Analele Ştiinţifice ale Universităţii „Al.I.Cuza" Iaşi, s. Biologie animală, Tom L, 2004

PREDATORS INSECTS CONTROLLING *APHIS FABAE* SCOP. POPULATIONS

BY

PRELIPCEAN CARMEN[1], MUSTAŢĂ GHEORGHE[1], ANDRIEV SORINA[1], PRELIPCEAN ANDREI[1]

Keywords: biological control, predators, sinecological analysis;

Based on the researches made in 2003 concerning *Aphis fabae* Scop. colonies installed on 16 plant species from Botoşani District area, we identified 19 predator species which limited, through natural ways, some *Aphis fabae* populations. Those predator species proceed from 14 genera of three families from Coleoptera, Diptera, and Neuroptera Phillum.
These investigations concerning the role of each species inside the aphid population limitation, we made a sinecological analysis of the following indexes like: abundance, constancy, dominance, ecological significance and coenotic affinity.

Introduction

Aphis fabae Scop is a very dangerous species forming strong colonies on over 200 spontaneous and cultivated herbal species. It has migration and it has primary hosts in plants from species like *Phyladelphus*, *Evonimus* and *Viburnum*, and after that it passes on herbal plants.

It forms massive colonies as a consequence of prolification. Their colonies are controlled by many predator species like coccinelides. Predators realized a high limitation of *Aphis fabae* populations. So that, at the end of June, in July and august, there were identified only few colonies. These colonies have a restoration in Septembre, when they come back on primary host plants.

We investigated predator species controlling *Aphis fabae* populations from different plant species in the environmental conditions of the year 2003.

Material and methods

The researches were realized in 2003, from spring to autumn period, in seven localities from Botoşani District area. There were studied plants attacked by *Aphis fabae* populations. There were investigated both: primary and secondary host plants, woody and herbal plants, cultivated and spontaneous plants (Table 1).

We preserved 1142 individuals from some predator species (larvae and adults). There were identified 19 predator species conjugating their actions for *Aphis fabae* populations limitations.

[1] „Al.I. Cuza" University of Iaşi

For the investigation of each specie role and the contribution of them inside the limitation, through natural ways, we made a sinecological analysis concerning: abundance, constancy, dominance, ecological significance and coenotic affinity.

Results and discussions

Inside the *Aphis fabae* colonies installed on 16 cultivated and spontaneous plants, there were preserved 1142 individuals (larvae and adults) from 19 predator species:

- Coleoptera Phyllum, Coccinellidae family: 1. *Coccinella septempunctata* L., 2. *Coccinella quinquepunctata* L., 3. *Coccinella divaricata* Oliv., 4. *Adalia bipunctata* L., 5. *A. decempunctata* L., 6. *Adonia variegata* Goeze., 7. *Calvia quatuordecimpunctata* L., 8. *Propylaea quatuordecimpunctata* L., 9. *Platynaspis luteorubra* Goeze., 10. *Coccinula quatuordecimpustulata* L., 11. *Hippodamia tredecimpunctata* L., 12. *Semiadalia undecimpunctata* Schneider, 13. *Harmonia quadripunctata* Pontoppidan, 14. *Scymnus frontalis* Fabricius., 15. *Scymnus interruptus* Goeze;

- Diptera Phyllum, Chamaemyiidae family: 16. *Leucopis ninae* (Tanas.), 17. *L.bicolor* (Tanas.);

- Neuroptera Phylllum, Chrysopidae family: 18. *Chrysopa carnea* Stephens., 19. *Ch. formosa* Crauer.

It was realized a sinecological analysis for presentation of the role of each species from this complex. Table 2 presents the species depending on their abundance level: *Coccinella septempunctata* with 697 individuals, after that it follows *Adalia bipunctata* with 253 individuals, *Coccinella quinquepunctata* with 45 individuals, *Adalia decempunctata* with 30 individuals, and some other species with few individuals.

Coccinella septempunctata and *Adalia bipunctata* species are eudominant inside the *Aphis fabae* colonies. *Coccinella quinquepunctata*, *Adalia decempunctata* and *Propylaea quatuordecimpunctata* species are subdominant. After these species, it follows three recedent species and other subrecedent species.

Only *Coccinella septempunctata* is the eudominant specie. From the same point of view, seven species of all are accessories. The rest of the species are accidental for these aphid colonies. We have to mention than we registered an invasion of *Coccinella septempunctata* in 2003 (second part of May – first part of June period). This invasion was registered in all Moldova District area.

The high level of ecological signification index was registered in following species: *Coccinella septempunctata* (W5), *Adalia bipunctata* (W4) and *Coccinella quinqvepunctata* (W3). After them, it follows 13 species with W2 and the rest of them with W1.

The high level of coenotic affinity was registered in eudominant species.

Through their actions, predator species realized an efficient control in *Aphis fabae* colonies.

Conclusions

Based on the researches made in 2003 concerning the species from seven localities (Botoşani District), we investigated the complex of predator species which limits *Aphis fabae* colonies by natural ways. There were investigated *Aphis fabae* colonies installed on 16 plant species (cultivated and spontaneous plants, herbal and woody plants). From this point of view there were identified 19 species from 14 genera and three families from *Coleoptera, Diptera* and *Neuroptera* Phyllum (Orders).

For the establishing of contribution and role of each species to the *Aphis fabae* Scop. populations limitation, we used a sinecological analysis concerning the: abundance, dominance, constancy, ecological significance index and coenotic affinity.

References

1. Broussal, G., 1961 - C.R, Ac. Sci., Paris, 3025 – 3126.
2. Holmanm J. Pintere, A., 1981 - Shidri C.S.A.V. Praha, 1981.
3. Mustață Gh., 1986 - Lucr. celei de-a III a conf. de Entomol. Iaşi 20 –22 mai 1983, 583 –594.
4. Partzala, D., Valtu G., 1965 Ecel. Aphidoph. Iusut, 279 – 281, Praha.
5. Starý, P., 1904 – Ckologra Polska – Seria A, XII, 30, 529 –554, Warszama.
6. Starý, P., 1973 – Ann. Zool. et Bot. 84, 1 – 87, Bratislava.

Table 1 Presence of predator species in the *Aphis fabae* Scop. colonies in 2003

No.	Month	Localities	Host plants	*Coccinella septempunctata*	*Coccinella quinqvepunctata*	*Coccinella divaricata*	*Coccinula quatordecimpustulata*	*Adalia bipunctata*	*Adalia decempunctata*	*Semiadalia undecimpunctata*	*Adonia variegata*	*Hippodamia tridecimpunctata*	*Propylea quatordecimpunctata*	*Platynaspis luteorubra*	*Scymnus frontalis*	*Scymnus interruptus*	*Calvia quatordecimguttata*	*Harmonia quadripunctata*	*Leucopis ninae*	*Leucopis bicolor*	*Chrysopa carnea*	*Chrysopa formosa*
1	VII	Hudum	*Medicago sativa*	171	9		2	15	10	1	11	5	4	4			1	1	2		1	1
2	VII	Hudum	*Trifolium pratense*	23	14			7				1										
3	VIII	Curteşti	*Cirsium arvense*	24						1									2	1		
4	VII	Botoşani	*Melilotus officinalis*	19																		
5	VII	Botoşani	*Phaseolus vulgaris*	7																		
6	VI	Ipoteşti	*Arctium lappa*	29									1	4								
7	VII	Botoşani	*Robinia pseudaccacia*	7					2						1							

No.	Month	Localities	Host plants	*Coccinella septempunctata*	*Coccinella quinqvepunctata*	*Coccinella divaricata*	*Coccinula quatordecimpustulata*	*Adalia bipunctata*	*Adalia decempunctata*	*Semiadalia undecimpunctata*	*Adonia variegata*	*Hippodamia tridecimpunctata*	*Propylea auatordecimpunctata*	*Platynaspis luteorubra*	*Scymnus frontalis*	*Scymnus interruptus*	*Calvia quatordecimguttata*	*Harmonia quadripunctata*	*Leucopis ninae*	*Leucopis bicolor*	*Chrysopa carnea*	*Chrysopa formosa*
8	VIII	Agafton	*Carduus sp.*	12	5			3			1		2	2								
9	VI	Hudum	*Atriplex hastata*	5	10																	
10	VI	Stânceşti	*Matricharia chamomila*	11			2															
11	VI	Hudum	*Cichorium intibus*	24					8										2			
12	VI	Botoşani	*Zea mays*	122	1			57	10	2	2		8	2				1			2	2
13	V	Botoşani	*Philadelphus coronarius*	228	1	1		143					12	5		1	16				1	1
14	V	Baisa	*Euonimus europea*	8		1	1	19									2					
15	VII	Stânceşti	*Helianthus annuus*	6		1	1	9									2					
16	VI	Hudum	*Achillea millepholium*	1	2																	
				697	45	3	6	253	30	11	14	6	27	17	1	1	21	2	6	1	4	4

Table 2. Sinecological analysis of predatory insects from *Aphis fabae* Scop. colonies

No.	Specie	Abundance	Dominance	Constancy	Ecological Significance Index	Coenotic affinity																		
						1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
1	**Coccinella septempunctata** Linnė, 1758	697	61.37 D5	100 C4	61.00 W5		44	19	44	31	38	31	38	25	25	31	19	25	25	19	19	19	7	7
2	**Adalia bipunctata** Linnė, 1758	253	21.96 D5	44 C2	9.66 W4			38	50	33	30	50	30	33	22	33	25	10	22	38	38	25	0	0
3	**Coccinella quinquepunctata** Linnė, 1758	45	3.90 D3	44 C2	1.75 W3				38	38	25	33	38	33	10	24	33	33	43	43	38	0	0	0
4	**Adalia decimpunctata** Linnė, 1758	30	2.60 D3	25 C2	1.78 W2					67	33	80	40	17	14	20	17	40	75	75	50	25	25	25

No.	Specie	Abundan-ce	Dominan-ce	Constan-cy	Ecological Significance Index	Coenotic affinity																		
						1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
5	**Propylea quatuordecimpunctata** Linnė, 1758	27	2.34 D3	31 C2	0.63 W2						29	100	29	13	13	13	33	60	60	40	20	0	14	0
6	**Calvia quatuordecimguttata** Linnė, 1758	21	1.82 D2	25 C2	0.45 W2							50	17	75	60	20	17	17	17	17	17	20	0	0
7	**Platynaspis luteorubra** Goeze, 1777	17	1.47 D2	31 C2	0.45 W2								33	14	13	17	0	33	61	60	40	0	0	0
8	**Adonia variegata** Goeze, 1777	14	1.21 D2	19 C1	0.22 W2									20	17	17	20	20	20	0	0	40	0	0
9	**Coccinula quatuordecimpustulata** Linnė, 1758	6	0.52 D1	25 C2	0.13 W2										20	17	17	20	20	20	0	0	40	0
10	**Hippodamia tredecimpunctata** Linnė, 1758	6	0.52 D1	13 C1	0.06 W2											25	25	25	25	23	0	0	0	0

No.	Specie	Abundan-ce	Dominan-ce	Constan-cy	Ecological Significance Index	Coenotic affinity																	
						1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
11	**Leucopis ninae** (Tamas)	6	0.52 D1	6 C1	0.03 W2												40	40	67	0	33	20	20	0
12	**Semiadalia undecimnotata** Schneider, 1792	4	0.34 D1	13 C1	0.04 W2													40	40	67	0	33	20	0
13	**Chrysopa formosa** Braner, 1850	4	0.34 D1	19 C1	0.06 W2														100	25	0	0	0	20
14	**Chrysopa carnea** Stephens, 1836	4	0.34 D1	19 C1	0.06 W2															100	25	0	0	20
15	**Coccinella divaricata** Olivier, 1808	3	0.26 D1	19 C1	0.04 W2																25	0	0	0
16	**Harmonia quadripunctata** Pontoppidon, 1763	2	0.17 D1	13 C1	0.02 W2																	0	0	0
17	**Scymnus frontalis** Fabricius, 1787	1	0.08 D1	6 C1	0.0006 W1																		0	0

No.	Specie	Abundan-ce	Dominan-ce	Constan-cy	Ecological Significance Index	Coenotic affinity																		
						1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
18	**Leucopis bicolor** (Tamas)	1	0.08 D1	6 C1	0.0006 W1																			0
19	**Scymnus interruptus** Goeze, 1777	1	0.08 D1	6 C1	0.0006 W1																			