	+	+	+	+	+	-	frequent in Moldavia, but with smaller populations in the Southern part.
27.	*Metrioptera roeselii*	+	+	+	-	-	-	this species is localized especially in the Oriental Carpathians, being rarer in the Moldavian Plateau.
28.	*Metrioptera fedtschenkoi vasilii*	+	+	+	+	+	-	frequent species in the Moldavian Plateau and Moldavian Plane, rare in the mountains.
29.	*Platycleis affinis*	-	-	-	+	+	-	rare in the Eastern and Southern Moldavia.
30.	*Platycleis intermedia*	-	-	-	+	+	-	rare in the Eastern, Central and Southern parts of Moldavia.
31.	*Platycleis albopunctata grisea*	-	-	+	+	+	-	quiet a common subspecies in Moldavia, it prefers the high lawns and forest fringes.
32.	*Platycleis striata*	-	-	-	+	-	-	so far this species has been found only in the lawns near Iaşi: David's Valley, Mârzeşti and Horleşti.
33.	*Platycleis veyseli*	-	-	+	+	+	-	rare and localized in Central, Eastern and Southern Moldavia.
34.	*Pholidoptera frivaldskyi*	+	+	+	-	-	-	it has been found only in the Western part of Moldavia (especially in the Oriental Subcarpathians), sometimes in high numbers: Suceava, Fălticeni - Sv., Vânători-Neamţ, Sihla, Crăcăoani, Piatra Neamţ - Nt. etc.
35.	*Pholidoptera griseoaptera*	-	+	+	+	+	-	common in Moldavia, it lives in forest fringes, glades, town parks etc.
36.	*Pholidoptera littoralis similis*	-	+	+	+	-	-	very rare, it has been found only on Vrancea Mountains, near Lepşa - Vn.
37.	*Pholidoptera fallax*	-	+	+	+	+	-	rare in the Oriental Carpathians and in the Eastern and South-Eastern Moldavia.
38.	**Pholidoptera transsylvanica*	-	+	+	-	-	-	a rare species, localized in some high mountains: Călimani, Giumalău, Rarău - Sv., Ceahlău, Bicaz Gorges - Nt., Vrancea Mountains - Muşat High pass.
39.	*Pholidoptera aptera*	-	+	+	-	-	-	very rare in the Oriental Carpathians: Zugreni Gorges, Giumalău, Rarău - Nt., Ceahlău - Nt.
40.	*Rhacocleis germanica*	-	-	+	+	+	-	very rare in the forests from Southern and South-Eastern Moldavia.
41.	*Pachytrachis gracilis*	-	-	+	+	+	-	it is a very rare species, being found so far only at Codrii Pascanilor and Bârnova - Is.
Subfamily Bradyporinae								
42.	*Ephippiger ephippiger*	-	+	+	+	+	-	frequent in Moldavia, especially in the Eastern and Southern part. High numbered populations have been found also in the surroundings of Izvorul Muntelui lake - Nt. (Bicaz, Potoci, Hangu, Poiana Largului etc.).
Superfamily Grylloidea **Family Gryllidae** **Subfamily Gryllinae**								
43.	*Gryllus*	-	+	+	+	+	-	one of the most frequent species in Moldavia.

No.	Species	Ecological preference						Species' distribution in Moldavia
		Hygrophilous	Hygro-mesophilous	Mesophilous	Meso-xerophilous	Xerophilous	Synantropic	
	campestris							
44.	**Acheta domesticus*	-	-	-	-	-	+	so far it has been found only at Paşcani - Is., but probably it is more frequent in Moldavia.
45.	*Melanogryllus desertus*	-	+	+	+	+	-	frequent in Moldavia, excepting the mountains.
46.	*Modicogryllus frontalis*	-	+	+	+	+	-	as the former species, it is very common in Moldavia, excepting the mountains.
47.	**Modicogryllus truncatus*	-	-	-	+	+	-	rare in the Southern Moldavia, it has been found at Mărăşeşti - Vn.
Subfamily Nemobiinae								
48.	*Pteronemobius heydenii*	+	+	-	-	-	-	rare, it has been found in some hygrophilous meadows, especially in the Eastern part.
Subfamily Oecanthinae								
49.	*Oecanthus Pellucens*	-	+	+	+	+	-	frequent in Moldavia, but more rare in the Oriental Carpathians.
Family Gryllotalpidae **Subfamily Gryllotalpinae**								
50.	*Gryllotalpa gryllotalpa*	-	+	+	+	+	-	common in Moldavia.
Suborder Caelifera **Infraorder Tridactylidea** **Superfamily Tridactyloidea** **Family Tridactylidae** **Subfamily Tridactylinae**								
51.	*Xya variegata*	+	+	+	+	+	-	common in some river meadows (Siret, Prut), especially in the Southern and Central Moldavia.
52.	**Xya pfaendleri*	+	+	-	-	+	-	rare, it has been found so far only near Galați.
Infraorder Acrididea **Superfamily Tetrigoidea** **Family Tetrigidae** **Subfamily Tetriginae**								
53.	**Tetrix ceperoi*	+	+	-	+	+	-	very rare, near Galați.
54.	*Tetrix subulata*	+	+	+	+	+	-	frequent in Moldavia, especially in hygrophilous areas.
55.	**Tetrix bolivari*	+	+	-	+	+	-	very rare in South-Eastern Moldavia.
56.	**Tetrix tuerki*	+	+	-	+	-	-	rare, it has been found in some stony and sandy river beds from Oriental Carpathians (Putna - Sv., Agapia - Nt. etc.) and Central Moldavian Plateau (Paşcani - Is.).
57.	*Tetrix tenuicornis*	+	+	+	+	+	-	one of the most frequent species in Moldavia.
58.	*Tetrix undulata*	+	+	+	+	+	-	rare in Moldavia, it has been found in several places: Suceava - Sv, Agapia - Nt., Paşcani, David's Valley - Is., Bacău - Bc. etc.
59.	*Tetrix bipunctata kraussi*	-	+	+	-	-	-	rare in the high mountains (Rarău - Sv. and Ceahlău - Nt.)
60.	*Tetrix bipunctata bipunctata*	-	+	+	-	-	-	rare in the hilly and low mountain forest fringes and glades.
Superfamily Acridoidea **Family Acrididae** **Subfamily Catantopinae**								

No.	Species	Ecological preference						Species' distribution in Moldavia
		Hygrophilous	Hygro-mesophilous	Mesophilous	Meso-xerophilous	Xerophilous	Synantropic	
61.	**Pezotettix giornae*	-	+	+	+	+	-	frequent in Eastern Moldavia, more rare in the Central part.
Subfamily Calliptaminae								
62.	**Paracaloptenus caloptenoides*	-	+	+	+	+	-	very rare, it has been found so far only at Bârnova forest, near Iaşi.
63.	*Calliptamus italicus*	-	+	+	+	+	-	a common species in Moldavia, but with low numbers of individuals.
64.	*Calliptamus barbarus*	-	-	-	+	+	-	rare in the Southern and South-Eastern Moldavia.
Subfamily Melanopliinae								
65.	*Podisma pedestris*	-	+	+	-	-	-	very rare in the Oriental Carpathians; we found this species at Bicaz Gorges - Nt.
66.	*Miramella ebneri*	-	+	+	-	+	-	this is a typical mountain species, living in the high Oriental Carpathians. The lowest registered altitude is 600m, at Câmpulung Moldovenesc - Sv.
67.	*Pseudopodisma fieberi*	+	+	+	-	-	-	a rare species in the Oriental Carpathians.
68.	*Odontopodisma decipiens*	+	+	+	+	-	-	it is very rare, it has been found in some forest in the Eastern Moldavia (Bălătău-Prut, Bârnova - Is., Huşi - Vs.).
Subfamily Acridinae								
69.	*Acrida ungarica*	-	-	-	+	+	-	rare in the Eastern part, more frequent in the South-Eastern and Southern areas in Moldavia.
Subfamily Oedipodinae								
70.	*Locusta migratoria*	+	+	+	-	-	-	very rare, it has been found near Codrii Paşcanilor - Is.
71.	*Oedaleus decorus*	-	-	-	+	+	-	very rare in the Eastern Moldavia.
72.	*Psophus stridulus*	-	+	+	-	-	-	a localized species in the Oriental Carpathians, sometimes with big populations (Câmpulung Moldovenesc, Găineşti - Sv., Durău - Nt.).
73.	*Celes variabilis*	-	-	-	+	+	-	very rare in some lawns in the Eastern part.
74.	*Oedipoda caerulescens*	-	-	-	+	+	-	a localized species, it lives especially in stony areas like some river beds (Moldova, Bistriţa etc.)
75.	*Sphingonotus caerulans*	-	-	-	+	+	-	rarer than the former species, but with the same way of life.
76.	*Acrotylus insubricus*	-	-	-	-	+	-	rare in Southern Moldavia
77.	*Acrotylus longipes*	-	-	-	-	+	-	this species has been found so far only at Hanu Conachi - Gl.
78.	*Aiolopus thalassinus*	+	+	+	-	-	-	a common species in the hygrophilous meadows.
79.	**Epacromius coerulipes*	+	+	-	-	-	-	very rare in some salty areas from Eastern Moldavia (Mârzeşti, David's Valley, Ileana's Valley - Is.).
80.	*Paracinema tricolor bisignata*	+	-	-	-	-	-	rare in some hygrophilous lawns in Eastern and Southern Moldavia (Bârnova, Chiriţa - Is., Bârlad - Vs. etc.).
81.	*Mecostethus alliaceus*	+	+	-	-	-	-	very rare in South-Eastern Moldavia and in some mountain hygrophilous meadows (Găineşti - Sv).
82.	*Stethophyma grossum*	+	-	-	-	-	-	rare, in hygrophilous meadows, but localized all over Moldavia.
Subfamily Gomphocerinae								

No.	Species	Ecological preference						Species' distribution in Moldavia
		Hygrophilous	Hygro-mesophilous	Mesophilous	Meso-xerophilous	Xerophilous	Synantropic	
83.	*Euthystira brachyptera*	+	+	+	+	-	-	common in forest fringes and glades in mountain and hilly areas. Rare in South-Eastern Moldavia.
84.	*Chrysocharon dispar*	+	+	+	-	-	-	rare, in some forests; sometimes it forms big populations (Vânători Neamţ - Nt etc.).
85.	*Arcyptera fusca*	-	+	+	-	-	-	rare in the Oriental Carpathians.
86.	*Dociostaurus brevicollis*	-	-	-	+	+	-	rare in some lawns in the Eastern part.
87.	*Stenobothrus stigmaticus*	-	+	+	-	-	-	frequent in the Oriental Carpathians (rare in the high mountains), rare in Central Moldavia.
88.	*Stenobothrus lineatus*	-	+	+	+	+	-	frequent in Moldavian lawns.
89.	*Stenobothrus nigromaculatus*	-	-	+	+	+	-	very rare in Eastern Moldavia (David's Valley - Is., Hârboanca - Vs.).
90.	*Omocestus viridulus*	-	+	+	+	-	-	distributed in the Oriental Carpathians.
91.	*Omocestus rufipes*	-	+	+	+	+	-	frequent in Moldavia.
92.	*Omocestus haemorrhoidalis*	-	+	+	+	-	-	very rare in Moldavia: Durău (Nt.), David's Valley (Is.) etc.
93.	*Omocestus petraeus*	-	-	-	+	+	-	very rare in South-Eastern Moldavia.
94.	*Omocestus minutus*	-	-	-	+	+	-	rare in South-Eastern part.
95.	*Myrmeleotettix antennatus*	-	-	-	-	+	-	so far this species has been found at Hanu Conachi - Gl.
96.	*Myrmeleotettix maculatus*	-	-	+	+	-	-	a rare species in the Oriental Carpathians: Giumalău, Găineşti - Sv., Agapia, Ceahlău - Nt., etc.
97.	*Gomphocerippus rufus*	-	+	+	+	+	-	rare species in Moldavia, the main populations live in the Eastern part.
98.	*Stauroderus scalaris*	-	+	+	-	-	-	very rare in the Oriental Carpathians: surroundings of Izvoru Muntelui lake - Nt.
99.	*Chorthippus apricarius*	-	+	+	+	-	-	common in many forest fringes and glades, sometimes even alongside the country roads.
100.	*Chorthippus biguttulus hedickei*	-	+	+	+	+	-	very common in Moldavia.
101.	*Chorthippus brunneus*	-	-	+	+	+	-	common in Moldavia, especially in the Southern part.
102.	*Chorthippus mollis*	-	-	+	+	+	-	rare, it has been recorded only from the lawns near Iasi: David's Valley, Horleşti, Mârzeşti etc. The species forms big populations in these grasslands.
103.	*Chorthippus macrocerus purpuratus*	-	-	+	+	+	-	rare in some forest fringes and glades in Eastern Moldavia: Mârzeşti, David's Valley, Iaşi - Is., Hârboanca - Vs. etc. Sometimes it can be seen in xerophilous lawns (Crăieşti - Gl.).
104.	*Chorthippus pullus*	-	-	+	+	-	-	quiet a rare species in the Oriental Carpathians: Zugreni Gorges, Rarău, Găineşti - Sv., Agapia, Ceahlău, Bicaz Gorges - Nt., etc.
105.	*Chorthippus albomarginatus*	-	+	+	+	-	-	distributed in the Western part of Moldavia.
106.	**Chorthippus Oschei*	-	-	-	+	+	-	known from Southern Moldavia.
107.	**Chorthippus albomarginatus×oschei*	-	+	+	+	-	-	this hybrid is frequent in North-Eastern Moldavia.

No.	Species	Ecological preference						Species' distribution in Moldavia
		Hygrophilous	Hygro-mesophilous	Mesophilous	Meso-xerophilous	Xerophilous	Synantropic	
108.	*Chorthippus loratus*	-	-	-	+	+	-	it can be found in the xerophilous lawns from Southern and South-Eastern parts of this region.
109.	*Chorthippus dichrous*	+	-	-	+	-	-	rare in the South-Eastern area.
110.	*Chorthippus dorsatus*	-	+	+	+	-	-	common in the Oriental Carpathians and in Eastern Moldavia.
111.	*Chorthippus montanus*	+	+	+	-	-	-	rare in the Oriental Carpathians.
112.	*Chorthippus parallelus*	+	+	+	+	+	-	very common in Moldavia, especially in the Central part.
113.	*Euchorthippus pulvinatus*	-	-	-	+	+	-	rare, localized in the Eastern part of this region.
114.	*Euchorthippus declivus*	-	-	+	+	+	-	a common species, excepting the mountains.

Isophya kraussii Brunner von Wattenwyl, 1878 - it is a Central European species. In Romania is very rare and so far it has been found only in the North and North-West of Moldavia. It is a mesophilous species, living in sunny meadows, with tall grass and raspberry bushes.

Isophya stysi Cejchan, 1957 - it is a protected species, being found on Annex II in Habitats Directive. It is one of the biggest *Isophya* species from Moldavia. The species is endemic to the Carpathian area; it was also found in Czech Republic, Hungary and Ukraine. In our country it is common in the Apuseni Mountains, in Transylvania and rare in the Oriental Carpathians and in some forests of Moldavian Plateau. It is a phytophagous, arbusticolous and praticolous species. It lives in forest glades and mesophilous mountain meadows.

Saga pedo (Pallas, 1771) - it is a protected species in Romania , found on the Annex IV of the Habitats Directive. It is a Central Asian-South European species, in our country being very rare and localized. It is a predatory species living in xerophilous and meso-xerophilous lawns, with tall herbaceous vegetation; sometimes it can be seen on bushes.

Decticus albifrons (Fabricius, 1775) - the White-faced Bush-cricket is a very curious finding for Moldavia. It is a thermophilous species, xerophilous, praticolous and geophilous, predominantly insectivorous. Usually it lives in tall grasslands and bushes. Circummediterranean species, it is known from Southern Europe, Minor Asia and Northern Africa; in Romania it can be found only at the seaside (in Dobrudja) and very rarely in Moldavia. Its presence at David's Valley (Is) is very interesting, especially because this species hasn't been found here until 2005 (Iorgu & Pisică, 2006).

Pholidoptera transsylvanica (Fischer, 1853) - it is also a protected Nature 2000 species, endemic for the Carpathian Mountains. In Moldavia it can be encountered only localized in the mountains. It is an omnivorous , praticolous and geophilous, mesophilous and hygro-mesophilous species, characteristic for the mountain grasslands, forest fringes and glades. We found it in Ceahlău, Giumalău, Rarău, Călimani and Vrancea Mountains.

Acheta domesticus (Linnaeus, 1758) - it is a synantropic, thermophilous and omnivorous species. It can be found in the old houses, made of clay, in kitchens, cellars, living hidden in cracks in the walls. It can easily be identified by its stridulation, especially during the night. It is a Holopalaearctic species, rare in Romania.

Modicogryllus truncatus (Tarbinsky, 1940) - it is a Central Asian-Pontic species, very common in Romania in the Southern parts. It is a thermophilous, xerophilous and geophilous species, living in cracks in the soil and underneath the rocks.

Xya pfaendleri (Harz, 1970) - a Central Asian-Pontic species, distributed especially in the Southern part of Romania . It is a psamophilous species, living near rivers and building galleries in the sand. It a new record for the Orthoptera fauna of Moldavia: we found it on Siret and Prut river banks in South and South-East.

Tetrix ceperoi Bolivar, 1887 - also a new record for the Orthoptera fauna from Southern Moldavia, it has a West Palaearctic distribution, known from Europe and Northern Africa. It is a phytophagous, geophilous, thermophilous and hygrophilous species. It usually lives in marshes and on the water shores, with tall vegetation.

Tetrix bolivari Saulcy, 1901 - it is a Central Asian-Mediterranean species, rare in Romania, found in the Southern part. It is a rare species, we found it localized in the South-Eastern part of Moldavia. It is a hygrophilous, thermophilous and geophilous species.

Tetrix tuerki (Krauss, 1876) - it is a Central European species, rare and localized in Romania. It is the first record of the species for the Orthoptera fauna from Moldavia. It is a geophilous species, found on gravely shores of rivers, especially in the mountain regions.

Paracaloptenus caloptenoides (Brunner von Wattenwyl, 1861) - it is a protected species in Romania and a Nature 2000 species. It is a Ponto-Mediterranean species, in Romania is very rare found especially in the Southern part of the country. It is a geophilous, thermophilous species, living in meadows, forest fringes and clearings.

Pezotettix giornae (Rossi, 1794) - it is a Circummediterranean species, very common in Romania, especially in the South. In Moldavia is relatively frequent, especially in the South and East. It lives in various biotopes: forest glades, bushes, grasslands etc. It is a meso-xerophilous, thermophilous species. It is a species in extension of areal: in the 1980's it was known only from Southern Romania and in 2005 was reported for the first time in Moldavia (Iorgu & Pisică, 2006). Now it can be found in great numbers in almost all the Eastern Moldavia.

Miramella ebneri Galvagni, 1953 - it is also a protected species in our country found on the Annex IV of the Habitats Directive. It is endemic for the Carpathians. In Moldavia it has been found only in the mountain areas. This species is represented in our country's fauna by two subspecies, *Miramella ebneri ebneri* from the Occidental, Meridional and the Oriental Carpathians and *Miramella ebneri carpathica*, known only from Rodna Mountains, in the North-Western part of the Oriental Carpathians. So far in Moldavia, only the nominotypical subspecies has been found.

Epacromius coerulipes (Ivanov, 1888) - it is a South Palearctic species, in Romania is quite rare, being found in the Eastern part of the country in hygrophilous and halophilous grasslands. This is the first record of *Epacromius* in Moldavia. It is a hygrophilous and hygro-mesophilous , praticolous and geophilous species ; it can also be found on salty soil. We have found it at Mârzeşti, Lețcani and David's Valley (Is), in late September 2008.

Myrmeleotettix antennatus (Fieber, 1853) - it is a Eurosiberian species, very rare in Romania, being found only at Foeni (Mm) and Hanu Conachi sandy dunes Reserve (Gl). It is a xerophilous, praticolous species, living especially on sandy dunes and in areas with psamophilous vegetation. It is accompanied by the species *Acrotylus insubricus, Sphingonotus caerulans, Calliptamus barbarus* etc. We consider this species to be endangered in Romania.

Chorthippus oschei Helversen, O. von, 1986 - *C. oschei* is known from South-Eastern Europe. In Romania is widely distributed, excepting the North-Eastern area. In Moldavia it can be found in the Southern part of the region. It is a species characteristic to meso-xerophilous and xerophilous grasslands. It is a new record for the Orthoptera fauna of Romania.

Chorthippus albomarginatus (De Geer, 1773) - in Europe, the species *Chorthippus albomarginatus* is known from the Central and Northern parts. In Romania it is known so far only from the North-Western part of Moldavia, but more thoroughly studies are needed on this species and the close related species, *Chorthippus oschei*. It is a praticolous species; it inhabits the mesophilous grasslands from hilly and low mountain areas. The species can be discriminated from *C. oschei* by the male's courtship song and the number of pegs of the stridulatory file.

Chorthippus albomarginatus* × *oschei (Vedenina & Helversen, O. von, 2003) - the hybrid between the two species is known from North-Eastern Romania, Republic of Moldavia and Ukraine. In Moldavia, the hybrid is widely distributed in the Central, Northern and Eastern parts. The courtship song is complicated and it constitutes a differentiation criterion for the species *C. albomarginatus* and *C. oschei*. Those two species hybridize in the Eastern part of Moldavia (Romania), in the Republic Moldavia and in Ukraine. The stridulation of the hybrid is intermediate between the ones of the parental species. Also the movements of the posterior legs during stridulation are different between the two species and the hybrid.

Conclusions

In this paper we presented an annotated checklist of 112 species of Orthoptera with 9 new records for the Orthoptera fauna of Moldavia: *Isophya kraussii, Acheta domesticus, Modicogryllus truncatus, Xya pfaendleri, Tetrix bolivari, Tetrix ceperoi, Tetrix tuerki, Epacromius coerulipes* and *Chorthippus oschei.*

The Orthoptera fauna of Moldavia is dominated by species living in mesophilous, meso-xerophilous and hygrophilous habitats which is correc due to the fact that in Moldavia the majority of the habitats are mesophilous and meso-xerophilous.

In the Moldavian Orthoptera fauna there are three species listed on Annex II in Habitats Directive: *Pholidoptera transsylvanica, Paracaloptenus caloptenoides* and *Isophya stysi*; all of them are protected in designated sites. Other two protected species, this time at the national level are: *Miramella ebneri* and *Saga pedo*. For them, we found new collecting sites.

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Lucrările Simpozionului *„Entomofagii şi rolul lor în păstrarea echilibrului natural”*
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SYNECOLOGICAL DATA ON THE ORTHOPTERA (INSECTA: ORTHOPTERA) IN SOME AREAS FROM DOBRUDJA (ROMANIA)

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Abstract. In this paper we compared the ecology of interrelationships in some Orthoptera communities from four Dobrogean representative areas: Hagieni, Letea, Histria and Cernavodă. Comparing these collecting sites, it is obvious that some xerophilous species are very well adapted and represented by high-sized populations: *Oecanthus pellucens*, *Acrotylus insubricus* and *Chorthippus loratus*. Among the rarest species in Dobrudja can be considered *Phaneroptera gracilis*, *Gampsocleis schelkovnikovae*, *Gryllotalpa unispina* from Letea, *Saga campbelli gracilis* from Histria and *Asiotmethis limbatus* from Hagieni.

Key words: Orthoptera, Dobrogea, synecological analysis.

Rezumat. Aspecte sinecologice asupra ortopterelor (Insecta: Orthoptera) din Dobrogea (România). În prezenta lucrare am facut o comparaţie sinecologică a comunitaţilor de ortoptere din 4 zone reprezentative pentru Dobrogea: Hagieni, Letea, Histria şi Cernavodă. Comparând aceste zone de colectare, este evident că unele specii xerofile sunt foarte bine adaptate şi formează populaţii numeroase: *Oecanthus pellucens*, *Acrotylus insubricus* şi *Chorthippus loratus*. Printre speciile cele mai rare specii din Dobrogea le putem enumera pe *Phaneroptera gracilis*, *Gampsocleis schelkovnikovae*, *Gryllotalpa unispina* din Letea, *Saga campbelli gracilis* de la Histria şi *Asiotmethis limbatus* de la Hagieni.

Cuvinte cheie: Orthoptera, Dobrogea, analiza sinecologică.

Introduction

The four collecting areas have been chosen after comparing several ecosystems in Dobrogea - we analyzed the vegetation types and the anthropic influence in all of them; so, three of them are national reserves and one is located close to a city (Cernavodă). Hagieni Reserve is a complex of ecosystems: forest (*Carpinus orientalis, Fraxinus ornus* etc.), xerophilous lawns (*Stipa lessingiana, Stipa capillata, Festuca valesiaca, Chrysopogon gryllus* etc.) and hygrophilous meadows (*Typha latifolia, Carex* sp. etc.). The xerophilous grasslands (*Apera spica-venti, Cynodon dactylon, Bromus squarrosus, Secale sylvestre, Carex colchica, Euphorbia seguieriana, Artemisia maritima, Kochia arenaria, Scabiosa argentea, Centaurea arenaria* etc.) near the stronghold of Histria are traversed by halophilous strips (*Salicornia europaea, Suaeda maritima* etc.). Close to lakes we can find some hygrophilous vegetation, mainly composed of *Phragmites australis*. In the Letea Forest there are sandy dunes with only few plant species (*Elymus sabulosus, Ephedra distachia* etc.). Both Histria and Letea are parts of the Danube Delta Biosphere Reserve. At Cernavodă the collecting area is a grassland with: *Poa bulbosa, Lolium perenne, Cynodon dactylon, Rosa canina, Prunus spinosa* etc.

Material and methods

The collection was made using an entomological net, by sweeping the vegetation on a 200m transect. The identification of the specimens was made according to the identification keys by B. Kis (1976, 1978).

Results and discussion

1. The characterization of Orthoptera communities in Hagieni Reserve

Table 1. The diversity of the Orthoptera species collected from Hagieni in 2008

No	Species	18.05.2008	Abundance %	07.07.2008	Abundance %	05.08.2008	Abundance %	total	Dominance %		Constance %		Ecological significance index %	
1.	*Tylopsis liliifolia*	-	-	23	23.2	11	3.93	34	5.34	D4	66	C3	3.52	W3
2.	*Phaneroptera nana*	-	-	5	5.05	10	3.57	15	2.35	D3	66	C3	1.55	W3
3.	*Leptophyes albovittata*	2	0.78	9	9.09	7	2.50	18	2.83	D3	100	C4	2.83	W3
4.	*Isophya hospodar*	29	11.2	3	3.03	-	-	32	5.02	D4	66	C3	3.32	W3
5.	*Isophya rectipennis*	1	0.39	-	-	-	-	1	0.16	D1	33	C2	0.05	W1
6.	*Isophya modesta*	8	3.10	13	13.1	-	-	21	3.30	D3	66	C3	2.18	W3
7.	*Poecilimon fussii*	4	1.55	10	1.01	3	1.07	8	1.26	D2	100	C4	1.26	W3
8.	*Poecilimon brunneri*	7	2.71	14	14.1	2	0.71	23	3.61	D3	100	C4	3.61	W3
9.	*Conocephalus hastatus*	-	-	3	3.03	15	5.36	18	2.83	D3	66	C3	1.86	W3
10.	*Ruspolia nitidula*	-	-	2	2.02	1	0.36	3	0.47	D1	66	C3	0.31	W2
11.	*Tettigonia viridissima*	2	0.78	8	8.08	-	-	10	1.57	D2	66	C3	1.04	W3
12.	*Decticus verrucivorus*	-	-	1	1.01	-	-	1	0.16	D1	33	C2	0.05	W1
13.	*Platycleis affinis*	-	-	-	-	2	0.71	2	0.31	D1	33	C2	0.10	W2
14.	*Platycleis intermedia*	-	-	3	3.03	-	-	3	0.47	D1	66	C3	0.31	W2
15.	*Platycleis veyseli*	-	-	1	1.01	3	1.07	4	0.63	D1	66	C3	0.41	W2
16.	*Pholidoptera griseoaptera*	-	-	4	4.04	1	0.36	5	0.78	D1	66	C3	0.52	W2
17.	*Pholidoptera fallax*	-	-	1	1.01	-	-	1	0.16	D1	33	C2	0.05	W1
18.	*Bucephaloptera bucephala*	1	0.39	22	22.2	17	6.07	40	6.28	D4	100	C4	6.28	W4
19.	*Rhacocleis germanica*	-	-	5	5.05	2	0.71	7	1.10	D2	66	C3	0.73	W2
20.	*Bradyporus dasypus*	-	-	1	1.01	5	1.79	6	0.94	D1	66	C3	0.62	W2
21.	*Ephippiger ephippiger*	-	-	-	-	3	1.07	3	0.47	D1	33	C2	0.16	W2
22.	*Gryllus campestris*	11	4.26	-	-	-	-	11	1.73	D2	33	C2	0.57	W2
23.	*Melanogryllus desertus*	5	1.94	-	-	-	-	5	0.78	D1	33	C2	0.26	W2
24.	*Modicogryllus frontalis*	2	0.78	-	-	-	-	2	0.31	D1	33	C2	0.10	W2
25.	*Oecanthus pellucens*	-	-	1	1.01	25	8.93	26	4.08	D4	66	C3	2.69	W3
26.	*Arachnocephalus vestitus*	-	-	-	-	-	0.36	1	0.16	D1	33	C2	0.05	W1
27.	*Tetrix bolivari*	-	4.65	-	3.03	-	1.79	20	3.14	D1	100	C4	3.14	W3
28.	*Tetrix tenuicornis*	-	0.39	-	-	-	-	1	0.16	D1	33	C2	0.05	W1
29.	*Asiotmethis limbatus*	-	-	-	4.04	-	-	4	0.63	D1	33	C2	0.21	W2
30.	*Pezotettix giornae*	-	-	1	1.01	10	3.57	11	1.73	D2	66	C3	1.14	W2
31.	*Calliptamus italicus*	-	-	-	-	1	0.36	1	0.16	D1	33	C2	0.05	W1
32.	*Calliptamus barbarus*	-	-	4	4.04	7	2.50	11	1.73	D2	66	C3	1.14	W3
33.	*Acrida ungarica*	-	-	2	2.02	11	3.93	13	2.04	D3	66	C3	1.35	W3
34.	*Oedaleus decorus*	-	-	5	5.05	3	1.07	8	1.26	D2	66	C3	0.83	W2
35.	*Oedipoda caerulescens*	-	-	10	10.1	5	1.79	15	2.35	D3	66	C3	1.55	W3
36.	*Oedipoda germanica*	-	-	13	13.1	17	6.07	30	4.71	D3	66	C3	3.11	W3
37.	*Acrotylus insubricus*	22	8.53	3	3.03	11	3.93	36	5.65	D4	100	C4	5.65	W4
38.	*Dociostaurus brevicollis*	-	-	-	-	3	1.07	3	0.47	D1	33	C2	0.16	W2
39.	*Stenobothrus lineatus*	-	-	1	1.01	3	1.07	4	0.63	D1	66	C3	0.41	W2
40.	*Omocestus rufipes*	5	1.94	-	-	-	-	5	0.78	D1	33	C2	0.26	W2
41.	*Omocestus petraeus*	-	-	1	1.01	6	2.14	7	1.10	D2	66	C3	0.73	W2
42.	*Omocestus minutus*	-	-	5	5.05	9	3.21	14	2.20	D3	66	C3	1.45	W3
43.	*Chorthippus brunneus*	-	-	21	21.2	15	5.36	36	5.65	D4	66	C3	3.73	W3
44.	*Chorthippus loratus*	-	-	29	29.2	37	13.2	66	10.3	D5	66	C3	6.84	W4
45.	*Chorthippus dichrous*	-	-	3	3.03	2	0.71	5	0.78	D1	66	C3	0.52	W2
46.	*Chorthippus parallelus*	-	-	9	9.09	4	1.43	13	2.04	D3	66	C3	1.35	W3
47.	*Euchorthippus pulvinatus*	-	-	5	5.05	9	3.21	14	2.20	D3	66	C3	1.45	W3
48.	*Euchorthippus declivus*	-	-	17	17.1	20	7.14	37	5.81	D4	66	C3	3.83	W3

Discussions: the most abundant species are: *Isophya hospodar, Chorthippus loratus, and Acrotylus insubricus.* The species *Chorthippus loratus* is eudominant, *Isophya hospodar, Bucephaloptera bucephala, Oecanthus pellucens, Chorthippus brunneus, Euchorthippus declivus* are dominant. Among the rarest species in the Reserve are: *Dociostaurus brevicollis, Arachnocephalus vestitus* and *Tetrix tenuicornis*. Some characteristic species for this area are : *Chorthippus loratus, Acrotylus insubricus* and *Bucephaloptera bucephala.* The majority of the species are accessory and few are accidental such as : *Isophya rectipennis* and *Pholidoptera fallax.*

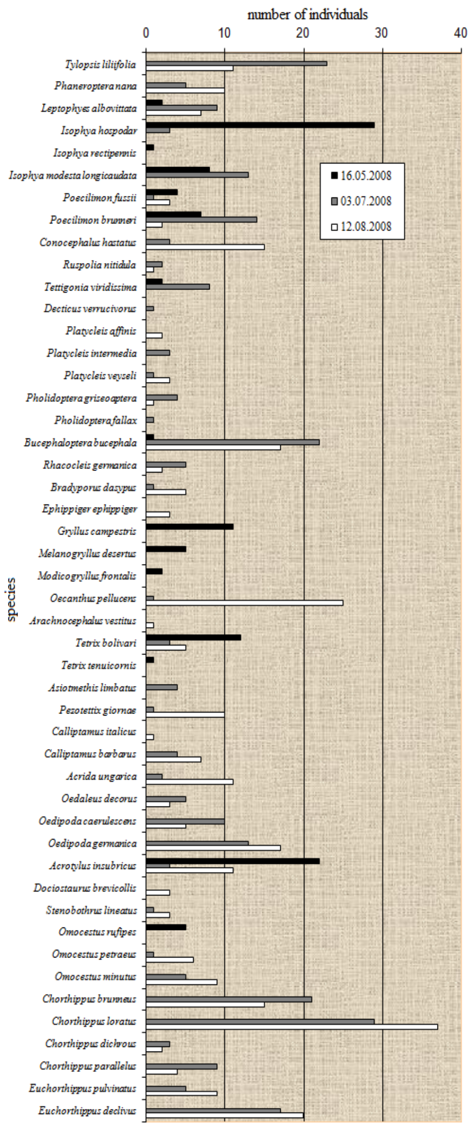

Fig. 1. Abundance of the Orthoptera species in the 3 samples collected at Hagieni

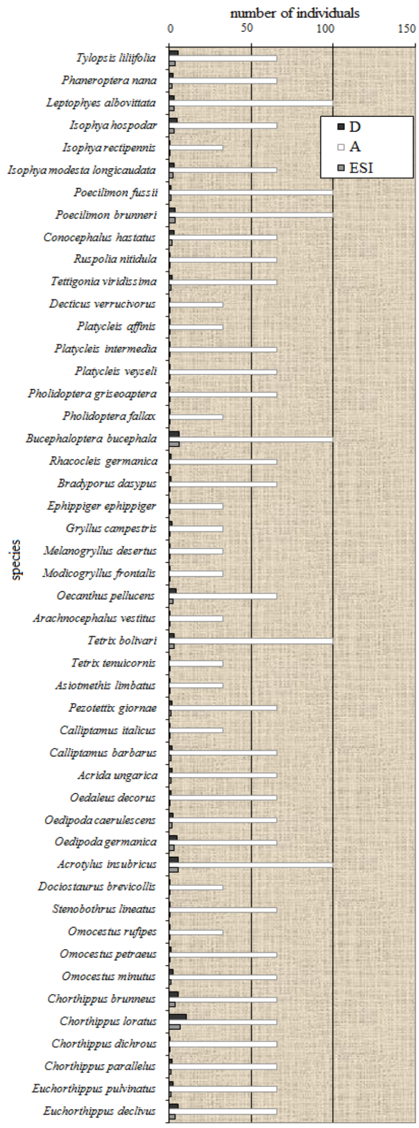

Fig. 2. Dominance, constance and ecological significance index of the Orthoptera species in the 3 samples collected at Hagieni

2. The characterization of Orthoptera communities in Histria Reserve

Table 2. The diversity of the Orthoptera species collected from Histria in 2008

No	Species	22.05.2008	Abundance %	15.07.2008	Abundance %	20.08.2008	Abundance %	total	Dominance %		Constance %		Ecological significance index %	
1.	*Phaneroptera nana*	-	-	3	2.03	9	5.45	12	3.27	D3	66	C3	2.16	W3
2.	*Leptophyes albovittata*	-	-	1	0.68	2	1.21	3	0.82	D1	66	C3	0.54	W2
3.	*Poecilimon fussii*	1	1.85	5	3.38	4	2.42	10	2.72	D3	100	C4	2.72	W3
4.	*Poecilimon brunneri*	-	-	7	4.73	2	1.21	9	2.45	D3	66	C3	1.62	W3
5.	*Conocephalus fuscus*	-	-	16	10.8	9	5.45	25	6.81	D4	66	C3	4.50	W3
6.	*Ruspolia nitidula*	-	-	3	2.03	-	-	3	0.82	D1	33	C2	0.27	W2
7.	*Saga campbelli gracilis*	-	-	6	4.05	2	1.21	8	2.18	D3	66	C3	1.44	W3
8.	*Tettigonia viridissima*	5	9.26	4	2.70	-	-	9	2.45	D3	66	C3	1.62	W3
9.	*Decticus verrucivorus*	4	7.41	9	6.08	7	4.24	20	5.45	D4	100	C4	5.45	W4
10.	*Platycleis affinis*	1	1.85	5	3.38	2	1.21	8	2.18	D3	100	C4	2.18	W3
11.	*Platycleis albopunctata grisea*	-	-	3	2.03	4	2.42	7	1.91	D2	66	C3	1.26	W3
12.	*Platycleis veyseli*	-	-	2	1.35	8	4.85	10	2.72	D3	66	C3	1.80	W3
13.	*Gryllus campestris*	11	20.3	-	-	1	0.61	12	3.27	D3	66	C3	2.16	W3
14.	*Melanogryllus desertus*	2	3.70	-	-	-	-	2	0.54	D1	33	C2	0.18	W2
15.	*Oecanthus pellucens*	-	-	3	2.03	21	12.7	24	6.54	D4	66	C3	4.32	W3
16.	*Arachnocephalus vestitus*	-	-	-	-	1	0.61	1	0.27	D1	33	C2	0.09	W1
17.	*Tetrix bolivari*	4	7.41	-	-	-	-	4	1.09	D2	33	C2	0.36	W2
18.	*Tetrix subulata*	7	12.9	-	-	-	-	7	1.91	D2	33	C2	0.63	W2
19.	*Calliptamus italicus*	-	-	2	1.35	1	0.61	3	0.82	D1	66	C3	0.54	W2
20.	*Calliptamus barbarus*	-	-	16	10.8	7	4.24	23	6.27	D4	66	C3	4.14	W3
21.	*Acrida ungarica*	-	-	4	2.70	12	7.27	16	4.36	D3	66	C3	2.88	W3
22.	*Oedipoda caerulescens*	-	-	1	0.68	2	1.21	3	0.82	D1	66	C3	0.54	W2
23.	*Aiolopus thalassinus*	-	-	2	1.35	1	0.61	3	0.82	D1	66	C3	0.54	W2
24.	*Epacromius coerulipes*	-	-	3	2.03	14	8.48	17	4.63	D3	66	C3	3.06	W3
25.	*Acrotylus insubricus*	11	20.3	1	0.68	7	4.24	19	5.18	D4	100	C4	5.18	W4
26.	*Dociostaurus brevicollis*	-	-	1	0.68	-	-	1	0.27	D1	33	C2	0.09	W1
27.	*Stenobothrus lineatus*	-	-	6	4.05	2	1.21	8	2.18	D3	66	C3	1.44	W2
28.	*Omocestus minutus*	-	-	4	2.70	3	1.82	7	1.91	D2	66	C3	1.26	W2
29.	*Chorthippus brunneus*	3	5.56	7	4.73	8	4.85	18	4.90	D3	100	C4	4.90	W3
30.	*Chorthippus loratus*	5	9.26	10	6.76	17	10.3	32	8.72	D4	100	C4	8.72	W4
31.	*Chorthippus dichrous*	-	-	19	12.8	9	5.45	28	7.63	D4	66	C3	5.04	W4
32.	*Euchorthippus pulvinatus*	-	-	1	0.68	3	1.82	4	1.09	D2	66	C3	0.72	W2
33.	*Euchorthippus declivus*	-	-	4	2.70	7	4.24	11	3.00	D3	66	C3	1.98	W3

Discussions: abundant species of Orthoptera: *Chorthippus dichrous, Chorthippus loratus, Conocephalus fuscus* and *Calliptamus barbarus. Chorthippus loratus, Chorthippus loratus, Acrotylus insubricus* are dominant species and characteristic to this area, being species with high resistance to the draught and halophilous soil. The rarest species encountered are: *Dociostaurus brevicollis, Leptophyes albovittata* and *Aiolopus thalassinus*. The species *Poecilimon fussii, Decticus verrucivorus, Platycleis affinis, Acrotylus insubricus, Chorthippus brunneus* and *Chorthippus loratus* are present in all the collected samples. Also, an interesting subspecies was encountered, *Saga campbelli gracilis*.

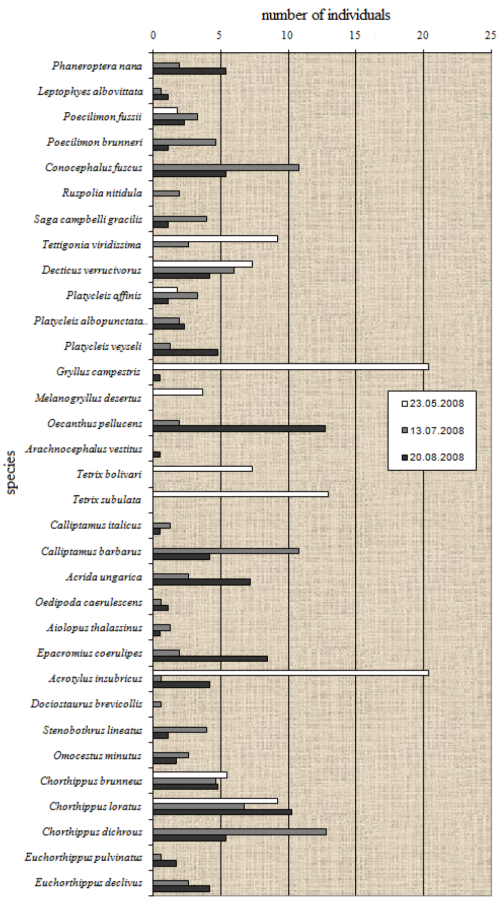

Fig. 3. Abundance of the Orthoptera species in the 3 samples collected at Histria

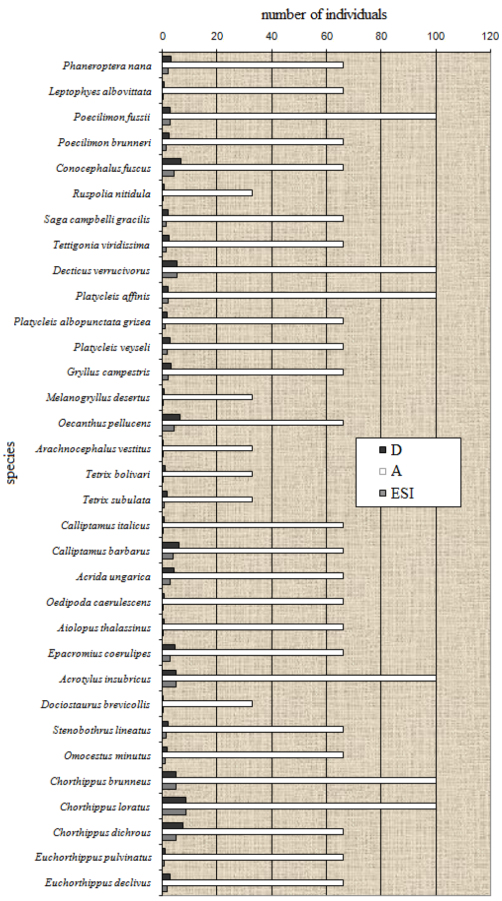

Fig. 4. Dominance, constance and ecological significance index of the Orthoptera species in the 3 samples collected at Histria

3. The characterization of Orthoptera communities in Letea

Table 3. The diversity of the Orthoptera species collected from Letea in 2008

No.	Species	16.05.2008	Abundance %	01.07.2008	Abundance %	14.09.2008	Abundance %	total	Dominance %		Constance %		Ecological significance index %	
1.	*Phaneroptera nana*	-	-	3	2.11	1	0.58	4	1.1	D2	66	C3	0.73	W2
2.	*Phaneroptera spinosa*	-	-	1	0.7	2	1.16	3	0.82	D1	66	C3	0.55	W2
3.	*Conocephalus fuscus*	-	-	3	2.11	7	4.05	10	2.74	D3	66	C3	1.83	W3
4.	*Ruspolia nitidula*	-	-	-	-	4	2.31	4	1.1	D2	33	C2	0.37	W2
5.	*Gampsocleis schelkovnikovae*	-	-	2	1.41	-	-	2	0.55	D1	33	C2	0.18	W2
6.	*Gampsocleis glabra*	-	-	6	4.23	-	-	6	1.64	D2	33	C2	0.55	W2

No.	Species	16.05.2008	Abundance %	01.07.2008	Abundance %	14.09.2008	Abundance %	total	Dominance %		Constance %		Ecological significance index %	
7.	*Decticus albifrons*	-	-	-	-	1	0.58	1	0.27	D1	33	C2	0.09	W1
8.	*Platycleis affinis*	-	-	1	0.7	3	1.73	4	1.1	D2	66	C3	0.73	W2
9.	*Platycleis intermedia*	-	-	2	1.41	1	0.58	3	0.82	D1	66	C3	0.55	W2
10.	*Platycleis albopunctata*	-	-	1	0.7	-	-	1	0.27	D1	33	C2	0.09	W1
11.	*Gryllus campestris*	1	2	-	-	-	-	1	0.27	D1	33	C2	0.09	W1
12.	*Modicogryllus frontalis*	1	2	-	-	-	-	1	0.27	D1	33	C2	0.09	W1
13.	*Modicogryllus burdigalensis*	3	6	2	1.41	-	-	5	1.37	D2	66	C3	0.91	W2
14.	*Oecanthus pellucens*	-	-	5	3.52	32	18.5	37	10.1	D5	66	C3	6.76	W4
15.	*Gryllotalpa unispina*	1	2	-	-	-	-	1	0.27	D1	33	C2	0.09	W1
16.	*Xya variegata*	6	12	3	2.11	-	-	9	2.47	D3	66	C3	1.64	W3
17.	*Xya pfaendleri*	9	18	13	9.15	1	0.58	23	6.3	D4	100	C5	6.30	W4
18.	*Tetrix ceperoi*	2	4	-	-	-	-	2	0.55	D1	33	C2	0.18	W2
19.	*Tetrix subulata*	1	2	-	-	-	-	1	0.27	D1	33	C2	0.09	W1
20.	*Tetrix bolivari*	3	6	-	-	1	0.58	4	1.1	D2	66	C3	0.73	W2
21.	*Pezotettix giornae*	-	-	2	1.41	8	4.62	10	2.74	D3	66	C3	1.83	W3
22.	*Calliptamus italicus*	-	-	2	1.41	1	0.58	3	0.82	D1	66	C3	0.55	W2
23.	*Calliptamus barbarus*	-	-	12	8.45	19	10.9	31	8.49	D4	66	C3	5.66	W4
24.	*Acrida ungarica*	-	-	3	2.11	7	4.05	10	2.74	D3	66	C3	1.83	W3
25.	*Oedipoda caerulescens*	-	-	14	9.86	10	5.78	24	6.58	D4	66	C3	4.38	W3
26.	*Sphingonotus caerulans*	-	-	21	14.7	7	4.05	28	7.67	D4	66	C3	5.11	W4
27.	*Acrotylus insubricus*	23	46	2	1.41	13	7.51	38	10.4	D5	100	C5	10.41	W5
28.	*Acrotylus longipes*	-	-	3	2.11	11	6.36	14	3.84	D3	66	C3	2.56	W3
29.	*Omocestus petraeus*	-	-	5	3.52	3	1.73	8	2.19	D2	66	C3	1.46	W3
30.	*Omocestus minutus*	-	-	17	11.9	14	8.09	31	8.49	D4	66	C3	5.66	W4
31.	*Chorthippus brunneus*	-	-	2	1.41	7	4.05	9	2.47	D2	66	C3	1.64	W3
32.	*Chorthippus loratus*	-	-	13	9.15	20	11.5	33	9.04	D4	66	C3	6.03	W4
33.	*Chorthippus dichrous*	-	-	1	0.7	-	-	1	0.27	D1	33	C2	0.09	W1
34.	*Euchorthippus declivus*	-	-	3	2.11	-	-	3	0.82	D1	33	C2	0.27	W2

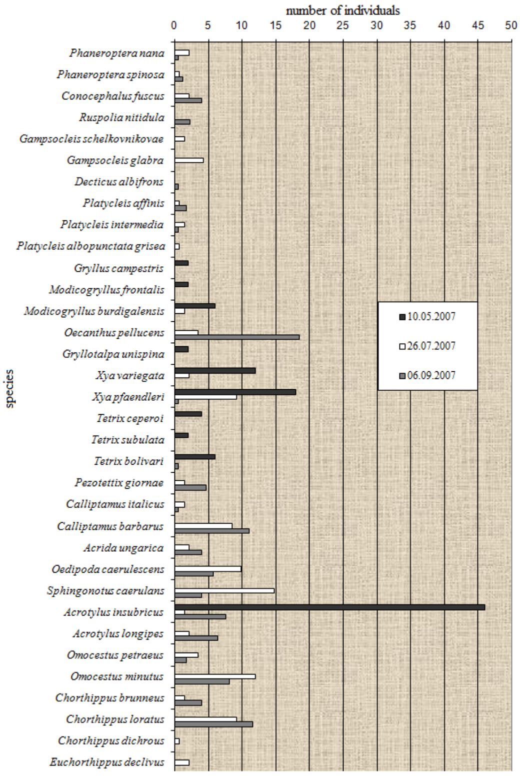

Fig. 5. Abundance of the Orthoptera species in the 3 collected samples at Letea

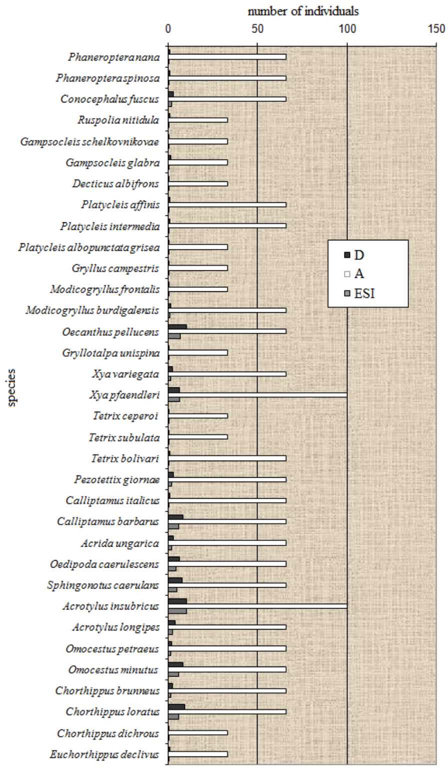

Fig. 6. Dominance, constance and ecological significance index of the Orthoptera species in the 3 collected samples at Letea

Discussions: the eudominant species is *Acrotylus insubricus,* specific in all the sandy ecosystems. The dominant species at Letea are: *Oecanthus pellucens* and *Xya pfaendleri.* Only the species *Xya pfaendleri* and *Acrotylus insubricus* were constantly present in all the samples. Among the rarest species, we can encounter *Decticus albifrons* and *Gryllotalpa unispina*. Because of the small variety of vegetal associations, the Orthoptera diversity is small. Still, the psamophilous species are adapted very well and can be encountered with high-sized populations, as: *Calliptamus barbarus, Oedipoda caerulescens, Omocestus minutus* etc.

4. The characterization of Orthoptera communities in Cernavoda

Table 4. The diversity of the Orthoptera species collected from Cernavoda in 2008

No	Species	10.05.2008	Abundance %	03.07.2008	Abundance %	12.08.2008	Abundance %	total	Dominance %		Constance %		Ecological significance index %	
1.	*Tylopsis liliifolia*	-	-	3	2.73	1	0.63	4	1.27	D2	66	C3	0.84	W2
2.	*Phaneroptera nana*	-	-	1	0.91	7	4.40	8	2.55	D3	66	C3	1.68	W3
3.	*Leptophyes albovittata*	-	-	4	3.64	1	0.63	5	1.59	D2	66	C3	1.05	W1
4.	*Poecilimon fussii*	-	-	11	10	2	1.26	13	4.14	D3	66	C3	2.73	W3
5.	*Poecilimon brunneri*	-	-	6	5.45	3	1.89	9	2.87	D3	66	C3	1.89	W3
6.	*Conocephalus fuscus*	-	-	5	4.55	11	6.92	16	5.10	D4	66	C3	3.36	W3
7.	*Ruspolia nitidula*	-	-	1	0.91	4	2.52	5	1.59	D2	66	C3	1.05	W2
8.	*Tettigonia viridissima*	5	11.1	9	8.18	5	3.14	19	6.05	D4	100	C4	6.05	W4
9.	*Decticus verrucivorus*	2	4.44	7	6.36	2	1.26	11	3.50	D3	100	C4	3.50	W3
10.	*Platycleis affinis*	-	-	4	3.64	1	0.63	5	1.59	D2	66	C3	1.05	W1
11.	*Platycleis veyseli*	-	-	1	0.91	3	1.89	4	1.27	D2	66	C3	0.84	W2
12.	*Ephippiger ephippiger*	-	-	1	0.91	4	2.52	5	1.59	D2	33	C2	0.53	W2
13.	*Gryllus campestris*	14	31.1	-	-	-	-	14	4.46	D3	33	C2	1.47	W2
14.	*Oecanthus pellucens*	-	-	3	2.73	21	13.21	24	7.64	D4	66	C3	5.04	W3
15.	*Tetrix tenuicornis*	8	17.7	-	-	2	1.26	10	3.18	D3	66	C3	2.10	W3
16.	*Pezotettix giornae*	-	-	1	0.91	14	8.81	15	4.78	D3	66	C3	3.15	W3
17.	*Calliptamus barbarus*	-	-	3	2.73	1	0.63	4	1.27	D2	66	C3	0.84	W2
18.	*Acrida ungarica*	-	-	7	6.36	11	6.92	18	5.73	D4	66	C3	3.78	W3
19.	*Oedipoda caerulescens*	-	-	2	1.82	5	3.14	7	2.23	D3	66	C3	1.47	W3
20.	*Acrotylus insubricus*	12	26.6	1	0.91	16	10.06	29	9.24	D4	100	C4	9.24	W4
21.	*Stenobothrus lineatus*	-	-	8	7.27	2	1.26	10	3.18	D3	66	C3	2.10	W3
22.	*Omocestus rufipes*	3	6.67	5	4.55	1	0.63	9	2.87	D3	100	C4	2.87	W3
23.	*Omocestus minutus*	-	-	4	3.64	2	1.26	6	1.91	D2	66	C3	1.26	W3
24.	*Chorthippus brunneus*	1	2.22	16	14.55	13	8.18	30	9.55	D4	100	C4	9.55	W4
25.	*Chorthippus loratus*	-	-	4	3.64	20	12.58	24	7.64	D4	66	C3	5.04	W4
26.	*Euchorthippus declivus*	-	-	3	2.73	7	4.40	10	3.18	D3	66	C3	2.10	W3

<u>Discussions:</u> the dominant Orthoptera species at Cernavoda are: *Conocephalus fuscus, Tettigonia viridissima, Oecanthus pellucens, Acrida ungarica, Acrotylus insubricus, Chorthippus brunneus* and *Chorthippus loratus*. Some of the rarest species are: *Platycleis veyseli* and *Calliptamus barbarus*. With a constant presence in the samples are the species: *Tettigonia viridissima, Decticus verrucivorus, Acrotylus insubricus, Omocestus rufipes* and *Chorthippus brunneus*.

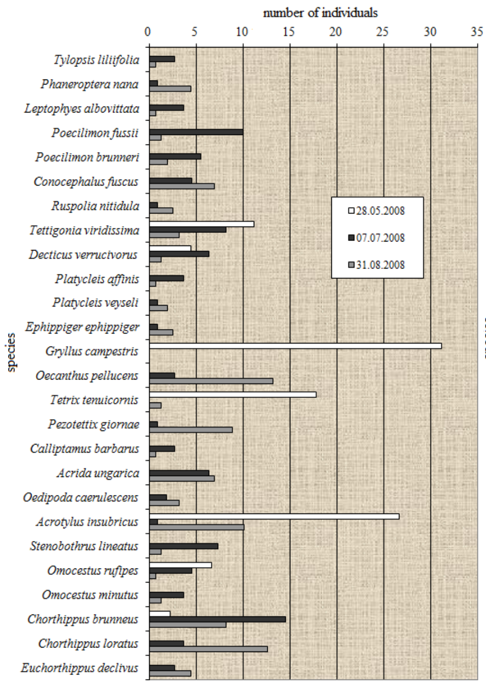

Fig. 7. Abundance of the Orthoptera species in the 3 samples collected at Cernavoda

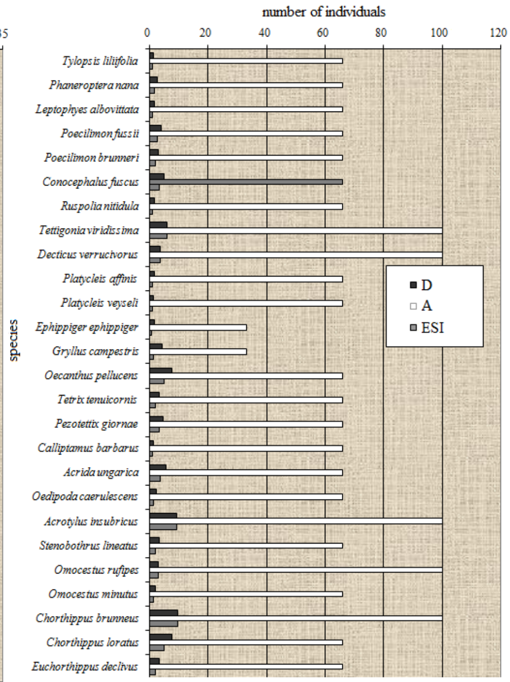

Fig. 8. Dominance, constance and ecological significance index of the Orthoptera species in the collected samples collected at Cernavoda

Conclusions

Comparing the four collecting sites from Dobrudja, it is obvious that some xerophilous species are very well represented by high-sized populations in this region of Romania. For example, the species *Oecanthus pellucens*, *Acrotylus insubricus* and *Chorthippus loratus* are only some of the ones recorded in all the collecting sites. As very rare species in Dobrogea can be considered *Phaneroptera gracilis*, *Gampsocleis schelkovnikovae*, *and Gryllotalpa unispina* from Letea, *Saga campbelli gracilis* from Histria and *Asiotmethis limbatus* from Hagieni.

Each of the studied areas is specific because of its microclimate and relief, the Orthoptera populations' development depending on those. The knowledge of those communities can be used in determining an area evolution, the Orthoptera being well-known indicatory species.

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Lucrările Simpozionului „*Entomofagii şi rolul lor în păstrarea echilibrului natural*”
Universitatea „Al.I. Cuza” Iaşi, 2008

PESTS THAT HARMED OBJECTS IN THE ETHNOGRAPHY COLLECTION OF THE COUNTY MUSEUM IN HUŞI

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Abstract. In this paper we have presented aspects of the attack of certain species of insects that caused deteriorations to objects of patrimony belonging to the ethnography collection of the Huşi County Museum. The incorrect storage of the objects, the unharmed ones together with the ones that were under biological attack, the lack of disinfection and disinsection and the storage of the objects in an environment with temperature and humidity values that were favorable to the development of xylophagous insects, determined a serious degradation of the wooden pieces in the ethnographic collection. *Anobium punctatum* deGeer*, Oligomerus ptilinoides* Woll.*, Xestobium rufovillosum* deGeer (*Coleoptera, Anobiidae*)*, Ptinus brunneus* Duftschmid (*Coleoptera, Ptinidae*) have been identified as pests and, also, the predator species *Korynetes caeruleus* (*Coleoptera, Cleridae*).

Key words: pests, cultural patrimony

Insecte dăunătoare obiectelor de patrimoniu din colecţia de etnografie a Muzeului municipal din Huşi

Rezumat. În lucrare sunt prezentate aspecte privind atacul unor specii de insecte care au produs deteriorări bunurilor de patrimoniu din colecţia de etnografie a Muzeului municipal din Huşi. Depozitarea incorectă a obiectelor, păstrarea pieselor sănătoase împreună cu cele cu atac biologic activ, lipsa intervenţiilor de dezinfecţie-dezinsecţie şi menţinerea obiectelor într-un mediu cu valori ale temperaturii şi umidităţii favorabile dezvoltării insectelor xilofage au dus la degradarea avansată a pieselor din lemn din colecţia de etnografie. Au fot identificate speciile de insecte dăunătoare *Anobium punctatum* deGeer*, Oligomerus ptilinoides* Woll.*, Xestobium rufovillosum* deGeer (Fam. Anobiidae)*, Ptinus brunneus* Duftschmid (Fam. Ptinidae) şi specia prădătoare *Korynetes caeruleus* (Fam. Cleridae).

Cuvinte cheie: insecte dăunătoare, patrimoniu cultural

Introduction

The Huşi County Museum was founded in the autumn of 1956. It was based on a number of collections from schools and churches in the city and on donations from professors such as Ştefan Bujoreanu and Mihai Ciobanu. In 1958 the scientific team of the museum was formed under the guidance of „Alexandru Ioan Cuza” University, Professor Ioan Gugiuman.

The current collection of the museum is made up of 6,600 pieces collected from Răducăneni, Fălciu, Crasna, Hoceni, Bârlad: 5,016 pieces of ceramics, 102 wooden objects, 982 metal objects, 154 paintings and icons, 95 textile objects, 65 books, 58 glass objects, 47 objects made of rock and bone. There was also a natural science branch which functioned until 1979.

The etnographic collection ilustrates by means of its historical and artistic value (objects from the 15th to the 20th centuries) the local craftsmen’ skill and the old traditional occupations such as agriculture, cattle breeding, bee keeping and hunting (the oldest hunting horn dating from 1820). The house keeping activity is very well represented by means of objects related to cooking, in making textiles and, also, objects which reflect the religious life. The variety and originality of these pieces made by means of traditional techniques, in a large variety of materials are impressive. The sculpted, incised and multicoloured objects are made of oak, beech, lime, willow, cornel wood and fruit trees.

The museum has been closed to the public since 1993, because of the advanced state of degradation of the building (the Adam Mitache house - historical monument dating from 1820), the collections being stored in conditions that were unsuitable to preservation and the personnel has been reduced to only two employees.

The ethnographic objects storage house was founded in 1982, shelves of composite wood panel being made on a metal frame to shelter the objects that were not exhibited at that time. At the closing of the museum, its large number of etnographic pieces were moved to a little storage room, crammed up in the same area with wood, ceramics and metal objects. Thus, the wood objects have suffered important biological, physical and mechanic alterations, being noticed wood degradations, fissures, deformations and losses of object components, decorative surfaces degraded by countless holes for flying made by the xylophagous insects.

Materials and Methods

The ethnographic objects collection was studied between November 2007 – October 2008, the xylophagous insects attack being monitored by means of adhesive Pherocon®AM Trécé Inc. Traps, the values of the climate within the storage room being monitored too. Collections of adult specimens from the shelves, from the packed objects and from the flying orifices have been made; the relative abundence of the species according to the formula Ar = n/N x 100 (n - the number of specimens belonging to the species in question, N - the total number of the collected specimens) and the sex-ratio at the dominant species have been calculated. The intensity of the attack and the state of preservation of some representative objects have also been evaluated.

Results

Xylofagus species from the *Anobiidae* and *Ptinidae* families (Order Coleoptera), have been identified, the active attack being recorded only for the *Anobium punctatum* deGeer and *Oligomerus ptilinoides* Woll.. Dead specimens of *Xestobium rufovillosum* deGeer species have been identified only in some pieces treated with biocids, proving the existence of a prior attack. Insects belonging to the species *Ptinus brunneus* Duft. have been collected from the shelves of the storage room.

Anobium punctatum deGeer, 1774

Synonims: *Anobium striatum* Oliver,1790; *Anobium domesticum* Geoffroy, 1785.

2.5-5 mm long insects, light or dark brown, covered with thick hairs (Fig. 1a); antennae segmented into 11 parts, segments 9 and 10 a little longer than the first 8 (Fig.1c); prothorax narrower than the basis of the elytra, being very narrow in the superior part, with the posterior angles rounded and the posterior angular proeminence very obvious (Fig. 1b); the Felitrae are dotted and layered and the apical part is rounded; the last abdominal sternite of the male with a small cavity (Hickin, 1963); aedeagus with a specific aspect as in fig. 1d (White, R. E., 1971).

Biology: it is an antropophile xylophagous insect, that attacks softwoods and hardwoods, especially the soft essences. The surface of the objects is punched with holes for flying of approximately 1-2.5 mm diameter, that eliminate a fine sawdust with fusiform excrements (Chiappini, 2001). It is the most frequent species of xylophagous insects that attacks objects belonging to the Romanian patrimony.

One of the predators of the *A. punctatum* species, *Korynetes caeruleus* Degeer (Cleridae) (Fig. 1e) has been identified.

Geographical distribution: common species in Europe, considered almost cosmopolitan because of the timber imports.

Identified material: 309♂♂ şi 428♀♀ - in icons, polyptichs with founders list, spinning wheel, reels, spoons, hay forks, yokes, barrel taps, shepherds' sticks, flail used for beating the wheat, tables, chairs.

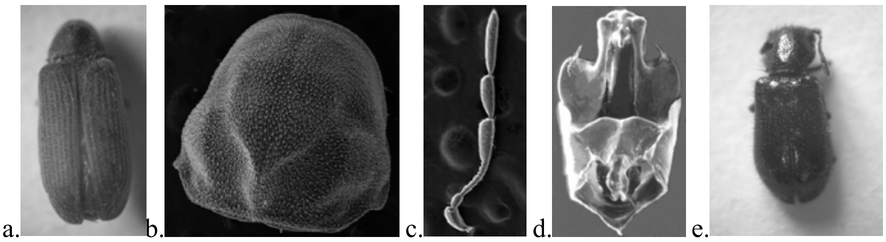


Figure 1. ***Anobium punctatum*** **– imago (a), protorax (b), antenna (c), aedeagus (d) and the predator** ***Korynetes caeruleus*** **(e)**

Oligomerus ptilinoides Wollaston, 1854

They are 5-7 mm long insects, covered with short and thick hairs, (Fig. 2a); their antennae are segmented into 11, the 9th segment - the first one of the club– as long as the first 8 segments, the ^{10th} and ^{11th} segments equal to the 9th (Fig. 2c); the last segment of the maxillary palp very long (Español, 1998); the eyes with short and lifted cilia; prothorax extremely convex with rounded posterior angles, with the superior and posterior margins narrowed (Fig. 2b) (Sutter, 1992); the maximum width in the median area equal to the basis of the elytra; long and narrow elytra with parallel lateral margins and regular dots in layers, aedeagus with specific aspect as in Fig. 2d (Español, 1998).

Biology: it atacks timber made of most of the hardwood (Liotta, 1998), especially humid wood, degraded by fungi. It can seldom be met outside, preferring the timber stored inside, in the furniture. The surface of the wood has holes of 2.5-3mm in diameter made by the adult specimens of the species that left the cocoon.

Geographical distribution: anthropophilous insect, present in European, African and Asian countries. In Japan this species lives together with endemic species of the same genus.

Identified material 4♂ ♂ şi 11♀♀- in the barrel for beating the corn and on the shelves of the storage room.

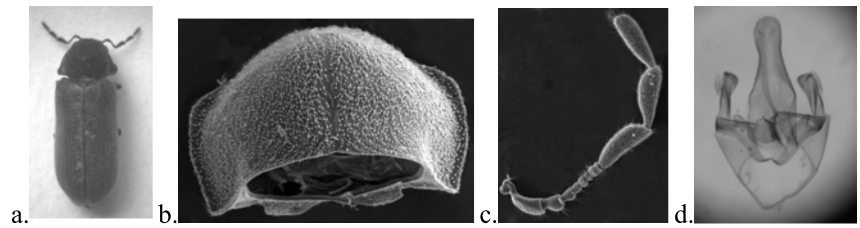


Figure 2. ***Oligomerus ptilinoides*** **– – imago (a), protorax (b), antenna (c), aedeagus (d)**

Xestobium rufovillosum deGeer, 1774

Sinonimii: *Xestobium faber* Thunberg, *Xestobium fatidicum* Blumenberg, *Xestobium tesselatum* Herbst, *Xestobium pertinax* Shall, *Xestobium pulsatorium* Villers, *Xestobium rubiginosum* Muller, *Xestobium squalidum* Lec..

5-9 mm long insects; their body is covered with golden hairs shaped as irregular spots (Fig. 3a), with filiform antennae made up of 11 segments (Fig. 3c); its prothorax is wider than the basis of the elytra, with rounded angles, narrowing down to the lower area, its lateral margins hemmed and corrugated (Fig. 3b), its elytra have parallel lateral margins rounded in the apical area; its tybia is compressed, having the outer part narrow as compared to the lateral parts, forming a living edge, and in the apical area, towards the interior, 2 strong spurrs (Fig. 3d); aedeagus with a specific aspect as in Fig. 3e (Logvinovskij, 1985).

Biology: it prefers wood from strong leafy trees (especially oak and beech) (Mustaţă M., 1998), but it can also be met in the resinous wood. The adult specimen hatches in the spring, the opposite sexes meeting by means of sounds, the males hitting their heads in the wood and the females answering in order to locate one another for reproduction. The surface of the object has large holes up to 3-3.5 mm, full of sawdust of a specific flat form.

Geographical distribution: spread all over Europe, North America, Russia.

Identified material:2♀♀ şi 1 ♂ - in the threshing sledge.

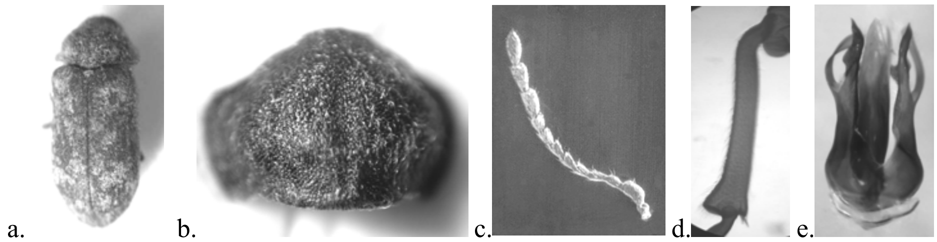


Figure 3. *Xestobium rufovillosum* – imago (a), protorax (b), antenna (c), tibia (d), aedeagus (e)

Ptinus brunneus Duftschmid, 1785

Synonyms: *Ptinus testaceus* Olivier,1790; *Ptinus clavipes* Panzer, 1792; *Ptinus hirtellus* Sturm, 1837; *Ptinus rufus* Lucas, 1847; *Ptinus hirticollis* Lucas, 1847; *Ptinus brevipennis* Pic, 1896.

They are 2.3-3.2 mm long insects of a red-brown colour in the case of the females and yellow-brown for the males (Fig. 4a); ovally shaped females and long shaped males having almost parallel margins of the elytra; their body is covered with grey thick long hairs; prothorax is more or less diamond-shaped with a granulated surface and iregular hairs (Mustaţă M., 2001).

Biology: polyphagous species met in storage rooms for dehydrated food, medicines, book collections, wood objects, old textile objects and insectariums.

Identified material: 3♀♀ - on the storage shelves

Figure 4. ***Ptinus brunneus*** **♀– imago**

The attack of the insects was caused by the objects under active attack which being stored within the same room with the healthy objects determined the generalized infestation of the whole storage house including the objects and the shelves and crates that contain the ceramics objects. The very high values of the relative humidity (75% UR on 25.03.2008, 68% UR on 29.05.2008 and 29.05.2008, 78,4 % UR on 24.10.2008) favoured the biological attack of both the insects that prefer the humid environment and the microorganisms, the fungi colonies being spread on both the objects and the walls and shelves of the storage room (Fig. 5).

a. b. c.

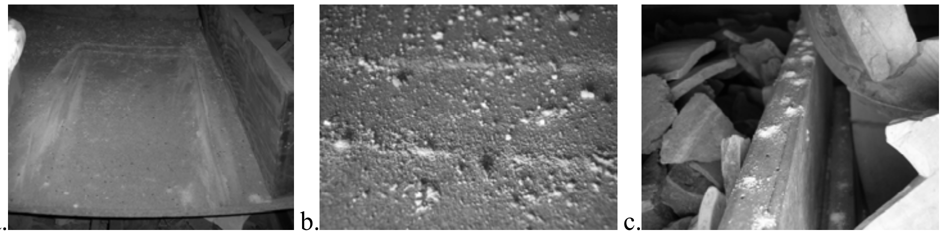


Figure 5. Xylophagus insects, sawdust and fungi colonies on the shelves of the storage facility (a, b) and sawdust on the crates containing fragments of ceramics (c)

Most of the wood objects have been altered by the *A. punctatum* species (Fig. 6a), the intensity of the attack being shown by the large number of collected adult specimens (755 ♀ and ♂) and the large number of holes for flying (more than 100 holes/dm^2) (Fig. 6b). The *A punctatum*'s flight has been recorded between June and August when the temperature values within the storage facility went higher than 20^{0}C. The surface of the objects have 1.5-2.5 mm holes (Fig. 6c), some old and some fresh of which sawdust containing specific fusiform excrements fell.

a. b. c.

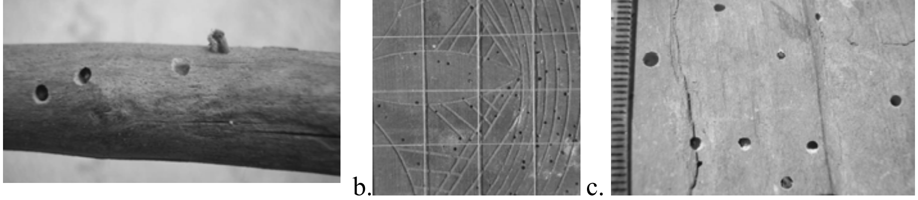


Figure 6. ***Anobium punctatum*** **–adult (a), decorative panel containing over 100 flying orifices/holes/dm2 (b) and holes for flying with 1-2,5 mm diameter (c)**

The insects have attacked objects made of softwoods: little chairs, tables, crates, spinning wheel, church-shrine (Fig. 7a-c), lime wood: icons, charity box, candlesticks, polyptychs, barrel bung (Fig. 7 d-f), poplar wood: a large spoon for flour (Fig. 7g), elm wood: a hay fork (Fig. 7h), a yoke, a flail, beech wood: a little bench (Fig.7i), cornel wood: shepherds'sticks (Fig. 7j, k), but also liquid containers made of pumpkin or covered with sawdust paste (Fig. 7 l-n).

Figure 7. Objects attacked by *Anobium punctatum*: little chair (a), spinning wheel (b), shrine-church (c), icon (d), charity box (e), candlesticks (f, g), polyptych with founders list (e), barrel bung (f), spoon for flour (g), hay fork (h), little bench (i), shepherds' sticks (j, k), glass covered by sawdust paste (l, m), liquid container made of pumpkin (n)

Because of the *A. punctatum*'s attack, the wood has lost its mechanic rezistence and the objects have many fissures, deformities and loss of material (fig. 8).

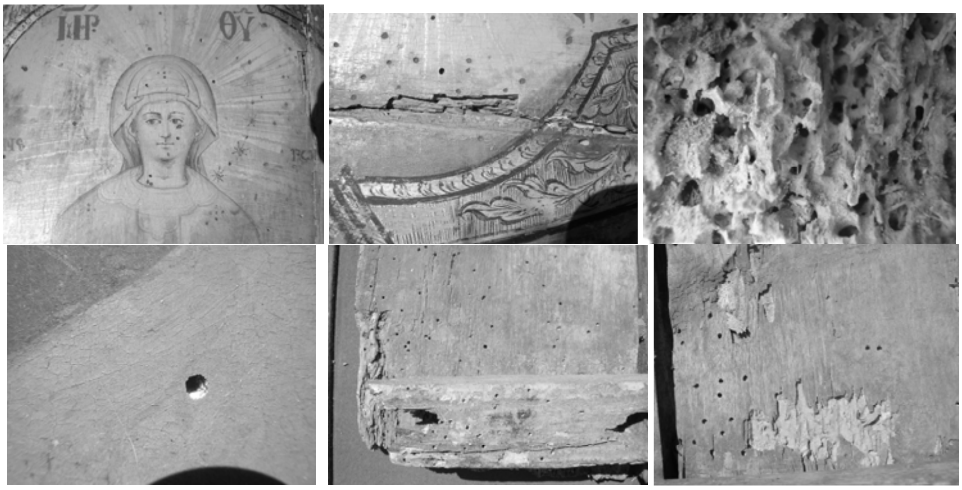


Figure 8. Degradation of the wood attacked by *Anobium punctatum*- loss of wood, on icon „*Mother of God*" (sec. al XVIII -lea)

After the collections of *A punctatum* adult specimens, the relative abundance index was calculated as 97.61%, and the sex-ratio (♀ : ♂) recorded being of 58.07 : 41.92 (Table 1).

Table 1. Sex ratio of the species *Anobium punctatum*

The object/ the storage place	Females	Males	Number of specimens
storage shelves	324	179	503
candlesticks	28	18	46
multicoloured charity box	9	16	25
decorated piece of wood	4	8	12
chair	3	1	4
yoke	17	29	46
flail	14	24	38
table leg 1	4	6	10
table leg 2	10	23	33
yarn swift	6	1	7
sculpted panel	2	1	3
barrel tap	3	1	4
prop (foot and leg)	4	2	6
Total	**428 (58.07%)**	**309 (41.92%)**	**737**

The *Oligomerus ptilinoides*'s attack is weak, only 15 adult individuals being collected and the relative abundance index is 1.98 %. The flight is between May and June and the surface of the objects is punched by the adult ready to fly through 3-3.5 diameter holes (Fig. 9).

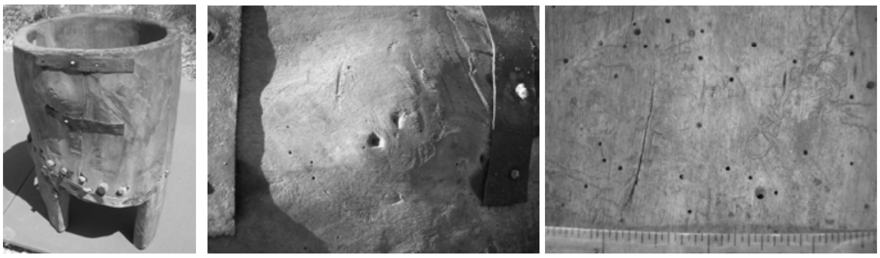


Figure 9. Barrel for beating the corn („ciubei")altered by *Oligomerus ptilinoides*

Xestobium rufovillosum was found in a rare ethnological piece, the threshing sledge („dicanie") which was unsuitably treated with biocids that became crystalized at the surface of the wood, affecting both the aspect of the object and the wood structure.

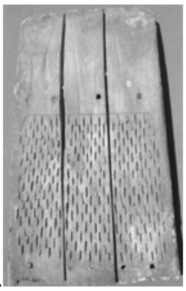
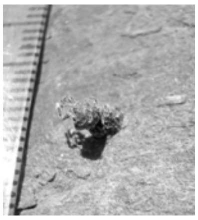
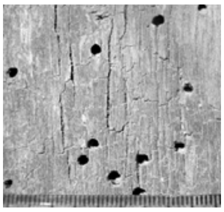
a.  b.  c.  d. 

Figure 10. Treshing sledge (a), *Xestobium rufovillosum* adult specimen (b), loss of wood, holes for flying and fissures and crystals from the biocid substances (c, d)

Conclusions

In this study we have focused on aspects related to the xylophagous insects' attack and the damage produced by them on goods belonging to the national patrimony, in the ethnography collection of the Huşi County Museum. Species of pest insects such as *Anobium punctatum* deGeer*, Oligomerus ptilinoides* Wollaston*, Xestobium rufovillosum* deGeer (*Anobiidae*)*, Ptinus brunneus* Duftschmid (*Ptinidae*), and the predator species *Korynetes caeruleus* (*Cleridae*) have been identified in the storage room and the collected objects, the damages being caused at the moment by *A. punctatum* and *O. ptilinoides.* The relative abundance index is 97.61% for *A. punctatum*, and the sex ratio to the same species is 58.07:41.92 (♀ : ♂).

The generalized attack of the xylophagous insects on the collection has been caused by the objects under active attack stored within the same space with the healthy objects, the thriving continuous biodegradation being maintained by the very high humidity (68-78% UR) and the temperature values favourable to the development of such pest.

The lack of any disinsection or disinfection of the collection or the storage space determined the advanced biodegradation of the goods belonging to the national patrimony, fractures and losses of wood from the parts of different pieces taking place in this way, loosing some of the historical and artistic value of the objects.

Acknowledgements

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Universitatea „Al.I. Cuza” Iaşi, 2008

ECOLOGICAL CORRELATIONS IN THE WOOD ETIOPATHOLOGY

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Abstract In the wood biodegradation the etiopatogenic complex has as main factors the combined action of bacteria, fungi and xylophagous insects. In the context of the determinant and co-factors specific correlations are produced between the fungi and the insects, the vital activity of the last ones being essentially conditioned by the action of the first. In essence the impossibility of the insects to digest pure cellulose (one of the main constituents of wood), requires the preparation of the nutrient base, the enzymatic degradation of cellulose being eased out by the activity of the fungi witch are in symbiotic relations with the insects.
The present work proposes the presentation of some ecological relations between some species of fungi responsible for wood degradation and some species of xylophagous insects witch attack wood from constructions, results obtained during our research as part of the PhD program corroborated with information’s from the literature of specialty.

Key words: biodegradation, xylophagous insects, fungi, conservation, etiopatology

Corelaţii ecologice în etiopatologia lemnului

Rezumat În biodegradarea lemnului complexul etiopatogen are ca principali factori acţiunea corelată a bacteriilor, ciupercilor şi a insectelor xilofage. În contextul factorilor favorizanţi şi a co-factorilor, se produc anumite corelaţii ecologice între ciuperci şi insecte, activitatea vitală a celor din urmă fiind în mod esenţial condiţionată de acţiunea primelor. În esenţă imposibilitatea insectelor de a digera celuloza pură (constituent de bază al materiei lemnoase), impune pregătirea prealabilă a substratului nutritiv, degradarea enzimatică a celulozei fiind facilitată de activitatea ciupercilor aflate într-o relaţie de simbioză cu insectele xilofage.
Lucrarea propune prezentarea unor corelaţii ecologice între unii fungi responsabili de degradarea lemnului şi unele specii de insecte xilofage care atacă lemnul din construcţii, rezultate obţinute în baza cercetărilor efectuate în cadrul programului de pregătire doctorală, coroborate cu date din literatura de specialitate.

Cuvinte cheie: biodegradare, insecte xilofage, fungi, conservare, etiopatologie

Introduction

The installation of the xylophagous Coleoptera attack from the category of secondary and tertiary pests is characterized in most cases by the emergence and development of a previous attack of fungal origin which realizes a "preparation" of the wood mass that converts the matter enzymatically in a substrate nutrient easier to digest for most of the insect species in the category mentioned above. At the same time, it is reported the simultaneous development of xylophagous insect attacks with the extention of fungal depreciation of the wood, in the light of ecological relationships that are created between the two consumers of the different components of wood substrate. Thus, in the pathology of wood one can appreciate the correlations between the main factors of the etiopatogenic complex, which interrelate in the biotic degradation process of wood.

In this sense, in the context of wood biodegradation in the literature of speciality are met, in particular, references to the associations that appear between xylophagous insects and different species of lignicolous macromycetes. Among xylophagous insects are cited mainly species of *Anobiidae,* they are pests with the highest occurrence on the old wood essences.

The problem of association between fungi and xylophagous insects in the biodegradation of wood was developed in literature mainly for two of the most important species of xylophagous pests: *Xestobium rufovillosum* (Col. *Anobiidae*) and *Anobium punctatum* (Col. *Anobiidae*).

Correlation between the depreciation of wood material by fungi and the installation of the xylophagous insects attack was detailed in relation to *X. rufovillosum* by RC Fisher (1958-59). In his observations, Fisher notes that the oak wood degraded by the fungus *Fistulina* (Huds.) Fr. is preferred by insects. The wood depreciated by the fungus has a characteristic dark brown color, the attack of insects being associated with that active of the fungus, or installed in the wood once degraded by the fungus after it ceased its activity.

In constructions, the wood attacked by *X. rufovillosum* is necessarily associated with the initial depreciation of the wood substrate by the action of fungi. Cartwright and Findlay (1936) associate the attack of the insect with the degradation of oak wood caused by the fungus *Phellinus cryptarum* Karst. Hickin (1968) mentions the fact that in constructions the attack of the species *X. rufovillosum* is often associated with the depreciation of the wood by the species of fungi with an increased incidence in the wood of constructions: *Coniophora cerebella* Pers. and *Merulius lacrymans* (Wulf.) Fr. The association of insects with these two species of fungi in the wood degradation is reported by M. Mustata (1998), too, at the church "Frumoasa" in Iasi and at the church "Ion Creangă" of Broşteni-Suceava.

Table 1. The association of some xylophagous species of fungi and the species *X. rufovillosum* (Col. *Anobiidae*) in the degradation of wood

Xestobium rufovillosum / **Fungi**	**Woody essence**
Fistulina hepatica	Oak tree
Phellinus cryptarum	
Coniophora cerebella	
Merulius lacrymans	
Fibroporia vaillanti	Resinous species
Coniophora puteana	
Merulius lacrymans	
Phellinus contiguus	

Table 2. The correlation of the attack of species *A. punctatum* (Col. *Anobiidae*) with some species of fungi

	Fungi
Anobium punctatum	*Coniophora puteana*
	Merulius lacrymans
	Fibroporia vaillanti
	Phellinus contiguus
	Poeciliormycetes varioti
	Chaeomium globosum

In her research Bucşa L. studied the incidence of the xylophagous coleopterans in association with macrofungi. Her results confirme the above mentioned correlations and get information about other ecological relationships between the species *X. rufovillosum* and species of macromycetes which degrade the wood. It was thus reported the combined attack of the insects of the mentioned species with the fungus *Fibroporia vaillant* in the resinous wood used in construction in a proportion higher than the correlation with two other species of fungi mentioned in literature: *Coniophora puteana* and *Merulius* *lacrymans*. At the same time, the author signals the association in a smaller number of cases between *X. rufovillosum* and *Phellinus contiguus*, as well as the association between *X. rufovillosum* and the species *Serpula lacrymans* in the oak wood, the correlation being generally mentioned in the case of the attack on the resinous species

In the particular case of the species *Anobium punctatum* was reported the association with the fungus *Coniophora puteana* at a high frequency, as well as the correlation with the species *Merulius lacrymans*, the association with *Fibroporia vaillant* and *Phellinus contiguus* being reported in a number much lower than in the case of the species *X. rufovillosum* (Bucşa, 2005).

Bletchly (1953) demonstrated experimentally that in the case of wood infested with molds *Poeciliormycetes varioti* and *Chaeomium globosum*, the survival percentage of the larvae of species is higher, although the speed of their development does not modify.

Materials and Methods

We tried to establish some correlations between the degradation of wood by the xylophagous insects and the incidence of development of the biodeteriogenic microfungi on the wood substrate in cause. In order to determine the strains of biodeterigenous microphungi associated in the biodegradation of wood, we have conducted laboratory tests on cultures in Petri plates with Sabouraud medium with agar. The composition of the culture medium used was: Sabouraud – 30 grams of glucose, pepone 10 grams, 20 grams agar, 1000 ml distilled water, the pH is controlled at 5.6[1]. The medium sterilization has been carried out in autoclave, at 115 ^{o}C (0.5 atm.) for 20 min.

The media have been sown by the application on the surface of some samples taken from the wood pieces exposed outdoors, attacked by xylophagous coleoptera species. We used a total of 20 plates with culture medium, the samples of wood material being taken from the essences of oak, beech, elm and resinous trees (fir, spruce fir); attacked by species of xylophagous insects. Later, sown plates were kept in the incubator for two weeks at a temperature of 28 ^{o}C, the development evolution of colonies being monitored every three days. On two of those plates under observation, mycelia without sporulation were developed, the colonies could not be so identified, further analysis being carried out on the basis of the colonies developed on the other 18 plates. We have to mention that on all the 20 plates sown have developed in the first phase bacterial cultures, the mycellia of the fungal colonies appearing after 4 to 6 days of incubation.

The preparations used in the microscopic determination have been prepared by the method blade-lamella. In the realization of mountings on blades two types of media were used: glycerogelatine and lactophenol. Microsamples collection of Petri dishes was done using a spatulated needle.

Determination of the microfungi strains has been made to the level of genus.

Results and Discussion

Our research was carried out between 2007-2008, aiming to point out the possible relations between microfungi and the damaging xylophagous insects which occur in some outdoor wooden constructions. The xylophagous insects we refer to in our work belong to the following species: *Xestobium rufovillosum* De Geer., *Anobium punctatum*

[1] The amounts were given for one liter of medium

De Geer., *Ptilinus pectinicornis* L. (Col. Anobiidae) and the species *Lytus linearis* Goeze. (Col. Lyctidae).

As a result of the microscopic analysis of smears realized in the colonies developed on Petri plates with culture media, there have been identified fungi belonging to seven genera with biodeteriogenic species whose action is harmful to cultural goods made of wood, whether or not this is related with the attack of xylophagous insects.

Of the family *Mucoraceae,* I have recorded *Mucor* sp. and *Rhizopus* sp., the family *Hypocreaceae* with *Verticillium* sp., family *Trichocomaceae* with *Apergillus* sp. and *Penicillium* sp., family *Pleosporaceae* with *Alternaria* sp., family *Dothioracea*e with *Aureobasidium* sp.

From Table 3 results that the genera of micromycetes with the highest occurrences are *Rhizopus* sp. met in 10 of the 18 samples analyzed and *Penicillium* sp. encountered in 8 cases. The other genera recorded have a lower occurrence in comparison with the first two mentioned: *Aspergillu*s sp. and *Mucor* sp. have been met in 3 of the samples studied, and *Verticillium* sp., *Aureobasidium* sp. and *Alternaria* sp. were each met in only every 2 of the samples analyzed.

The fungi of the genera *Rhizopus* sp. and *Penicillium* sp. are met practically on all the samples examined, having the greatest degree of polyphagia.In the case of genus *Mucor* sp. although it appears in only 3 samples is present on three different wood essences: oak, resinous trees[2] and beech. The fungi from the genera *Aspergillus* sp., *Aureobasidium* sp. and *Alternaria* sp. were observed only in case of oak wood, and *Verticillium* sp. only on elm and beech wood. It results therefore the fact that the oak is the essence on which most species of micromycetes reported have developed.

Table 3. The occurrence of genera of micromycetes on the number of samples analyzed

Plate no.	Type of woody essence	Specise of micromycetes
1	Oak with attack of Xestobium	*Penicillium sp.* *Aspergillus sp.*
2	Oak with attack of Xestobium	*Penicillium sp.* *Alternaria sp.*
3	Oak with attack of Xestobium	*Penicillium sp.* *Rhizopus sp.* *Aspergillus sp.*
4	Oak with attack of Xestobium	*Mucor sp.*
5	Old oak degraded by insects, without active attack	*Penicillium sp.* *Aureobasidium sp.*
18	Oak with attack of Xestobium	*Penicillium sp.*
6	Oak wood with attack of Anobium	*Rhizopus sp.*
7	Oak wood with attack of Anobium	*Rhizopus sp.*
19	Oak wood with attack of Anobium	*Aureobasidium sp.* *Aspergillus sp.* *Alternaria sp.*
8	Wood of resinous trees attacked by *Anobium*	*Rhizopus sp.*
9	Wood of resinous trees attacked by *Anobium*	*Rhizopus sp.* *Mucor sp.*
10	Wood of resinous trees attacked by *Anobium*	*Penicillium sp.* *Rhizopus sp.*
20	Wood of resinous trees attacked by *Anobium*	*Rhizopus sp.*
11	Beech with attack of *Ptilinus*	*Penicillium sp.*

[2] Essence of fir or spruce fir, difficult to determine in the context of depreciation of wood in the composition of the object

		Verticillium sp. *Rhizopus sp.*
12	Beech with attack of *Ptilinus*	*Rhizopus sp.*
13	Beech with attack of *Ptilinus*	*Mucor sp.*
14	Elm with attack of *Lyctus*	*Rhizopus sp.*
15	Elm with attack of *Lyctus*	*Penicillium sp.* *Verticillium sp.*

Table 4. The distribution of genera of micromycetes on the essences analyzed

	Oak *X. r*	Oak *A. p*	Beech	Resinous trees	Elm
Rhizopus sp.	■	■	■	■	■
Penicillium sp.	■	■	■	■	■
Aspergillus sp.	■	■			
Mucor sp.	■		■	■	
Verticillium sp.			■		■
Aureobasidium sp.	■	■			
Alternaria sp.	■	■			

X. r = Xestobium rufovillosum, A. p = Anobium punctatum

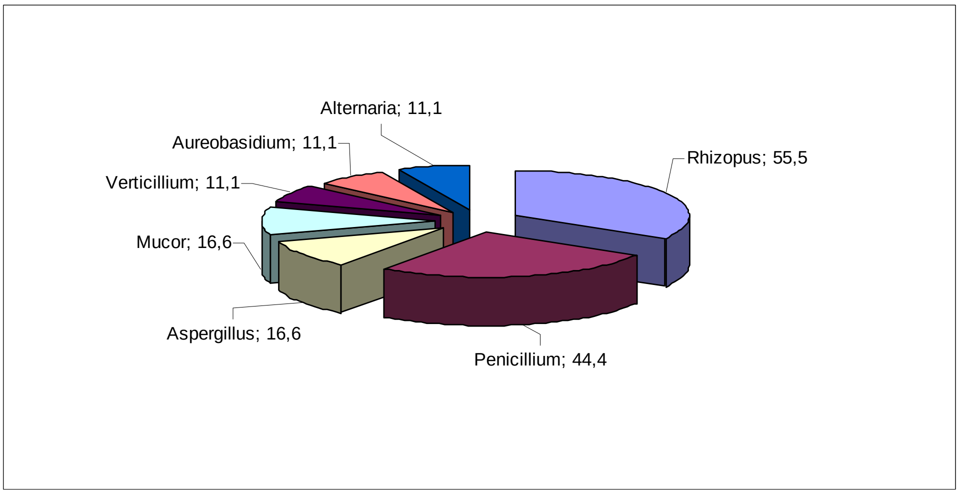

Figure 1. Comparative percentage ratios of the genera of found micromycetes

Conclusions

Biological degradation of wood is essentially a complex process, causality being always the correlation of several degrading factors, whose corroborated action lead to the depreciation of woody matter.

Celulose, the primary constituent of woody material, is an impossible component of degradating in pure form by a species of insect, a fact which explains the ecological correlations between different species of fungi and xylophagous insects, by relationships of interdependence (ecto and endosymbionts), which provides the capacity of processing the constituents of wood mass in nutrients necessary to support metabolic activity.

In our research we have identified some genera of fungi (*Penicillium sp., Aspergillus sp., Alternaria sp., Rhizopus sp., Aureobasidium sp., Mucor sp., Verticillium* *sp.*), that attak wood of different essences (oak, beech, elm and resinous trees), used in constructions, making it accessible to some species of xylophagous insects , as: *Xestobium rufovillosum* De Geer., *Anobium punctatum* De Geer., *Ptilinus pectinicornis* L. (Col. Anobiidae) and the species *Lytus linearis* Goeze. (Col. Lyctidae).

As regards the relationship of depreciation of wood by species of micromycetes and the installation of the attack of xylophagous insects, we consider, based on our research, that it is possible to draw a connection of correlation of those two types of attack. We prove in this way the fact that the xylophagous insects prefer the wood attacked by fungi.

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REPRESENTATIVES OF THE ENTOMOLOGY SCHOOL FROM THE „AL. I. CUZA” UNIVERSITY OF IAŞI

REPREZENTANȚI AI ŞCOLII DE ENTOMOLOGIE DE LA UNIVERSITATEA „AL.I. CUZA” IAŞI

PROFESSOR GHEORGHE MUSTAȚĂ AT 70 YEARS

Gheorghe Mustață was born in March 6 th , 1938, in Adjudu Vechi village (Vrancea County). He graduated primary school in this place and gimnasium level at Adjud. Each day, he was traveling 4 km from home to school and back, no matter how hostile the weather was.

That was a hard period of time. All those five children of Ana and Ion Mustață went to school. Their father was fireman and mother was housewife. Their father was graduated as engine driver in the same time with his sons.

Gheorghe graduated The Secondary School from Tecuci (in Adjud wasn't a Secondary School, it was built one year after his graduation). During this time, he lived at The Boy Boarding School from Tecuci. For a short period of time, he lived in lodgings in a wet room, where, sometimes, the walls were covered with snow. He was taken ill and broke off his studies for one year. The Secondary School lasted 10 years. As a great professor said: *„Well, my good fellow, they haven't graduated the secondary school yet"*.

After the convalescence period, he was employed as a pedagogue at The Secondary School from Adjud. Those responsibilities activated new needs of the young pedagogue. He started to understand that he needs continuing to learn, to know, to find and to discover. All those actions were performed using individual study method. This was the biggest achievement of him. During the two academic years from secondary school, he wasn't very careful with his achievements, and, he paid for this. In 1955, he returned to Secondary School from Tecuci and he continued to study. He became another man. He was more mature and more reflexiv. He started to prepare his future career, with responsible maturity.

After he graduated the secondary school, in 1956, he became a substitute teacher at the Primary School in Păuneşti. As he declared himself, with some special ocassions, this period of time was a real training, a new kind of school for him. He was involved frontally in those activities and he worked hard and full of enthuziasm. The rewards appeared through the results of his pupils. He was really happy when he saw how smart they are, that was the real reward for him. When pupils were unprepared or they didn't do their homeworks, he became sad and he tried to change his methods.

Finally, the substitute teacher understood that he loved to teach and he decided to follow another stage of education. He was wanting to graduate a faculty.

He choosed the Faculty of Biology . Therefore, in 1957, he was admited as a student at the Department of Zoology of the Faculty of Biology (Department of Nature – Sciences -Geography). For the young student, his succes of admission to faculty was a real surprise. It was a challenge which involved new responsibilities and a huge work. He wanted to demonstrate his level, capacities and skills for learning. His analitical spirit and stubborness focused his efforts to discover and understand those complex biological processes. He focused his efforts to know nature as an entire through its unique parts.

That's why, in 1961, when he was in the fifth year of study , he was elected as a member in the first team that has realized academic exchanges of students between the „Alexandru Ioan .Cuza" University of Iaşi and „ the Friederich . Schiller" University of Jena (Democratic Republic of Germany).

During faculty courses, he studied a discipline named „evolutionism" based on old principles (influenced by Stalin's political concepts). After his experience at Jena, especially at the Filetic Museum founded by Ernst Haeckel, Gheorghe Mustață became a supporter of the modern evolutionism.

In 1962, he graduated and he was employed as preparatory-assistant in Zoology Department (managed by Prof. Mihai Constantineanu). He was the professor who made the scientific coordination of Gh. Mustață's licence paper.

From preparatory-assistant of Prof. Mihai Constantineanu, he became one of his disciples. The fame of Prof. Mihai Constantineanu as great entomologist and one of the biggest ichneumologist was the main reason for the young preparatory-assistant to focuse his attention to investigations concerning to ichneumonids. In this domain there were many other specialists included in the School of Entomology created by Prof. Mihai Constantineanu. Because of that reason, Gheorghe Mustață had to choose other subfamilies to investigate - *Mesochorinae* and *Mesoleiinae*. He published information referring to many species from this subfamily. Together with his professor, he published a fascicle in the **Romanian Fauna** concerning to *Mesochorinae* subfamily.

For doctoral thesis, he chooses a theme named: **"Parasite Insects in Pests of Vegetables from Moldavia**". This theme seemed to be impossible to realize. Besides, he had no car. He went by train and he get off where he saw a cabbage culture. He traveled in the Region of Moldavia from Galați to Botoşani. The impossible became possible. He accumulated a huge number of data and he realized a valuable thesis for those years (1974). With this occasion, he defined the main directions of his researches: studies concerning to entomophagous complexes which control some pests of culture plants, studies concerning to parasitoid complexes which limited some aphid species; biodiversity researches concerning to cynipid parasitoids and mesochorines.

For some of those studies concerning to parasitoid complexes which limited pest insects in the cultures of cabbage , he obtained, in 1994, The "Emil Racoviță" Award of Romanian Academy.

One of those studies concerning to parasitoid complex which limit *Plutella xylostella* L. populations was founded by specialists from Asian Vegetable Reasearch and Development Center (AVRDC) from Taiwan. The huge number of this parasitoid which controls this pest in the Region of Moldavia is very impressive. For this reason, Gheorghe Mustață was invited by N. Taleka, Director of AVRDC, to present those results in a conference in Taiwan.

At the Congress from Tainan (Taiwan) from 9-12 December, 1990, he presented his scientific results concerning to parasitoid complex which limited *Plutella xylostella* L. populations. As a consequence, he was elected as member in the Director Comitee of IOBC (Working Group on Biological Control of *Plutella* – AVRDC).

Professor Gheorghe Mustață continuing his studies in this domain together with Alan Kirk from European Biological Control Laboratory from Montpellier (France), Christian Borgemeister from Hannover University, Institut of Plant Diseases and Plant Protection (I.P.P. – Germany) and Löhr Bernard from I.C.I.P.E. (Kenya).

In the domain of entomophagous complexes which control some pest insect populations, Professor Gheorghe Mustață published, together with his wife and a PhD.

Student, two important books: **The role of parasitoid biocenosis in keeping the equilibrium of nature** (Gh. Mustaţă, Mariana Mustaţă) and **Pest aphids and their parasitoid compelxes which limited these populations. The role of parasioid biocoenoses in keeping the equilibrium of nature** (Gh. Mustaţă, Mariana Mustaţă, Călin Maniu).

His next studies were developed together with his PhD. students.

Another domain covered by Gheorghe Mustaţă's investigations is the marine biology.

From 1987, Gh. Mustaţă started to teach the course of Hydrobiology . Gradually, he discovers this domain and its secrets. In 1990, he became Director of **"Prof. Ioan Borcea" Marine Biological Station** . He succeeded to bring back this scientific station, founded by Prof. Ioan Borcea in 1926, in the property of the "Al.I.Cuza" University and to keep it on function. From 1990 to present, there were organized three scientific sessions dedicated to 70, 75 and 80 years from the foundation of this scientific station Therefore, there was reloaded the publishing of scientific papers from "Prof. Ioan Borcea" Marine Biological Station. There were elaborated three doctoral theses, many scientific papers (diploma and dissertation) based on researches made along the Sea side territory.

About the Prof. Gh.Mustaţă's scientific activity at "Prof. Ioan Borcea" Marine Biological Station , we could write tens of pages. But, in the same time, we have to make connections between him and the rebirth of this scientific station .

I have to talk about Prof. Gh. Mustaţă's activity, my good friend, only inside of this Entomology School from "Al.I.Cuza" University of Iaşi. About this school I have been informed both from my grandson Lucian Fusu, the youngest member of third generation of entomologists, and a presentation made by Gheorghe and Mariana Mustaţă: ***"A century of entomology of "Al.I.Cuza" University".*** This school was founded by Prof. Ioan Borcea and substantiated by Prof. Mihai Constantineanu. After that, it became the most powerful school of entomology from Romania and it continues to be developed.

Besides, Prof. Gheorghe Mustaţă is great biographer of our times. I appreciated it at each scientific session, he pays homage to the great personalities in the filed of universal and Romanian biology.As I know that this professor, who teaches about **Evolutionism**, tried to replace the absence of a course on the **History of Biology** by organizing , together with his students, of a Symposium named **Personalities of Romanian and Universal Biology** , which had 15 editions. The History of biology represents a domain of biological sciences investigated already by Prof. Gh. Mustaţă.

Prof. Gh. Mustaţă teaches evolutionism and, for this reason, he considered of his own duty to be involved in the explanation of some evolutionary theories, solving a few difficult problems from the domanin of biology . As a consequence, he published few papers concerning to: **Autoevolution Theory**, theory of **Evolution Without Natural Selection** elaborated by Lima de Faria and **Synergic Theory of Evolution** elaborated by Denis Buican. The newest general-biological law elaborated by Prof. Gheorghe Mustaţă has to be considered as very important by other specialists: **"Evolution doesn't wipe off its marks, it keeps them functional"**.

As ecologist, I appreciate and admire the book **Somatic Ecology** published by Prof. Gh. Mustaţă and his son ,Georgian-Tiberiu Mustaţă, edited by „Junimea" Publishing- House. This is the first and the last book published concerning to this domain all around the world. Not the priority of this book is evaluated here, but information and how they are presented. In this context, the **„somatic ecology"** concept is well explained, with more details and arguments. This book opened a new direction for understanding of this concept in connections with function of pluricellular organisms, including human organisms.

If we continue to evaluate the priorities, than, we have to mention that Prof. Gh. Mustață was the first who made studies concerning to living organisms by biosemiotic method. In 2006, he published, together with his wife Mariana Mustață, **„Evolutive and Semiotic Strategies of Life"**. This book presents us information which contributes to the understanding of all the vital processes.

Those two volume of essays named **Essays of Biology** present us the large areas of interests manifested by Prof. Gh. Mustață. It is true that evolutionism represents the philosophy of biology domain, and these two volumes introduce us into the philosophical universe. As an argument, it is enough to read **"Logic of Living Things in Eminescu's conception"** (vol. I) and **"Time and Existence During Time"** (vol. II).

If we are already familiarized with the papers elaborated by Prof. Gh. Mustață and his distinguished wife, than, we are surprised to discover papers from other domains.

If you didn't know very well the professor, than, you are in trouble when you'll discover two other papers. I talk here about two scientific papers published by Gheorghe Mustață and Mariana Mustață - **"The Ecological Decalogue"** and **"Ecological Plagues which threaten the future of human being and Earth"**.

Although he tried to be involved into other spheres of human spirit, Professor Gh. Mustață follows the scientific truth. He tries and succeeds to find a common way, an accessible language for all of us, concerning to all analyzed problems from different perspectives.

His scientific activity is focused on papers and books which he already published. This is only a part, but not the most important.

For a professor, the measure of his value is measured through his disciples. Not all disciples become as their model. After a time, some of them don't give rewards to their professor. They turn against those times, against the one who transformed him into a scientist. Professor Gh. Mustață had few experiments like this. For him, it remainded the satisfaction to form 14 PhD. students who are graduated in biology domain. Many of them are valuable specialists. Now, he has new 12 PhD. students who continue his studies. It is a School which continues his activities.

I have to mention Professor Gh. Mustață's skills as manager of all these scientific meetings. Besides those three scientific meetings with guests from abroad organized at **"Prof. Ioan Borcea" Marine Biological Staion** of Agigea, we have to mention those three editions of the Symposium **„Entomophags and Their Role in Natural Equilibrium"**. Also, he was a member of the team who organized many scientific meetings in the Faculty of Biology.

I remebered the session in October 1990, when we did together a field trip to the Putna Monastery. Then, we established strong relationships between the specialists from Chişinău and Iaşi.

As Minister of Environment from the Republic of Moldavia, I filled near by me all these collegues, whence Professor Gh. Mustață seems to be closer.

I was honoured to receive the academic title „Honorary Professor" of „Al.I.Cuza" University of Iaşi. But, in the last period, these connections are damaged. I hope to be a better perspectives of them concerning to brothers from the same land situated here and across the Prut River.

At the beginning of his career, Professor Gh. Mustaţă started to focus his atention on Invertebrate Zoology and Entomology domains. He didn't want to realize only theoretical studies. And because of that, he tried to take a new account of Invertebrate Collection of Biology Faculty, which was initiated by Prof. Ioan Borcea.

He began to guide some training courses of Invertebrate Zoology and field trips organized for students. The number of strudents from biology domain was more and more smaller. And, as a concequence of that, some academic planned rate disappeared. The young assistant Gh. Mustaţă had to go to The **Central Institute of Perfecting for Teachers (I.C.P.P.D.)** from Iaşi. Here, he became lecturer in 1971. At this institution, he met the great biologist Vasile Ghenciu. They became partners and tried to share their responsibilities. The Young lecturer Gh. Mustaţă had to teach **Didactics of Biology** and **Animal Biology**. Released by all the preassures and incertitudes, he was totally involved in his work. He prepared his courses concerning to Comparative anatomy of Animals, Evolutionism and Anthropology. The succeeses obtained gave him courage to explore new domains of biology . It was a necessary action for the development of his critical landing concerning to didactics of biology. As he already told us, I.C.P.P.D. became a powerfull academic school. Here, he had the biggest and the most important accumulations in the domain of biology. His talent to teach was polished here. His skills to teach began to be active fully and, together with Vasile Ghenciu, have tried to put order int the system of secondary education.

Courses concerning to Didactics of Biology and Comparative Anatomy of Animals, published during the I.C.P.P.D. period of time, are evidences for his skills of great professor.

In 1979, when I.CP.P.D. was dissolved, he returned to the Faculty of Biology as a lecturer. For the beginning, he taught the Biology of **Pests** and **Biogeography**.

In 1985, after Prof. Corneliu Zolyneak died, Gh. Mustaţă started to teach General Biology. This course was presented before by Associate Professor Iordache Tudose. This was another best moment for his career. It was a special pleasure for him to discover this new domain and to teach other students everything he knew. He realizes a complete course, which was published in 1999 and in 2001 (**Origin, Evolution and Evolutionism** by Gh. Msutaţă and Mariana Mustaţă). After taht, other courses were published : **Hydrobiology**, **Marine Biology** and **Anthropology**.

Professor Gh. Mustaţă teached many other courses, during his career, as following: **Biodiversity of Aquatic Environments, Productivity of Aquatic Environments, Pests of Ornamental Plants and Vegetables, The role of parasioid biocoenoses in keeping the equilibrium of nature, Animal Phylogenesis, Evolutive Strategies in the World of Animaols , Relationships Between Species and Elements of Biosemiotics**. All these disciplines were available for PhD. And Master students.

Concerning to his skills as teacher, we could be informed by his students. He has a saint gift to talk, to send information to other people. He has a real talent. Who listened either his conferences (**"Logic of Living Things in Eminescu's conception"**, **"From Music of Spheres to Music of Genes"**, **"Symbolism of Water"** etc.) or his special speeches could confirm that it is true.

His work is impressive, a lot of courses and academic treaties published, alone or together with other specialists certified this huge effort. In this context, we have to mention: **Essays of Biology** and **Somatic Ecology** published by Prof. Gh. Mustaţă together his son Georgian-Tiberiu Mustaţă, **"The Ecological Decalogue"** and **Evolutive**

and Semiotical Strategies of Life" published by Prof. Gh. Mustaţă together with his wife Mariana Mustaţă.

His scientific experience was accumulated during years and it was revaluated continously.

Between 1994-2000 he was President of **The Science Comission (II)** from CNEAA, and, between 2001-2004 he was member of the same comission. During this period, he controlled and coordinated the activities of few domains (Biology, Ecology, Geography, Geology, Environment Protection, Geochemistry etc.) of all Romanian universities. Toghether with his special team, he succeeded to impose academic exigences for all Rmanian universities for a high level of education.

As General Chancellor of the Senate of the „Al.I.Cuza" University (during 1997-2004, 2004-2005) and Dean of the Faculty of Biology (2001-2004), he was involved in all kind of management activities and he was apprecieted for his style and achievements.

In 2001 he was Head of Zoology-Ecology Department of faculty. During this period, he was involved in academic procedures to give awards for few of the greatest biologists. His atention was focused on: Academician Mihai Băcescu, Acad. Petre Bănărăscu, Acad. Nicolae Botnariuc and Acad. Cristian Hera. He was involved to give the academic title as „Honorary Professor" of „Al.I.Cuza" University of Iaşi to the following persons: Acad. Prof. Ion Dediu from the State University of Chişinău; C.S. PhD. Ştefan Negrea from teh Institute of Spaeology in Bucharest; Prof. Traian-Marian Gomoiu, corresponding member of Romanian Academy (Manager of Romanian Centre of Geology and Marine Geoecology of Constanţa); Prof. Teodosie Perju from U.S.A.M..V. Cluj-Napoca and Prof. Victor Ciochia from „Lucian Blaga" University of Sibiu.

Prof. Gheorghe Mustaţă is a member of many scientific societies and organizations in Romania and abroad. He is a titular member of the Academy of scientists from Romania and of the National Academy of Ecology in the Republic of Moldavia. He earned a lot of awards and decorations as a reward for his efforts (as professor and scientist) during those 45 years of activity. Here, we have to mention:

- Commander of The Order Merit for Education, 2004;
- Special Compensation conferred by C.N.A.I.M., through M.E.C.T. Decision, 2006;
- Professor Emeritus, 2007.

I met Prof. Gheorghe Mustaţă, for the first time, in 1990, after the Romanian Revolution during those scientific field trips along the Prut River. After that meeting we became good friends. From that moment, we are collaborating to realize scientific meetings, we opened ours souls to one another . Together, we discovered some secrets of ecology and evolutionism.

I am honoured by his friendship, and I am honoured to present his life, his scientific and academic activities. I am really a lucky man, because I have such a friend like you.

On this special ocassion, 70 years of life , I want to wish him „Happy Aniverssary". Also, I wish him a long and happy life near us!. God bless you my dearest friend !

Prof. PhD. Ion DEDIU, member of
Academy of Science of Republic of Moldavia

PROFESORUL GHEORGHE MUSTAŢĂ LA 70 DE ANI

Născut la 6 martie 1938 în satul Adjudu Vechi, judeţul Putna (astăzi judeţul Vrancea), Gheorghe Mustaţă a urmat şcoala primară în sat, apoi a continuat cursurile gimnaziale la Adjud. A trebuit să străbată zilnic distanţa de peste patru kilometri, indiferent de condiţiile atmosferice.

Erau condiţii grele, iar la un moment dat cei cinci copii ai Anei şi ai lui Ion Mustaţă erau la şcoală. Mama era casnică, iar tatăl fochist de locomotivă, însă a urmat apoi şcoala de mecanici de locomotivă învăţând alături de copiii săi.

Gheorghe a urmat liceul la Tecuci, deoarece la Adjud nu era încă liceu. S-a înfiinţat după un an. A stat la internatul Liceului de Băieţi din Tecuci. A stat şi la gazdă o perioadă, însă neavând bani pentru lemne dormea într-o cameră în care puteai rade zăpada de pe pereţi. Aşa s-a îmbolnăvit şi a trebuit să întrerupă clasa a X-a. Liceul era de fapt o şcoală medie de 10 ani. Vorba unui mare profesor universitar de la Iaşi: „*Măi, ăştia n-au făcut liceul*”.

După o perioadă de convalescenţă s-a încadrat ca pedagog la Liceul de la Adjud. Responsabilitatea acestei funcţii a trezit multe dintre valenţele adormite ale tânărului pedagog. A început să conştientizeze nevoia de studiu individual pentru o bună pregătire a lecţiilor. A fost cea mai mare realizare a sa, deoarece în primele două clase de liceu nu acordase atenţia cuvenită pregătirii individuale. În 1955 revine la Liceul din Tecuci şi îşi continuă studiile. Era deja un alt om. Devenise mai matur în gândire şi a început să se pregătească în mod serios, cu multă responsabilitate.

După absolvirea liceului, în 1956, s-a încadrat ca profesor suplinitor la Şcoala generală din Păuneşti. După cum declara în diferite ocazii, perioada de profesor suplinitor a reprezentat pentru Gheorghe o nouă şcoală. S-a angajat frontal în muncă şi a lucrat cu un entuziasm ieşit din comun. Bucuria muncii îi era răsplătită prin răspunsurile bune ale elevilor la lecţii. Când elevii probau că au învăţat cele predate la lecţiile anterioare era fericit, iar atunci când elevii erau nepregătiţi era nefericit şi încerca să-şi schimbe stilul de muncă.

Profesorul suplinitor şi-a dat seama că îi place meseria de profesor şi s-a hotărât să bată la porţile unei facultăţi.

A ales Facultatea de Biologie. Aşa se face că în septembrie 1957 a reuşit cu succes la Secţia de Zoologie a Facultăţii de Biologie (Ştiinţele Naturii-Geografie). Succesul de la examenul de admitere l-a surprins pe tânărul student, dar l-a şi îndârjit în muncă. Dorea să se menţină la nivelul potenţelor probate la admitere. Şi a reuşit acest lucru. Spiritul său analitic l-a ajutat să aprofundeze structurile şi procesele biologice complexe şi i-a canalizat eforturile către cunoaşterea naturii. Aşa se explică faptul că în 1961, pe când era în anul al V-lea, a fost selectat pentru a face parte din primul schimb de studenţi dintre Universitatea „Al.I. Cuza” şi Universitatea „Fr. Schiller” din jena, din Republica Democrată Germană.

Deşi făcea la facultate un evoluţionism de tip miciurinist (grav afectat de influenţele politice ale lui Stalin), după experienţa căpătată la Jena, mai ales la Muzeul Filetic fondat de Ernst Haeckel, a devenit un partizan al evoluţionismului.

După absolvirea facultăţii, în 1962, a fost încadrat ca preparator la Catedra de Zoologie, la disciplina de Zoologia nevertebratelor, onorată de eminentul profesor Mihai Constantineanu, la care îşi pregătise lucrarea de licenţă.

Din preparator al profesorului Mihai Constantineanu a devenit unul dintre discipolii acestuia,. Aureola de mare entomolog a profesorului său, faptul că era unul dintre cei mai mari ichneumonologi ai lumii, l-a determinat pe tânărul preparator să-şi îndrepte atenţia către studiul ichneumonidelor. Cum erau mulţi ichneumonologi în şcoala creată de magistrul său Mihai Constantineanu, a fost nevoit să-şi aleagă subfamiliile Mesochorinae şi Mesoleiinae. A publicat multe specii din aceste subfamilii, iar în ceea ce priveşte subfamilia Mesochorinae a reuşit să publice, împreună cu profesorul o fasciculă în seria Fauna României.

Pentru teza de doctorat şi-a ales tema: **Insecte parazite în insectele dăunătoare legumelor din Moldova**. Şi-a ales o temă care părea a fi imposibil de realizat. Unde mai pui că nu avea maşină. Se suia în tren şi cobora acolo unde vedea culturi de varză. Trebuia însă să străbată Moldova de la Galaţi la Botoşani. Imposibilul a fost însă făcut posibil. A acumulat enorm de multe date şi a realizat o teză de excepţie pentru anii 1974. Cu această ocazie şi-a canalizat şi principalele direcţii de cercetare: studiul complexelor de entomofagi care controlează unele insecte dăunătoare plantelor de cultură; complexele de parazitoizi care limitează unele specii de afide; cercetări de biodiversitate privind cinipidele parazitoide şi mesochorinele.

Pentru unele lucrări privind complexele de parazitoizi care limitează insectele dăunătoare culturilor de varză a obţinut, în 1994, Premiul „Emil Racoviţă" al Academiei Române.

Una dintre lucrările sale privind complexul de parazitoizi care limitează populaţiile de *Plutella xylostella* L. a fost găsită de specialiştii de la Asian Vegetalble Reasearch and Development Center (AVRDC) din Taiwan. Impresionat de numărul mare de parazitoizi care controlează acest dăunător în Moldova, N. Talekar, directorul AVRDC l-a invitat pe Gh. Mustaţă la un congres în Taiwan pentru a prezenta rezultatele cercetărilor sale.

Participând la Congresul din 9-12 decembrie 1990 de la Tainan, din Taiwan, Gh. Mustaţă a prezentat cercetările sale privind complexul de parazitoizi care limitează populaţiile de *Plutella xylostella* L. Aşa se face că în cadrul acelui Congres a fost ales ca membru în Comitetul Director al IOBC Global Working Group on Biological Control of *Plutella*, AVRDC.

În prezent profesorul Gheorghe Mustaţă continuă cercetările în acest domeniu împreună cu Alan Kirk de la European Biological Control Laboratory din Montpellier, Franţa şi cu Christian Borgemeister de la Hannover University, Institut of Plant Diseases and Plant Protection, I.P.P. Germania şi Löhr Bernard de la I.C.I.P.E. Kenya.

În domeniul complexelor de entomofagi care controlează populaţiile unor insecte dăunătoare, profesorul Mustaţă a publicat, împreună cu soţia sa şi cu un doctorand două cărţi importante: **The role of parasitoid biocenosis in keeping the equilibrium of nature** (Gh. Mustaţă, Mariana Mustaţă) şi **Afide dăunătoare şi complexul lor de parazitoizi care le limitează populaţiile. Rolul biocenozelor parazitoide în păstrarea echilibrului natural** (Gh. Mustaţă, Mariana Mustaţă, Călin Maniu).

Cercetările entomologice au fost dezvoltate împreună cu doctoranzii săi.

Un alt domeniu al cercetărilor acoperit de profesorul Gh. Mustață este cel din domeniul biologiei marine.

Preluând în 1987 cursul de Hidrobiologie, Gh. Mustață s-a introdus, în mod treptat, în domeniul hidrobiologiei. În 1990 a preluat conducerea **Stațiunii Biologice Marine „Prof.dr. Ioan Borcea”,** pe care o conduce şi astăzi. A reuşit să readucă la Universitate această Stațiune fondată de profesorul Ioan Borcea în 1926 şi s-o facă funcțională atât pentru practica studenților cât şi pentru cercetări. Au fost organizate trei sesiuni ştiințifice dedicate împlinirii a 70, 75 şi 80 de ani de la înființarea Stațiunii. Astfel că a fost reluată seria publicațiilor ştiințifice de la Stațiunea „Prof.dr. Ioan Borcea”. Au fost elaborate, sub conducerea sa, trei teze de doctorat şi nenumărate lucrări de licență şi de dizertație pe baza cercetărilor efectuate la Marea Neagră.

Despre activitatea profesorului Gh. Mustață la Stațiunea Biologică Marină „Prof.dr. Ioan Borcea” s-ar putea scrie zeci de pagini. Trebuie însă să legăm renaşterea acestei Stațiuni de numele său.

Nu pot să-i urmăresc activitatea prietenului meu, profesorul Gh. Mustață, decât în cadrul puternicii Şcoli de Entomologie de la Universitatea „Al.I. Cuza” din Iaşi. Despre această şcoală am aflat de la nepotul meu Lucian Fusu, care a devenit membru al celei mai tinere generații de cercetători şi din prezentarea soților Mustață: **Un veac de entomologie la Universitatea „Al.I. Cuza” Iași**. Această Şcoală înființată de titanul Zoologiei româneşti, profesorul Ioan Borcea şi fundamentată de eminentul entomolog, profesorul Mihai Constantineanu, a devenit cea mai puternică şcoală entomologică din România şi a ajuns acum în perioada sa de înflorire.

De altfel, profesorul Gh. Mustață se dovedeşte a fi unul dintre marii biografi ai timpului nostru din domeniul biologiei. Am apreciat faptul că, la fiecare sesiune ştiințifică domnia sa a avut grijă să prindă în program şi omagierea unor mari personalități, ai biologiei româneşti şi universale. După câte ştiu profesorul de **Evoluționism** a încercat să suplinească lipsa unui curs de **Istoria biologiei** prin organizarea cu studenții a Simpozionului **Personalități ale biologiei româneşti şi universale,** care a avut 15 ediții. Istoria biologiei reprezintă o ramură a ştiințelor biologice care a fost acoperită şi de profesorul Mustață.

Fiind titularul cursului de **Evoluționism** profesorul Gh. Mustață a considerat că este de datoria sa să se implice în prezentarea în spirit critic a unor teorii evoluționiste şi în elucidarea unor probleme complexe de biologie. Astfel ne explicăm publicarea în Analele Ştiințifice ale Universității „Al.I. Cuza”, Seria Biologie, a unor lucrări privind teoria **Autoevoluției**, sau a **Evoluției fără selecție naturală** a lui Lima de Faria şi **Teoria sinergică a evoluției** a lui Denis Buican. Merită însă toată atenția noua lege general-biologică pe care profesorul Gh. Mustață o lansează către evoluționiştii din întreaga lume: „**Evoluția nu-şi şterge urmele, ci le menține funcționale**”.

Ca ecolog nu pot să nu-mi exprim aprecierea şi admirația asupra cărții **Ecologie somatică**, publicată de profesorul Gh. Mustață şi de fiul său Georgian-Tiberiu Mustață în Editura Junimea. Este prima şi unica lucrare publicată pe plan mondial în acest domeniu. Nu prioritatea contează ci modul în care autorii au reuşit să fundamenteze conceptul de **Ecologie somatică**. Această carte deschide o direcție nouă în înțelegerea chiar a edificării şi funcționării organismelor pluricelulare, între care şi a organismului uman.

Şi dacă ne menținem pe linia priorităților, atunci ne simțim obligați să arătăm că profesional Gh. Mustață este primul biolog român care a abordat studierea organismelor vii prin prisma biosemioticii. Cartea **Strategii evolutive şi semiotice ale vieţii**, publicată în 2006, împreună cu distinsa sa soţie, Mariana Mustaţă, cu care colaborează în mod ideal în realizarea unor lucrări ştiinţifice, ne deschide o nouă perspectivă în înţelegerea proceselor vitale.

Cele două volume de **Eseuri de biologie** îţi dezvăluie paleta largă a preocupărilor profesorului Gh. Mustaţă. Este adevărat că evoluţionismul reprezintă o adevărată filosofie a biologiei, iar aceste două volume de eseuri te introduc într-un univers cu adevărat filosofic. Pentru a vă convinge de cele afirmate de mine citiţi măcar „**Logica viului în gândirea lui Eminescu**” (vol. I) şi „**Timpul şi existenţa în timp**” (vol. II).

Dacă ne-am familiarizat cu lucrările profesorului Gh. Mustaţă şi ale distinsei sale soţii, am rămas surprins şi încurcat când am ajuns la unele lucrări din alte domenii.

Două lucrări bilingve îţi pot provoca mari nedumeriri dacă nu-l cunoşti mai îndeaproape pe profesorul Mustaţă. Este vorba de **Decalog ecologic/The ecological decalog** şi **Plăgile ecologice ameninţă viitorul omului şi al planetei/Ecological plagues which threating the future of human being and earth**, Gh. Mustaţă şi Mariana Mustaţă.

Deşi pătrunde în alte sfere ale spiritualităţii umane, profesorul nu se îndepărtează de adevărul ştiinţific. Încearcă şi reuşeşte, în mare măsură, să găsească o cale comună, un limbaj care să permită înţelegerea problemelor puse în discuţie din perspective diferite.

Munca sa ştiinţifică este concretizată în lucrările ştiinţifice şi în cărţile pe care le-a publicat. Aceasta reprezintă doar o faţetă şi nu chiar cea mai importantă.

Pentru un profesor universitar măsura valorii este dată de discipolii pe care îi formează. Nu întotdeauna discipolii răsplătesc munca magistrului, dimpotrivă, când „se ajung” şi li se iveşte prilejul, unii se întorc împotriva celui care i-au selectat şi format. Nici profesorul Mustaţă nu a fost lipsit de o astfel de experienţă. A rămas însă, cu bucuria de a fi format, până acum 14 doctori în ştiinţele biologice, mulţi dintre ei fiind deja specialişti consacraţi. Are încă în perioada de pregătire a doctoratului 12 doctoranzi. Este o şcoală care îi continuă unele dintre direcţiile de cercetare.

Nu pot să nu consemnez aici calităţile profesorului Gh. Mustaţă de organizator de sesiuni ştiinţifice. În afara celor trei reuniuni ştiinţifice cu participare internaţională organizate la **Staţiunea Biologică Marină „Prof.dr. Ioan Borcea**” de la Agigea, trebuie să amintim de cele trei ediţii ale Simpozionului „**Entomofagii şi rolul lor în păstrarea echilibrului natural**”. Domnia sa a contribuit la organizarea multor sesiuni ştiinţifice ale Facultăţii de Biologie.

Îmi amintesc cu plăcere de Sesiunea din octombrie 1990, când am făcut şi o aplicaţie la Mănăstirea Putna. Atunci am reuşit să ne cunoaştem cu adevărat şi să stabilim nesfârşite relaţii între specialiştii de la Chişinău şi colegii noştri de la Iaşi.

Ca Ministru al Ministerului de Mediu din Republica Moldova i-am simţit alături de mine pe colegii de la Iaşi, între care şi pe profesorul Mustaţă.

Am fost onorat cu titlul de Profesor de Onoare al Universităţii „Al.I. Cuza” însă, în ultima perioadă relaţiile dintre Chişinău şi Iaşi s-au cam răcit. Sper într-o revigorare a relaţiilor dintre noi şi o revigorare a relaţiilor dintre fraţii aceluiaşi pământ situaţi de o parte şi de alta a Prutului.

În formarea sa Gh. Mustaţă a început să aprofundeze studiile de Zoologia nevertebratelor şi de Entomologie. Pentru a nu face doar studii teoretice şi-a propus să realizeze reinventarierea colecţiei de nevertebrate de la Facultatea de Biologie, ale cărei baze au fost puse de profesorul Ioan Borcea.

A început să conducă unele lucrări practice de Zoologia nevertebratelor şi să participe la aplicaţiile practice organizate cu studenţii. Numărul de studenţi de la Secţia de Biologie a început să fie din ce în ce mai mic, astfel că normele didactice au început să se restrângă. În această situaţie asistentul Gh. Mustaţă a fost nevoit să-şi caute un loc la **Institutul Central de Perfecţionare a Personalului Didactic (I.C.P.P.D.)**. În 1971 a ocupat prin concurs, un post de lector la I.C.P.P.D. Filiala Iaşi. La acest Institut mai funcţiona eminentul biolog Vasile Ghenciu. Cei doi şi-au împărţit domeniile de activitate astfel că tânărul lector a trebuit să acopere **Metodica predării biologiei** şi domeniul de **Biologie animală**. Eliberat de presiunea normelor şi de nesiguranţa postului, Gh. Mustaţă a găsit o supapă cu oxigen în activitatea sa şi a început să se angajeze frontal în muncă. A început să-şi pregătească primele prelegeri, care erau de anatomie comparată a animalelor, de evoluţionism şi de antropologie. Succesele obţinute i-au dat aripi şi a început să abordeze şi celelalte domenii ale biologiei pentru a putea face faţă la inspecţiile speciale şi pentru a aborda în mod critic metodica predării biologiei. După cum a afirmat, în repetate rânduri, I.C.P.P.D-ul i-a devenit o adevărată şcoală academică. Aici a avut cele mai mari acumulări din domeniul biologiei. Aici şi-a şlefuit o adevărată cunoaştere enciclopedică din domeniul biologiei. Valenţele de mare metodist au început să funcţioneze din plin, împreună cu conferenţiarul Vasile Ghenciu punând ordine în învăţământul biologic preuniversitar.

Cursurile de metodică şi de anatomie comparată publicate în perioada de la I.C.P.P.D. stau mărturie în ceea ce privesc calităţile sale de mare profesor.

În 1979, când I.C.P.P.D.-ul a fost desfiinţat, a revenit ca lector la Facultatea de Biologie. A predat la început **Biologia dăunătorilor animali** şi **Biogeografie.**

În 1985, în urma dispariţiei profesorului Corneliu Zolyneak a preluat cursul de **Biologie generală** de la conferenţiarul Iordache Tudose, care a primit cursul de Genetică rămas liber. Cursul de **Biologie generală** i-a căzut lui Gheorghe Mustaţă ca o mană cerească. Se simţea în largul său. A lucrat cu sârg la conturarea unui curs cuprinzător, pe care l-a publicat în 1999 şi apoi în 2001 (**Origine, evoluţie şi evoluţionism**, Gh. Mustaţă şi Mariana Mustaţă). Au urmat cursurile de **Hidrobiologie, de Biologie marină** şi de **Saprobiologie.** Ultimele două cursuri au fost introduse în planul de învăţământ de profesorul Gh. Mustaţă. Un alt curs introdus în planul de învăţământ de profesorul Gh. Mustaţă a fost cel de **Antropologie**. Cursurile de **Hidrobiologie, Biologie marină** şi **Antropologie** au fost publicate pentru a veni în sprijinul studenţilor şi a specialiştilor interesaţi.

Profesorul Gh. Mustaţă a mai onorat şi alte cursuri, care au fost introduse în planurile de învăţământ de la secţiile de master sau la Şcoala doctorală: **Biodiversitatea în mediile acvatice, Productivitatea mediilor acvatice, Dăunătorii plantelor ornamentale şi legumelor, Rolul biocenozelor parazitoide în păstrarea echilibrului natural, Filogeneza animală, Strategii evolutive în lumea animală, Relaţiile dintre specii** şi **Elemente de biosemiotică.**

În ceea ce priveşte harul didactic al profesorului Gh. Mustaţă putem afla cu uşurinţă de la cei care l-au avut profesor. A fost hărăzit de Dumnezeu cu har didactic şi cu talentul oratoriei. Cine l-a ascultat în conferinţele sale: **Logica viului în gândirea lui Eminescu, De la muzica sferelor la muzica genelor, Simbolistica apelor** şi multe altele, sau în luările sale de cuvânt cu diferite ocazii poate să depună mărturie.

Impresionează numărul mare de cursuri universitare şi de tratate pe care le-a publicat singur sau în colaborare. Între altele merită să nominalizăm cele două volume de

Eseuri de biologie, Ecologie somatică Gh. Mustață, Georgiana-Tiberiu Mustață, **Decalog ecologic** şi **Strategii evolutive şi semiotice ale vieţii** Gh. Mustaţă, Mariana Mustaţă.

Experienţa didactică şi ştiinţifică acumulată de-a lungul anilor au fost valorificate în diferitele funcţii pe care le-a avut.

În perioada 1994-2000 a fost preşedinte al **Comisiei de Ştiinţe Exacte 2** din cadrul CNEAA, iar între 2001-2004 membru al aceleaşi comisii. În această calitate a controlat şi coordonat activitatea specializărilor: Biologie, Ecologie, Geografie, Geologie, Protecţia mediului, Ingineria mediului, Geochimie etc. din universităţile din România. Cu o echipă de excepţie a reuşit să impună exigenţele necesare facultăţilor de profil din România, militând pentru menţinerea ridicată a ştachetei calităţii învăţământului academic.

În calitate de Cancelar al Senatului Universităţii „Al.I. Cuza" (1997-2004, 2004-2005) şi de decan al Facultăţii de Biologie (2001-2004) s-a implicat în activităţile de management universitar, fiind apreciat pentru stilul său de lucru şi pentru realizările sale.

În 2001 a onorat şi Catedra de Zoologie-Ecologie în calitate de şef de Catedră.

În această perioadă a reuşit să onoreze pe unii dintre marii biologi ai ţării noastre cu titlul de Doctor Honoris Causa al Universităţii „Al.I. Cuza" Iaşi: acad. Mihai Băcescu, acad. Petre Bănărăscu, acad. Nicolae Botnariuc, acad. Cristian Hera. De asemenea, a onorat cu titlul de Profesor de Onoare al Universităţii „Al.I. Cuza" Iaşi pe acad. Prof.dr. Ion Dediu, de la Universitatea de Stat din Chişinău, cercet. Pr. I dr. Ştefan Negrea de la Institutul de Speologie din Bucureşti, prof.dr. Traian-Marian Gomoiu, m.c. al Academiei Române, director al Centrului Român de Geologie şi Geoecologie Marină din Constanţa, prof.dr. Teodosie Perju de la USAMV Cluj Napoca şi prof.dr. Victor Ciochia, de la Universitatea „Lucian Blaga" din Sibiu.

Profesorul Gh. Mustaţă este membru al unui mare număr de societăţi ştiinţifice din ţară şi din străinătate. Este membru titular al Academiei Oamenilor de Ştiinţă din România şi al Academiei Naţionale de Ecologie a republicii Moldova.

Între distincţiile pe care le-a primit ca răsplată pentru activitatea didactică şi ştiinţifică, prestate vreme de peste 45 de ani menţionăm:

- Ordinul Merite pentru Învăţământ, în rang de Comandor, 2004;
- Indemnizaţie de Merit acordată de C.N.A.I.M. prin MECT, 2006;
- Profesor Emeritus, 2007.

L-am cunoscut pe profesorul Gheorghe Mustaţă în 1990, după Revoluţia din România, cu ocazia Expediţiei Ecologice organizată pe Prut. Ne-am cunoscut şi am rămas cu adevărat prieteni. Am colaborat la realizarea unor reuniuni ştiinţifice şi ne-am deschis unul către altul în tainele evoluţionismului şi ale ecologiei.

Mă simt onorat să prezint în aceste pagini câteva aspecte din viaţa şi din opera didactică şi ştiinţifică a acestui mare om şi profesor universitar.

Cu ocazia împlinirii frumoasei vârste de 70 de ani îi urez tradiţionalul „La Mulţi Ani" şi îi doresc ca Dumnezeu să-l ţină în viaţă pentru a putea fructifica în scris cât mai multe dintre acumulările sale.

Prof.dr. Ion DEDIU, membru titular
al Academiei de Ştiinţe din Republica Moldova

LE PROFESSEUR IONEL ANDRIESCU À L'AGE DE 75 ANS.

IONEL ANDRIESCU, professeur universitaire à la Faculté de Biologie de l'Université „Al. I. Cuza” de Iasi, est né le 7 juin 1933 à Botosani, âiné de 3 enfants, deux garçons et une fille, fils d'Adela et de Dumitru Andriescu. Son père, adjudant au Régiment 8 Rosiori, s'est engagé par hasard dans l'armée, en dépit de ses penchants artistiques, de dessinateur et de poète. Ses enfants n'ont pas eu l'occasion de connaître ses réussites ou déceptions professionnelles, car à l'âge de 42 ans, pris dans le tourbillon de la guerre, il a disparu dans les infinis terrifiants de la Sibérie. Les enfants se le rapellent tout de même comme un père aimant et gentil. Par la suite, pour le reste de la famille, ce furent l'exode devant la calamité du front, la perte de la maison et de tous les biens, les deux terribles années de sécheresse et de famine auxquelles s'ajoute la pauvreté générale du pays détruit par la guerre et le payement des dettes imposées. Seul le dévouement infini de la mère a permis à la famille de traverser ces temps difficiles. Puis les choses ont commencé à se redresser. Des fabriques ont été construites, dans lesquelles la mère a réussi à se faire embaucher, comme tant d'autres femmes roumaines, assurant ainsi la vie matérielle des enfants. La gratuité des écoles et des universités leur ont permis d'avoir une formation secondaire et supérieure. Pendant les vacances scolaires, et même durant l'année universitaire, les enfants, devenus jeunes gens maintenant, travaillaient aussi, afin de subvenir à leurs besoins quotidiens.

En tant qu'élève, IONEL ANDRIESCU a étudié au lycée de garçons, au célèbre „August Trebonium Laurian”. Il a eu des professeurs sévères mais ayant le sens du devoir et l'amour de leur métier. C'est ainsi que ses penchants naturels pour la connaissance des animaux minuscules et surtout pour les insectes des bocages, ruisseaux et prés des environs de Botosani, ont été stimulés et devenus entiers par le talent pédagogique et la compétence du professeur de biologie, REMUS CEHOVSCHI, dont il garde jusqu'à présent une image fraîche et lumineuse. Cela n'a donc rien d'étonnant qu'à la fin des études secondaires, avec les meilleurs résultats de sa promotion, il est allé à la faculté de Biologie de l'Université „Alexandru Ioan Cuza” de Iasi, où, suite aux nombreux et durs examens d'admission, typiques de l'époque, il a été admis en première année, toujours parmi les premiers.

Une autre époque a donc commencé pour le jeune étudiant, en focalisant son enthousiame, son intérêt et son effort sur l'apprentissage et l'approfondissement de ses connaissances dans ses domaines préférés: la zoologie des invertébrés, la biologie générale, mais surtout la vie des insectes. C'est à partir des premiers jours de sa première année universitaire même, que l'étudiant IONEL ANDRIESCU s'est présenté devant le professeur MIHAI CONSTANTINEANU, lui faisant part de sa passion et lui disant qu'il „souhaitait, quant à lui, étudier les insectes”. Il ne supposait pas le monde sans limites et infiniment divers de ce domaine. Le professeur, avec sa grande ouvertude d'esprit vers la jeunesse et pour la recherche scientifique qui le caractérisait, l'avait reçu, écouté et lui avait conseillé de fonder avec, éventuellement, d'autres étudiants passionnés, un cercle scientifique estudiantin. C'est ainsi qu'à l'automne de 1951 a été créé le cercle scientifique estudiantin de Zoologie des invertébrés, formé autour des étudiants IONEL ANDRIESCU et VICTOR CIOCHIA, un autre grand passionné de la nature.

Le cercle scientifique dirigé par le professeur MIHAI CONSTANTINEANU, PAUL BORCEA (lecteur à l'époque) et l'assistant IOAN SUCIU, s'est élargi au fil des années suivantes par l'adhésion des étudiants C. PISICA, I. PETCU, Gh. MUSTATA, RAOUL CONSTANTINEANU, MARIN VOICU, etc., futurs professeurs universitaires et chercheurs éminents. Ce fut ainsi que le cercle est devenu une pépinière importante de cadres supérieurs. Les succès scientifiques du cercle et les prix reçus aux Conférences nationales pour l'activité de ses membres demeurent inoubliables, tout comme les expéditions, parfois de plusieurs semaines, organisées par le professeur MIHAI CONSTANTINEANU dans les endroits les plus divers du pays, souvent avec la participation des professeurs M. PEIU, C. FILIPESCU de l'Agronomie, Dr. A. ALEXINSCHI de l'Académie, l'assistant I. SUCIU et d'autres. Ces expéditions avaient pour but ce que l'on appelle aujourd'hui „l'apprentissage et la connaissance de la biodiversité des hyménoptères parasitoïdes", base de l'équilibre naturel et de la lutte biologique des insectes nuisibles.

Parallèlement, les recherches des malophages parasites sur des oiseaux et mammifères ont conduit à la formation d'aptitudes pour la recherche dès la période universitaire. Des articles scientifiques ont été publiés dès cette époque-là. Les professeurs étaient brillants et les étudiants de l'époque les voyaient comme des dieux, comme des super-hommes, certains „plus gentils", d'autres „plus méchants", en fonction de leur comportement envers eux. Parmi ces professeurs, ceux qui ont été remarquables du point de vue professionnel pour l'étudiant IONEL ANDRIESCU, en dehors du professeur M. CONSTANTINEANU qui se situait au-dessus de tous, étaient les professeurs PETRE JITARIU, OLGA NECRASOV, PETRE ŞUSTER, ZIGMAN FEIDER, LIBERTINA SOLOMON, PAUL BORCEA, NECULAI MACAROVICI, et d'autres, chacun d'entre eux ayant contribué avec leurs connaissances et savoir-faire à la formation du jeune étudiant et futur professeur universitaire à son tour. Pour le jeune chercheur débutant, le maître, prof. MIHAI CONSTANTINEANU, était un exemple de travail passionné pour l'étude des hyménoptères Ihneomonidae car il avait participé pleinement à leur connaissance et approfondissement sur le plan européen et mondial. Il a représenté pour ses étudiants un modèle de correction, honnêteté et sobriété, faisant preuve de générosité matérielle et spirituelle envers ses collaborateurs.

Toutes les minutes de sa vie étaient destinées à l'étude. Il n'a jamais perdu son temps avec des amusements futiles ou autres „vanités" de l'existence. Ce que l'on appelle habituellement des „vices" lui étaient étrangers: le tabac, la consommation d'alcool, la bonne chère, etc. Cette vie extrêmement modérée et dédiée au travail scientifique et didactique lui a permis d'avoir une bonne santé et une longévité active, jusqu'à l'âge de presque 100 ans. Evidemment, un tel exemple est difficile à suivre. Tout de même, certaines influences bénéfiques ont pu être transmises à ses étudiants, pour leur bien-être. Ce qui a impressionné et influencé en plus le jeune étudiant et, par la suite, l'assistant universitaire IONEL ANDRIESCU, c'est la manière respectueuse, presque sacrosainte dont M. CONSTANTINEANU parlait de son maître, le professeur IOAN BORCEA, qui transmettait à ses étudiants le message selon lequel il était nécessaire d'étayer et appliquer les méthodes biologique dans la lutte avec les insectes nuisibles. Ce message s'est profondément enraciné dans la conscience professionnelle et éthique de l'étudiant et futur assistant Ionel Andriescu.

En 1955, le jeune IONEL ANDRIESCU finissait la faculté avec le diplôme de mérite et, grâce à la proposition du professeur M. I. CONSTANTINEANU, avait été nommé préparateur au Département de Zoologie des Invertébrés, en même temps que son camarade d'études, des excursions, des expéditions, d'idéal dans la recherche scientifique, VICTOR CIOCHIA, originaire de Brasov. Et, à ce moment, la vie a pris une autre tournure, a connu d'autres rythmes, d'autres chemins et d'autres sens, dramatiques et cruels pour les deux jeunes ainsi que pour d'autres comme eux de l'Université de Iasi et du pays entier qui venaient de finir leurs études. A peine commencée l'activité didactique et scientifique, ainsi que celle de doctorat, portés sur les ailes de l'espoir et d'un idéal professionnel réalisé, tout ceci s'avère presque détruit par la réalité atroce de l'époque la plus hostile de l'histoire moderne de notre pays: 1945-1965!

Jusqu' ici je me suis permis de présenter d'une manière plus détaillée la vie du jeune IONEL ANDRIESCU, afin de faire mieux comprendre ce qui a contribué à sa formation professionnelle et les aspirations qui le poursuivront et qui détermineront ses futurs actes. Par la suite, je crois qu'il n'est pas dépourvu d'intérêt de présenter l'évolution de la vie et des activités de notre camarade, telle que celles-ci se sont déroulées.

Suite à la grande „épuration" politique des années 1958, surtout parmi les intellectuels, l'assistant universitaire VICTOR CIOCHIA est envoyé en prison, pour environ cinq ans, avec d'autres jeunes, actuellement des personnalités du monde scientifique et social de notre pays. Ionel Andriescu est renvoyé de l'enseignement supérieur, conformément à l' article le plus dur et le plus important de l'époque, „pour l'amélioration de la composition sociale" de l'enseignement supérieur. MARIA CRISTESCU, du Département de Recherches dirigé par l' enseignante OLGA NECRASOV, professeur universitaire elle aussi, ne sera pas épargnée non plus. De plus, on retire au jeune IONEL ANDRIESCU le droit de passer son doctorat. Par cette action, ont été décapitées les deux équipes de jeunes chercheurs universitaires appartenent aux professeurs M. CONSTANTINEANU et OLGA NECRASOV, en même temps qu' a été détruit l'avenir de jeunes de talent. Des dizaines d'années et d'autres conditions historiques ont été nécessaires pour que leurs compétences se remettent d'aplomb. Pour eux, les principaux chemins sont cependant restés inaccessibles... Pour IONEL ANDRIESCU, sans ressources matérielles, le chemin de sa vie bouclé du point de vue social par l'action politique qui venait d'être appliquée, ont suivi des temps extrêmements difficiles. Il a exercé des emplois temporaires et en dessous de sa qualification, dans d'autres villes, comme par exemple à „Sanepid Inter-raional" (service sanitaire) de Barlad (1959-1960) par la bonne volonté du professeur dr. Ernest Ungureanu, du département Parasitologie-Medecine qui répondait de l'activité anti-malaria dans cette institution.

En 1961, il est recruté à la Station de Recherches Marines „Prof. I. Borcea" d' Agigea, par le directeur nouvellement arrivé, le professeur PAUL BORCEA, délégué par l'Université de Iasi. Là, le chercheur IONEL ANDRIESCU doit entreprendre une nouvelle activité, dans le domaine de la biologie marine. Il s'adapte au fur et à mesure et laisse des traces de son activité par des publications incluant des nouveautés importantes pour la science et l'étude de la Mer Noire, mais il continue parallèlement les recherches entomologiques, essayant ainsi de transposer dans sa vie son ancien idéal lié à la lutte biologique. D'autant plus qu' à partir de 1966, après l'ouverture sociale et politique de 1965, il est nommé, de la part de l'Université de Iasi, directeur de la Station, sans avoir été membre du Parti Communiste Roumain et, de plus, avec un passé politique connu. Il accueille avec enthousiasme et responsabilité cette mission et se charge du développement de la station avec de grands efforts, dans des conditions difficiles, car les débats avaient déjà commencés en vue d'arracher la Station à l'Université de Iasi afin de l'utiliser comme base de l'Institut de Recherches Marines qui devait être fondé sous peu.

Entre parenthèses, allons voir un peu l'historique de la Station et les réalisations du jeune directeur, IONEL ANDRIESCU, historique écrit et archivé à l'Université de Iasi par le professeur SERGIU CARAUSU, ex-directeur de la Station, avant que IONEL ANDRIESCU soit nommé à Agigea. „Ce jeune directeur assure le développement des domaines de la recherche déjà existants et développe d'autres nouveaux domaines tels la biologie du benthos marin dont il se charge personnellement, l'étude des mauvaises herbes des cultures de Dobroudja, l'étude des insectes auxiliaires, en vue d'étayer la lutte biologique, la réalisation de la collection de plantes vivantes de Dobroudja, etc. A Agigea ont travaillé en moyenne 60 chercheurs par an, dont 30% étrangers; on a organisé deux sessions scientifiques, l'une „anniversaire", se rapportant aux débuts de la station, l'autre internationale, le cours d'été sous les auspices de l'Association Méditerranéenne de Biologie Marine et Océanographie (MAMBO), avec la participation de 22 chercheurs de 12 pays méditéranéens et de 40 chercheurs roumains. En 1968 et 1969, ont été publiés 2 volumes de travaux scientifiques de la Station, d'environ 700 pages. La pratique estudiantine à Agigea a été fortement encouragée et soutenue, pour toutes les Universités du pays et certaines Universités étrangères, avec un nombre d' environ 160 étudiants par an. Des cours d'été ont été organisés pour les professeurs du secondaire, entre 40 et 70 chaque été. Sept nouveaux jeunes chercheurs ont été recrutés pour tous les domaines de recherche, (dont VICTOR CIOCHIA, une fois sorti de prison), mais aussi 13 postes d'auxiliaires; de nouveaux laboratoires ont été amenagés leurs nombre ayant ateint 12; le nombre de places pour le logement des étudiants arrive à 80 et, pour les chercheurs invités, à 30. Trois nouveaux moyens de transport sont désormais assurés aussi qu'un nouveau moteur pour le bateau „Gilortul". On obtient l'accord des fonds pour la construction d'espaces nouveaux, salle de conférences et foyer d' étudiants. Beaucoup de démarches sont entreprises en vue de garder la Station au sein de l'Université".

C'est ainsi qu'en 1968 on propose que la Station devienne „Centre de Recherches de Biologie Marine et Terrestre" de l'Université, en appuyant son rôle didactique et de recherche. Cependant, tous les efforts et espoirs tombent à l'eau une fois paru l'article de loi du Parti Communiste Roumain, 256/1970, selon lequel la Station est détachée de l'Université et mise à la base du nouvel Institut de Recherches Marines, qui n'avait aucun fondement matériel (locaux, laboratoires, bateau de recherche), ni documentaire (échange courant de publications avec 47 pays et 137 institutions et des collections de revues scientifiques). Cette décision a représenté un désastre, tant au sens propre qu'au sens figuré, pour la recherche universitaire de Iasi et pour la pratique estudiantine. Le personnel qui a pris la relève de la Station a détruit plus de 500 échantillons (environ 1500 bocaux de 1-5kg) de benthos, lavés et triés, un matériel biologique non encore étudié, d'une valeur inestimable.

En ce qui concerne le personnel de recherche, ceux qui ont fondé des familles à Constantza sont restés là dans le nouvel Institut, tandis que le directeur Ionel Andriescu s'est mis à la disposition de l'Université de Jassy qui lui a offert le poste de directeur de la Station de Recherches Biologiques Géologiques et Géographiques „Stejarul" („le Chêne") de Pângaratzi – le département Neamtz. Sa vie a pris une nouvelle tournure; en 1970 il est passé des rivages ensoleillées au bord de la mer avec laquelle il s'était habitué, à l'ombre des vallées, des forêts et des montagnes de Bistritza. Il lui a fallu beaucoup de force et de sagesse pour traverser ces moments de tension et reprendre à zéro, une nouvelle fois, après tant de travail et d'efforts énormes réalisés au sein de l'organisation et l'administration toujours ascendente de la Station d' Agigea.

Et, c'est ainsi qu'ont disparu pendant 19 ans, le soleil, la lumière, la chaleur et l'ambiance avec son charme occidental ineffable caractérisant le site d' Agigea, jusque 1989 quand ont été réalisées des „réparations", ce qui a permis à l'Université de récupérer la Station, malheureusement quasiment en ruines..

A Pangaratzi, durant ce temps, avait commencé une nouvelle étape, dans des conditions très difficiles, car la méthode occidentale d'auto-financement (à base de contrats de recherche) venait d'être appliquée à la recherche roumaine, qui n'y était pas encore preparé pour cette nouvelle situation.

IONEL ANDRIESCU réussit pourtant à trouver des moyens permettant de sortir de cette situation décourageante, en se basant sur ceux-la des nouveaux collègues qui avaient de l'esprit d'initiative et de l'optimisme. Voilà comment en 6 ans, période pendant laquelle il a été à la tête de cette station, le budget a augmenté deux fois suite aux contrats de recherche réalisés, leur valeur ayant augmenté de 22 fois.

En ce qui concerne le personnel de recherche au sein de la Station lequel, en 1970 avait eu tendance à se disperser, en réalité, personne ne s'est retrouvé sans emploi, au contraire, le nombre de chercheurs a augmenté de 17 en 1970 à 41 en 1976, soit 2,4 fois. Ils avaient même des conditions matérielles meilleures que celles de leurs collègues du Centre de Recherches Biologiques de Iasi. Dans ce sens, IONEL ANDRIESCU réalisa son idéal de créer le premier laboratoire de Lutte biologique du pays, dans le milieu universitaire, réalisation pour laquelle avaient milité le professeur I. BORCEA au début du XXè siècle et le professeur M. CONSTANTINEANU après les années '50.

Il réussit à faire venir, par un transfert, son collègue et ami VICTOR CIOCHIA d'Agigea, où il était resté temporairement après l'intégration de la Station au sein de l'IRCM (Institut Roumain de Recherches Marine). Avec celui-ci, mais aussi avec les jeunes chercheurs recrutés: IOAN MOGLAN, aujourd'hui doyen de la faculté de Biologie, Dr. VERONICA SAUCINITEANU MOGLAN, Dr. IRINEL OANCEA CONSTANTINEANU, aujourd'hui CS I. à l'Institut de Recherches biologiques de Jassy, ils ont organisé le nouveau laboratoire qui allait aborder deux thèmes fondamentalement applicatifs et démonstratifs. Le prèmier thème fu l'organisation d'un élévage de l'entomophage Encarsia perniciosi d'après le modèle apporté par VICTOR CIOCHIA de la Station INRA d'Antibes (France), ou il avait travaillé et l'introduction de cet entomophage dans les vergers de pommier de Roumanie, contre le pou de San-José, Diaspidiotus perniciosus. En ce qui concerne l'entomophage, il a été introduit en Roumanie depui des élevages similaires d'Antibes - France, par VICTOR CIOCHIA et aussi d'Antibes et de la Station Féderale de Recherches Agricoles de Changin-Suisse, par I. ANDRIESCU. Le deuxième theme a reposé sur la lutte microbiologique du papillon blanc américain (Hyphantria cunea) et d'autres chenilles, par des bio-préparations à base de Bacillus thuringiensis, roumains et étrangers. Il s'agissait d'une démonstration à grande échelle, dans l'ensemble de la ville de Roman, sur des arbres ornementaux et fruitiers, représentant un vrai succes.

A Pangaratzi, le directeur IONEL ANDRIESCU a soutenu le développement de tous les domaines de recherche et la formation des chercheurs, favorisant les relations avec l'étranger, malgré l'interdiction pour lui même de celles-ci depuis 1972. C'est ainsi que durant la période suivante, toute une pléiade de professeurs universitaires sont partis de la Station vers les Universités de Iasi, Bacau et Suceava, en tout au minimum 10. Cet aspect représentait une réalisation importante de la Station. Evidemment, l'activité didactique a continué dans le cadre des pratiques d'été des étudiants en biologie et géographie du pays entier et de l'étranger.

Souhaitant poursuivre son idéal de vie et revenir dans la ville de sa jeunesse et de sa formation, vers la fin de l'année 1976 il va s'installer, avec son labo de recherches, à Iasi, dans le cadre du Centre de Recherches Biologiques, auquel ils appartenaient depuis 1974. VICTOR CIOCHIA s'installe lui aussi dans sa ville natale, à Brasov, à l'Institut de Recherches sur la pomme de terre et la betterave, où il a mis en place un laboratoire de production et utilisation des trichogrammes dans la lutte biologique des papillons nuisibles en agriculture.

A Iasi, le chercheur IONEL ANDRIESCU avait l'intention de réaliser aussi un laboratoire d'élevage et d'utilisation des trichogrammes. Cependant, n'ayant pas encore les possibilités matérielles nécessaires et l'espace lui faisant défaut, il s'est engagé avec ses collaborateurs dans la réalisation de certains thèmes et contrats visant l'effet des pesticides granulés du sol et leur sélectivité ainsi que l'influence des pesticides sur les insectes entomophages auxiliaires dans les vergers de pomiers. La préoccupation principale reste tout de même l'étayage de la lutte intégrée dans les vergers, par l'étude de la dynamique et de l'effet des diverses méthodes de lutte contre les insectes nuisibles, sur les entomophages comme facteur de l'équilibre naturel. Ces recherches ont été realisés sous les auspices de l'Institut de la Protection des Plantes de Bucarest.

Parallèlement, il développe des recherches visant la biodiversité des zones humides et adjacentes, surtout dans le Delta du Danube, sous l'égide de l'institut de Recherches-Projection Delta du Danube. Il s'intéresse également à l'utilisation des méthodes biologiques pour la Protection de l'Environnement, sous les auspices du Ministère de l'Education Nationale.

Durant la même période, il entreprend de nombreuses démarches d'elever et utiliser les trichogrammes dans la lutte contre les insectes nuisibles des vergers, des vignes et des cultures agricoles. Et, dans le contexte de l'ouverture surgie en 1985-1986 dans le cadre du Ministère de l'Agriculture vis-à-vis de l'importance de la lutte biologique, il obtient des fonds pour la réalisation de ce laboratoire. Le laboratoire regroupe ainsi les Dr. IONEL ANDRIESCU, Dr. I. MOGLAN, Dr. VERONICA MOGLAN et le chercheur GEORGETA GAIDAU, en collaboration avec le Dr. KLAUS FABRITIUS de l'Institut d'Hygiène et Santé Publique de Bucarest. En 1987, ils commencent l'organisation de ce laboratoire, financé ensuite de 1988 à 1990 par les Ministérs de l'Education et de l'Agriculture et de l'Alimentation. C'est ainsi qu'a été réalisée l'élevage de l'hôte de laboratoire, auquel Dr. I. MOGLAN a contribué de manière particulière, et les premiers lancements de trichogrammes dans les vignes IAS Bucium et Copou. Mais en 1991, le financement fut stoppé, dû aux réformes réalisées après 1989. Ces recherches ont été tout de même reprises plus tard par l'effort et la passion du professeur I. ANDRIESCU, qui était devenu en 1991 le directeur de l'Institut de Recherches biologiques de Iasi. Mais une nouvelle période difficile est apparue pour l'Institut et le nouveau dírecteur I. ANDRIESCU puisque le financement baissait vertigineusement à cause de l'efondrement de l'agriculture et de l'industrie, qui avaient jusqu'alors représenté les principales sources de financement pour la recherche de l'Institut.

Le directeur I. ANDRIESCU faît des démarches pour transférer l'Institut dans le sein de l'Academie Roumaine où, à verai dire etait sa place, dès sa création et où le financement aurait été assuré plus ou moins mais on n-a pas eu l'accord de la diréection de ce temps-là, de la filiale de Iasi de l'Academie. Il fait des grands efforts pour le maintien de l'Institut et il est profondement affécté quand, pour la première fois de sa vie, une partie du personnel supérieur et auxiliaire doit quitter l'Institut ou partir à la retraite. Ultérieurement les choses se sont amelioré et le dr. I. ANDRIESCU oriente les recherches de son equipe, sous les auspices du Ministère de l'Education et de la Recherche et de l'Institut „Delta du Danube", vers l'étude de la biodiversité des insectes et, bien sur, pour les bases de la lutte biologique et intégrée, l'evaluation de l'impact anthropique dans le Delta du danube, le rôle des facteurs biotiques dans le regulation du niveau des populations d'insectes. En ces domains il réalise des projets en collaboration avec les instituts de Zoologie, de Protéction biologoque des Plantes et d'Ecologie, de l'Académie des Sciences de Chisinau, Republique de Moldova.

En 1991, le dr. I. ANDRIESCU revient également dans l'enseignement supérieur d'où il avait été éloigné 33 ans auparavant, en tant que professeur au sein du Département de Zoologie. Il continue cependant à être le directeur de l'Institut de Recherches biologiques jusqu'en 1997 quand, devenu Secrétaire Scientifique du Conseil Professoral, il doit renoncer à la fonction de directeur de l'Institut, gardant uniquement son poste de professeur. Il continue la collaboration avec le collectif de lutte biologique qu-il a crée dans le cadre de l'Institut de Recherches Biologiques de Iasi. Cette colaboration, entre ce collectif de recherche et la Faculté de Biologie concernait la réalisation d'une bio-station modulaire pour la production des trichogrammes. Mais, à partir de 2003, il a cessé cette collaboration à cause des graves différends d'étihque professionnelle mais surtout scientifiques dus à M. Alecu Diaconu, membre du collectif de lutte biologique dans le cadre de l'Institut.

En 2000, sous les auspices du Ministère de l'Education Nationale, le prof. I. ANDRIESCU oriente les recherches du collectif de lutte biologique de l'Institut de Recherches Biologique de collaboration avec les cadres didactiques de l'Université, (et ceci pour un bon moment), vers, d'une part, l'étude de la biodiversité de l'entomofaune dans les vergers à pommiers en fonction du type de protection phyto-sanitaire et, d'autre part, l'étude de la biodiversité dans les zones marginales et agrosystèmes voisins. Ces thèmes-contrats représentent des sous-contrats avec l'Institut de Recherches biologiques. À partir de 2002, sous la même coordination, recommencent les recherches vis-à-vis de la production et l'utilisation des trichogrammes dans la protéction intégrate du verger à pommiers. Ces dernières recherches sont initiées par la faculté de Biologie, plus précisément par les coordinateurs, prof. I. ANDRIESCU et prof. I. MOGLAN. Ensuite, la collaboration avec l'Institut a pratiquement cessé depuis 2003 pour les raisons déjà mentionnées.

En ce qui concerne l'activité didactique, après l'éloignement de l'enseignement en 1958, celle-ci a continué tout de même par intermittence à l'université de Constantza, en qualité de „cadre didactique" associé, où, entre 1964-1969, il tient les premiers cours de biologie générale et génétique moderne, puis il assure les pratiques d'été pour les étudiants tout comme les cours d'été des enseignants (lycée), tant à Agigea qu'à Pangaratzi. Une fois réintégré dans l'enseignement supérieur, après 1990, il tient au moins 10 cours avec des travaux pratiques dans les domaines de la zoologie et de l' entomologie. Il introduit et enseigne, pour la première fois dans l'enseignement universitaire classique roumain, tant dans les cours de licence que dans ceux du master, des cours tels: „Les bases écologiques de la lutte contre les insectes nuisibles (Lutte biologique et intégré), „La systématique et la biologie des entomophages prédateurs et parasitoïdes", „Les méthodes et les principes de la zoologie systématique", „La biodiversité des milieux terrestres", „La bioproductivité des écosystèmes terrestres". De plus, il contribue à la création des sections master de „lutte intégré" et de „Biodiversité".

Durant toute son activité didactique faite de cours et travaux pratiques, le prof. I. Andriescu a essayé d'introduire des connaissances et méthodes nouvelles, modernes, liant toujours les aspects fondamentaux théoriques à ceux applicatifs. Il a toujours considéré que les méthodes biologiques de lutte contre les insectes nuisibles constituent l'un des moyens principaux de protection de l'environnement et en assurent le développement durable. Il a également suivi ce concept dans les mémoires de fin d'études, dans les thèses de grades didactiques et celles de doctorat.

En ce qui concerne la recherche scientifique, elle a été poursuivie dans des contrats et projets de recherche, ainsi qu'à travers la publication des résultats obtenus. Ainsi, avec le prof. I. MOGLAN, on a réalisé le premier contrat international pour la période 1973-1999 avec l'Institut International de Lutte biologique de Commonwealt – la station Delemont – Suisse. Ce contrat traitait de la lutte biologique des mauvaises herbes. Il a également proposé et coordonné plus de 30 projets-contrats établis avec différents institutions de recherche, ministères et unités économiques, réalisant entre 1971 et 2004 presque 130 rapports de phase, ce qui regroupe plus de 8000 pages. À leur tour, les publications consistent en une collaboration à 5 livres dont un traité, tous faisant référence à l'étayage de la lutte intégré et biologique contre les insectes nuisibles, et environ 130 articles scientifiques, dont il est l' auteur ou en collaboration avec des collègues et disciples formés.

Les principales directions de recherche exprimées par ces publications concernent la biodiversité des différents groupes d'invertébrés (benthos marin, nématodes et copépodes marines, etc.) et surtout des insectes hyménoptères parasitoïdes, Chalcidoidea, l'entomofaune de certains écosystèmes naturels et agrosystèmes, dont des réservations naturelles; l'étude de certains complexes parasitoïdes des insectes d'importance économique et écologique; l'étayage et l'expérimentation de la lutte intégré dans les vergers à pommiers; l'étayage et l'application de la lutte biologique à l'aide des insectes auxiliaires et des microorganismes; et enfin, l'effet des pesticides sur l'entomofaune de certains agrosystèmes et l'introduction de critères de sélectivité, etc. Tout pouvait ainsi être résumé à la biodiversité, facteurs biotiques d'équilibre dans l'écosystème et agro-écosystème, de la lutte biologique et intégré. Ainsi, par exemple : la découverte et la description de plusieurs nouvelles espèces pour la science, dont 2 genres aussi - Chalcimerus borceai STEFFAN et ANDRIESCU, 1962, genre et espèce nouvelle, Boucekastichus homocerus Andriescu, 1971, genre et espèce nouvelle, un ordre, plusieurs familles et genres tout comme des dizaines d'espèces nouvelles pour la faune de la Roumanie, dont beaucoup de taxons d'une grande importance biogéographique. En ce qui concerne les autres publications, celles-ci traitent des domaines de recherche présentés ci-dessus. Il est important de mentionner le fait que 31 articles et résumés ont été publiés à l'étranger (Angleterre, Autriche, l'ancienne Tchéchoslovaquie, Egypte, Suisse, France, Allemagne, Italie, République Moldova, Pologne, Etats-Units, Turquie, Ukraine, Hongrie).

La prolongation de l'activité didactique et de recherche a pu être réalisée grâce à sa direction doctorale, droit obtenu uniquement après 1989. Dans ce domaine, les sujets des thèses de doctorat se sont axés sur les préocupations du professeur, visant l'étayage de la lutte biologique et la biodiversité, comme des facteurs biotiques de l'équilibre naturel. C'est ainsi que, depuis 1990 jusqu'à présent, il a conduit 18 thèses de doctorat dont deux en République Moldova, certaines avec la distinction „Cum Laudae". Il est donc pertinent d'affirmer, avec certitude, que le professeur IONEL ANDRIESCU a fait école dans son domaine de recherche et a contribué pleinement au développement et à la modernisation de l'école entomologique de Iasi.

Dans le même esprit, le professeur I. ANDRIESCU a été membre de plusieurs commissions pour l'obtention des dimplômes dans l'enseignement secondaire et universitaire, des commissions doctorales dans notre pays et en République Moldova, mais aussi membre des commissions d'acréditation des Instituts nationaux de recherche dans le cadre MCT (ANSTI / Agence Nationale pour la Science et la Technologie). Depuis 1966, il a été membre de la commission d'évaluation de certains grants du CNCSU dans le cadre du Ministère de l'Education, membre des commissions d'acréditation des titres de docteur en science des Instituts de Zoologie, de Protéction des plantes et d'Écologie en République Moldova, membre de deux comités de rédaction des revues de catégorie „B" dans notre pays et d'une revue de l'Académie des Sciences de la République Moldova, membre de „Research Board of Advisors" de „The American Biological Institute", etc.

L'activité organisatrice du professeur I. ANDRIESCU a premièrement visé les institutions où il a été directeur, puis le domaine qu'il a promu, la lutte biologique. Ses débuts datent des années 1960 à Agigea, mais l'instauration du laboratoire, la formation du collectif et les directions de développement, ils les a démarrés à Pangaratzi en 1970, en les continuant et en les développant à Iasi dans le cadre de l'Institut de Recherches biologiques. Huit cadres étaient salariés et collaborateurs directs (à ce jour, la majorité d'entre eux étant des personnalités dans le domaine), et tout autant de techniciens. Le collectif a fonctionné progressivement jusqu'en 1997, „la collaboration" ayant cessé totalement telle que précisé avant, en 2003 lorsque le professeur I ANDRIESCU a pris sa retraite, en continuant son activité de recherche et de direction doctorale.

Un autre aspect de ce type d'activité est l'organisation de manifestations scientifiques dont 2 internationales „Le cours international de biologie marine (des eaux saumâtres)" en 1969, à la station de recherches marines „prof. I. BORCEA" sous les auspices de MAMBO, (l'Association Méditerranéenne pour la Biologie Marine et Océanologie) et le XVe Symposium International d'Entomofaunistique pour l'Europe Centrale SIEEC, à Iasi, en 1996, en qualité de président du comité d'organisation. Il a participé aussi à l'organisation de 8 symposions SIEEC à l'étranger (Suisse, Yougoslavie, Allemagne, Slovenie, Ukraine, Hongrie, Autriche), en appuyant aussi la participation des chercheurs roumains, à ces manifestations. Dans le pays, il a contribué aussi à l'organisation de nombreuses manifestations scientifiques en qualité de principal organisateur ou collaborateur. Dans les conditions d'ouverture générale après 1989, mais aussi avant cette date, le professeur I. ANDRIESCU, soutenu par ses collègues entomologistes du pays entier, a mis les bases de la „Société Roumaine d'Entomologie Générale et Appliquée", de même qu' il est membre fondateur de plusieurs sociétés scientifiques et de protection de l'environnement.

En dehors de l'activité organisatrice proprement dite, le professeur I. ANDRIESCU, des 1966, a été membre, au fil du temps, de 10 sociétés scientifiques à l'étranger et environ 10 sociétés scientifiques en Roumanie. Et depuis 1982, il est membre du Commité International Permanent de la SIEEC (Societas Internationalis Entomofaunistica Europae Centralis).

En ce qui concerne les relations avec l'étranger, malgré les difficultés de l'époque et le combat qu'il a continuellement mené pour l'ouverture vers le monde scientifique, le prof. I. ANDRIESCU a établi et a développé ce type de rapports avec des instituts et universités étrangers dès 1966, au peril de sa propre situation et en supportant diréctement les rigueurs de l'époque. Ces relations ont été établies, non pas à des fins personnelles, mais pour faire progresser les institutions dans lesquelles il a travaillé, ainsi que pour aider au développement de son pays. Cette implication lui a coûté cher, car il a eu l'interdiction de sortir du pays, même pour aller dans certains pays socialistes, et ceci à partir de 1972, jusque au grand changement politique et social de 1989,

Ces événements, et bien d'autres encore, ne l'ont pas découragé et ne l'ont pas empêché de poursuivre sa voie professionnelle, surtout durant le peu de temps qui lui restait à activer après 1989. Même dans ces conditions, presque toujours sur son propre compte, le chercheur et, par la suite, le professeur, a entrepris des stages plus ou moins longs dans des universités ou instituts à l'étranger (Tunisie, Danemark, Italie, Belgique, France, Suisse, Allemagne, Hongrie, Ukraine, etc. Il a usé de ses relations et collaborations, tout comme de la documentation, pour moderniser ses propres recherches et celles de son collectif tout entier. Dans le cadre de ces relations, le professeur a eu de nombreuses invitations à des événements scientifiques à l'étranger, et a pu honorer 18-20 d'entre elles, quatre seulement ayant été avec un financement officiel. Malgré la dureté des temps et des réalités sociales, les mérites et les réalisations du professeur I. ANDRIESCU, son dévouement pour le développement et la qualité de la science roumaine, dans tous les domaines abordés, lui ont apporté aussi quelques appréciations, surtout par les communautés scientifiques en dehors de celles présentées ci-dessus.

Ainsi, en 1980, le Ministère de la Recherche et de la Technologie accorde le 3e prix au niveau national au collectif formé par le cp III dr. I. ANDRIESCU, conf. Dr. C. PISICA, CP III. dr. I. MOGLAN et au collectif des collaborateurs avec lequel ils travaillaient pour „l'étayage de la lutte intégré contre les insectes nuisibles dans les vergers à pommiers".

Le film documantaire „Les armes de la nature" réalisé par GASPAR V, CIOCHIA V, BERATLIEF ZOE (son consultant scientifique avait été le professeur I Andriescu), a remporté le 2e prix du film scientifique en Yougoslavie.

Le professeur I. ANDRIESCU a reçu en même temps le diplôme d'excellence délivré par l'Université „Al. I. Cuza" de Iasi et par le comité d'organisation des sessions anniversaires de 75 ans de la station d'Agigea et celle d'un siècle d'entomologie à l'Université „Al. I. Cuza". De pareilles diplômes lui ont été accordés aussi par d'autres sociétés de Roumanie, mais il a reçu en même temps des appréciations à l'étranger, comme par exemple le diplôme et la médaille anniversaire de la réserve „Codrii" („Forêts") en République Moldova. Il a également été élu membre de l'Académie d'Ecologie de la République Moldova.

Un autre mode de reconnaissance de ses mérites et réalisations scientifiques repose sur la citation de quelques dizaines de travaux scientifiques du professeur en travaux monographiques et scientifiques dans le monde entier, ainsi que dans les banques de données des domaines les plus importants: Chalcidoidea Data Base of the World", „Fauna Europaea", „Base de données sur Aranea en Europe" etc. On retrouve également de courtes biographies professionnelles ou des présentations d'activité du professeur I. ANDRIESCU, dans les volumes d'histoire de la science roumaine éditées par l'Académie Roumaine, dans d'autres recueils de Roumanie ou dans „Who'sWho". Les chercheurs du domaine des hyménoptères parasitoïdes et arachnides de Roumanie, Hongrie, Allemagne et Russie, ont donné le nom du professeur I. ANDRIESCU à 7 nouvelles espèces pour la science.

Personnalité complexe, ayant une formation et une activité multilatérales, le prof I. ANDRIESCU est difficile à cerner et exposer dans les quelques lignes de présentation. On lui souhaite, à l'occasion de ses 75 ans, qu'il continue en bonne santé son activité de recherche utile aux jeunes entomologistes et au développement de l'Entomologie, cette science d'une très grande importance, aujourd'hui, dans notre pays, comme ailleurs.

Prof.dr. Gheorghe MUSTAȚĂ

PROFESORUL IONEL ANDRIESCU LA VARSTA DE 75 DE ANI

Profesorul universitar IONEL ANDRIESCU s-a născut la 7 iunie 1933, în oraşul Botoşani, fiind primul dintre cei 3 copii, doi băieți şi o fată, ai familiei ADELA şi DUMITRU ANDRIESCU. Tatăl său, adjutant în Regimentul 8 Roşiori, cu înclinațiile sale mai mult artistice, cu talente de desenator şi poet, nimerise din întâmplare în armată, dar copiii n-au apucat să-i cunoască împlinirile sau decepțiile profesionale, deoarece la doar 42 de ani, luat de vârtejul războiului, s-a pierdut în nemărginirile îngrozitoare ale Siberiei. Copiii şi-l amintesc totuşi ca pe un tată bun şi iubitor. Au urmat refugiul în fața urgiei frontului, pierderea casei, şi a tuturor bunurilor şi cei 2 ani ai secetei şi foametei, ani de sfârşit de lume, la care se adaugă sărăcia generală a țării distrusă de război şi de datoriile postbelice. Numai devotamentul fără margini al mamei a ajutat familia să traverseze vitregia acelor timpuri. Apoi lucrurile au început să se redreseze, au început să se contruiască fabrici unde a lucrat şi mama, asigurând viața materială, iar gratuitatea în şcoli şi facultăți au favorizat pregătirea medie şi superioară a copiilor. Nu este mai puțin adevărat că, în timpul vacanțelor, iar în facultate şi în timpul semestrelor, copiii lucrau ici - colo pentru nevoile zilnice. Elevul IONEL ANDRIESCU, a învățat la liceul de băieți, de altfel, celebrul „August Trebonium Laurian” având profesori severi dar buni. Aşa că, înclinațiile naturale pentru cunoaşterea animalelor mărunte şi mai ales ai insectelor din zăvoaiele, pâraiele şi fânețurile din jurul Botoşanilor, au fost stimulate şi întregite de talentul pedagogic şi competența profesorului de biologie, REMUS CEHOVSCHI, a cărui imagine proaspătă şi luminoasă va rămâne în amintirea lui IONEL ANDRIESCU, până în ziua de astăzi. A fost deci normal ca, la sfârşitul studiilor liceale cu rezultate dintre cele mai bune ale promoției sale, să meargă la Facultatea de Biologie a Universității „Alexandru Ioan Cuza” din Iaşi unde, în urma unor examene de admitere numeroase şi grele, cum se obişnuia pe atunci, să fie admis în anul I, tot printre primii.

O altă epocă a început în viața tânărului student, focalizându-şi entuziasmul, interesul şi efortul pe cunoaşterea şi adâncirea domeniilor preferate: Zoologiea Nevertebratelor, Biologia Generală, dar mai ales viața insectelor. Chiar din primele zile ale anului I, studentul IONEL ANDRIESCU s-a prezentat la Profesorul MIHAI CONSTANTINEANU, mărturisindu-i pasiunea sa, şi spunându-i că vrea să „studieze insectele”, nebănuind universul fără margini şi infinit de divers a acestui domeniu. Profesorul, cu mare deschidere pentru tineret, si pentru cercetarea ştiințifică ce-l caracteriza, l-a primit, l-a ascultat şi l-a sfătuit ca, eventual împreună şi cu alți colegi pasionați, să alcătuiască un cerc ştiințific studențesc. În acest mod a luat naştere, în toamna anului 1951, cercul ştiințific studențesc de Zoologia Nevertebratelor, grupat în jurul studenților IONEL ANDRIESCU şi VICTOR CIOCHIA, alt mare pasionat de natură. Cercului ştiințific îndrumat de Prof. M. CONSTANTINEANU, PAUL BORCEA, lector (pe atunci), şi asistent IOAN SUCIU, s-au alăturat în anii următori studenții C. PISICĂ, I. PETCU,

GH. MUSTAȚĂ, RAOUL CONSTANTINEANU, MARIN VOICU, etc., viitori profesori universitari şi cercetători eminenți, cercul ştiințific devenind o pepinieră importantă de cadre superioare. Neuitate au rămas pentru toți succesele ştiințifice ale cercului şi premiile obținute la Conferințele Naționale, precum şi expedițiile, uneori de mai multe săptămâni, făcute cu profesorul MIHAI CONSTANTINEANU în cele mai diverse locuri din țară, însoțiți adeseori de Profesorii M. PEIU, C. FILIPESCU de la Agronomie, Dr. A. ALEXINSCHI de la Academie, asist. I. SUCIU şi alții, expediții care aveau ca scop ceea ce se cheamă astăzi cunoaşterea biodiversității himenopterelor parazitoide, bază a echilibrului natural şi a combaterii biologice a insectelor dăunătoare. Cercetările în paralel şi a malofagilor prazite pe păsări şi mamifere, au dus la formarea aptitudinilor pentru cercetare încă din timpul facultății, atestate de articolele ştiințifice publicate, încă de pe atunci. Profesorii erau străluciți, iar studenții îi privesau ca pe nişte zei, ca pe nişte supraoameni, unii ,"mai buni" alții „mai răi", după cum se purtau cu studenții. Printre ei s-au remarcat pentru studentul IONEL ANDRIESCU, aşa cum mărturiseşte el însuşi, în afară de Prof. M. CONSTANTINEANU care era deasupra tuturor, profesorii PETRE JITARIU, OLGA NECRASOV, PETRE ŞUSTER, ZIGMAN FEIDER, LIBERTINA SOLOMON, PAUL BORCEA, NECULAI MACAROVICI, şi alții, fiecare contribuind cu ceva la formarea tânărului student şi viitor profesor universitar la rândul său. Pentru tânărul începător în ale ştiinței, magistrul său, Prof. M. CONSTANTINEANU, era un exemplu de muncă pasionată pentru studiul himenopterelor ihneumonide, la a căror cunoaştere pe plan european şi mondial a contribuit din plin, un exemplu de corectitudine, cinste şi sobrietate, de generozitate materială şi spirituală față de colaboratori. Toate minutele vieții sale erau destinate studiului, nerisipind timpul pentru nici un fel de distracție şi alte „deşertăciuni" ale vieții, toate „viciile" obişnuite fiindu-i străine: fumatul, consumul de alcool sub orice fel, îmbuibarea, etc. Această viată extrem de cumpătată şi dedicată muncii ştiințifice şi didactice i-a permis sănătatea şi longevitatea activă, până în al 100-lea an de viață când s-a stins mai mult dintr-un accident regretabil. Desigur că un astfel de exemplu este greu de urmat, totuşi unele influențe benefice le-a exercitat asupra elevilor, spre succesul acestora. Ceea ce l-a impresionat şi influențat în plus pe tânărul student şi apoi asistentul universitar IONEL ANDRIESCU, a fost de asemenea modul respectos aproape sacrosant în care vorbea despre magistrul său, profesorul IOAN BORCEA şi în care transmitaea elevilor săi, mesajul prof. I. BORCEA despre necesitatea de a fundamenta şi aplica metodele de combatere biologică în lupta cu insectele dăunătoare. Şi în special acest mesaj s-a înrădăcinat adânc în conştiința profesională şi etică a studentului şi mai apoi a asistentului IONEL ANDRIESCU.

În anul 1955, tânărul IONEL ANDRIESCU termina facultatea cu diploma de merit şi, la propunerea Prof. M. I. CONSTANTINEANU este numit preparator la Catedra de Zoologia Nevertebratelor, odata cu colegul său de studiii, de excursii, de expediții, de ideal în cercetarea ştiințifică, VICTOR CIOCHIA, de origine din Braşov. Şi, din acel moment, viața a căpătat alte ritmuri, alte căi şi alte sensuri, dramatice şi nimicitoare pentru cei doi tineri ca şi pentru alți tineri din Universitate şi de aiurea. Abia începută activiate didactică şi ştiințifică, precum şi aceea de doctorat, purtați de aripile speranței şi a unui ideal profesional îndeplinit, toate acestea sunt zdrobite de o realitate atroce, țesută în culisele neştiute ale epocii celei mai vitrege din istoria modernă a țării noastre: 1945-1965!

Până aici mi-am permis să prezint mai în detaliu viața tânărului IONEL ANDRIESCU, pentru a înțelegere cât de cât sensul şi modul formării profesionale şi a aspirațiilor care-l vor călăuzi şi-i vor determina paşii şi acțiunile viitoare. În continuare voi prezenta desfăşurarea vieţii şi activităţii colegului meu, mai abrupt, mai frust, aşa după cum s-a şi desfăşurat în realitate.

Ca urmare a marii „epurări” politice din 1958, mai ales în rândul intelectualităţii, asistentul universitar VICTOR CIOCHIA este trimis în inchisoare, pentru aproape 5 ani, alături de alţi tineri, în prezent personalităţi ale vieţii ştiinţifice şi sociale din ţara noastră, iar IONEL ANDRIESCU este înlăturat din învăţământul superior, conform cu articolul cel mai dur şi important în aceea vreme „pentru îmbunătăţirea compoziţiei sociale” a învăţământului superior, ca şi MARIA CRISTESCU din colecivul de cercetare a profesoarei OLGA NECRASOV şi în plus tânărului i se retrage dreptul de aşi da doctoratul. Prin această acţiune au fost decapitate cele două echipe de tineri cercetători şi universitari: ale Prof: M. Constantineanu şi ale Prof. Olga necrasov şi s-au retezat aripile tinerilor talentaţi, trebuind zeci de ani şi alte condiţii istorice, pentru a renaşte din cenuşă şi pentru a se redresa. Totuşi principalele trenuri au rămas pierdute... Pentru tânărul IONEL ANDRIESCU, rămas fără mijloace de existenţă şi cu drumul vieţii închis, din punct de vedere social, prin pecetea politică aplicată, au urmat vremuri incredibil de vitrege. Locuri de muncă temporare şi sub calificarea sa, şi în alte localităţi, ca de exemplu la Sanepidul Interraional de la Bîrlad (1959-1960) prin bunăvoinţa Prof. dr. ERNEST UNGUREANU, de la Parazitologie-Medicină care răspundea de activitatea antimalarică din Sanepiduri.

În 1961 este angajat la Staţiunea de Cercetări Marine „Prof.I.Borcea” de la Agigea, de către proaspătul director Prof. PAUL BORCEA, detaşat acolo de către Universitatea din Iaşi. Aici cercetătorul IONEL ANDRIESCU trebuie să înceapă o nouă activitate, în domeniul biologiei marine. Se adaptează din mers şi lasă urme, prin publicaţii cu noutăţi importante pentru ştiinţă şi pentru Marea Neagră, dar continuă în paralel şi cercetările entomologice încercând să transpună în viaţă idealul mai vechi de combatere biologică, mai ales după ce în 1966 după deschiderea socială şi politică din 1965, este numit de către Universitatea din Iaşi directorul Staţiunii, fără să fi fost membru de partid şi în plus cu trecutul politic cunoscut. Primeşte cu entuziasm şi responsabilitate această sarcină şi depune eforturi mari pentru dezvoltarea staţiunii, în condiţii grele, deoarece se începuseră deja luptele pentru luarea Staţiunii de la Universitate şi utilizarea ei ca bază a Institutului de Cercetări Marine care urma să fie înfiinţat.

Dar să spicuim din istoricul Staţiunii şi din realizările tânărului director, IONEL ANDRIESCU, istoric scris şi depus în arhivele Universităţii, de către Profesorul SERGIU CĂRĂUŞU, fostul director al Staţiunii, înainte de numirea la Agigea a lui IONEL ANDRIESCU. Asigură şi dezvoltă domeniile de cercetare existente şi dezvoltă altele noi ca Biologia bentosului marin în care se angajează personal, studiul buruienilor din culturile dobrogene, studiul insectelor auxiliare în vederea fundamentării Combaterii Biologice, realizarea colecţiei de plante vii dobrogene, etc.

În medie au lucrat la Agigea 60 de cercetători pe an din care 30% străini; s-au organizat două sesiuni ştiinţifice, una aniversară a Staţiunii iar alta internaţională, cursul de vară sub egida Asociaţiei mediteraneene de biologie marină şi oceanografie (MAMBO), cu participarea a 22 cercetători din 12 ţări mediteraneene şi 40 de cercetători români; s-au publicat 2 volume de lucrări ale Staţiunii, în 1968 şi 1969, însumând aproape 700 pagini; s-a sprijinit practica studenţească la Agigea, pentru toate universităţile din ţară şi unele din străinătate cu aprox. 160 de studenţi / an; s-au organizat cursuri de vară pentru profesorii secundari, 40-70 pe vară; s-au adăugat 7 tineri cercetărtori noi, pentru toate domeniile de cercetare, printre care şi VICTOR CIOCHIA, după ce ieşise din închisoare, precum şi 13 personal auxiliar ; s-au amenajat noile laboratoare, numărul laboratoarelor ajungand la 12; se extinde spaţiul de cazare la 80 de locuri pentru studenţi şi 30 pentru cercetatorii oaspeţi; se asigură 3 mijloace de transport şi motor nou pentru vasul „Gilortul"; se obţin aprobarile pentru proiectare şi fondurile pentru construcţia de spaţii noi, sala de conferinţe şi cămin studenţesc, multe dintre demersuri şi măsuri se fac şi se i-au pentru ca Staţiunea să rămână a Universităţii. Astfel, în 1968 se propune ca Staţiunea să devină Centrul de Cercetări de Biologie marină şi terestră, a Universităţii, întărind-se rolul de cercetare şi didactic, dar toate eforturile şi speranţele cad, odată cu Hotărârea CC al PCR 256/1970, prin care Staţiunea este desprinsă de Universitate şi pusă la baza noului Institut de Cercetări Marine, care nu avea nici baza materială (clădiri, laboaratoare, vase de cercetari), nici documentară (schimb curent de publicaţii cu 47 de ţări şi 137 instituţii şi colecţii de reviste ştiinţifice). Aceasta a constituit un dezastru la figurat şi la propiu pentru cercetarea universitatră ieşeană şi pentru practica studenţească, barbaria mergând până acolo încât cei ce au ocupat staţiunea au distrus la propiu peste 500 de probe (aproximativ 1500 de borcane de 1-5 Kg.) de bentos, spălate şi triate, un material biologic nestudiat, de valoare inestimabilă.

În ceea ce priveşte personalul de cercetare, acei care au avut familii în Constanţa au rămas în noul institut, iar directorul IONEL ANDRIESCU s-a pus la dispoziţia Universităţii din Iaşi, care i-a oferit postul de director al Staţiunii de Cercetări Biologice Geologice şi Geografice „Stejarul" de la Pângăraţi – Neamţ, viaţa lui luând o altă întorsătură, în 1970 trecând de la ţărmurile însorite şi de la marea cu care se obişnuise la umbra întunecată a văilor, pădurilor şi munţilor Bistriţei. Multă putere şi înţelepciune i-au trebuit să treacă şi peste această încercare şi să o i-a din nou, de la capăt, după munca şi eforturile enorme puse în organizarea şi administraţia mereu ascendentă a Staţiunii de la Agigea.

Şi astfel, soarele, lumina, căldura, şi atmosfera cu farmecu-i occidental inefabil al Agigei, a apus pentru 20 de ani când, după 1989 s-a făcut reparaţia de rigoare, redând-o universităţii aproape în stare de ruină.

La Pângăraţi, unde l-a purtat soarta, începuse o nouă etapă, sub auspicii foarte sumbre, aceea a aplicării în cercetarea româneasca, a metodei occidentale de autofinanţare, pe bază de contract de cercetare.

În atmosfera de descumpănire şi de descurajare, noul director a găsit căile şi mijloacele, bizuindu-se pe acei dintre noii săi colegi care aveau iniţiativă şi nu-şi pierduseră speranţa, pentru a stabiliza şi dezvolta staţiunea. Astfel în cei 6 ani cât a condus staţiunea, bugetul a crescut de două ori, pe bază de contracte de cercetare, valoarea aceasta crescând de 22 ori. În ce priveşte personalul de cercetare, de unde în 1970 avea tendinţa să se disperseze, în realitate nimeni nu a rămas fără muncă şi, din contra, a crescut de la 17 cercetători în 1970 la 41 în 1976, adică de 2,4 ori, cu condiţii materiale mai bune decât colegii lor, din Centrul de Cercetări Biologice - Iasi. În acest cadru, IONEL ANDRIESCU îşi îndeplineşte idealul din totdeauna, înfiinţând primul Laborator de Combatere Biologică din ţara noastră, în mediul universitar, realizare pentru care militaseră Prof. I. BORCEA la începutul sec. XX şi Prof. M. I. CONSTANTINEANU, după 1950, în condiţii în care acest lucru nu era posibil.

Astfel, el aduce, prin transfer pe colegul şi prietenul VICTOR CIOCHIA, de la Agigea, unde rămăsese provizoriu după integrarea Staţiuniii în IRCM. Împreună cu el şi cu tinerii cercetători angajaţi, IOAN MOGLAN, astazi Decan al Facultăţii, Dr. VERONICA SAUCINIŢEANU MOGLAN, Dr. IRINA OANCEA CONSTANTINEANU, astazi CS I la Institutul de Cercetari Biologice Iaşi, organizeză noul laborator care a abordat două teme fundamental aplicative şi demonstartive. Organizarea, după modelul adus de la Staţiunea INRA de la Antibes (Franţa) de către VICTOR CIOCHIA, a crescătoriei entomofagului *Encarsia perniciosi* şi introducerii acestuia împotriva păduchelui din San-José, *Diaspidiotus perniciosus*, entomofagul fiind introdus din crescătorii asemănătoare din Elveţia şi Franţa. A doua acţiune a fost combaterea microbiologică a fluturelui alb american (*Hyphantria cunea*) şi altor omizi, cu biopreparate pe bază de *Bacillus thuringiensis*, străine şi româneşti. A fost vorba de o demonstarţie la scară mare, în întregul oraş Roman, pe arbori ornamentali şi fructiferi, cu un succes deplin.

La Pângaraţi directorul IONEL ANDRIESCU a sprijinit dezvolatrea tuturor domeniilor de cercetare şi formarea cercetătorilor, favorizând relaţiile cu străinătatea, care lui însuşi îi erau interzise din 1972. Asa se face că în perioada următoare, de aici a plecat o întreagă pleiadă de profesori universitari, la Universităţile din Iaşi, Bacău, şi Suceava, în total cel puţin 10 şi acest aspect, putând fi considerat o realizare importantă a staţiunii. Bine înţeles că şi activitatea didactică a fost continuată în cadrul practicilor de vară a studenţilor biologi şi geografi din întreaga ţară şi din străinătate.

Urmându-şi idealul de a lucra şi trăi din nou în oraşul tinereţii şi formării sale, într-un moment favorabil, la sfârşitul anului 1976 se transferă, împreună cu Laboratorul la Iaşi, în cadrul Centrului de Cercetări Biologice, de care aparţineau din 1974, VICTOR CIOCHIA stabilindu-se şi el în oraşul său natal, la Braşov, la Institutul de Cercetări pentru Cartof şi Sfeclă de Zahăr, unde a înfiinţat un laborator de producere şi utilizare a trichogramelor în combaterea biologică a fluturilor dăunători în agricultură.

În Iaşi, cercetătorul I. ANDRIESCU plănuia să realizeze un laborator de înmulţire şi utilizare a trichogramelor, dar până a găsi posibilităţile materiale şi de spaţiu, se angajează împreună cu colaboratorii, la realizarea unor teme şi contracte privind efectul pesticidelor granulate de sol şi selectivitatea aestora, precum şi faţă de insectele entomofage şi utile din livezi de măr, dar preocuparea principală rămânând fundamentarea combaterii integrate în livezi, prin studiul dinamicii şi efectului diferitelor metode de combatere a dăunătorilor, asupra entomofagilor ca factor ai echilibrului natural, aceste cercetări făcându-se sub egida Institutului de Protecţia Plantelor, Bucureşti. În paralel dezvoltă cercetări privind biodiversitatea zonelor umede şi adiacente şi în special din Delta Dunării, sub egida Institutului de Cercetare - Proiectare Delta Dunării, precum şi utilizarea metodelor biologice în Protecţia mediului, sub egida Ministerului Educaţiei şi Învăţământului. În acelaşi timp face numeroase demersuri pentru creşterea şi utilizarea trichogramelor în combaterea dăunătorilor din vii, livezi şi culturi agricole şi, în contextul deschiderii apărute în 1985-1986 în cadrul Ministerului Agriculturii faţă de importanţa combaterii biologice, obţine fonduri pentru realizarea acestui laborator. Astfel, laboratorul compus din Dr. IONEL ANDRIESCU, Dr. I. MOGLAN, Dr. VERONICA MOGLAN şi Cercet. GEORGETA GAIDĂU, în colaborre cu Dr. KLAUS FABRITUS de la Institutul de Igienă şi Sănătate Publică Bucureşti, încep în 1987 organizarea acestui laborator, finanţat apoi în 1988-1990, de către MEI şi MAIA. S-a realizat crescătoria gazdei de laborator la care o contribuţie deosebită a avut-o Dr. I. MOGLAN şi s-au făcut primele lansări de Trihograme în viile IAS Bucium şi Copou, dar în 1991, finanţarea a fost oprită, datorită reformelor de după 1989, urmând ca aceste cercetări să fie reluate mai târziu prin strădania Prof. I. ANDRIESCU, ce devenise directorul Institutului de Cercetări Biologice-Iaşi în 1991. Şi din nou a urmat o perioada grea în viaţa Institutului şi a directorului I. ANDRIESCU, finanţarea cercetării scăzând vertiginos din cauza prăbuşirii agriculturii şi industriei care fuseseră sursele principale de finanţare.

Face demersuri împreună cu Consiliul Ştiinţific pentru trecerea Institutului la Academie, unde i-ar fi fost locul încă de la înfiinţare dar s-a întâmpinat opoziţia conducerii de atunci a filialei Iaşi a Academiei Române. Depune mari eforturi pentru menţinerea institutului şi este profund afectat când, pentru prima data în viaţa sa, unii oameni, din personalul superior şi auxiliar, trebuie să plece din institut sau să se retragă la pensie. Ulterior lucrurile s-au mai ameliorat, iar Prof. I. ANDRIESCU îşi orientează cercetările, sub egida Ministerului Educaţiei şi Învaţămâmtului şi a Institutului Delta Dunării, în studiul biodiversităţii şi desigur în continuare, în fundamentarea combaterii biologice şi integrate, evaluarea impactului antropic în Delta Dunării, rolul factorilor biotici de reglare a nivelului populaţiilor de insecte, realizând şi contracte în colaborare cu Institutul de Zoologie şi cu Institutul de Combatere Biologică, a Academiei de Ştiinţe de la Chişinău.

Din anul 1991 dr. I. ANDRIESCU se întoarce şi în învăţământul superior de unde fusese îndepărtat cu 33 de ani în urma, pe postul de Profesor, la Catedra de Zoologie, dar continuă şă fie şi Directorul Institutului de Cercetări Biologice până în 1997 când, devenind Secretarul Ştiinţific al Consiliului Profesoral, a trebuit să părăsească funcţia de director la Institut, continuând numai ca Profesor. Continuă colaborarea cu Institutul de Cercetări Biologice Iaşi cu privire la Trichogramma, mai exact prin Colectivul de Combatere Biologica in cadrul caruia urma sa se realizeze in colaborare cu Facultatea de Biologie, Biostaţia modulara pentru cresterea trichogramelor, dar incepând din anul 2003 a incetat total această colaborare, datorită gravelor diferende de etica profeisonală dar mai ales ştiinţifică cu Dl. CS III Alecu Diaconu, membru al Colectivului de Combatere Biologică din cadrul Institutului.

Din anul 2000, sub egida Ministerului Educaţiei şi Învaţămâmtului, Prof. ANDRIESCU orientează cercetările colectivului de colaborare cu cadrele didactice ale facultăţii, pentru o bună perioada de timp, spre studiul biodiversităţii entomofaunei din livezi de măr în funcţie de tipul de protecţie fitosanitară, şi studiul Biodiversităţii în zonele marginale şi agrosistemele invecinate, aceste teme - contract fiind subcontracte cu Institutul de Cedrcetări Biologice, iar din 2002, sub aceeaşi egidă se reîncep cercetările cu privire la creşterea şi utilizarea tichohramelor în protecţia integrală a livezii de măr, din parte Facultăţii coordonator fiind, Prof. I. ANDRIESCU şi Prof. Dr. MOGLAN IOAN, colaborarea cu institutul întrerupându-se, practic din 2003, din motivele aratate mai sus.

În ce priveşte activitatea didactică, după eliminearea din Invăţământul superior, în 1958, aceasta a continuat totuşi cu intermitenţă, la Universitatea din Constanţa, în calitate de cadru didactic asociat, unde în 1964-1969 ţine primele cursuri de Biologie Generală şi Genetică modernă în această Universitate, apoi asigură practicile de vară studenţeşti, ca şi cursurile de vară ale profesorilor de liceu, atât la Agigea cât şi la Pângăraţi. Odată cu reîntegrarea în învăţământul superior, după 1990, ţine cel puţin 10 cursuri cu lucrări practice, în domeniul Zoologiei şi Entomologiei, introducând şi predând pentru prima data în învăţământul universitar clasic din Romania cursuri precum „Bazele ecologice ale combaterii insectelor dăunătoare (Combatere Biologică şi Integrată)", „Sistematica şi biologia entomofagilor prădători şi parazitoizi", „Metodele şi principiile Zoologiei sistematice" „Biodiversitatea mediilor terestre", „Bioproductivitatea ecosistemelor terestre", atât la cursurile de licentă cât şi la masterat unde, în plus contribuie la înfiinţarea secţiilor de „Combatere integrată" şi „Biodiversitate".

În toată activitatea didactică, cursuri şi lucrări practice, prof. I. ANDRIESCU s.-a străduit să introducă cunoştinţe şi metode noi, moderne, legând totdeauna aspectele fundamentale de cele aplicative, considerând totdeauna că metodele biologice de combatere a insectelor dăunătoare constitue unul dintre principalele mijloace de protecţie a mediului şi de asigurare a dezvoltării durabile, acest lucru urmărindu-l şi la acordarea titlurilor pentru tezele de licenţă, lucrărilor de grad şi tezelor de doctorat.

În ce priveşte cercetarea ştiinţifică, aceasta s-a exprimat prin contractele şi proiectele de cercetare şi prin publicarea rezultatelor. Astfel împreună cu Dl Prof. I. MOGLAN, a realizat primul contract internaţional în perioada 1973 – 1999, cu Institutul Internaţional de Combatere Biologică al Commonwealt - Staţiunea Delemont - Elveţia privind Combaterea biologică a burienilor dăunătoare şi a propus şi coordonat peste 30 de contracte, încheiate cu diferite instituţii de cercetare, ministere şi unităţi economice, coordonând şi realizând, între 1971 şi 2004, apropae 130 de rapoarte de fază, însumând peste 8000 pagini. Publicaţiile la rândul lor constau în colaborarea la 5 cărţi dintre care un tratat, toate referitoare la fundamentarea combaterii integrate şi biologice a insectelor dăunătoare şi aproape 130 articole ştiinţifice, ca singur autor şi în colaborare cu colegi şi elevii scolii formate. Direcţiile principale de cercetare exprimate prin publicaţii privesc biodiversitatea difereitelor grupe de nevertebrate (bentos marin, nematode şi capepode marine, etc.) şi în special insecte himenoptere parazitoide, Chalcidoidea, entomofauna unor ecosisteme naturale şi agroecosisteme, printre care rezervaţii naturale, studiul unor complexe parazitoide ale insectelor de importanţă economică şi ecologică, fundamentarea şi experimentarea combaterii integrate în livezi de măr, fundamentarea şi aplicarea combaterii biologice cu ajutorul insectelor auxiliare şi a microorganismelor şi, în sfârşit, efectul pesticidelor asupra entomofaunei unor agroecosisteme şi stabilirea criteriilor de selectivitate, etc., toate putând fi rezumate la biodiversitate, factori biotici de echilibru în ecosisteme şi agroecosisteme, combaterea biologică şi integrată. Putem astfel oferi câteva exemple: descoperirea şi descrierea a mai multor specii noi pentru ştiinţă, printre care şi 2 genuri – *Chalcimerus borceai* STEFFAN şi ANDRIESCU, 1962, gen şi specie nouă, *Boucekastichus homocerus* ANDRIESCU, 1971, gen şi specie nouă, un ordin, mai multe familii şi genuri, precum şi zeci de specii noi pentru fauna României, dintre care numeroşi taxoni de mare importanţă biogeografică. Cât despre alte publicaţii, acestea se referă la domeniile de cercetare prezentate mai sus. De menţionat este faptul că 31 de articole şi rezumate au fost publicate în străinătate (Anglia, Austria, Cehoslovacia, Egipt, Elveţia, Franţa, Germania, Italia, Rep. Moldova, Polonia, SUA, Turcia, Ukraina, Ungaria).

O prelungire a activitaţii didactice şi de cercetare o constitue conducerea de doctorat, drept obţinut abia după 1989. Şi în acest domeniu, subiectele tezelor de doctoarat, s-au axat pe preocupările profesorului, referitoare la fundamentarea combaterii biologice şi biodiversitate, inclusiv importanţa complexelor parazitoide ale insectelor fitofage şi dăunătoare, ca factori biotici ai echilibrului natural. Astfel, din 1990 şi până în prezent a condus 18 teze de doctorat dintre care două în Rep. Moldova, unele dintre ele cu distincţia „Cum Laudae". Se poate afirma deci, cu certitudine, că Prof. ANDRIESCU a realizat o şcoală în domeniul său de cercetare şi a contribuit din plin la dezvoltarea şi modernizarea şcolii entomologice ieşene.

În acelaşi domeniu, Prof. I. ANDRIESCU a făcut parte din multe Comisii pentru acordarea gradelor didactice din învăţământul secundar şi universitar, dar mai ales din comisii de doctorat, în ţara noastră şi în Rep. Moldova, dar şi membru în comisii de acreditare a Institutelor naţionale de cercetare din cadrul MCT (ANSTI), din 1966, membru al comisiei de evaluare a unor granturi din CNCSU, membru al comisiilor de acreditarte a titlurilor de doctor în ştiinţe ale Institutelor de Zoologie, de Protecţia

Plantelor şi de Ecologie din Rep.Moldova, membru a două comitete de redacție a revistelor din categoria „B" din țara noastră şi a unei Reviste a Academiei de Ştiințe din Rep. Moldova, membru al „Research Board of Advisors" al „The American Biological Institute", etc.

Activitatea organizatorică a Prof. ANDRIESCU, s-a referit în primul rând la instituțiile al căror director a fost, apoi la domeniul pe care l-a promovat, combaterea biologică, începuturile fiind încă în anii 1960 la Agigea, dar înființarea laboratorului, colectivului şi direcțiilor de dezvoltare le-a început practic la Pângărați în 1970, continuându-le şi dezvoltându-le la Iaşi, în cadrul Institutului de Cercetări Biologice, 8 cadre fiind salariați şi colaboratori direcți, majoritatea personalități în domeniu în prezent şi tot atâția tehnicieni. Colectivul a funcționat ascendent, până în 1997, „colaborarea „ întrerupându-se total în 2003 după cum s- arătat mai sus, când Prof. ANDRIESCU s-a pensionat, continuînd activitatea de cercetare şi conducerea de doctorat.

Un alt aspect al acestui tip de activitate este organizarea de manifestări științifice, printre care 2 internaționale, „Cursul Internațional de Biologie Marină (apele salmastre)", în 1969, la Stațiunea de Cercetări Marine „Prof. I. Borcea"", sub egide MAMBO (Asociația Mediteraneană pentru Biologia Marină şi Oceanologie) şi cel de-al XV-a Simpozion Internațional de Entomofaunistică pentru Europa Centrală SIEEC, la Iaşi, în 1996, ca Preşedinte al Comitetului de Organizare şi a participat, de asemenea la organizarea a 8 simpozioane SIEEC în străinătate (Elveția, Yugoslavia, Germania, Slovenia, Ukrania, Ungaria, Austria), înlesnind şi participarea cercetătorilor români la aceste manifestări. În țară, de asemenea, a contribuit la organizarea a numeroase manifestări științifice în calitate de organizator principal sau colaborator. În condițiile de deschidere generală de după 1989, dar şi înainte de această dată, Prof. I. ANDRIESCU, sprijinit de colegii săi entomologi din toată țara, pune bazele „Societății Române de Entomologie Generală şi Aplicată" şi este membru fondator al mai multor societăți științifice şi de protecție a mediului.

În afara activității organizatorice propriuzise, Prof. ANDRIESCU IONEL încă din 1966 a făcut parte, în timp, din 10 societății științifice din străinătate şi din aproape 10 societății ştiințifice din Romania, iar din 1982 este membru al Comitetului Internațional al SIEEC. (Societas Internationalis Entomofaunistica Europae Centralis).

În ce priveşte relațiile cu străinătatea, în pofida greutăților timpului şi în lupta continuă cu acestea, adeseori periclitându-şi situația şi suferind direct rigorile epocii şi ale relațiilor neprincipiale interumane, Prof. ANDRIESCU, încă din 1966 a stabilit şi a dezvoltat astfel de relații cu Institute şi Universități din străinătate, în toate instituțiile în care a lucrat, nu în folosul propriu ci al instituțiilor respective şi a țării noastre. Acestea i-au şi atras interdicția călătoriilor în străinătate, chiar şi în unele țări socialiste, începând din 1972.

Acestea şi altele nu l-au descurajat, nu l-au impiedicat să-şi urmeze neabătut drumul profesional, mai ales în puținii ani care i-au rămas după 1989. Chiar şi în aceste condiții, aproape totdeauna pe cont propiu, cercetătorul şi mai apoi profesorul a petrecut stagii mai scurte sau mai lungi în universitătii şi institute din străinătate (Tunisia, Danemarca, Italia, Belgia, Franța, Elveția, Germania, Ungaria, Ukraina,etc.), cu o singură excepție, ca invitat, folosind relațiile şi colaborările, ca şi documentarea, pentru modernizarea cercetărilor proprii şi a colectivului său. În cadrul acestor relații, profesorul ANDRIESCU a avut numeroase invitații, la evenimentele științifice, din străinătate, putând onora doar 18-20 dintre ele, numai 4 fiind cu finanțare parțial oficială. Cu toate vicisitudinile timpului şi realităţilor sociale, meritele şi realizările Prof. ANDRIESCU, dăruirea lui pentru dezvoltarea şi calitatea ştiinţei româneşti,în toate domeniile abordate, i-au adus şi unele aprecieri mai ales din partea comunităţii ştiinţifice şi în afara celor prezentate mai sus.

Astfel, în 1980 Ministrul Cercetării şi Tehnologiei acordă Premiul III pe ţară Colectivului format din CP III dr. I.ANDRIESCU, Conf. Dr. C PISICĂ, CP III dr. I. MOGLAN şi colectivului de colaboratori cu care lucrau, pentru „Fundamentarea Combaterii Integrate a insectelor dăunătoare în livezile de măr”, iar filmul documentar „Armele Naturii” realizat de GASPAR V., CIOCHIA V., BERATLIEF ZOE şi al cărui consultatnt ştiinţific a fost Prof.ANDRIESCU, a fost distins cu premiul 2 pentru filmul ştiinţific în Yugoslavia. De asemenea, profesorului i s-a acordat diploma de excelenţă de către Universitatea „Al. I. Cuza” Iaşi şi de către Comitetul de organizare a sesiunilor aniversare de 75 ani a Staţiunii de la Agigea şi a ceea de aniversare a unui secol de Entomologie la Universitatea din Iaşi, prin persoana Prof. Dr. Gh. MUSTAŢĂ, astfel de diplome fiindu-i acordate şi de alte societăţi din ţară, dar şi aprecieri din străinătate, ca de exemplu, diploma si medalia aniversară a Rezervaţiei „Codrii” din Rep. Moldova, sau faptul că a fost ales membru al Academiei de Ecologie dn aceaşi ţară vecină.

Un alt mod de recunoaştere a meritelor şi realizărilor ştiinţifice este citarea a câtorva zeci de lucrări ştiinţifice ale profesorului în lucrări monografice şi ştiinţifice din toată lumea, precum şi băncile de date cele mai importante în domeniu: „ Chalcidoidea Data Base of the World”, „Fauna Europaea”, „Baza de date despre *Aranea* din Europa” etc. Scurte biografii profesionale sau prezentări ale activităţii Profesorului ANDRIESCU, se află în volumele de Istorie a Ştiinţei Româneşti editate de Academia Română, în alte culegeri şi volume din România sau de tipul „Who's,Who”, iar cercetători în domeniul himenopterelor parazitoide şi arahnidelor din România, Ungaria, Germania şi Rusia, au dat numele profesorului la 7 specii noi pentru ştiinţă.

Personalitate complexa, cu pregătire şi activitate multilaterală, Profesorul ANDRIESCU este greu de cuprins şi de reprezentat în cele câteva pagini. Îi dorim cu prilejul celei de a 75-a aniversări să-şi continue cu sănătate, activitatea de cercetare utilă tinerilor entomologi şi dezvoltării acestei ştiinţei de mare importanţă şi actualitate în prezent în ţara noastră.

Prof.dr. Gheorghe MUSTAŢĂ

PROF. UNIV. DR. CONSTANTIN PISICĂ – DONOSE

Né le 1[er] Mars 1932 dans une famille paysanne du village Merisani du département Teleorman, il a fait ses études primaires dans le village natal et suivi pendant la période 1944 – 1952 le lycée « Anastasescu » de la ville Roşiorii de Vede, puis les études universitaires jusqu'à 1957 à la Faculté des Sciences de la Nature de l'Université « Al. Cuza » à Iaşi – spécialité biologie – zoologie.

Pendant la période de ses études universitaires en plus de ses activités obligatoires (cours, travaux pratiques, examens, etc.) il était attiré comme par un aimant par le laboratoire de « Zoologie des invertébrés » du Professeur Mihai Constantineanu et son groupe de travail scientifique, activité fort apprécié et reconnue sur le plan scientifique local et national.
Le Professeur Constantin Pisică a montré dès le début de son activité, un attrait important pour l'étude de l'entomologie, attrait entretenu par son maître Professeur Mihai Constantineanu, celui à qui il doit son choix de carrière et de vie.

Retenu dans l'enseignement supérieur, il a parcouru toutes les étapes et fonctions universitaires : assistant (1957 – 1962), chef de travaux pratiques (1962 – 1972), maître de conférences (1972 – 1990) et professeur (1990 – 2002). Après la retraite en 2002 il reste professeur consultant et actuellement il est professeur associé, ayant reçu le Prix de l'Académie Roumaine de Sciences « Emil Racoviţă » (1980) et le titre de «Profesor Emeritus » de l'Université « Al. Cuza » Iaşi (2002).

Il a passé toute sa carrière scientifique et d'enseignement dans le cadre du même département de Zoologie de la faculté de Biologie de Iasi où il a commencé comme étudiant. Il a obtenu en 1959 son Doctorat ès sciences en biologie avec sa thèse « Contributions à l'étude des pimplines (Pimplinae Cresson, Hym. Ichneum.) de Roumanie, d'un point de vue systématique, biologique, écologique et économique ».

Sur le plan didactique il a soutenu des cours et travaux pratiques de zoologie générale aux étudiants en géographie et géologie, de zoologie des invertébrés, d'entomologie et biologie des nuisibles aux étudiants en biologie et pour les études approfondies il a enseigné la filogenèse, le rôle des insectes auxiliaires dans la protection des ressources biologiques végétales, la systématique et la biologie des entomophagues, les nuisibles des forets, etc.

Depuis 1977 il a dirigé des nombreuses thèses de licence, travaux de 1[er] degré et 22 thèses de Doctorat ès sciences. En qualité de professeur universitaire, en plus des enseignements aux étudiants il a soutenu des cours de synthèse et de la formation continue aux professeurs de biologie de l'enseignement secondaire. Chaque année universitaire il a dirigé les stages pratiques des étudiants sut le terrain et dans différents écosystèmes naturelles.

Tous les cours enseignés aux étudiants ont été actualisés en permanence avec les dernières nouveautés scientifiques nationales et internationales. Comme enseignant, le professeur C Pisica c'est rapidement distingué par ses cours claires, synthétiques et d'un haut niveau scientifique très appréciés par les étudiants.

Pour aider les étudiants il a élaboré et publié les cours enseignés à partir de 1973 avec « Cour d'entomologie » (éditions de l'Université « Al. I. Cuza », Iaşi), « La biologie des animaux nuisibles » (Editura Didactică şi Pedagogică, Bucureşti -1980), « La zoologie d'invertébrés » (Editura Didactică şi Pedagogică, Bucureşti – 1983), « La biologie des animaux nuisibles – Travaux pratiques » (1982), « La zoologie d'invertébrés – travaux pratiques de laboratoire» (Vol I 1999, Vol II 2002 - éditions de l'Université « Al. I. Cuza », Iaşi).

En plus de ses activités d'enseignement, il a présidé des nombreux jurys de Baccalauréat dans la région de Moldavie et il a été aussi membre des jurys des thèses et concours.

Pendant la période de 1967 et 1968 il a enseigné la zoologie à l'Université en Guinée – Conakry et il a fait des stages de documentation en France (1968), Bulgarie (1975), République de Moldavie (1990 et 1995).

Il a commencé l'activité de recherche scientifique comme étudiant dans le laboratoire de zoologie sous les conseils du professeur Mihai Constantineanu et il s'est orienté rapidement vers l'entomologie, domaine de tradition du laboratoire. Dès la fin des études il a été embauché comme assistant, et il a travaillé à coté du professeur Mihai Constantineanu dans la laboratoire mais aussi sur le terrain, dans différents écosystèmes du pays.

Son activité de recherche a été orientée vers l'étude d'un groupe d'insectes très importantes du point de vue scientifique et pratique mais peu connues et étudiés à ce moment. Il a commencé avec l'étude des malophages et anoplures parasites des oiseaux et du gibier. Ces études avait comme objectif de connaître leurs diversité, leurs écosystème, leur degré de parasitage, leur actions sur les hôtes et les facteurs qui influent sur leur développement et leur destruction. Les résultats de ces travaux ont été publiés dans 8 articles et une monographie des éditions de l'Université (1996). Ces travaux sont très utiles aux médecins vétérinaires, zootechniciens, ou biologistes ou écologistes du domaine de la biodiversité.

Ultérieurement il a abordé l'étude des insectes entomophages appartenant à l'ordre Hymenoptera, famille Chalchidoidae, Proctotrupidae et surtout la famille Ichneumonidae, sujet traité aussi dans sa thèse de Doctorat ès sciences. Ces recherches ont été une suite des études démarrés par le professeur Mihai Constantineanu, l'initiateur de « l'Ecole d'entomologie » à Iasi.

Les recherches scientifiques du professeur C.Pisica sur les insectes entomophages on prit plusieurs directions comme les études de systématique et faunistique, études de morphologie, biologie et écologie surtout pour les Ichneumonidae.

Les recherches de systématique et faunistique des Ichneumonidae ont eu à la base du matériel entomologique collecté dans différents régions de Roumanie (Dobrogea, Delta Dunării, Podişul Central Moldovenec, munții: Ceahlău, Cheile Bicazului – Lacu Roşu, Rarău, Călimani, Bucegi, Făgăraş etc). Ces recherches ont amélioré les connaissances sur le patrimoine naturel et le génofond faunistique et par l'investigation des écosystèmes vierges des réservations naturelles (Slătioara, Ponoare, Ceahlău, Porțile de Fier, Agigea, Valea lui David – Iaşi ş.a.) il a enrichi les connaissances scientifiques sur la biodiversité des Ichneumonidae

D'autres recherches ont été réalisées sur la base des grants et contrats avec différents bénéficiaires dont le plus récent est un projet de collaboration à « *Fauna Europaea* » financé par la Communauté Européenne (2000-2004).

L'activité de recherche du professeur C. Pisica se retrouve dans 7 monographies, 6 volumes pour les étudiants et plus de 120 articles et communications publiés dans revues de spécialité nationales et internationales. Ses travaux publiées ont été très appréciés sur le plan national et aussi à l'étranger étant sollicités et cités par d'autres chercheurs dans leurs publications (Aubert J. - Franca, Kasparian D.R. - Russie, Townes H. - S.U.A., Thirion C.- Belgique, Hinz R. – Allemagne, etc).

Avec ses travaux de recherche il a participé tous les ans aux sessions de la Faculté dans les « Journées de l'Université » de Iasi, Bucureşti Cluj-Napoca et « Journées des Musées de Sciences Naturelles » de Bucureşti, Piteşti, Craiova, Galați, Bacău et Suceava.

Il a été aussi responsable de l'organisation et le bon déroulement à Iasi d'autres manifestations scientifiques nationales et internationales, surtout pendant la période qu'il était Doyen de la Faculté : Le Congrès National de Biologie « Emil Racoviță » (1992); Le Symposium «L'homme et l'environnement » (1993) ; La 6ème Conférence Nationale d'Entomologie Générale et Appliquée (1995) et Le XVème -Symposium International d'Entomofaunistique Central- Européenne (1996).

Comme reconnaissance de la valeur de son travail scientifique, prof C Pisica a été mentionné dans plusieurs publications biographiques comme : Directory of the Hymenopterists of the World (1982), Who's Who in the Balcans (1998), International Biographical Centre Cambridge (1998), Biologi din România (Ed. Ion Borcea, Bacău, 2001), Who's who în România, Pegasus Press (2002) et il est aussi membre des différentes Sociétés et associations scientifiques : La Société de Sciences Biologiques de Roumanie, La Société Roumaine d'Entomologie Générale et Appliquée, La Société d'Ecologie de Roumanie, L'Association des conservateurs des musées de sciences naturelles de Roumanie, International Society of Hymenopterists – SUA et Membre Titulaire de l'Académie d'Ecologie de République de Moldavie.

Dans sa spécialité et ses directions de recherche, le Professeur C Pisica a attiré des nombreux jeunes chercheurs, d'abord des étudiants, puis des doctorants qui sont devenus ultérieurement des valeureux chercheurs ou universitaires de prestige

Pendant la période 1990 – 1996, en qualité de Doyen de la Faculté de Biologie il a pu mettre en valeur ses qualités de manager et développer de manière importante la Faculté avec une bonne organisation et nombreuses réalisations. Parmi ceux-ci les plus importantes ont été :

- L'indépendance de la Faculté de Biologie par sa séparation de la section Géographie-Géologie en 1990, nouvelle organisation et gestion de l'espace et des moyens techniques : installation de deux microscopes électroniques, ordinateurs pour chaque département et réseau informatique pour les étudiants.
- Rattachement à la Faculté pour la pratique des étudiants, des Stations des Recherches Biologiques de Agigea – Constanta et de Potoci/Pângarati – Neamt.. Les nouvelles organigrammes approuvées par le Ministère de l'Enseignement et de la Recherche, ont été nommés les nouveaux directeurs des ces unités : prof. dr. Gheorghe Mustață à Agigea et prof. dr. Ion Miron à Pâgarați.

Pr. C Pisica c'est beaucoup impliqué dans le développement de la Faculté et il a obtenu l'accord du Ministère de l'Enseignement et de la Recherche pour des nouvelles spécialités, Ecologie et Biochimie, dans le cadre de la Faculté de Biologie de Iasi.

Avec la réorganisation des plans d'enseignement après 1990 et l'augmentation du nombre d'étudiants des nouveaux postes ont été crées et nombreuses promotions réalisés. Pour les étudiants il a fait et signé des conventions d'échanges pour la pratique terrain avec l'Université Paris VII – Département de l'Environnement (1990 – 1996),Université de Jena (1994-1995) et Université de Chisinau (1991 – 1996).

Professeur C. Pisica a eu une contribution importante au développement de l'enseignement roumain de biologie par son toute activité de 45 ans de chercheur, de maître et de promoteur de son domaine et des carrières dans son domaine en tant que membre de Conseil National d'Attestation de Diplômes Titres Scientifiques et Certificats Universitaires (1990 – 1996), mais aussi comme directeur de thèse, coordonnateur de Doctorat, membre des commissions et jurys d'évaluation, de promotion dans la recherche et l'enseignement secondaire et supérieur.

Prof.dr. Gheorghe MUSTAȚĂ

PROF. UNIV. DR. CONSTANTIN PISICĂ – DONOSE

Originar din satul Merişani, comuna Dobroteşti, judeţul Teleorman s-a născut la 1 martie 1932 într-o familie de ţărani gospodari. După şcoala primară din satul natal, a urmat Liceul « Anastasescu » din Roşiorii de Vede în perioada anilor 1944 – 1952, apoi Facultatea de Stiinţe Naturale a Universităţii « Al. Cuza » din Iaşi, facultate absolvită în 1957 cu specializarea biologie – zoologie.

In perioada studiilor universitare pe lângă activităţile didactice obligatorii (cursuri, lucrări de laborator, seminarii, examene etc.) era atras ca de un magnet de laboratorul de zoologia nevertebratelor, de cabinetul profesorului Mihai Constantineanu şi de activitatea desfăşurată în cadrul cercului ştiinţific studenţesc, activitate bine apreciată şi premiată la sesiunile ştiinţifice studenţeşti locale şi naţionale.

Prof. Constantin Pisică a arătat încă de pe băncile facultăţii o înclinare pentru studiul entomomogiei, pe care a ştiut să i-o cultive dascălul său prof. Mihai Constantineanu, marele zoolog – entomolog, căruia îi datorează drumul pe care l-a ales în viaţă.

Reţinut în învăţământul superior, etapic a parcurs toate funcţiile didactice, precum: preparator (1957 – 1959), asistent (1959 – 1962), şef de lucrări (1962 – 1972), conferenţiar (1972 – 1990), profesor (1990 – 2002) şi după pensionare profesor consultant iar în prezent, profesor asociat. Distins cu Premiul Academiei Române « Emil Racoviţă » (1980) şi titlul de «Profesor Emeritus » al Universităţii « Al. Cuza » Iaşi (2002).

Activitatea didactică şi ştiinţifică şi-a desfăşurat-o numai în cadrul Catedrei de Zoologie a Facultăţii de Biologie al cărei bun student a fost. In anul 1959 a devenit doctor în biologie cu teza « Contribuţii la studiul pimplinelor (Pimplinae Cresson, Hym. Ichneum.) din România d.p.d.v. sistematic, biologic, ecolgic şi economic ».

In plan didactic a efectuat lucrări practice şi a predat cursurile de: zoologie generală studenţilor geografi şi geologi; studenţilor biologi le-a predat cursurile de zoologia nevertebratelor, entomologia, biologia dăunătorilor animali, iar la studii aprofundate (master) a predat : filogeneza, rolul insectelor auxiliare în protecţia resurselor biologice vegetale, sistematica şi biologia entomofagilor, dăunătorii pădurilor, animale dăunătoare şi combaterea lor etc. S- a remarcat şi prin aceea că a condus numeroase lucrări de licenţă, lucrări de gradul didactic I şi teze de doctorat (22 la număr, începând din anul 1977). In calitate de confereţiar şi profesor, pe lângă cursurile predate studenţilor a susţinut şi prelegeri de sinteză în cadrul cursurilor de perfecţionare a profesorilor de biologie din învăţământul preuniversitar. In fiecare an universitar a condus practica şi aplicaţiile de teren ale studenţilor în diferte ecosisteme naturale din ţară şi s-a preocupat permanent pentru asigurarea materialului didactic şi de aparatura necesară lucrărilor de laborator cu studenţii.

Cursurile predate studenţilor au fost permanent actualizate cu ultimile noutăţi ştiinţifice de pe plan naţional şi internaţional. Ca profesor, C. Pisică s-a distins repede prin activitatea sa didactică şi ştiinţifică. Prelegerile sale fiind clare, sintetice şi de un înalt nivel ştiinţific, audiate cu deosebită atenţie de către studenţi.

In sprijinul studenţilor a elaborat şi publicat cursurile predate studenţilor, după cum urmează: Curs de entomologie (1973), Editura Univ. « Al. I. Cuza », Iaşi; Biologia dăunătorilor animali (1980), Editura Didactică şi Pedagogică, Bucureşti; Zoologia nevertebratelor (1983), Editura Dedactică şi Pedagogică, Bucureşti; Biologia dăunătorilor animali, îndrumător de lucrări practice (1982); Zoologia nevertebratelor, lucrări practice de laborator (vol. I, 1999 şi vol. II, 2002), Editura Univ. « Al. I. Cuza » Iaşi.

Tot pe linie didactică menţionăm şi faptul că a prezidat numeroase comisii de bacalaureat din Moldova, a participat ca membru în comisiile de licenţă şi ale concursului de admitere în facultate etc.

In anii 1967 şi 1968 a predat zoologia în Republica Guineea – Africa şi a făcut stagii de documentare ştiinţifică în Franţa (1968), Bulgaria (1975), Republica Moldova (1990 şi 1995).

Activitatea de cercetare ştiinţifică a început-o ca student în cadrul cercurilor ştiinţifice studenţeşti la Laboratorul de Zoologie al Facultăţii de Biologie, Universitatea « Al. I. Cuza » din Iaşi, sub îndrumarea prof. dr. Mihai Constantineanu şi a fost orientată spre cercetări din domeniul entomologiei care aveau tradiţie în laborator.

După ce a fost încadrat preparator a lucrat mai mulţi ani alături de prof. Mihai Constantineanu, atât în laborator cât şi pe teren în diferite ecosisteme din ţara noastră.

Activitatea de cercetare a fost orientată spre studierea unor grupe de insecte cu deosebită importanţă ştiinţifică şi practică şi mai puţin studiate în ţara noastră. Astfel, la început a abordat studiul malofagelor şi anoplurelor parazite pe păsările domestice şi de vânat. Studiile asupra malofagelor şi anoplurelor au urmărit cunoaşterea diversităţii lor şi unele aspecte ecologice, precum gradul de parazitare, acţiunea asupra gazdelor, factorii care le influenţează dezvoltarea şi combaterea lor. Rezultatele acestor cercetări sunt prezentate în 8 lucrări publicate în diverse reviste din ţară şi o monografie, publicată în Editra Univ. « Al. I. Cuza » din Iaşi (1996), al căror conţinut interesează atât pe zootehnişti, medici veterinari cât şi pe biologii care se ocupă cu studiul biodiversităţii şi ecologiei.

Ulterior a abordat studiul unor insecte entomofage din ordinul Hymenoptera, familiile Chalchidoidae, Proctotrupidae şi mai ales familia Ichneumonidae care i-a constituit şi subiectul tezei sale de doctorat. Aceste cercetări au constituit o continuare a studiilor iniţiate de profesorul Mihai Constantineanu creatorul unei puternice şcoli de entomologie la Iaşi.

Cercetările ştiinţifice ale prof. C. Pisică asupra insectelor entomofage au cuprins mai multe direcţii, precum studii sistematice şi faunistice, precum şi studii morfologice, biologice şi ecologie, mai ales asupra ichneumonidelor.

Cercetările de sistematică şi faunistică asupra ichnumonidelor au fost făcute pe un bogat material entomologic colectat din numeroase zone ale ţării noastre (Dobrogea, Delta Dunării, Podişul Central Moldovenec, munţii: Ceahlău, Cheile Bicazului – Lacu Roşu, Rarău, Călimani, Bucegi, Făgăraş etc). Cercetările de faunistică au adâncit cunoaşterea patrimoniului natural şi genofondul faunistic, iar prin investigarea unor ecosisteme nealterate din rezervaţii naturale (Slătioara, Ponoare, Ceahlău, Porţile de Fier, Agigea, Valea lui David – Iaşi ş.a.) s-a îmbogăţit mult fondul de cunoştinte referitoare la biodiversitatea ichneumonidelor.

O alta serie de cercetări au fost efectate pe bază de contracte şi granturi de cercetare cu diferiţi beneficiari din ţara, iar mai recent colaborator la *Fauna Europaea* la un proiect finanţat de Comisia Europeana (2000 – 2004).

Activitatea de cercetare şiinţifică a prof. C. Pisică s-a concretizat în 7 monografii, 6 manuale didactce şi peste 120 aricole, studii şi comunicări publicate în diferite reviste de specialitate din ţara şi străinătate. Lucrările sale publicate au fost bine apreciate de specialiştii din domeniul său de activitate, atât din ţara cât şi din străinătate, fiind solicitate şi citate în lucrările lor (Aubert J. - Franţa, Kasparian D.R. - Rusia, Townes H. - S.U.A., Thirion C.- Belgia, Hinz R. - Germania ş. a).

Fiind implicat în munca de cercetare biologică, anual a participat cu importante lucrări ştiinţifice la sesiunile Facultăţii în cadrul Zilelor Universităţii « Al. I. Cuza » Iaşi, Universităţilor din Bucureşti, Cluj-Napoca şi a Muzeelor de Ştiinţele Naturii din Bucureşti, Piteşti, Craiova, Galaţi, Bacău şi Suceava.

In timpul cât a fost decan de facultate s-a preocupat de organizarea şi buna desfăşurare, la Iaşi, a unor manifestări ştiinţifice de nivel naţional şi internaţional : Congresul Naţional de Biologie « Emil Racoviţă » (1992); Simpozionul «Omul şi Mediul Inconjurător » (1993) ; A VI-a Conferinţă Naţională de Entomologie Generală şi Aplicată (1995) şi Al XV-lea Simpozion Internaţional de Entomofaunistică Central-European (1996).

Pe parcursul anilor a participat cu lucrări ştiinţifice la numeroase manifestări ştiinţifice în ţară şi străinătate (Germania, Ungaria, Republica Moldova, Anglia, Republica Cehă, Elveţia).

Ca urmare a recunoaşterii activităţii sale didactice şi ştiinţifice prof. C. Pisică a fost nominalizat în mai multe publicaţii biografice precum: Directory of the Hymenopterists of the World (1982), Who's Who in the Balcans (1998), International Biographical Centre Cambridge (1998), Biologi din România (Ed. Ion Borcea, Bacău, 2001), Who's who în România, Pegasus Press (2002) ş.a. şi a făcut parte din diferite societăţi ştiinţifice: Societatea de Stiinţe Biologice din România, Societatea Română de Entomologie Generală şi Aplicată, Societatea de Ecologie din România, Asociaţia Muzeologilor Natutalişti din România, International Society of Hymenopterists – SUA şi Membru Titular al Academiei de Ecologie din Republica Moldova.

In domeniul şi direcţiile de cercetare abordate prof. C. Pisică a atras numeroşi tineri încă din timpul studenţiei în cadrul cercurilor ştiinţifice studenţeşti şi apoi în cadrul doctoratului, care între timp au devenit cercetători valoroşi şi cadre didactice universitare de prestigiu în ţara noastră.

In perioada anilor 1990 – 1996, în calitate de decan al Facultăţii de Biologie a fost apreciat ca un bun manager, sub conducerea sa facultatea a avut o deosebită dezvoltare, o bună organizare şi importante realizări. Dintre acestea vom menţiona unele mai importante:

Separarea Facultăţii de Biologie de secţia de Geografie-Geolgie la începutul anului 1990; extinderea şi organizarea spaţiului facultăţii; dotarea facultăţii cu aparatura modernă de laborator (două microscoape electronice, aparatura de calcul pentru fiecare catedră, reţea de calculatoare pentru studenţi etc.

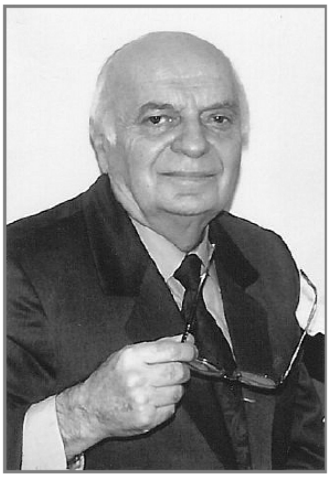
Redobândirea Staţiunilor de Cercetări Biologice şi de practică a studenţilor de la Agigea – Constanţa şi de la Potoci – Neamţ, pierdute de Facultate în perioada anilor 1980. După aprobarea organogramei acestor staţiuni de către Miniserul Educaţiei şi Cercetării, au fost numiți cu aprobarea Senatului Universității directorii acestor stațiuni, prof. dr. Gheorghe Mustață la Agigea şi prof. dr. Ion Miron la Pâgarați.

S- a implicat în dezvoltarea facultății prin înființarea şi obținerea aprobărilor necesare de la M.E.C a secțiilor de Ecologie şi de Biochimie la Facultatea de Biologie din Iaşi.

Prin restructurarea planurilor de învățămât, conform noilor orientări după 1990 şi prin creşterea numărului studenților la cele trei specializăi s-a crea posibilitatea încadrării de noi cadre didactice şi de promovarea cadrelor didactice cu activitate îndelungată în facultate etc.

A făcut convenții de schimb de studenți, în cadrul practicii biologice, cu Departamentul Mediului al Universității Paris VII pentru perioada anilor 1990 – 1996, cu Unversitatea din Jena pentru 1994 şi 1995 şi cu Facultatea de Biologie din Chişinău (1991 – 1996.

Prof. C. Pisică a avut o contribuție substanțială la dezoltarea învățământului biologic românesc prin activitatea sa la catedră timp de 45 de ani, cât şi prin alte activități de promovare a cercetări biologice şi de promovare a cadrelor precum: membru al Consiliului Național de Atestare a Titlurilor Stiințifice, Diplomelor şi Certificatelor Universitre (1990 – 1996; în calitate de conducător de doctorat; membru în numeroase comisii de doctorat, de promovare a cadrelor didactice din învățământul superior şi de cercetare științifică din diferite institute de cercetări, în comisii de acordare a gradelor didactice în învățământul preuniversitar etc.



UNIVERSITY PROFESSOR DR. VARVARA MIRCEA

On the 13th of August 1932 in the village of Dealul Morii, Vultureni Commune, Bacau County, in the Valley of Berheci, Anica and Dumitru Varvara's family rejoiced at the arrival in the world of their first-born child, a boy, baptized Mircea. Five brothers and sisters were to follow: Ştefan, Speranţa, Aneta, Maria and Viorel. With their grand-father, Vasile Plugaru (who died at the age of 91), they made up a family of nine (six children and three adults).

During the war years, 1940-1944, the father of Mircea and his brothers and sisters was called up on military service. He worked in a clerical capacity with a military company. Following the war he became the secretary of a Village Council (1945-1952) and then an accountant in the village of Dealul Morii. For many years he worked long hours at his job only returning home after six in the evening. In these circumstances their mother Anica came to represent their father as the authority figure and was accepted as such by all the Varvara family. Their grand-father's life and his belief in work was also an example to them.

Honest to perfection, their mother, Anica, loved her children, respecting and understanding them in her gentle soul. When the children were squabbling, calling each other names or pushing each other around, she would tell them: "*You should understand each other, love one another, and eat, all of you, from one egg*". It is an original saying, an example of many others from that part of the world.

There is no doubt that their mother, who daily cooked the food for those nine members of the family, was hard-working, wise and just, dividing her diligence between the household chores and the work of the fields, encouraging her children early to take part in these activities, so that each one had something constructive to do at home, in the fields or with the animals. And it was thus that the head of the family, Dumitru Varvara, the householder, a soldier in his early days, and later a minor public official, gave way to his diligent wife and came to play the supporting role to her within the family.

The village of Dealul Morii, equidistant (60km) between the towns of Bacău and Tecuci, was a growing settlement when the eldest child of the family came, through education at school, to have his eyes opened to the wider world of knowledge. Here at school in the village, Mircea Varvara learnt to write on a slate and to read the beloved ABC primer under the guidance of two competent teachers, who both taught two classes simultaneously, each one with alternative activities. On Saturdays all those four forms were taught together in one class with the pupils sitting three to a bench.

As a war-time school-leaver from a rural area, Mircea Varvara, when he graduated from primary school in 1945, had to choose between remaining at home or going on to secondary school. In this he needed his parents' approval. Seeing that the boy liked books and wanted to learn, his mother Anica was insistent with her husband that their boy should follow an academic path. How right she was! The same happened in due course with the other children, both boys and girls, who all benefited from being enlightened by an academic education.

Today, Dealul Morii, within whose educational framework the future pupil, student and man evolved, has become the most beautiful village in the Valley of Berheci. The well-organised settlement with its attractive buildings and its well-laid out network of roads, nestles in its natural surroundings, with farms and fruit trees and village gardens. Stately limes guard the main highway and perfume with the smell of their blossom the beautiful nights and summer days, attracting the diligent bees and generously offering them their nectar and their pollen, which are miraculously converted into honey, propolis and wax.

The most suitable and appropriate school for what his parents destined Mircea to become was to be found at Bârlad. The boy did not refuse, having as his models his teachers, the notary and the priest. The school was near the famous Normal School of Bârlad whose buildings were destroyed in the final part of the Second World War and never rebuilt.

Mircea studied lessons at the school which was renamed the Pedagogical School after the Reforms of the year 1948.

To stay on at school beyond the minimum school leaving age was a very brave effort between the years 1945 and 1952. To the toll in human lives and the economic losses caused by war, the terms of the Armistice, foreign occupation and the Paris Peace Conference of 1947, were added the extra burdens of the period of transition from one socio-political régime to another, the terrible drought of the year 1947, and the pressures of the Communist East on all spheres of activity, economic, administrative, cultural, scientific and, above all, political. The Varvara family managed by dint of hard work and devotion to keep the children protected under the sheltering arm of an academic education and the enlightening influence of books.

At the strict boarding school at Bârlad, Mircea Varvara learnt useful lessons, experiencing life in a heterogenous collective, hardening himself as he faced up to adversity. Brought up at home in the spirit of work and with rural common sense, he respected and strictly adhered to the scholars' traditional codes and customs, and exercised restraint, avoiding the temptations of youth. While the pupils of the boarding school still fought amongst each other from time to time, he advocated patience and tolerance, never quarrelling with anybody. He was convinced that he must gain much knowledge in order to become "at some time or other, somebody, somewhere".

At his side was his best friend and colleague, Valeriu Zanoschi, a model of work and good preparation. Together they formed a well-known pair both in the field of learning and as examples of civilized behaviour, extending beyond the years of their student days until Valeriu was prematurely taken from us in 1996.

Mr. Varvara himself remembers with gratitude and admiration the teachers at Bârlad who skillfully and unselfishly added brick by brick to the building of some solid intellectual and moral civic structures, as only the Pedagogical Schools knew how to and were still capable of doing.

To name some of the teachers: Vasile Velicu, Biology, a mentor who cultivated his pupils' passion for the study of plants, animals, and the human body.
Iancu Maxim, Geography, the published author, after 25 years of tenacious labour, of the much valued work: "The Ethnogenesis of the Romanian People", which, to date, 2007,

has run to four editions. This venerable teacher is now 96 years old and still has an appetite for work.

Mircea Varvara graduated from the Pedagogical School in 1952, receiving a Merit in his Diploma. He then taught at the school in Lăleşti, in the Commune of Pueşti, Vaslui County, where he worked as a supply teacher. And it was as such that he was then transferred, at his own request, to the school at Lozinca-Bacău. All this took place in the school year 1952-1953.

Mircea aspired to gain a higher qualification, and accompanied by his esteemed friend Valeriu Zanoschi, he was admitted for the entrance examination for the Faculty of Natural Sciences – Chemistry at the Alexandru Ioan Cuza University at Iassy. On the basis of his previous Merit Diploma, he was allowed in without having to take the exam. There followed four years of academic study (1953-1957), courses, practical work, field work and serious exams (6 per semester plus oral exams).

The remarkable and much regretted Professor of General Biology, Petre Şuster (1896-1954) made the following remark when he wrote his comments in the students' note-books: "Mircea Varvara has known and answered like a Lion, and Valeriu Zanoschi like a Para-Lion".

In those four years of intense, interesting, pleasant and profound studies, he had the privilege to be guided by people with many years' didactical experience, who as long-term disciples were also learning with him, and as teachers were his mentors and preceptors. These included Mihai Constantineanu, Petre Şuster, Constantin Papp, Olga Necrasov, Mr. and Mrs. Petru and Matilda Jitariu, the brothers Sergiu and Dumitru Cãrãuşu, Zigman Feider, Filimon Cârdei, Constantin Dobrescu, etc. He valued his masters' teaching, their methodology and behaviour and during these years of study, he himself absorbed the subject matter and the science they taught him.

He was a teenager and young man who liked to assimilate knowledge, and during the summer holidays he lent a hand to the family on the farm. He steadfastly gained understanding of the biological and chemical sciences, and graduated from the Faculty passing the State Examination and gaining a Diploma of Merit, a result of which he was appointed to a position as teacher at the Theoretical Liceum in Podul Turcului, in Bacău County in 1957. A year later the Alaxandru Ioan Cuza University invited him to join the ranks of the teaching staff.

It was while he was at Podul Turcului that he decided that the right time had come to tie the matrimonial knot. He and Elena were married on 12th October 1958. And it was thus that he arrived at Iassy a married man.

On the 15th of October 1958, as dictated by the effort necessary at this stage in his life, Mircea Varvara bravely set out on the realization of his professional career, working at the University. He started as chief of a laboratory at the Faculty of Biology-Geography- Geology, which later, in 1990, became the Faculty of Biology. Here he carried on with his activities right up to the age of 70 years old, when he retired. All these years he benefited from very good health, the result of a moderate life-style, and total abstinence from cigarette-smoking and the drinking of alcohol.With patience and optimism he gradually rose through a succession of university posts, gaining in turn the following degrees and positions:

1958-1960	Chief of Laboratory	Faculty of Biology,	Iassy University
1960-1966	Teaching Assistant	Pedagogical Institute	Iassy for three years while also continuing at the Faculty of Biology at Iassy University
1966-1990	Lecturer (Ph.D.)	Faculty of Biology,	Iassy University
1990-1994	Reader (Ph.D.)	Faculty of Biology,	Iassy University
1994-2002	Professor (Ph.D.)	Faculty of Biology,	Iassy University

1972	**Doctor of Biology**
2002	**Emeritus Professor at the University by the Decision of the Senate of the Alexandru Ioan Cuza University, Iassy, no. 4879, July 2002.**
2003	**Certificate** of inclusion in the first edition of the Book: **"The Contemporary Who's Who",** edited by the American Biographical Insitute, USA.
2004	**Diploma of Excellency** granted for special merit by the Faculty of Biology, University of Iassy, for strengthening, developing and raising the prestige of the Entomological School of the University of Iassy.
2005	**Associate University Professor (Dr.)**

In summary, the work of Mircea Varvara, Professor, Biologist and Entomologist can be described in the following *concrete and pragmatic* terms:

- Constant endeavour to further his own development in the field of his specialisation: doctorate, *perfections*, the experience of academic exchanges, correspondence.
- Constant and tireless involvement in the training of others (Master's Degrees, Teachers of Biology, Candidates for PhDs).
- Involvement in basic and applied biological research *concretized* in scientific papers published either on his own or in collaboration with colleagues.
- The *elaboration* of papers on practical field work, regarding tackling modes of research and the protection of the natural environment.
- Engagement in social and humanitarian activities useful to students and to people in general.

Thus, in the year 1964, he was admitted to prepare for a higher academic qualification, a Doctorate, under the *aegis* of the Alexandru Ioan Cuza University at Iassy. His supervisor was Emeritus Professor Doctor Docent, Mihai I. Constantineanu, a well-known and respected entomologist both in Romania and abroad.

On the 2nd of December 1972, after eight years of assiduous work, he presented his doctoral thesis, the title of which was "**Pest insects of the plum tree in Iaşi County and their natural enemies (entomophagous insects)"**, to the Commission and before a capacity audience in lecture room B2 of the Faculty of Biology. Numerous first year students, whom the candidate was teaching the practical Zoology of Invertebrates, attended.

The Examination Board for the doctorate, a prestigious one, was composed of:

- The President: University Professor, Doctor, Docent Sergiu Cărăuşu
- The official Reviewers: University Professor, Doctor, Docent Constantin Bogoiescu of the University of Bucharest; University Professor, Doctor, Docent

Mihai Peiu of the Institute of Land Management, Iassy; University Reader Dr. Gheorghe Boguleanu of the Institute of Land Management, Bucharest.

The thesis drafted by lecturer Mircea Varvara represented a study, with multiple ecological aspects, of the partnership of the plum tree and its entomocoenosis, from the orchards of plum trees in the Moldavian Central Plateau (Iasi County).

The main quantitative results of the thesis regarding the pest-insects/predators/parasites, were cited by Professor Mihai Ionescu, entomologist, Corresponding Member of the Romanian Academy in a scientific article published in "Science Progresses" no. 4/1973, p183-189.

In his professional work, Mr. Mircea Varvara manifested particular diligence, seriousness and responsibility and worked with perseverance. He had confidence in people and especially in students who listened to his explanations in the practical work and in the courses that he taught, courses that were held both for them and for the teachers who came to prepare for teaching diplomas in the preliminary stages of University education.

Directly or indirectly, he required his students, and those aspiring to perfection, not to merely scratch the surface, but to dig down deep to the hidden roots in their search for the causes of phenomena and the relationships of things. For many years in the course of his teaching activities he undertook field-work in different ecosystems. The principles of zoology, entomology, and ecology were all applied and thus an important link for the use, application and consolidation of knowledge from laboratories and lecture theatres at one end of the spectrum to the wider world of nature at the other, was created.

The wealth and diversity of his teaching activities resulted in synthesis as shown in the following:

The course of his normal teaching covered the performance of practical laborotary work with students in 14 subjects, Just a few of those disciplines are here ennumerated: Invertebrate Zoology, General Entomology, Agricultural Entomology, Paleontology, Principles of Ecology, General Ecology and the Protection of the Environment.

This difficult situation did not discourage him. On the contrary it motivated him in the search for explanations for the links between the processes of adaptation, survival and reproduction of the species.

His work on text books for both course and practical work was of great value and benefit to students: he *produced* and published the following manuals:

- Invertebrate Zoology: Manual of Practical Work Vol.1 (1978), Vol. II (1980)
- The Paleontology of Vertebrates –Handbook of Practical Work (1985)
- A Course of Geology-Stratigraphy and Elements of Paleontology (1993)
- A Course of Ecology (First Edition 1998, Second Edition 2002)
- Practical Works of Ecology (2001)
- General Biology and Ecology (2001) for students studying from a distance.

For over 35 years he guided the biology students of Iassy in their practical biological work in the territory of Moldavia. He also took them on field trips to Germany for three weeks in 1982 and 1987, and to France in 1993. In addition, in 1982 and 1985, he took German students from the University of Jena on fieldwork trips to study aquatic and terrestrial ecosystems in Romania.

For an appreciable number of years he guided the curriculum, from the fourth year onwards, for pupils from the General Schools and the Lycées of Iassy.

He supervised the publication under licence of 84 works covering the theory and, more particularly, the practical work of Zoological and Ecological subjects including agricultural, forest and steppe-ecosystems).

He collaborated on the production of 34 texts on the nature of the methodology of Biological science, a requisite component of Part 1 of the Teacher Training qualification in the preliminary, pre-university Diploma, taken by teachers from the Moldavian communes and towns.

For all this he needed a high degree of competence as a scientist and as a teacher, good health to put up with all the moving around, and the ability to cope with stress.

Educated in the spirit of the Pedagogical School with its expectation of high levels of educational attainment and progression on to university, Professor Mircea Varvara was a member of 40 commissions of inspection. He evaluated the teaching qualities and organizational skills of aspiring Biology teachers , deciding whether they merited to receive a first degree in the teaching of Biology and whether they had duly attended their courses and taken part in discussions; He evaluated and weighed up the results of the candidates and objectively decided whether they had demonstrated the qualities of a good teacher.

He drafted and taught whole and part-time courses for 13 subjects for students at undergraduate level: courses for resident students, and for extra-mural degrees. He also supervised courses for candidates for Master's Degrees. These courses included Invertebrate Zoology, General Ecology, Historic Geology and Paleontology (Extra-mural); General Ecology , General Ecology and the Protection of the Environment, Principles of Ecology (courses for full-time students); Pests of cereals and *technical* plants, The Effects of Pollution on Animal Organisms (Courses for Candidates for MSc. Degrees).

In his capacity as Lecturer and Reader, Professor Mircea Varvara taught *composite* courses for final degrees, for secondary diplomas in Education and for *the activity of perfection.* In these he focussed on problems of speciation, evolution and adaptation. Examples of these were: The evolution of the digestive, respiratory, circulatory, and excretory systems and of the nervous system in invertebrate animals, with reference to problems in Biology characterized by synthesis, clarity and conex explanations.

For over 45 years Professor Mircea Varvara's scientific activity has been focused on several lines: personal scientific activity; scientific activity with students and with teachers of Biology; scientific activity of specialization and of realization of scientific contracts; scientific activity participating in Symposia and International Congresses; activity on doctoral Commissions.

Personal scientific activity has evolved in two directions focusing on the taxonomic and the ecological.In the ecological direction he has tackled as a priority aspects of the ecology of insects in the zoo-geographical region of Moldavia. For example, he has researched and specified the phenology, the food consumption, the behaviour, the prolificity of the following species in the climatic conditions of Iassy: Melasoma populi, M. tremulae, Malacosoma neustria, Aporia crataegi, Lymantria dispar, Coccinella septempunctata, Neurotoma nemoralis. On the basis of the wealth of material collected, he specified the complex of parasitoids of the stages of egg, larva, and chrysalis in the species of harmful Lepidoptera (Aporia crataegi, Yponomeuta padellus, Euproctis chrysorrhoea, Lymantria dispar, Malacosoma neustria) in the ecosystem of the plum tree orchards of Central and Northern Moldavia.

The richest field of activity concerning different ecological aspects, and the one which has resulted in the most published material, has been carried out upon the Carabidae (Coleoptera) family, from the terrestrial, natural and agricultural ecosystems of Moldavia. He specified the diversity, distribution, phenology, dynamics, abundance, dominance, etc. of some species of Carabidae from the forest associations of Querco-carpinete, Carpino-Fagete, Abieto-Fagete, as well as from natural meadows, apple tree orchards, agricultural crops (winter wheat, maize, potatoes, sugar beet) on the basis of the material collected from different Moldavian localities in the course of many years.

He published over 100 scientific papers, the great majority being drafted in the English language by the author himself. On the basis of the authentic scientific material collected from different ecosystems, he also drafted 62 contracts and scientific grants, for 35 (56%) of which he was the sole author.

In his scientific research, Professor Mircea Varvara took a keen interest that his papers should be backed up by a wealth of natural data, and he manifested a particular care in the drafting of papers and in synthesizing the presentation of the results in front of the specialists and the biologists.

His scientific research activity was much appreciated and he was invited to attend scientific conferences (Symposia and Congresses, and 8 Internationals) where he presented 13 communications: Hungary (1983, 1989, 1991), England (1994), Czech Republic (1998), Switzerland (1999), Austria (2003). At the Vth European Congress on Entomology, York, England" (1994) he participated with two papers which he presented in the English language. At the Scientific Conference "The VIth European Conference on Entomology" Ceske Budejovice, Czech Republic (1998), he attended with two other presentation papers.

Some of his scientific results are cited in several doctoral theses from Romania, or in papers in other countries abroad (for example, Thiere Hance, 1998), or in specialist scientific journals.

In the line of his scientific work, he made trips abroad for information, specialization, documentation and exchanges of experience, in the course of which the means of communication was mainly in English. We cite: The Institute of Ecology, Warsaw, 1974 and 1991; The Institute of Zoology, Freiburg, 1986 and 1995.

In appreciation of his contribution to the science of entomology, biologists Traian Ceuca (University of Cluj) and Irinel Popescu (University of Iassy) have dedicated to the name of Mr. Varvara the following species: Entomobielzia (Moldovobielza) varvara n. sp. (1985), (Diplopoda) and respectively Torymus varvarai (Chalcidoidea, Torymidae, 2005). (Insecta).

On account of his scientific competence Professor Mircea Varvara was named by the doctoral Commissions as official reviewer for the analysis and evaluation of the contents of doctoral theses. He was also a member of numerous Commissions for the examination of candidates for the degree of Doctorate.

Taking into account his long and fruitful didactic and scientific activity in the domains of Invertebrate Zoology, Entomology and General Ecology, exerted to the limits of his powers and capacities, the Senate of the Alexandru Ioan Cuza University, at the proposal of the Scientific Council of the Faculty of Biology, headed by university Professor Dr. Gheorghe Mustață (Dean), conferred on him the title of Emeritus Professor, by the Decision No. 4879/July 2002, the year in which superannuation led him to retire from teaching activity.

Professor Mircea Varvara is named for merit in scientific research and in university didactic activity in eight international publications: International Who's Who of Intellectuals. Edition 13, 1999, Cambridge, England; Contemporary Who'sWho. American Biographical Institute, 2002-2003, pg. 302; The Contemporary Who's Who of Professionals, 2004 SUA; and five home publications: Who's Who in Romania, 2002 pg. 697; Nature and Biological Research in Bocovina, pg.180-182; etc. Besides all of this, between the years 1958 and 2004, Professor Mircea Varvara, both as a young man and in more advanced age, has carried on a rich and varied array of communal and public activities. These consisted of the organization and guidance of the productive practice of students (1970-1978); the organization of the trade-union group (1967-1970); president of the Syndical Section of Biology (1986-1989); vice-president of the Red Cross Commission (1980-1987); member of commissions for analysis of courses, commissions for the promotion of teaching staff (lecturers, readers, professors). Since 1990 he has been a member of the Drafting Committee of the Scientific Annals of the Alexandru Ioan Cuza University with the task of verifying the translation of scientific papers into English.

In accepting the hypocratic typology of tempers, according to the descriptions of extro and introversion powers, we have reasons to understand that Mr. Varvara is an introvertti, overwhelmed by the qualities of extroversion, a consequence of the profession practiced in life (with people, for people and nature).

Taking into account the neuro-physiological aspects manifested by Mircea Varvara, general line of conduct, details of temperament and the temperamental interferences (as pure types of temperament), I have found him , as a matter of fact, to be a phlegmatic with sanguine influences .

In difficult moments, faced with embarrassment , he remains within his temperament, that is: prudent and reserved , calm and tactful, indulgent and patient, gentle and discreet, emphatic,co-operative, attentive those in need.

He is a combinative type, according to creative general aptitudes (intelligence, imagination, observant, good memory , practical with applicative inclinations) . A stable superior motivator of long standing ; highly receptive towards scholar and education (correctly guiding and cultivating), the university has help create Mircea Varvara, an indisputable man of character **.**

In theoretical and practical activities (with the students and other categories of specialists working in agriculture,viticulture, fruit growing and sylviculture, protecţion of plants and the combat of pests) he has proved an analytical- synthetic thinker, with the correlative understanding of natural and anthropic biological phenomena. He has a good visual memory and a great openness towards improvement, always confident in the future. He has never felt tired and bored with work.

And Mircea Varvara hobbies and his private life are also extraordinary and extra professional , such as :

- Walking as a morning pleasure 50 minutes for over 40 years, from home to his faculty, and the numerous trip , excursions with particular or professional character;
- Learning, as an autodidact, the English language , something that has brought him great satisfaction in communicating through science with people from abroad, he has friends in England, Scotland, Ireland , Holland, France , Germany, the United States

of America. He has also presented the results of some papers at International Congress. He has drafted of papers directly into English;

- Communicating with people (relatives, colleagues, friends, collaborators, institutions) by classical correspondence (letters), telephone (fix, mobile), fax, e-mail or drafted papers , setting in motion a richness of particular information and of specialities.

Next year (October, 2008) Elena and Mircea Varvara will celebrate their "Golden Wedding Anniversary" . An honorable, stable family , enriched and widened , through time , by the births, education and professions of two sons: Varvara Viorel (48 years old), university Professor Ph.D. at "Gh. Asachi" University and Varvara Cătălin (38 years old), Company manager , of two daughters- in - law, Roxana and Beatrice who are both doctors. Their families have given them two grand daughters: Sorana an economist, graduated in the profile faculty from the town of Bern. She is now married and living in Switzerland . And Karina, the clever one, at only the age of two years and 8 months, (2007).

In a previous corespondence, (2004) with modesty and full sincerity Mircea Varvara confessed to me briefly: **" all my life I have liked to work… I am grateful to chance, fortune,destiny, parents , especially to the work and qualities of my wife and children, to my temperament that have made me a toiler of the long- distance race, tolerant, submitting to the Empire of Hope**". Yes, I say and write it again this is Mircea Varvara!

Because he has from his very beginnings had the fundamental principles of behaviour of the workers of the sacred Homeland deeply rooted in his personality, both country people and town folk consider him to be one of them.

He has been and remains a biologist, teacher and researcher well-known in Iassy as well as in the whole of Moldavia , for his contribution to the training and perfecting of our pre-university teaching staff, and of numerous generations of students, and to the advancement of the study of Biology in our schools.

For amiability, generosity, team-spirit in research, professional altruism and openness to collective activity, he has been liked without reserve as much by his older colleagues and those of the same generation as him, as by a younger generation aspiring to knowledge about nature and its conservation.

Through contracts and scientific grants of practical importance he has traveled beyond the borders of Moldavia, and has had influence , as a research scientist on young researchers in Transylvania, Oltenia, the Barsei Country and the Republic of Moldavia.

For contemporaries and for posterity, University Professor Mircea Varvara, is seen as the embodiment of reason and seriousness of expectation. For his intellectual endeavour and prolonged physical efforts, for his lack of self-interest and his kindness in his relationships with people, a well-meritied place of honour has been reserved for him in the rich gallery of Iasiensian biologists.

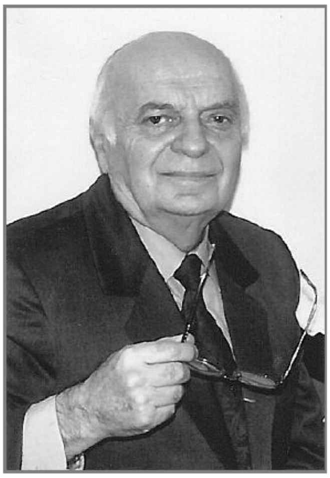
This presentation cannot be brought to a close without emphasizing the fellowship, the co-operative spirit, the particular understanding of which the relationships with all those who would wish to call him their friend are proof. I count myself such a friend and realize the full advantages and the pleasure this friendship has brought me.

Acknowledgements

The translation of the text from Rumanian into English was carefully read and kindly improved by Mrs. **Elisabeth Berry**, Scotland, Tayfield. Her humanism, the competence and help are most highly appreciated.

The text in the Romanian language was drafted by first Degree teacher, Mihai Bejinaru,based on documentary material. The beneficiary of this presentation brings collegial and friendly thanks for his special competence and kindness.

First Degree Teacher Mihai Bejinaru,
Campul Lung Moldovenesc, 2007



PROF. UNIV. DR. VARVARA MIRCEA

Pe Valea Berheciului, în satul Dealul Morii, comuna Vultureni, judeţul Bacău, la 13 august 1932, familia Dumitru şi Anica Varvara s-a bucurat de venire pe lume a primului lor copil, băiatul botezat Mircea. I-au urmat apoi fraţii şi surorile: Ştefan, Speranţa, Aneta, Maria şi Viorel. Împreună cu Vasile Plugaru, bunicul lor (decedat la vârsta de 91 ani), alcătuiau o familie de noua membri (6 copii şi 3 adulţi).

Mama lor , Anica şi-a iubit copii, respectându-i şi înţelegându-i în sufletul ei blând, spunându-le, „Să vă înţelegeţi, să vă iubiţi şi să mâncaţi toţi dintr-un ou!”, expresie originală, pilduitoare, ca multe altele de prin partea locului.

Fără îndoială că mama lor, care zilnic pregătea hrana pentru cei 9 membri ai familiei, era harnică şi chibzuită, împărţindu-şi vrednicia între treburile gospodăreşti şi munca câmpului, antrenând copiii la aceste activităţi, încât fiecare avea ceva concret de făcut acasă, pe ogor sau cu animalele.

Satul Dealul Morii , la egală distanţă (60 km) între oraşele Bacău şi Tecuci, era o aşezare umană în plină formare când, primul copil al familiei, a deschis „ochii cunoaşterii”, prin şcoală. Aici, la şcoala din sat, Mircea Varvara a învăţat scrisul pe tăbliţa de gresie şi cititul pe îndrăgitul Abecedar, sub îndrumarea competentă a doi învăţatori care predau la câte două clase deodată, fiecare cu activitate alternativă, iar sâmbăta, toate cele patru clase erau împreună, încât elevii stăteau câte trei în bancă.

La terminarea şcolii primare, în 1945, absolventul vremurilor de război, Mircea Varvara, cu acceptul părinţilor, avea de ales între “să fi rămas fecior la plug, să fi rămas la coasă” sau să meargă la şcoală “mai departe”. Văzând că îi plăcea cartea şi dorea să înveţe, mama Anica, a insistat pe lângă soţul ei, ca băiatul lor, să urmeze drumul şcolii şi… n-a greşit! Aşa s-a întâmplat şi cu ceilalţi copii (băieţi şi fete), care au beneficiat de “lumina şcolii”.

Astăzi, (2007) Dealul Morii, de care s-a desprins încet-încet viitorul elev, student, cadru didactic , a ajuns cel mai frumos sat de pe Valea Berheciului , ca amplasare, sistematizare, căi de circulaţie şi ambient natural: gospodării cu pomi fructiferi şi grădini săteşti, tei falnici care străjuesc şoseaua principală şi parfumează cu mirosul lor de flori nopţile şi zilele frumoase de vară, atrăgând harnicele albine, “oferindu-le cu mărinimie” nectarul şi polenul lor, miraculos convertite în miere, propolis şi ceară.

Cea mai potrivită şi apropiată şcoală pentru ceea ce doreau părinţii să ajungă Mircea, avându-i drept model pe învăţători, notar şi preot, a fost găsită la Bârlad. Este vorba despre vestita Şcoală Normală–Bârlad, rămasă fără localul propriu, distrus în partea finală al celui de al Doilea Razboi Mondial

A urmat cursurile şcolii, devenită Pedagogică, după Reforma din 1948, intre anii 1945-1952..

În şcoala din Bârlad, cu internat sever, Mircea Varvara a învățat carte folositoare, deprinzând viața într-un colectiv eterogen, călindu-se în lupta cu greutățile, avându-l de partea sa pe colegul şi cel mai bun prieten al său Valeriu Zanoschi, model de muncă şi pregătire, dispărut prematur. (1996)

Cu admirație şi recunoştință, domnul Varvara, îşi aminteşte de profesorii bârlădeni care, cu pricepere şi dăruire , au pus cărămidă peste cărămidă în „clădirea" unor temeinice structuri intelectuale şi moral-cetățeneşti, cum numai Şcolile normale ştiau şi puteau s-o mai facă,nominalizând-i pe profesorii: *Vasile Velicu* (biologie, mentor în cultivarea pasiunii elevilor pentru cunoaşterea plantelor, animalelor şi a corpului omenesc), *Iancu Maxim*, (geografie, autor (după 25 de ani de muncă tenace) a valoroasei cărți „Etnogeneza poporului român", publicată până acum, 2007, în 4 ediții. Venerabilul profesor a împlinit vârsta de 96 de ani.

A absolvit Şcoala Pedagogică (1952), primind Diplomă de Merit

Năzuind la calificare superioară, însoțit de apreciatul său prieten Valeriu Zanoschi, se înscrie la concursul de admitere în Facultatea de Ştiințele Naturii-Chimie a Universității „Alexandru Ioan Cuza" Iaşi. În baza Diplomei de merit este admis fără examen. Urmează anii de studii academice (1953 – 1957) constând în cursuri, lucrări practice, practică în teren şi examene serioase (6 pe semestru, plus colocvii).

În cei 4 ani de studii intense, interesante, plăcute şi profunde a avut parte de călăuza unor personalități cu îndelungat apostolat şi multă experiență didactică, precum: Mihai Constantineanu, Petre Şuster, Constantin Papp, Olga Necrasov, soții Petru şi Matilda Jitariu, frații Sergiu si Dumitru Cărăuşu, Zigman Feider, Filimon Cârdei, Constantin Dobrescu etc.

De-a lungul anilor de studii, a absorbit în propria-i personalitate, cunoştințele de la obiectele şi ştiințele predate de valoroşii lui dascăli, în metodologiile şi comportamentele lor, onorante.

A fost adolescentul şi tânărul care îi placea să asimileze cunoştințe, iar în timpul vacanțelor de vară, oferea familiei "mână de lucru". Permanent şi neabătut a cules şi a căutat să înțeleagă ştiințele biologice şi chimice, absolvind facultatea cu Examen de Stat şi Diplomă de merit, drept pentru care a obținut post de profesor la Liceul Teoretic din Podul Turcului- Bacău (1957). Un an mai târziu, Universitatea "Alexandru .Ioan Cuza", l-a chemat în rândul cadrelor didactice.

Podul Turcului a fost locul care i-a hotărât, la timpul potrivit (12.10.1958), destinul matrimonial, aşa încât ajunge la Iaşi, gata căsătorit cu Varvara Elena.

Braț la braț cu efortul şi nevoile vârstei, la data de 15 octombrie 1958, Mircea Varvara, începe munca în realizarea profesională, universitară. A început ca Şef de laborator la Facultatea de Biologie-Geografie-Geologie din Iaşi, devenită apoi Facultatea de Biologie (1990) unde şi-a desfăşurat activitatea până în anul 2002, când, la vârsta de 70 ani, s-a pensionat, după ce a benefeciat de o sănătate foarte bună, ca urmare a unui mod de viață cumpătat.

Succesiv, cu optimism şi răbdare, la aceeaşi Instituție de învățământ superior ieşean, a parcurs următoarele trepte universitare, obținând şi titlurile aferente:

1958 - 1960, Şef laborator, Facultatea de Biologie, Iaşi;

1960 - 1966, Asistent, Institutul Pedagogic de 3 ani, Iaşi şi Facultatea de Biologie, Iaşi;

1966 - 1990, Şef de lucrări dr. Lector, Facultatea de Biologie, Iaşi;

1990 - 1994, Conferențiar univ. dr., Facultatea de Biologie, Iaşi;

1994 - 2002, Profesor univ. dr., Facultatea de Biologie, Iaşi.
1972, Doctor în Biologie;
2002, Profesor universitar **emeritus** prin Hotărârea Senatului Universităţii „Alexandru Ioan Cuza”, Iaşi nr.4879, iulie, 2002;
2003, **Certifica**t de includere în prima ediţie a cărţii „The Contemporary who’s who”, editată de American Biographical Institute, SUA;
2004, **Diplomă** de Excelenţă acordată de Facultatea de Biologie Iaşi pentru merite deosebite în întărirea, dezvoltarea şi ridicarea prestigiului Scolii de Entomologie de la Universitatea, Iaşi;
2005, Profesor universitar dr. **asociat**.

Global, munca dascălului biolog,entomolog Mircea Varvara, o găsim manifestată în următoarele planuri concret-pragmatice:

- strădania permanentă pentru propria formare, în specialitate (doctorat, perfecţionări, schimburi de experienţă, corespondenţă);
- preocuparea constantă, neostoită, în formarea altora (studenţi, masteranzi, profesori de biologie, doctoranzi);
- implicarea în cercetarea biologică fundamentală şi aplicativă, concretizată în lucrări ca singur autor sau în colaborare;
- elaborarea de îndreptări de muncă practică, în teren, privitoare la modul de abordare a cercetării şi protejării naturii înconjurătoare;
- angajarea în activităţi social-umanitare folositoare semenilor ş.a.

Astfel, în anul 1964, s-a înscris la forma de pregătire superioară academică (doctoratul), în cadrul Universităţii „Alexandru Ioan Cuza”, Iaşi. L-a avut ca îndrumător ştiinţific pe profesorul emerit doctor docent, Mihai I. Constantineanu, reputat entomolog în ţară şi peste hotare.

După opt ani de muncă asiduă, pe 2 decembrie 1972, susţine teza: „**Insectele dăunătoare prunului din Judeţul Iaşi şi duşmanilor lor naturali (insecte entomofage**)”, în faţa Comisiei şi a unui auditoriu care au ocupat toate locurile amfiteatrului B2 al Facultăţii de Biologie. Au asistat numeroşi studenţi ai anului I, la care aspirantul, preda lucrările practice de Zoologia nevertebratelor.

Comisia de doctorat, una de prestigiu: Preşedinte, profesor univ. dr. docent Sergiu Cărăuşu; referenţi oficiali, profesor univ. dr. docent Constantin Bogoiescu de la Universitatea Bucureşti; profesor univ. dr. docent Mihai Peiu de la Institutul Agronomic Iaşi; conferenţiar univ dr. Gheorghe Boguleanu de la Institutul Agronomic, Bucureşti.

Teza elaborată de Şeful de lucrări-lector, Mircea Varvara, a reprezentat un studiu cu multiple aspecte ecologice asupra consorţiului prunului şi entomocenoza sa din livezile de pruni din Podişul Central Moldovenesc (Judeţul Iaşi)

Principalele rezultate cantitative ale tezei privind relaţia dăunători-prădători, parazitozi au fost citate de profesorul Mihai Ionescu , entomolog, Membru corespondent al Academiei Române, într-un articol ştiinţific publicat în” Progresele Ştiinţei” nr. 4/1973, p.183-189.

Profesional, Domnul Mircea Varvara s-a manifestat ca o persoană deosebit de sârguincioasă, serioasă şi responsabilă

A efectuat lucrări practice de laborator cu studenţii la 14 discipline din Planurile de învăţământ: Zoologia nevertebratelor, Entomologie generală, Entomologie agricolă, Paleontologie, Principii de ecologie, Ecologie şi protecţia mediului şi Ecologie generală.

Aferent acestora, a venit în sprijinul studenților prin elaborarea şi publicarea următoarelor manuale de lucrări practice şi cursuri:

Manual de lucrări practice de Zoologia nevertebratelor Vol I (1978), Vol.II (1980); Paleontologia vertebratelor Caiet de lucrări practice (1985); Curs de Geologie-Stratigrafie şi Elemente de Paleontologie (1993); Curs de Ecologie (ediția I 1998, ediția II 2002); Lucrări practice de Ecologie (2001); Biologie generală , ecologie, pentru Invățământul la distanță (2001).

A condus practica biologică a studenților biologi ieşeni, pe teritoriul Moldovei (peste 35 de ani); şi câte trei săptămâni în Germania (1982, 1987); în Franța (1993), precum şi a studenților germani de la Universitatea din Jena (1982,-1985) în ecosisteme acvatice şi terestre din România.

A îndrumat practica pedagogică a studenților, în prag de absolvire, la şcoli generale şi licee din Iaşi, un număr apreciabil de ani.

A îndrumat teoretic, şi mai ales practic, elaborarea a 84 de lucrări de licență, acoperind subiecte de zoologie şi ecologie (din ecosisteme agricole, forestiere şi de stepă).

A coordonat elaborarea a 34 lucrări cu caracter metodico-ştiințific de Biologie, necesare obținerii gradului didactic I în Invățământul preuniversitar de către profesorii din comunele şi oraşele moldovene, activitate ce a presupus sănătate pentru deplasări, rezistență la stress şi competență ştiințifico-pedagogică.

Format în spirit normalist şi pedagogic, cu exigențele învățământului asumate, universitarul Mircea Varvara a fost membru în 40 Comisii de inspecții şi evaluare a cunoştințelor, calităților didactice şi organizatorice ale profesorilor de biologie pentru a merita şi primi acordarea gradului I în învățământul biologic, participând la orele predate, discutarea, evaluarea şi aprecierea rezultatelor candidaților, probând calitatea de bun didact, obiectiv.

A redactat şi predat cursuri parțiale şi integrale pentru 13 discipline, aferente studenților (cursuri de zi, cursuri fară frecvență, masteranzi), precum: Cursuri de Zoologia nevertebratelor, Ecologie generală, Geologie istorică şi Paleontologie (cursuri fără frecvență); Ecologie generală, Ecologie generală şi protecția mediului, Principii de ecologie (cursuri de zi); Dăunătorii cerealelor şi plantelor tehnice, Efectele poluării asupra organismelor animale (cursuri pentru Masterat).

Pentru profesorii de Biologie din Invățământul preuniversitar din Moldova (definitivat, obținerea gradului II, perfecționare) în calitate de Lector şi Conferențiar, a predat cursuri de sinteză, axate pe problemele de speciație, evoluție, adapatre. Exemplu: Evoluția sistemelor digestiv, respirator, circulator, excretor şi a sistemului nervos la animalele nevertebrate, ca probleme de referință în Biologie, caracterizate prin sinteză, claritate şi explicații conexe.

Activitatea ştiințifică a profesorului Mircea Varvara, pe peste 45 ani, s-a realizat şi concretizat pe mai multe linii: activitate ştiințifică personală, activitate ştiințifiică cu studenții, cu profesorii de biologie, activitate ştiințifică de specializare, de realizare de contracte ştiințifice, activitate ştiințifică ca participant la simpozioane, congrese internaționale, activitate în comisii de doctorat.

Activitatea ştiințifică personală a evoluat şi s-a concretizat pe două direcții: direcția taxonomică şi direcția ecologică, modernă.

In direcția ecologică a abordat, cu prioritate, în regiunea zoogeografică a Moldovei, aspecte ale ecologiei insectelor. De exemplu, a cercetat şi precizat fenologia, consumul de hrană, comportamentul, prolificitatea, in condițiile climatice de la Iaşi a speciilor: *Melasoma populi, M. tremulae, Malacosoma neustria, Aporia crataegi, Lymantria dispar, Coccinella septempunctata, Neurotoma nemoralis*. Pe baza unui bogat material colectat, a precizat complexul de parazitoizi la stadiile de ou, larvă, crisalidă, în condiţiile biocenotice ale ecosistemului livezilor de pruni din Centrul şi Nordul Moldovei la speciile de lepidoptere dăunătoare: *Aporia crataegi, Yponomeuta padellus, Euproctis chrysorrhoea, Lymantria dispar, Malacosoma neustria*.

Cea mai bogată activitate de teren si publicistică, privind diferite aspecte ecologice, a fost desfăşurată asupra familiei Carabidae (Coleoptera), din ecosisteme terestre naturale şi agricole ale Moldovei. A precizat diversitatea, răspândirea, fenologia, dinamica, abundenţa, dominanţa numeerică, etc. a unor specii de Carabidae din asociaţiile forestiere de Querco-Carpinete, Carpino-Făgete, Abieto-Făgete, precum şi din pajişti naturale, livezi de meri, culturi agricole (grâu, porumb, cartofi, sfeclă de zahăr) pe baza materialului colectat din diferite localităţi moldoveneşti, pe parcursul multor ani.

A publicat peste 100 de lucrări, marea majoritatea redactate în limba engleză, de către autor. si a redactat 62 contracte şi granturi ştiinţifice. însumând peste 800 de pagini.

In cercetarea ştiinţifică, profesorul Mircea Varvara a urmărit ca lucrările sale să aibă suportul bogat al datelor din natură, manifestând deosebită grijă în redactarea lucrărilor şi prezentarea sintetic-atrăgătoare a acestora în faţa auditorului de specialitate.

Apreciat pentru activitatea de cercetare ştiinţifică, a fost invitat şi a participat la manifestări ştiinţifice (Simpozioane şi Congrese, 8 internaţionale), unde a susţinut 13 comunicări: Ungaria (1983, 1989, 1991), Anglia (1994), Cehia (1998), Elveţia (1999), Austria (2003). La "5th European Congress of Entomology, York, England" (1994), a participat cu două comunicări pe carea le-a susţinut în limba engleză. De asemenea, la manifestarea ştiinţifică "The VIth European Congress of Entomology", Ceske Budejovice, Cehia (1998), a participat cu alte două comunicări.

Pe linie ştiinţifică a făcut deplasări în străinătate pentru informare, specializare, documentare şi schimburi de experienţă, folosindu-se pentru comunicare, mai ales, de limba engleză. Citām: Institutul de Ecologie, Warşovia 1974, 1991; Institutul de Zoologie , Freiburg 1986 şi 1995.

Apreciindu-i contribuţiile la cercetările entomologice, biologii Trăian Ceuca (Universitatea Cluj) şi Irinel Popescu (Universitatea Iaşi), dedică numele domnului Varvara urmatoarelor specii: Entomobielzia (Moldovobioelza) varvarai n. sp. (1985), respectiv Torymus varvarai (Chalcidoidea, Torymidae, 2005).

Luându-i-se în consideraţie îndelungata şi rodnica activitate didactică şi ştiinţifică, în limita puterilor şi capacităţilor sale, în domeniile Zoologiei nevertebratelor, Entomologiei şi Ecologiei generale, Senatul Universităţii "Alexandru Ioan Cuza", la propunerea Consiliului stiinţific al Facultăţii de Biologie, condus de profesor universitar dr. Gheorghe Mustaţă (Decan), i-a conferit titlul de Profesor emerit, prin Hotărârea nr. 4879/iulie 2002, anul retragerii din activitatea didactică, pentru limită superioară de vârstă.

Pentru merite în cercetarea ştiinţifică şi în munca didactică universitară este nominalizat în 8 publicaţii internaţionale (International Who's Who of Intelectuals, Ediţia 13, 1999, Cambridge, England; Contemporary Who's Who, American Biographical Institute, 2002-2003, pg. 302; The Contemporary Who's Who of Professionals, 2004 SUA; şi 5 interne (Who's Who in Romania, 2002, pg. 697; Natura şi Cercetarea biologică în Bucovina, 2004, (pg. 180-182)etc.

Profesorul Mircea Varvara, , a desfăşurat o variată activitate obştească (1958 – 2004): organizarea şi conducerea practicii productive a studenţilor (1970 - 1978), organizator al Grupei sindicale (1967-1970), preşedinte al Secţiei Sindicale de Biologie (1986 - 1989), vicepreşedinte al Comisiei de Cruce Roşie (1980 - 1987), în comisii de analiză de cursuri, comisii pentru promovarea unor cadre (lectori, conferenţiari, profesori). Din 1990 este membru în Comitetul de Redacţie al Revistei ştiinţifice, Analele Universităţii "Al.I. Cuza".

Tip combinativ, după creativitate, aptitudini generale (inteligenţă, imaginaţie, spirit de observaţie, memorie, înclinaţii practic-aplicative) deasupra celor speciale (tehnice, matematice, artistice, sportive); zestre ereditară apreciabilă; motivaţie superioară stabilă (de durată); receptivitate ridicată faţă de educaţia şcolară şi cea permanentă (corect orientate, şi mai ales deplin cultivate), au făcut din universitarul Mircea Varvara un **om de caracter de necontestat.**

În activităţile teoretice şi practice (cu studenţii şi alte categorii de specialişti care lucrează în agricultură, viticultură, pomicultură şi silvicultură, protecţia plantelor şi combaterea dăunătorilor) a dovedit gândire analitico-sintetică, înţelegerea corelativă a complexelor fenomene biologice naturale şi antropice, memorie vizuală remanentă şi mare deschidere spre mai bine, mereu încrezător în viitor. Niciodată nu s-a simţit obosit şi nici plictisit de muncă.

Şi nimic ieşit din comun extraprofesional, ceea ce la Mircea Varvara ar putea fi hobby-uri, sunt lucruri intim incluse în meserie:

- mersul pe jos, ca o plăcere matinală, de acasă la facultate, 50 minute, timp de peste 40 de ani, dar şi în numeroasele drumeţii-excursii cu caracter particular sau de serviciu;
- învăţarea, ca autodidact, a limbii engleze, fapt ce i-a adus satisfacţii deosebite în comunicare cu oameni de ştiinţă din străinătate, prieteni din Anglia, Scotia, Irlanda, Franta, Olanda, Germania, Polonia, Statele Unite, Republica Moldova, expunerea rezultatelor unor lucrări de cercetare la manifestări internaţionale şi redactarea unor lucrări direct în limba engleză;

Anul viitor (octombrie 2008), Elena şi Mircea, vor Aniversa "nunta de aur". O familie mai mult decât onorabilă, stabilă sentimental, imbogăţită şi lărgită ,de-a lungul timpului, de venirea , educarea si devenirea profesională a celor doi feciori: Varvara Viorel (48 ani), prof. univ. dr. la Universitatea "Gh. Asachi" şi Varvara Cătălin (38 ani), manager de Firmă , a celor două nurori, Roxana si Beatrice, medici. Familiile lor le-au adus două nepoate: Sorana (economistă, absolventa facultaţii de profil din oraşul Berna,Elveţia, doi ani de masterat, casatorită), respectiv Karina cea isteaţă, acum la vârsta de numai doi ani şi 8 luni, (2007)..

Intr-o corespondenţă anterioară, cu modestie şi deplină sinceritate, Mircea Varvara mi s-a mărturisit scurt şi cuprinzător: **"Toată viaţa mi-a plăcut să muncesc… Sunt recunoscător întâmplării, norocului, destinului, părinţilor, in special soţiei, copiilor şi temperamentului, care au făcut din mine un truditor de cursă lungă, tolerant, supus Imperiului speranţei**". Da, o spun şi o scriu din nou, acesta este Mircea Varvara!

Pentru contemporani şi posteritate, omul de omenie, prof. univ. dr. Mircea Varvara, perceput ca întruchiparea cuminţeniei în aşteptare, rezistenţei la efort intelectual şi fizic prelungit, precum şi al amabilităţii dezinteresate în relaţiile cu semenii, are rezervat **un loc de cinste,bine meritat în bogata galeria a biologilor ieşeni**.

Finalul acestei prezentări nu poate fi încheiat fără sublinierea colegialității, spiritului cooperant, deosebitei înțelegeri probate în relațiile cu toți cei care şi-l doresc amic, aşa cum mi s-a întâmplat şi mie, bucurându-mă de câştigul realizat.

Multumiri: Textul prezentei prezentări a fost redactat de profesor Gradul I, **Mihai Bejinaru** pe baza materialului documentar pus la dispoziție.Beneficiarul acestei prezentări îi aduce mulțumiri colegiale şi prieteneşti pentru deosebita sa amabilitate şi competență.

Profesor gradul I, Mihai BEJINARU
Câmpul Lung Moldovenesc

PROFESSOR PHD. VICTOR CIOCHIA

He was born in Braşov, February 4, 1932. Victor Ciochia has graduated primary and secondary school in Braşov. After that, he became pupil at “Andrei Şaguna" National High School. Education received from his family and added that of school had to put imprint on the young Victor who was strongly related to the history of its people and places in which it was born and lived.

He has chosen "Alexandru Ioan Cuza" University of Iasi and he intended to study history and culture of Moldavia and the Romanian people. In Iaşi, he became a student of huge personalities of this famous University from Faculty of Natural Sciences-Geography, with special affinity towards eminent entomologist Mihai Constantineanu.

He was a passionate hunter with adventurer spirit and a great collector of animals. Victor spreads among his colleagues from around its light and fun. He had a huge power of work and tried to investigate many scientific directions. The young student was quickly integrated into the academic area and became known in different academic structures of students. Everything he has achieved was the result of a passionate and hard work, his entire life was under the sign of avatars. His passion for nature was harmoniously correlated with his passion for hunting and trips. His fretting wish to investigate as many birds as possible became a real hobby for his entire life. Only that this hobby was turned into a real profession, because the passion has been extended with a scientific knowledge, and this has generated an impressive number of ornithology treatises.

As we know, hunting was a prohibited activity during a period of his life. And, for that reason, he transformed this hobby and he started to collect insects.

This picked student, known and appreciated by professors, Victor Ciochia was, in the same time, a great patriot, a great Romanian citizen. Sometimes, he was very imprudent and he presented his own opinions about country, Romanians and patriotism, regardless of those colleagues (collaborators of Romanian Security Services) slinked between them.

After faculty graduation, Ciochia Victor was employed as a Preparatory-assistant of Zoology Department by the head of Department, Professor Mihai Constantineanu. He started to teach practical works with students for few courses, as following: Invertebrates Zoology (titular Professor Mihai Constantineanu) and Zoogeography (Reader PhD. Ştefan Vancea).

Professor Mihai Constantineanu was known and respected not only for its conferences and courses concerning to Invertebrate Zoology but also for his reputation as a great ichneumonologist from Europe. He had a special interest for this kind of activity, and, for this reason, he started to investigate Ichneumonids. Moreover, during that period was obviously required to organize “students’ debating societies”. Young Victor Ciochia was involved in many specific activities of those scientific societies. He was an active member of the researchers group.

This seems to be an official presentation, but we must appreciate that the initiative of setting up of those “students’ debating societies” was a brilliant idea. These kind of unofficial academic structures have been received with interest by the best students and it had a miraculous effect in research domain.

He was employed as Preparatory-assistant in 1955. During this period, Victor Ciochia began to be known among students and academic staff through his personality and his hobbies (hunting and ornithology).

However, the celebration of 400 years from ascending of Moldavia Throne by the brave Voivode Stephen the Great was closer and closer. So, Victor Ciochia started to prepare this celebration and he participated with all his being at those activities in 1957.

About this, his colleague academician Alexandru Zub told us something about this celebration:

"Like other young persons, Victor Ciochia (he graduated and he was a part of academic staff of Biology Faculty) was fascinated by this beautiful idea and he has served discreet in many special ways, but with enough arguments for political repression structures. All these brought him a conviction for political reasons. We have met again at Court of Justice, few young people who graduated. We were accused of subversive activities against the regime".

The political power of those times has interpreted, in its own communist style, the specific enthusiasm of those young intellectuals expressed during Great Celebration. The epilogue was the verdict of five years of prison. During 1958-1963, Assistant Victor Ciochia was a political prisoner. The shadows of tortures influenced his health, and deprivation of liberty changed his entire existence. After he was put in the freedom , he had to fight hard in order to ensure the existence and to recover the lost time for his profession. Life avatars were to accompany him at all times.

I became a student in 1957 and I saw the young assistant when he passed through the Laboratory of Zoology. Then, I heard that he had been arrested and have launched all sorts of rumours and comments. The result has been that Victor Ciochia has become for us a great disappeared, the great hero of those times. We were knowing to see and analyze correctly all the actions of the Party and Government.

Although he was set free, the agony for Victor Ciochia didn’t stop. During 1963-1967, he was employed as a designer at the Forestry Zoology and Botany Department of Polytechnic Institute of Braşov. This designer not only made draws, but he realized documentations and tried to understand the essence of structures and biological processes which were drawn. So, he started to extend his knowledge and biological culture.

During 1967-1968, he was employed as a biologist at The Regional Veterinary Laboratory of Braşov. Erudite biologist Victor Ciochia followed the same way as the main character in Marin Preda’s novel **“The most beloved of earthlings”**.

Only in 1968, he found understanding and received "forgiveness" from the leadership of the "Alexandru Ioan Cuza” University, who agreed to employ him as a researcher at The Marine Biological "Prof. Ioan Borcea" Station of Agigea. Therefore, Ciochia Victor tried to rebuild his broken researches. He will resume his entomological researches which were initiated before the great rupture. He focused his attention to finish researches concerning to the subject of doctoral thesis. Moreover, the first contact between us was at the Secularly Forest of Slătioara, in 1963, in a scientific trip organized by Professor Mihai Constantineanu. Then, we’ve met again, in 1965, during another scientific trip at Baia Mare, Baia Sprie, Gutâi Mountains and other places from Maramureş. In these scientific expeditions we were able to know each other better.

Researches from Agigea have managed to revitalize the passion of a scientist for our hero. But, a miracle does not longer take than three days. In 1970, the Marine Biological "Prof. Ioan Borcea" Station was integrated into the Romanian Institute of Marine Research of Constanța, and he had to change his work-place. He was forced to transfer to the Station of Biological-Geographical and Geological Researches "Stejarul" of Pângărați, within the "Aexandru Ioan Cuza" University of Iaşi.

At Pângărați, Mr. Victor Ciochia was able to make the first Romanian Biostation used for rearing of entomophagous insects. *Prospaltella perniciosii* and *Aphytes proclia* used to combat the tree louse from San Jose. Thus, it was materialized the dream of two greatest biologists, Ioan Borcea and Mihai Constantineanu.

But, the avatars continue. Mr. Victor Ciochia had to go on at Braşov. In April 1974, he was transferred to **The Research Institute for Potato and Sugar Beet** of Brasov. Here, he realized researches concerning to control harmful insects for sugar beet and his researches concerning to biological control of pests. He made a **climate-room** used for rearing of insects used in biological control, which was patented in 1997. Also, he realized a **Biostation for industrial rear of entomophagous *Trichogrammae*** – the first in Eastern Europe. This served as a model for six biostations made at A.S.A.S., out of which four worked until 1992. Those four stations were the support for the biological treatment of a large area of sugar beet, corn, vineyard, apple and plum crops. The results were comparable to those obtained by chemical control, but without polluting the environment.

In 1957, Victor Ciochia became Chief of the Laboratory at I.C.C.S. and researcher in 1976. Here's how difficult was the path followed by an erudite biologist and researcher to get to the title of scientist.

During 1977-1990, Mr. Victor Ciochia worked as Senior Researcher III at I.C.C.P.T. of Fundulea. During 1990-1997 he was Senior Researcher I at S.C.P.C.S.Z. of Braşov.

In 1997, Mr. Victor Ciochia managed to see his dream fulfilled. He was employed as professor at "Lucian Blaga" University of Sibiu after a real competition.

We can say that it was done justice for him. But, who did this justice? Nobody did. Mr. Victor Ciochia managed to earn this, but with special scientific efforts. How he managed to fulfil the dream of his youth? Only he knows better than us.

He managed to obtain the competence to guide the students for doctoral theses at the University of Bucharest, Faculty of Biology.

We can not describe here all Professor Victor Ciochia's scientific achievements with many details. But, we must remember that, in 1981, he became laureate of "Emil Racoviță" Prize of The Romanian Academy. Also, in 1991, he became Corresponding Member of The Academy of Agricultural Sciences and Forest "Gheorghe Ionescu-Siseşti". During his entire scientific activity, he published 28 monographs and over 200 scientific papers in prestigious journals and reviews from Romania and abroad.

Professor Victor Ciochia is the founder and organizer of eight National Conferences of Environmental Protection through biological and biotechnical methods. Also, he organized five National Conferences of Ecosanogenesis.

He is member of a large number of national and international scientific societies. We have to mention here a few of them for underlining some aspects of research and concerns that he has:

- Société of Ornitologique de France (1966);
- Société pour l'étude et protection de la nature de la Brittany (1969);
- International Council for the Protection of Birds (CIO Cambridge, 1989);
- International Organization for Biological Control (1982).

It's time to mention here that Prof. PhD. Victor Ciochia is one of the greatest protectors of nature from Romania of our days.

In fact, who is Prof. PhD. Victor Ciochia ? It is one of the most brilliant personalities of Romanian Biology. He is a member of The Great School of Entomology of Iaşi, initiated by the Titan of Romanian Zoology, Professor Ioan Borcea and developed by Professor Mihai Constantineanu. In the same time, he is a great ornithologist and one of the founders of biological control of harmful insects in Romania, a passionate protector of nature and a fighter for nature protection.

Researcher, professor of few universities during his career, a passionate hunter and collector of insects and birds, Mr. Victor Ciochia spread around him a special light and a lot of fun. He is the professor with a special divine grace, a real creator. But, at the same time , he is a fighter, a great patriot, that person who paid with years of prison for these characteristics . He is a personality in the true meaning of the word.

Prof. PhD. Gheorghe MUSTAȚĂ

PROFESOR DR. VICTOR CIOCHIA

Născut la Braşov, la 04.02.1932, Victor Ciochia a urmat cursurile primare şi gimnaziale la Braşov, după care a devenit elev la Colegiul Naţional “Andrei Şaguna”. Educaţia primită în familie şi completată cu cea din şcoală aveau să-şi pună amprenta asupra tânărului Victor care era puternic legat de istoria neamului său şi de locurile în care s-a născut.

Şi-a ales Universitatea „Al.I. Cuza” de la Iaşi din dorinţa de a studia istoria şi cultura Moldovei şi a neamului românesc. La Iaşi a devenit studentul unei mari pleiade de profesori universitari de la Facultatea de Ştiinţe Naturale-Geografie, afinităţi deosebite având faţă de eminentul entomolog Mihai Constantineanu.

Vânător pasionat, spirit aventurier şi un mare colecţionar de animale Victor se detaşează între colegii săi răspândind în jurul său lumină şi bună dispoziţie. Dotat cu o putere de muncă ieşită din comun, căuta să acopere cât mai multe direcţii de activitate. Tânărul student s-a integrat rapid în mediul universitar ieşean şi a devenit cunoscut în diferite cercuri studenţeşti. Tot ceea ce a realizat a fost rezultatul unei munci pasionate şi asidue, întreaga sa viaţă fiind sub zodia avatarurilor. Pasiunea pentru studiul naturii s-a împletit în mod armonios cu patima pentru vânătoare şi cu gustul de drumeţie. Dorinţa sa neastâmpărată de a cunoaşte cât mai multe păsări s-a dovedit a deveni un hobi care i-a marcat întreaga viaţă. Numai că acest hobi s-a transformat în profesiune, deoarece pasiunea s-a prelungit în cunoaşterea ştiinţifică, iar aceasta a generat o sumă impresionantă de tratate de ornitologie.

După cum vom vedea, vânătoarea fiind într-o anumită perioadă a vieţii sale prohibită a fost fetişizată şi transformată în vânătoare de insecte.

Studentul de elită, cunoscut şi apreciat de profesori, Victor Ciochia, era, în acelaşi timp, un mare patriot, un mare român. Uneori însă făcea imprudenţa de a-şi spune deschis părerile despre ţară, românism şi patriotism, fără a ţine seama de urechile lungi ale unor colegi implantaţi între ei.

La absolvirea facultăţii Victor Ciochia a fost încadrat ca preparator la Catedra de Zoologie de către şeful de Catedră, profesorul Mihai Constantineanu. A început să ţină lucrări practice cu studenţii la obiectele **Zoologia nevertebratelor** (titular profesorul Mihai Constantineanu) şi la **Zoogeografie** (titular conf.dr. Ştefan Vancea).

Profesorul Mihai Constantineanu era cunoscut şi respectat nu numai pentru prelegerile sale magistrale de Zoologia nevertebratelor ci şi pentru faima de mare ichneumonolog al Europei. Atras de această latură a activităţii poporului său, Victor Ciochia a început iniţierea în studiul ichneumonidelor. De altfel, în acea perioadă, se impunea înfiinţarea de cercuri ştiinţifice studenţeşti. La organizarea activităţii acestui cerc a participat şi tânărul Victor Ciochia, care a făcut parte din primul detaşament studenţesc de cercetare.

Această prezentare pare a fi un limbaj de lemn, însă trebuie să apreciem că inițiativa înființării cercurilor științifice studențești a fost o idee strălucită, deoarece a fost primită cu interes de elita studenților şi a avut un efect miraculos în domeniul cercetării.

Angajat în anul 1955 ca preparator, Victor Ciochia a început să fie cunoscut între studenți şi cadrele didactice prin felul său de a fi şi prin aerul de mare vânător şi pasionat ornitolog.

Iată însă că se apropia sărbătorirea a 400 de ani de la urcarea pe tronul Moldovei a bravului Voievod Ştefan cel Mare. Victor Ciochia a intrat în febra pregătirilor şi a participat cu toată ființa sa la Marea Sărbătoare în 1957.

Iată ce prezintă colegul său de suferință, academicianul Alexandru Zub referitor la acest eveniment:

„Ca şi alți tineri, Victor Ciochia (terminase studiile şi era cadru didactic la Biologie) a fost câştigat de frumusețea ideii şi a servit-o discret, în forme pe care nu le cunosc foarte exact, dar care aveau să furnizeze „argumente" organelor de represiune pentru o condamnare politică. Ne-am regăsit în boxă, cei câțiva tineri, acum absolvenți cu rosturi oarecum diferite în şcoală, cercetare, cultură, acuzați de activități subversive contra regimului".

Puterea politică a timpului respectiv a interpretat în stilul caracteristic comunismului entuziasmul tinerilor intelectuali manifestat la Marea Sărbătoare. Epilogul acestuia a fost verdictul de cinci ani de puşcărie. În perioada 1958-1963 asistentul Victor Ciochia a fost deținut politic. Urmele chinurilor suportate i-au marcat sănătatea până astăzi, iar privarea de libertate i-a schimbat întreaga existență. După eliberare a trebuit să lupte din răsputeri pentru a-şi putea asigura existența şi pentru recuperarea timpului pierdut pentru profesiune. Avatarurile vieții aveau să-l însoțească în permanență.

Am devenit student în 1957 şi am apucat să-l văd pe tânărul asistent când a trecut prin sala de lucrări practice de la Zoologie. Am auzit apoi că a fost arestat şi s-au lansat tot felul de zvonuri şi de comentarii. Rezultatul acestora a fost acela că Victor Ciochia a devenit pentru noi un mare dispărut, marele erou al timpului. Ştiam să discernem şi să interpretăm corect toate acțiunile partidului şi ale guvernanților.

Deşi eliberat, calvarul n-a încetat pentru Victor Ciochia. În perioada 1963-1967 cu greu şi-a găsit un post de desenator la Catedra de botanică şi Zoologie Forestieră de la Institutul Politehnic din Braşov. Desenatorul nu executa doar planşe ci se documenta şi pătrundea în esența structurilor şi a proceselor biologice pe care le schematiza în planşele sale. Aşa a început să-şi lărgească paleta cunoştințelor sale, să-şi formeze o temeinică cultură biologică.

În perioada 1967-1968 a fost încadrat ca biolog la Laboratorul regional Veterinar din Braşov. Eruditul biolog Victor Ciochia călca astfel pe urmele eroului lui Marin Preda din romanul **Cel mai iubit dintre pământeni**.

Abia în 1968 a găsit înțelegerea şi a primit „iertarea" din partea conducerii Universității „Al.I. Cuza", care a acceptat să-l angajeze ca cercetător la Stațiunea Biologică Marină „Prof.dr. Ioan Borcea" de la Agigea. Astfel Victor Ciochia încearcă să reînoade firele rupte ale cercetărilor sale. Va relua cercetările entomologice în care s-a inițiat înainte de marea ruptură. Şi-a îndreptat atenția către finalizarea cercetărilor prin doctorat. De altfel, primul mare contact cu domnia sa a fost la Codrul Secular Slătioara, în 1963, într-o expediție științifică organizată de profesorul Mihai Constantineanu. A urmat apoi o altă expediție organizată în 1965 la Baia Mare, Baia Sprie, Munții Gutâi şi alte localităţi din Maramureş. În aceste expediţii ştiinţifice am reuşit să ne apropiem mai mult şi să ne cunoaştem cu adevărat.

Cercetările de la Agigea au reuşit să revitalizeze pasiunea de cercetător a eroului nostru. Numai că o minune nu ţine mult. În 1970 Staţiunea Biologică Marină „Prof.dr. Ioan Borcea" este integrată în Institutul Român de Cercetări Marine de la Constanţa, iar domnia sa a trebuit să-şi schimbe locul de muncă, fiind nevoit să se transfere la Staţiunea de Cercetări Biologice-geografice şi Geologice „Stejarul" de la Pângăraţi, care aparţine tot de Universitatea „Al.I. Cuza" din Iaşi.

La Pângăraţi domnul cercetător Victor Ciochia a reuşit să realizeze prima biostaţie românească de creştere a insectelor entomofage. *Prospaltella perniciosii* şi *Aphytes proclia*, pentru combaterea păduchelui ţestos din San Jose. Astfel se materializa visul celor doi mari înaintaşi, profesorii Ioan Borcea şi Mihai Constantineanu.

Avatarurile continuă. Domnul cercetător Victor Ciochia se vede nevoit să ia drumurile Braşovului. În aprilie 1974 s-a transferat la **Institutul de Cercetări pentru Cartof şi Sfeclă de Zahăr** de la Braşov. Aici avea să aprofundeze cercetările privind combaterea insectelor dăunătoare sfeclei de zahăr şi să continue cercetările de combatere biologică a dăunătorilor. Realizează o **cameră climatizată** cu utilizare în creşterea insectelor utile în combaterea biologică, pe care o brevetează în 1997 şi o primă **biostaţie de creştere industrială a entomofagului *Trichogramma*** din estul Europei, care a servit ca model pentru realizarea în cadrul cercetărilor de la ASAS a şase biostaţii, din care patru au funcţionat până în 1992, făcându-se tratamente biologice pe suprafeţe mari la culturile de sfeclă de zahăr, porumb, vară, viţă de vie, măr şi prun. Rezultatele au fost comparabile cu cele obţinute prin combaterea chimică, însă fără poluarea mediului.

În 1957 domnul Victor Ciochia devine Şef de laborator la ICCS, iar în 1976 cercetător ştiinţific. Iată cât de întortochiată s-a dovedit a fi calea urmată de un erudit biolog şi excelent cercetător pentru a ajunge la titlul de cercetător.

În perioada 1977-1990 domnul Victor Ciochia funcţionează ca cercetător ştiinţific principal III la ICCPT Fundulea, iar între anii 1990-1997 ca cercetător principal I la SCPCSZ Braşov.

Abia în 1997 domnul Victor Ciochia reuşeşte să-şi vadă împlinit visul său. Reuşeşte să ocupe prin concurs un post de profesor titular la Universitatea „Lucian Blaga" din Sibiu.

Am putea spune că s-a făcut dreptate. Dar cine a făcut această dreptate? Nimeni. Domnul profesor Victor Ciochia a reuşit să-şi câştige acest drept, însă prin eforturi ştiinţifice. Cum a reuşit să-şi îndeplinească visul tinereţii sale doar domnia sa ştie.

A reuşit să obţină şi dreptul de a conduce doctoranzi în cadrul IDD de la Universitatea din Bucureşti, la Facultatea de Biologie.

Nu putem amănunţi aici realizările ştiinţifice ale domnului profesor dr. Victor Ciochia, trebuie însă să amintim că în 1981 a devenit Laureat al Premiului „Emil Racoviţă" al Academiei Române, că în 1991 a devenit membru corespondent al Academiei de Ştiinţe Agricole şi Silvice „Gheorghe Ionescu-Siseşti" şi că a publicat 28 de monografii şi peste 200 de lucrări ştiinţifice în reviste prestigioase din ţară şi din străinătate.

Domnul prof.dr. Victor Ciochia este iniţiatorul şi organizatorul a 8 Conferinţe Naţionale de protecţia mediului prin metode şi mijloace biologice şi biotehnice şi a 5 Conferinţe Naţionale de Ecosanogeneză.

Impresionează numărul mare de societăți științifice naționale şi internaționale al căror membru este. Nominalizăm aici doar câteva dintre ele pentru a ne edifica mai bine asupra aspectului larg al cercetărilor şi preocupărilor pe care le are domnia sa:

- Société Ornitologique de france (1966);
- Société pour l'étude et protection de la nature de la Bretagne (1969);
- Consiliul Internațional pentru protecția Păsărilor (CIO Cambridge, 1989);
- Organizația Internațională pentru Luptă Biologică (1982).

Este momentul să menționăm aici că domnul prof.dr. Victor Ciochia este unul dintre cei mai mari ocrotitori ai naturii din România timpului nostru.

În fond cine este domnul prof.dr. Victor Ciochia? Este una dintre cele mai strălucite personalități ale biologiei româneşti. Face parte din marea Şcoală de Entomologie de la Iaşi, inițiată de titanul Zoologiei româneşti, profesorul Ioan Borcea şi dezvoltată de profesorul Mihai Constantineanu. Este, în acelaşi timp, un reputat ornitolog şi unul dintre pionerii combaterii biologice a insectelor dăunătoare din România, este un pasionat iubitor al naturii şi un fervent luptător pentru ocrotirea naturii.

Cercetător, profesor universitar, vânător pasionat şi mare colecționar de animale, domnul prof.dr. Victor Ciochia răspândeşte în jurul domniei sale lumină şi bună dispoziție. Este un profesor dăruit cu har didactic, un modelator de oameni, dar şi un răzvrătit al soartei şi un patriot înflăcărat, care a plătit cu ani grei de temniță această calitate a sa. Este o mare personalitate în adevăratul sens al cuvântului.

Prof.dr. Gheorghe MUSTAȚĂ

PROF. PhD. CONSTANTIN FILIPESCU (1924-2007)

Side by side with the greatest entomologists of our country, Prof. PhD. Constantin Filipescu is a very significant and important personality. He was formed on Entomology School of Iaşi initiated by Prof. PhD. Ioan Borcea and developed by the great ichneumologist Mihai Constantineanu. Later, he became one of the former of famous school initiated at The University of Agricultural Sciences and Veterinary Medicine „Ion Ionescu de la Brad” of Iaşi. Together with Prof. Mihai Peiu and Elena Pătrăşcanu, they contributed to the development of education in entomology domain with special applications for agriculture and horticulture from Moldavia.

Constantin Filipescu was born in Dorohoi, on October 14, 1924. His parents tried to offer him love and proper conditions and he became an educated man. Primary and secondary schools were graduated in Dorohoi. After, he graduated „Grigore Ghica Vodă” High School from the same town, The Second World War forced family to move out to Piteşti. It was a solution to avoid war and active front. At that time, he was registered as pupil of „I.C. Brătianu” High School from Piteşti.

He graduated high school, in 1946; he became a student at the “Aexandru Ioan .Cuza” University – The Faculty of Natural Science. He manifested a special passion for nature and its secrets. Through his spirit and native intelligence, he tried to observe and understand all those facts. Those efforts were noticed by his professors, especially the great entomologist Prof. Mihai Constantineanu who became his model. This was the main reason of his future scientific option – studies referring to insects.

After graduation, in 1951, he was employed as preparatory-assistant for Entomology course (performed by Prof. Mihai Constantineanu) of Agronomical Institute „Ion Ionescu de la Brad” of Iaşi.

As young preparatory-assistant, he begins to guide training courses of Entomology at Agronomical and Horticulture Faculty and training courses of Zoology at Faculty of Animal Science. His qualities, youth and social skills, but especially his academic grounding, made him famous into academic world, both for his students and academic staff.

He promoted into his career all academic hierarchy levels, as following: assistant-lecturer (1951-1961), lecturer (1961-1976) and reader (1976-1992). He became professor later, in 1992. For us, who lived those times, these facts had a special significance. For this entire scientific and academic activity, we gave him our respect.

As young lecturer, he presented courses as **Entomology** and **General Zoology**. During his academic career, he teaches many students about **Agricultural Entomology** and **Protection of Ornamental Plant**. It was an honour for him to do it. And this is not only a metaphor. He tried to help his students and other specialists and he published his researches as handbooks named **Agricultural Entomology** (1980 and 1997) and **Biology and Ecology of Animals** (1981). Those two handbooks were edited by Ed. Didactic and Pedagogic of Bucharest. Other publishing-houses of Romanian universities published few important books, as followes: **General Zoology** (Iaşi), **Horticultural Entomology** vol. I and II (Cluj-Napoca, 1991), **Agricultural Entomology** (Iaşi – 1993) and **Ornamental Plant Protection** (1993). Among his collaborators, we could mention Teodosie Perju, Bogdan Bobârnac, C. Costescu, I. Duvlea, Iustin Ghizdavu, P. Pasol, I. Pălăgesiu, T. Baicu, Al. Bărbulescu, T. Georgescu, Iulia Matei and many others. Who knows just few information from this domain, he already knows that they are master-minds of it. This is the proof that Prof. Constantin Filipescu wasn't an isolate researcher, but he was an important part of his scientific world. During his career, he participated to all the national conferences of Entomology, Agricultural Entomology and Plant Protection organized by Bucharest, Cluj-Napoca, Craiova, Iaşi and Timişoara. Besides, he participated to other impressive scientific meetings organized for different special occasions, as following: The II-nd International Congress of Entomology from Iaşi and National Symposium **„Entomophags and Their Role in Natural Equilibrium"** (1993, 2004) organized by "Al.I.Cuza" University" of Iaşi.

All of his published-works have a high academic level and scientific importance, and, because of that, they will be useful for specialists of this domain.

It was formed by Entomological School of Prof. Ioan Borcea and Prof. Mihai Constantineanu. Based on this, he developed entomological researches valuable and important for the scientific world from all around. His doctorate thesis named **"Contributions to systematic, morphological, biological, ecological and economical study of Braconidae family (Hymenoptera) parasites on pests of agriculture"**, transformed him into a specialist concerning to the huge Braconidae family. These are parasitoid insects with important role for keeping between normal limits the pests populations using natural methods. Besides, he investigated few pest complexes and their natural enemies. As a specialist in this field, he realized, together with Reader PhD. Matilda Lăcătuşu, a monographic study named **"Insecta, vol. IX, fasc. 11, Hymenoptera, Braconidae fam. – overview and studies concerns to Cardiochilinae, Microgasterinae, Acaeliinae and Miracinae families"** which was published in Fauna Series, edited by Publishing House of Romanian Academy (1989).

Concerning to pests insects and their natural enemies, Prof. Constantin Filipescu investigated species as following: *Anomala vitis, Phalonia epiliana, Sciaphobus squalidus, Ostrinia nubilalis, Etiella zinckenella, Cydia pomonella, Rhagoletis cerasi, Lobesia botrana, Eupoecillia ambiguella* etc. More than 50 scientific papers published by him present scientific results of modern researches very appreciated by his colleagues from all around the world.

As an important part of Entomological School initiated by Prof. Ioan Borcea and developed by Prof. Mihai Constantineanu, he laid the foundations of a new research direction into agricultural entomology domain, together with Prof. Mihai Peiu. His researches had a large area of interests, and, together with his PhD. students, he tried to develop this subjects which are connected to present reality. During his all studies, he investigated dangerous pests and their control through integrated method. All the time, he was a supporter of biological control and limitation of pesticides used in pest control.

He was a great professor and researcher recognized by all his disciples and specialists who continuing his scientific efforts. Therefore, he leaves behind a well-done Entomological School and a modern laboratory used for both researches and academic training of students. All the time, Prof. Constantin Filipescu was near by us to scientific sessions and to examinations for a doctor's degree of our PhD. students. He made a lot of scientific references of those PhD. theses. He was in integer man, a real one, and I'm grateful that I knew him. He was a good teacher, a man with a special charisma and a magic effect on everyone who listened to his conferences. I appreciated his modesty and enthusiasm. He left behind an important work, a school of agricultural entomology with a well-done structure, a family and a lot of friends who will keep his image in their hearts.

Prof. PhD. Gheorghe MUSTAȚĂ

PROF.DR. CONSTANTIN FILIPESCU (1924-2007)

În pleiada de mari entomologi ai neamului nostru se înscrie şi regretatul profesor universitar Constantin Filipescu. Format la Şcoala de Entomologie ieşeană iniţiată de eminentul prof.dr. Ioan Borcea şi fondată de marele ichneumonolog Mihai Constantineanu, Constantin Filipescu este unul dintre ctitorii Şcolii de Entomologie Agricolă de la Universitatea de Ştiinţe Agricole şi de Medicină Veterinară „Ion Ionescu de la Brad”. Alături de profesorul Mihai Peiu şi de Elena Pătrăşcanu a contribuit la afirmarea învăţământului entomologic agricol şi horticol din Moldova.

Născut la Dorohoi, la 14 octombrie 1924, Constantin Filipescu s-a bucurat de dragostea părinţilor săi, care au căutat să-i asigure toate condiţiile pentru a deveni un om luminat. Şcoala primară şi gimnaziul le urmează la Dorohoi şi îşi începe şi studiile liceale la renumitul Liceu Teoretic „Grigore Ghica Vodă”. Urgia celui de al doilea Război Mondială forţează familia să se refugieze la Piteşti pentru a scăpa de ameninţarea frontului. Aşa se face că tânărul Constantin Filipescu avea să finalizeze studiile liceale la Liceul „I.C. Brătianu” din Piteşti.

După absolvirea liceului, în 1946, devine student la Facultatea de Ştiinţe Naturale de la Universitatea „Al.I. Cuza” din Iaşi. Se remarcă între colegii săi prin pasiunea cu care se dăruia pentru cunoaşterea naturii, prin inteligenţa nativă şi prin spiritul de observaţie foarte dezvoltat. Este remarcat de profesorii săi şi este mult atras de profesorul Mihai Constantineanu, a cărui aureolă de mare entomolog îl cucereşte şi astfel se orientează către studiul insectelor.

După obţinerea licenţei, în 1951, este încadrat ca asistent la disciplina de Entomologie, care era onorată de profesorul Mihai Constantineanu, la Institutul Agronomic „Ion Ionescu de la Brad” din Iaşi.

Tânărul asistent avea să onoreze lucrările practice de Entomologie de la Facultatea de Agronomie şi de Horticultură, dar şi pe cele de Zoologie de la Facultatea de Zootehnie. Tinereţea, sociabilitatea şi mai ales temeinica pregătire profesională îl fac cunoscut pe asistentul Constantin Filipescu atât în rândul studenţilor cât şi al cadrelor didactice.

Parcurge în mod firesc treptele ierarhiei universitare, fiind asistent în perioada 1951-1961, şef de lucrări (1961-1976) şi conferenţiar (1976-1992). Titlul de profesor avea să-l obţină destul de târziu, în 1992. Pentru noi, cei care am trăit în acele vremuri ştim ce înseamnă; tocmai acest aspect ne determină să-l stimăm şi mai mult pe eruditul profesor Constantin Filipescu.

Ca şef de lucrări onorează cursurile de **Entomologie** şi de **Zoologie generală**. În cariera sa didactică avea să mai elaboreze cursurile de **Biologie şi ecologie animală, Entomologie agricolă** şi **Protecţia plantelor ornamentale**. Onorarea acestor cursuri nu reprezintă doar o figură de stil. Profesorul Constantin Filipescu a venit în sprijinul studenţilor şi a specialiştilor publicând în Editura Didactică şi Pedagogică cursurile de **Entomologie agricolă** (1980 şi 1997) şi **Biologia şi Ecologia animală** (1981). În diferite centre de multiplicare din marile centre universitare a mai publicat: Curs de **Zoologie**

generală (unic autor) la Iaşi, **Entomologie horticolă** vol. I şi II (1991) la Cluj Napoca, **Entomologie agricolă** (1993), la Iaşi şi **Protecția plantelor ornamentale** (1993) la Iaşi. Între colaboratorii cu care a publicat aceste cursuri menționăm pe Teodosie Perju, Bogdan Bobârnac, C. Costescu, I. Duvlea, Iustin Ghizdavu, P. Pasol, I. Pălăgesiu, T. Baicu, Al. Bărbulescu, T. Georgescu, Iulia Matei şi alții. Cine este introdus cât de cât în acest domeniu îşi poate da seama că aceşti autori sunt unii dintre corifeii Entomologiei agricole din țara noastră. Probăm prin aceasta faptul că profesorul Constantin Filipescu nu era un specialist izolat ci un mare cercetător şi profesor care a făcut parte din generația de aur a Entomologiei agricole româneşti din ultimele decenii. De altfel, profesorul Constantin Filipescu a participat la toate Conferințele Naționale de Entomologie, Entomologie agricolă şi de Protecția Plantelor organizate la Bucureşti, Cluj Napoca, Craiova, Iaşi, Timişoara şi la alte reuniuni ştiințifice prestigioase organizate cu diverse ocazii, cum ar fi cel de al II-lea Congres Internațional de Entomologie de la Iaşi şi la Simpozionul Național „Entomofagii şi rolul lor în păstrarea echilibrului natural" (1993, 2004), organizat la Universitatea „Al.I. Cuza" din Iaşi.

Opera didactică a profesorului Constantin Filipescu fiind de un înalt nivel academic va dăinui în timp cu folos pentru specialişti.

Format la Şcoala de Entomologie a profesorilor Ioan Borcea şi Mihai Constantineanu, profesorul Constantin Filipescu a realizat cercetări entomologice deosebit de valoroase. Teza de doctorat **„Contribuții la studiul sistematic, morfologic, biologic, ecologic şi economic a familiei Braconidae (Hymenoptere) parazite în insecte dăunătoare agriculturii"** l-a consacrat în cercetarea marii familii a braconidelor, insecte parazitoide cu rol important în limitarea pe cale naturală a unor insecte dăunătoare şi în studiul complexelor de insecte dăunătoare şi a duşmanilor lor naturali. Ca specialist în cercetarea acestei familii a realizat, împreună cu doamna conf.dr. Matilda Lăcătuşu , monografia „**Insecta vol IX, fasc. 11, Hymenopteram fam. Braconidae, partea generală şi subfamiliile: Cardiochilinae, Microgasterinae, Acaeliinae şi Miracinae**" în Seria Fauna României, Editura Academiei Române (1989).

În ceea ce priveşte complexul de insecte dăunătoare şi duşmanii lor naturali, profesorul Filipescu a urmărit speciile *Anomala vitis, Phalonia epiliana, Sciaphobus squalidus, Ostrinia nubilalis, Etiella zinckenella, Cydia pomonella, Rhagoletis cerasi, Lobesia botrana, Eupoecillia ambiguella* etc. În peste 50 de lucrări publicate în prestigioase reviste de specialitate a realizat cercetări moderne de entomologie, apreciate pe plan național şi mondial.

Component al puternicii Şcoli de Entomologie inițiată de profesorul Ioan Borcea şi dezvoltată de profesorul Mihai Constantineanu, a apus bazele la rândul său, unei direcții de cercetare în domeniul entomologiei agricole, împreună cu profesorul Mihai Peiu. Spectrul larg al cercetărilor abordate cu doctoranzii săi probează, pe lângă excelența în cercetare şi ancorarea profesorului în realitățile vieții, în urmărirea unor dăunători periculoşi şi combaterea prin metodele luptei integrate, fiind un partizan al combaterii biologice şi al limitării arsenalului de pesticide folosite în combaterea unor dăunători.

Un mare profesor şi cercetător este recunoscut în funcție de discipolii săi, de specialiştii pe care i-a format şi care îi continuă direcția de cercetare. În acest sens profesorul Constantin Filipescu lasă în urma sa o şcoală de entomologie bine formată şi un laborator modern destinat atât cercetărilor cât şi activităților didactice.

L-am simțit pe profesorul Constantin Filipescu alături de noi, la sesiunile ştiințifice şi la multiplele teze de doctorat pe care le-a analizat în calitate de referent. Am apreciat atât competența profesională, cât şi calitățile sale sufleteşti. A fost un om integru, un bun şi entuziast profesor, cu o modestie aleasă şi cu un şarm particular. A lăsat în urmă o operă durabilă, o şcoală de entomologie agricolă bine conturată, o familie bine închegată şi o mulțime de prieteni care vor purta în inimă şi în suflet imaginea profesorului iubit şi respectat.

Prof.dr. Gheorghe MUSTAȚĂ