

## MIHAIL GUȘULEAC (1887-1960) – 130 YEARS SINCE HIS BIRTH

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The great botanist of the last century, Mihail Gușuleac, was born on October 12, 1887, at Lucovița (in the vicinity of Cernăuți), in a family of countrymen. He begins elementary school in his native village, after which he moves to Cernăuți, to attend the lyceum (1899-1907) and then the University - founded in the year 1876 – attending the courses of the Faculty of Sciences (1907-1911). Between 1918 and 1939 he activated at the Faculty of Sciences, University of Cernăuți, being also invited to direct the Botanical Gardens (created in the year 1877) of the same city. Along all these years, Mihail Gușuleac published, in the prestigious journal "Buletinul Facultății de Științe" of Cernăuți (issued, in 12 volumes, between 1927-1939), several studies of vegetal biology. Starting with the year 1940 until the year 1960 he was professor at the University of București – which means a 40 year-long and fruitful career in the service of the Romanian science and culture (Pop, 1967; Cernăuțan, 1994).

As known, in the year 1775, Austria occupied and annexed to the Empire the region of Cernăuți, the territory known as Bucovina, with its center in Cernăuți. Between 1918-1940, this territory returns within the borders of Romania, but, in 1940, Northern Bucovina, as well as Basarabia, becomes part of the Soviet Union. Northern Bucovina, and the whole Cernăuți region, is included in Ukraine. Following the short period (1941-1944) in which both Basarabia and Northern Bucovina were returned to Romania, starting with the year 1944, the Cernăuți region is once again annexed, this time to Ukraine, a situation unfortunately continuing until today (Bejinaru and Gușu, 2002; Toma and Ivănescu, 2017).

Immediately after graduation, in the year 1911, Mihail Gușuleac starts his specialization in marine biology at the Zoological Research Station of Trieste, and also in morphology, systematics and phytogeography at the Universities of Vienna, Prague and Halle, where he has the chance of meeting some of the most famous botanists of the time: Friedrich Wettstein, Josef Velenovsky and G. Karsten (Pop, 1967).

For 7 years after his graduation, he worked as a teacher in high schools of Câmpulung Moldovenesc, Prague and Suceava; in the 1915-1916 school year, he succeeds to the renown professor of natural sciences Eugen Botezat, at the Romanian classes affiliated to the German Lyceum of Rădăuți (the present "Eudoxiu Hurmuzachi" Lyceum) (Cernăuțan, 1994).

Starting with the year 1918, he is invited to teach botanics at the Faculty of Sciences of the University of Cernăuți, where, in the following year – 1919 – he publicly defends his PhD thesis, entitled "**Structure of stomata in the Bromeliaceae family and their classification value**" (a topic of anatomy interpreted phylogenetically), under the scientific supervision of the reputed anatomist Karl Linsbauer.

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Along all his life, backed up by his sound scientific knowledge and by his native, impressive perseverance, Mihail Guşuleac built up a continuous and many-sided scientific, didactic and organizatoric activity. The lectures he delivered to students, the laboratory works he supervised were always characterized by distinctness, concision and human warmth, as he behaved as a real friend of his students, PhD students and collaborators, both in the laboratory and in their scientific expeditions, during the frequent and highly instructive trips he used to organize in various parts of Bucovina.

Even if an excellent taxonomist, he was rather attracted by the study of vegetation, which he knew to analyze and interpret as an accomplished geobotanist – which he was, indeed. This interest was materialized in the geobotanic monograph dedicated to the populations of common pine tree forest growing in Romania. Mention should be also made of the studies of some natural reservations (Fânețele Seculare from Bosanci-Frumoasa, Codrii Seculari Slătioara, Poiana Stampei Marsh), rocky areas (Cheile Bicazului), the salt marshes of Bucovina (evidencing three groups of plants growing in these lands: non-halophytes, facultative halophytes, compulsory halophytes).

Mihail Guşuleac remains one of the most important co-authors of the monumental work entitled "*The Flora of Romania*". The interest for this type of research gets intensified after his retirement, when the scientist continues to actively and enthusiastically work and process a number of 7 families (especially Boraginaceae) and 20 genera belonging to other families (for example, *Thymus*, *Mentha*), included in volumes I-VII of the same treatise.

Together with his colleague A. Mühldorf, from the same faculty, he publishes in "Floram Romaniae Exsiccata (1974-1975) – Herbarul Muzeului Botanic al Universității din Cluj", three species of bryophytes: *Hedwigia albicans*, *Rhytidium rugosum* and *Metzgeria pubescens*, collected from the Bistrița Aurie area.

He also discovers several new genera of Boraginaceae, named in honour of two Romanian botanists: *Procopiana* and *Hormuzakia* (Pop, 1967). Also, his name is given to a rare species of rozaceae: *Potentilla gusuleacii* Hurmuz.

On May 26, 1937 he is elected corresponding member of the Romanian Academy (re-elected on July 3, 1990) (Oțiman, 2013; Rusu, 2016; Anastasiu, 2017).

The main scientific domains in which Mihail Guşuleac became a worldwide reputed specialist in botanics are systematics, morphology and anatomy. When the external morphology failed to fully elucidate certain aspects of taxonomy, the scientist resorts to the anatomical structure, develops genetic experiments, cultivates several generations of plants and creates hybrids, thus introducing for the first time in Romania the *experimental method in systematics* (Pop, 1967).

A most detailed study devoted to the *Anchusa* genus (European and extraEuropean species) leads to the discovery of several new Boraginaceae genera, two of them being given – as already mentioned - the name of two Romanian naturalists born in Bucovina: Aurel Procopianu-Procopovici and Constantin Hurmuzachi.

The highly documented and original conclusions referring to the systemics of the *Anchusa* genus (Guşuleac, 1928), of Boraginaceae in general, have been immediately accepted, cited and taken over by the most important systematic works of synthesis created in the world.

All these ample and most detailed investigations made Mihail Guşuleac familiar with specific aspects of phylogeny, morphogenesis and genetics, leading him towards the

analysis of the position and orientation of ovules at Boraginaceae and Labiatae (1937), elucidation of the morphology of fruits (1939), inflorescences of Caryophyllaceae (1954), Umbelliferae (1955), a.s.o. (Toma et al., 1993; Toma, 2003). All these directions of research recommend Mihail Guşuleac as a genuine creator of school in taxonomy, both at the University of Cernăuţi and of Bucureşti (Cernăuţan, 1994).

After long and minute researches devoted to the morphology and anatomy of fruits from the representatives of several families, Mihail Guşuleac elaborates, in 1939, a new morphogenetic system of classification, almost simultaneously with and independently on Hubert Winkler.

Ion T. Tarnavschi, one of his former students and close coworkers, publishes an ample study about the natural system of fruit classification in “Acta Botanica Horti Bucurestiensis” (1976), demonstrating the priority of his master, yet admitting the double authorship of this new morphogenetic fruit system from the part of the two great botanists – Guşuleac and Winkler. The system of Guşuleac is of Latin origin, that of Winkler – of German type.

The study of Mihail Guşuleac was published, in German, in the year 1939 (in “Buletinul Facultăţii de Ştiinţe din Cernăuţi” vol. 12, 1938) being presented at “botanists’ session” of Graz (Austria), held on August 8, 1938, at the same time with the system of fruits (under printing) of Hubert Winkler (Tarnavschi, 1976). In his study, published in 1939, H. Winkler makes mention, in the *footnote* of page 218, with reference to “*expressis verbis*”, to the series of “apocarpoid” fruits and of “eusyncarpe” fruits from the paper of M. Guşuleac (published as early as 1938, but issued in the mentioned journal only in 1939) (Winkler, 1939 cf. Tarnavschi, 1976).

Even only as a brief footnote, the Austrian scientist Winkler recognizes that the study of Guşuleac was published prior to his. Winkler cites the study of Guşuleac in note 30 (once again *infrapage*), mentioning that he will resume this aspect. The same assertion is made by Winkler in his second paper, issued in 1940, where mention is also made (in paragraph 8) of the second study of Guşuleac (1939b), included in the same issue of the journal. Winkler recognizes the contribution of Guşuleac, however the authors who followed him took into consideration exclusively his system (Winkler, 1940 cf. Tarnavschi, 1976).

The great merit of Mihail Guşuleac is that of having substantiated his system on a simpler and more unitary definition, taking into consideration the gynaeceum, respectively the totality of carpels in a flower. In this interpretation, the fruit is defined as an organ of antophytes, respectively angiosperms, which get differentiated, after fecundation, from the gynaeceum, with the participation, to a higher or lesser extent, of the floral axis, respectively of the receptacle.

Following these directions of research, since the year 1948, his former student Ion Tarnavschi encouraged other Romanian young researchers – among whom mention should be made of R. Isăcescu and mainly Gabriela Şerbănescu-Jitariu – to continue the investigations devoted to fruit morphology.

In 1939, Mihail Guşuleac is transferred (together with his collaborators Ion T. Tarnavschi and Traian Ştefureac) to the Faculty of Sciences of the University of Bucureşti, as professor of botanics (1940-1960) and director of the Botanical Gardens of Bucureşti until his retirement in 1951 (Anastasiu, 2017).

Several studies have been devoted to the scientific activity of this great botanist - highly specialized in both systematics and morphology - written by biologists from Bucovina (Seghedin, 1983; Cernăuțan, 1994; Bejinaru, 2004), as well as by reputed botanists (Săvulescu, 1943; Tarnavschi and Ștefureac, 1961; Pop, 1967; Ștefureac, 1973; Pop and Codreanu, 1975; Tarnavschi, 1976;), who evidenced the value of his didactic and scientific work, his initiatives for the settlement of several protected areas in Bucovina, the creation - in Cernăuți and București - of the school of systematics and morphology, his achievements as a director of the Botanical Gardens of the two great Romanian university centers.

Mihail Gușuleac was a modest, sober, upright person, appreciated for his kindness and love for the people around him, for his ability of organizing laboratories, libraries and botanical gardens, as well as for his lofty moral conduct.

On September 11, 1960, a heart attack ended his life, prior to seeing and enjoying the final organization of the Botanical Gardens of București, neither the inauguration of the Botanical Institute.

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