

## THE CAPITALIZATION OF THE NATURE SCIENCE COLLECTIONS FROM THE OLTENIA MUSEUM FOR THE ELABORATION OF PHD THESES

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**Abstract.** The paper underlines the scientific importance of the patrimony belonging to the Natural Sciences Department of the Museum of Oltenia Craiova and its relevance for the elaboration of PhD theses by the experts of the department in the period since 1972 until now.

**Key words:** scientific patrimony, The Museum of Oltenia, PhD theses.

**Rezumat. Valorificarea colecțiilor de științele naturii din Muzeul Olteniei în elaborarea tezelor de doctorat.** Lucrarea prezintă importanța științifică a patrimoniului Secției de Științele Naturii a Muzeului Olteniei Craiova în elaborarea tezelor de doctorat de către specialiștii secției în perioada 1972 până în prezent.

**Cuvinte cheie:** patrimoniu științific, Muzeul Olteniei, teze de doctorat (doctorate)

The nature sciences patrimony of the Oltenia Museum from Craiova is structured on different collections, as it follows: mineralogy, paleontology, botany, and zoology. These were permanently enriched for multiple purposes: permanent, temporary, and itinerant exhibitions; courses with different subjects, as well as the elaboration of certain scientific papers, including the PhD theses.

We further render the PhD theses of the naturalist museographers who, by means of hard field and laboratory research, contributed to the knowledge of the flora and fauna from Oltenia and its neighbouring areas, so of Romania.

### The study of the avifauna from the Parâng-Vâlcan Mountains and Petroșani Depression

Sustained by Dr. MIRCEA POPESCU in 1972.

Dr. MIRCEA POPESCU has no longer been among us beginning with 1988. The respective paper was achieved by studying the Ornithological Collection of the Oltenia Museum and by adding the results of the avifauna field research, as well as the data from the literature in the field. There were captured 444 common and rare birds. The author approached issues such as systems, migrations, distribution, food, nesting; he also gathered data regarding the study of the populations. There were collected 40 layings summing 162 eggs. This area had not been previously studied, so the paper in question was a novelty. Besides the observations made in the field, there were captured 444 individuals, 320 males and 124 females, belonging to 126 species and subspecies, which can presently be found in the ornithological collection of the Oltenia Museum from Craiova and of the Biology Faculty from Bucharest. In the area, there were identified 133 species belonging to 12 orders and 34 families, which represent 34% of the total number of 391 species and subspecies of Romania avifauna. Of the 133 species and subspecies, 126 were collected and 9 observed. *Emberiza cirrus*, *Emberiza cia*, *Eremophilla alpestris balcanica*, *Carduelis carduelis balcanica*, *Carduelis chloris mihlei*, *Apus melba*, *Tichodroma muraria*, *Parus lugubris lugubris*, *Alcedo atthis ispida*, *Monticola saxatilis*, *Falco peregrinus*, *Aquila chrysaetos* etc. are very rare species and there were noticed in Oltenia for the first time. In the area of the Parâng-Vâlcan Mountains and Petroșani Depression, there were identified 36 sedentary species, 27% of the area hatching avifauna, 25 sedentary-erratic species, 18.7%; 52 migratory species, 39%; 14 winter guest species, 10% of the total avifauna of the area; 4 transitory species, 3.4%, and 2 accidental species, 1.5%. Of the 36 sedentary species, one species is in the alpine area, 23 in the forest area – 8 in the coniferous forest, 8 in the beech forest, 7 in the oak tree forest, and 12 species in the valleys and depressions areas.

The data regarding the arrival of certain migratory birds in Oltenia, as well as their ascension in the Parâng-Vâlcan Mountains complete the knowledge we have gathered in the field so far.

### Contributions to the knowledge of Chiroptera from Oltenia

Sustained by Dr. BAZILESCU ELENA in 1977

The geographical location of Oltenia within Romania together with a series of geomorphologic features determined the presence of a special vegetation and fauna, which belong to a specific biogeographical unit. Thus, it was studied the geographical distribution of the chiropters, as well as their ecology, biology, and practical importance in comparison with other regions, as bats are extremely important because they consume harmful insects for silviculture and agriculture. With regard to the systematic composition of the chiropters from Oltenia, there were identified 18 species, belonging to 8 genders from the Rhinolophidae and Vespertilionidae families. The 18 species represent 64.3% of the 28 species known in the country, while the 8 genders, 90% of the total taxonomic units from Romania. There were made numerous observations of the colonies from the caves, bridges, tree cracks and rocks and there were captured 515 individuals, which make up the chiropters collection of the Oltenia Museum from Craiova; thus, the main goal of a zonal museum was achieved – the research of the fauna located within the area the museum team studies and the gathering of a collection useful for both the scientific research and the cultural-educative activity.

Among the species signaled within Oltenia, *Nyctalus leisleri*, *Vespertilio murinus*, *Myotis mystacinus* and *Myotis emarginatus* were extremely rarely noticed in the European and Romanian fauna, while *Rhinolophus ferrum equinum*, *Rhinolophus*

*blasii*, *Myotis myotis*, *Miniopterus schreibersii* are quite common in the studied area and form colonies of thousands of individuals, not only here, but in the other regions of the country (Dobrogea, Banat, Transylvania) and in Europe. A special importance is held by our contribution referring to the distribution of chiropters species within Oltenia and the country, as we extended the studied area with new settlements: Berleşti, Bistreţ, Craiova, Maglavit, Negoşti, Radovan, Rânca, Gura Motrului, Hobiţa, Drobeta-Turnu Severin, Măldărăşti, Bulzeşti, Sopot, Tâlpas, Terpeziţa, Tismana. Thus, it was elaborated the map rendering the distribution in Europe of the 18 species of bats identified in Oltenia with the completion of the species *Myotis emarginatus*, *Myotis mystacinus*, *Barbastella barbastellus* for Romania. From the geographical origin point of view, the chiropters species from Oltenia are: *Myotis myotis*, *Myotis emarginatus*, *Myotis mystacinus*, *Myotis bechsteni*, *Nyctalus noctula* of European origin; *Plecotus auritus*, *Vespertilio murinus* of paleoartic origin; *Barbastella barbastellus* central-European; *Rhinolophus hipposideros* central-European and West-Asian; *Nyctalus leisleri*, *Pipistrellus pipistrellus* central-European and Mediterranean; *Miniopterus schreibersii* European-Mediterranean; *Myotis capaccinii* central-European and circum-Mediterranean; *Rhinolophus blasii*, *Rhinolophus euryale* circum-Mediterranean; *Myotis oxignathus* circum-Mediterranean and South-west Asian; *Rhinolophus ferrum equinum* of Mediterranean origin. Together with the activity of systemic study of the chiropters within Oltenia, we also made research regarding their way of living. The biology of these mammals is interesting, as many of their life aspects are not quite well known. For example, we do not know many things about their behaviour during the seasonal and circadian departures. The microclimate of each shelter used by bats is mainly influenced by the geographical location and secondly by the internal abiotic and biotic factors: the morphology of the shelter, altitude, temperature, humidity, light, air currents, the trophic factor and man-induced factor. By analyzing 80 samples of stomach contents, we established that the food is composed of Lepidoptera, Diptera, and Orthoptera. With regard to the trophic chain, bats are secondary consumers (predators), while they are eaten by night and day birds of prey and by reptiles (snakes). Their enemies are considered tertiary consumers in the trophic chain. Bats are active during night when there fly diverse kinds of insects that are harmful for silviculture and agriculture. Bats play an important role in the biological control of the enthomofauna. Thus, the economic importance of bats is obvious. Worldwide, the importance of bats is also unquestionable as they live in all the ecosystems. Consequently, their knowledge and protection must be taken into account as an issue closely related to the economy of each country.

All the researchers who studied and are still studying the Chiroptera fauna agree that their number is currently decreasing due to urbanization. The main causes are pollution due to insecticides, the decrease of the number of dispensable habitats, the destruction of old and hollow trees, the occupation of the caves for different activities. Of course, there are also meteorological factors that contribute to the decrease of the number of bats. A large number of bats is directly destroyed by man.

Many countries recognized the importance of bats' preservation and adopted a law for their protection. As many of the bats' species are migratory, all the countries should take equal measures of protection.

#### **The enthomofauna of the sandy terrains located in the neighborhood of Craiova**

Sustained by Dr. Dr. FIRU ION, 1982

According to the field research, there was noticed a number of 77,800 species of insects. Part of them represents the collections of the Oltenia Museum. The studies were made between 1963 and 1977. There were identified 672 species, which belong to 509 genders, 135 families, and 14 orders. There can also be noticed certain adaptations to the environment of the eremic and arenicole insects. Some of them display special adaptations to digging. They have protective colours and certain heteropters have long and thin shapes and, thus, they can "stick" to the soil in order to protect themselves from wind and natural enemies. It is rendered a zoogeographical list for 424 species of insects that are grouped in 32 areas. Overall, the Palearctic insects display the highest rate followed by the Holomediterranean West – Palearctic (European), the European-Mediterranean ones etc. On orders, the succession is as it follows: in the case of Orthoptera and Heteroptera: the Palearctic species followed by the Holomediterranean one; in the case of Neuroptera and Hymenoptera, the Holomediterranean, then the palearctic; in the case of Coleoptera, the Holomediterranean, then the European species; in the case of Lepidoptera, the Palearctic and Holarctic species; in the case of Diptera, the European species and, then the European-Mediterranean ones.

The research took place in three locations representative for the sandy area of Oltenia: Craiova-Obedeanu, Secui (12 km South of Craiova) and Prunet (22 km South of Craiova). In these locations, there were established 44 types of biotopes: dune, interdune, dried pool, and the skirt of the acacia forest. The enthomofauna of the sandy terrains according to the representative biotopes of these terrains were studied for the first time (dune, interdune, dried pool, and the skirt of the acacia forest).

Ion Firu died in 1983, shortly after he had obtained the scientific title of Doctor in Biology sciences.

#### **The systematic and ecologic study of the Helicacea – Gastropoda superfamily from the lower and middle catchment area of the Jiu**

Sustained by Dr. PĂUNESCU IRINA in 1982

There was made a systematic and ecological research of the Helicacea superfamily from the middle and lower catchment area of the Jiu, in natural conditions registered in 43 stations and in laboratories; thus, more than 14,000 measurements, weighings, and coloration analyses were performed. There were noticed 22 species, among which *Helix lucorum* and *Campylaea trizona* were identified for the first time in Oltenia. There appears a polymorphic variability between populations and within the same population, which is conditioned by the factors specific to the biotope they live in. Gastropods are indicators of the pollution with harmful metals. The analyses of the shells from the area Tismana-Gorj proved the presence of lead from the exhaust gases. The high quantity of iron at the *Helicella* species might be an iron indicator for the soil compositions within its habitat.

There was also rendered the economic importance of some species. The species *Helix pomatia* and *Helix lucorum* are used in the people's nourishment, as well as by certain animals. Within the middle and lower catchment area of the Jiu, there were established areas and biotopes for the natural breeding of different species of Gastropods by taking into account the ecological features of the respective biotopes. The following areas were recommended: Tismana, Bucovăț forest and Braniște, and the Jiu area for the species *Helix pomatia* and *Helix lucorum*. Gastropods play an important role in the ecosystems, as they are part of the trophic chains and networks, mainly as primary consumers. 90,000 species belong to this large group. The representatives of this class play an important role in hydrobiology as they represent part of the fishes' food. Another valuable aspect is that they represent stone documents for the geological eras.

Certain representatives are indicators of pollution and they are used in pharmacology. Worldwide, Gastropods are an important gastronomic element. The seasonal dynamics of the total biomass emphasizes the fact that the lowest one is registered in spring ( $487\text{g/m}^2$ ), then it increases during summer ( $721\text{g/m}^2$ ) and reaches a maximum in autumn ( $1,437\text{g/m}^2$ ).

There were made certain studies regarding the divergence of the characters on the slope/clină and it was elaborated an optimization program by measuring the factorial parameters regarding the optimum conditions for reaching a biological mass. This method can be also used in the case of other economically important animal breeds, such as the pigs and the cows.

### **The dynamics of the structure and of the production of the Gastropoda populations within the Oltenia Plain**

Sustained by Dr. CIOBOIU OLIVIA, 2000

The author studied the Preajba Valley, an area that has not been minutely studied so far and brought many new data about the hydrobiology.

The Preajba Valley is located 6 km south of Craiova; it is a hilly unit disposed within the platform of the Oltenia Plain. The researcher approached for the first time the ecological study of certain populations of Gastropods populations belonging to a special category of aquatic ecosystems – small basins. The basins are part of the Preajba Valley catchment area, which covers a surface of  $20.2\text{ km}^2$ . It is quite important that the basin, even if it covers a small geographical space, comprises a wide diversity of ecosystems: springs, streams, rivers, small basins. The research of the numerical dynamics emphasized important numerical differences between populations according to the seasonal periods – population reaching a maximum number: in spring – *Vivipara viviparus*, *Vivipara acerosus*, *Radix ovata*, *Radix peregra*; in summer – *Raxid auricularia*, *Physa fontinalis*, *Planorbis planorbis*, *Segmentina nitida*, *Fagotia auricularis*, *Fagotia esperi*, *Succinea elegans*; in autumn – *Physa acuta*, *Aplexa hypnorum*, *Valvata piscinalis*, *Anisus spirorbis*. This structure proves the capacity of the Gastropods' populations to integrate in variable environmental conditions and to capitalize the available resources. According to the analysis of the numerical evolution of the populations and of the seasonal dynamics on age categories of the individuals, it results that the Gastropods experiences an increasing process both as number of species and as number of individuals belonging to each species, which represents an answer to the favourable environmental factors.

The calculus of the affinity index emphasizes that the populations of *Viviparus acerosus*, *Viviparus viviparus*, *Physa acuta*, *Radix ovata* and *Aplexa hypnorum* are the best consolidated from the ecological point of view. The production of the Gastropods' populations expressed by the values of the individuals' biomass shows the increased biological production of the studied basins. The total annual production of biomass oscillates between  $1,291\text{ g/m}^2$  and  $8,245\text{ g/m}^2$ .

### **Taxonomic and ecological research of the Scarabaeidae family (Insecta: Coleoptera) within Oltenia**

Sustained by Dr. CHIMIȘLIU CORNELIA in 2004

The list of the Scarabaeidae identified in Romania so far was updated (exclusively the Lucanidae family), by adding the species signaled by other authors to the species and subspecies mentioned by S. Panin (1955, 1957) and by excluding the species erased from the fauna of the country.

With regard to the contributions to the research of the Scarabaeidae from the fauna of Oltenia, we brought up-to-date the research and knowledge study of the species from Oltenia, by synthesizing all the faunal data mentioned in the literature in the field from the beginning of the 20<sup>th</sup> century (1904) till nowadays; we also used personal data gathered during our own field research. Our own research took into account both the material collected by us between 1979 and 2007 and the material preserved in the entomological collections of the Section of Nature Sciences of the Oltenia Museum from Craiova (collected between 1951 and 2004), of the Section of Nature Sciences of the Museum of the Region Iron Gates Drobeta Turnu Severin (collected between 1964 and 1986) and of the Horticulture Faculty of the University of Craiova (collected between 1961 and 1981). We processed and determined from the scientific point of view 13,310 samples, which were gathered in 52 years, from 182 places located in the five counties of Oltenia. According to our research, there were identified 139 species and subspecies, included in 54 genders, 21 tribes, 14 subfamilies, 6 families; they represent 69% of the species and subspecies of the Scarabaeidae fauna of Romania, 81% of the genders, 91% of the tribes, 93% of the subfamilies, 86% of the families. Among the identified taxons, 48 species and subspecies, 4 subgenders, 4 genders, 2 subfamilies and 2 families have been signaled for the first time in the fauna of Oltenia. It was identified a new gender for the Romanian fauna – *Triodonta Mulsant*, 1842 and a new species – *Triodonta flavimana* Burmeister, 1855, included in the Sericini tribe, Melolonthinae subfamily, Scarabaeidae family.

Information about the newly mentioned species can be found in the papers elaborated between 1999 and 2004.

Presently, the taxonomic specter of the Scarabaeidae superfamily within the Coleoptera fauna of Oltenia emphasizes a number of 159 species and subspecies, respectively 69% of the 229 species mentioned in the fauna of

Romania. They belong to 54 genders, included in 21 tribes, 14 subfamilies and 6 families. Only one family (Glaphyridae – mentioned only in the fauna of Dobrudja) has not been identified in the fauna of Oltenia so far.

Of the 159 species and subspecies, 48 (respectively 30%) are newly mentioned for the fauna of the region, 91 (57%) are previously mentioned by other authors in their own research studies, and 20 (13%) were mentioned by other authors in the past, but not discovered in the present. 24 species and subspecies were identified and mentioned for the second time within Oltenia. 3 of them are secondly mentioned even for the Romanian fauna: *Aphodius (Melinopterus) pubescens* Sturm, *Copris hispanus* L. and *Onthophagus (O.) joanne* Goljan.

With regard to the distribution of the Scarabaeidae species within Oltenia, there were identified 182 sampling places, 93 of which were new and 89 previously mentioned and found by us, as well. In the entomological literature, there are mentioned another 59 sampling places, which were not identified by us; thus, the collecting of the Scarabaeidae has been made in 241 places, so far.

With reference to the ecology of the identified species, we noticed that the trophic preferences are quite diverse: 61 species are phytophagous, 71 coprophagous, 5 necrophagous, one species is micetophagous and another one sarcophagous. For some phytophagous species, there were identified new host plants, which had not been previously mentioned in the literature in the field. The research regarding this Coleoptera group was the subject of many scientific papers, among which the PhD thesis.

### The research of the sand flora from the Southwest of Oltenia

Sustained by Dr. NĂSTASE ADRIAN in 2005.

The psamophile flora is made up of a series of plants with special adaptations; the most important ones are the xeromorphous plants (with very well developed roots, glaucous, tomentous leaves, sclerenchymatic, rich tissue etc.) and the ones with an active vegetative regeneration.

According to the increased variation of the environmental conditions, the vegetal cover of the sandy areas displays as a variety of associations, which have different compositions and structures corresponding to the sand settling degree and to the depth of the aquifer. Except for some areas covered by mobile sand (new accumulations or reactions, such as the ones from Hunia-Maglavit, Southeast of Calafat and South of Băilești), the dunes are fixed and solidified; thus, the relief displays a wavy aspect. The research upon the sand flora from the Southwest of Oltenia identified 116 species in the area Cetate-Bistreț. Within the studied area, due to the geographical location, relief, hydrographic net, and soil varieties, to the local and general factors, a rich and interesting psamophile flora developed. There were identified 738 species (65 represented by subspecies) and 9 subspecies, 10 varieties, 8 forms, and 2 hybrids, distributed in 276 genders and 87 families belonging to Pteridophyta and Spermatophyta divisions. A significant contribution is the discovery of 3 new taxons for the flora of Romania: *Daucus broteri* Ten., *Hypericum olympicum* L. and *Ranunculus neapolitanus* Ten. The richest families in species are Asteraceae (99 sp.), Fagaceae (68 sp.), Poaceae (66 sp.), Brassicaceae (45 sp.), Lamiaceae (44 sp.), Apiaceae (28 sp.). By comparing the sand flora from the analysed area to the one from the left of the Jiu, we noticed that 27 species could not be found on the terraces located in the East of Oltenia. With regard to the ecological features according to the main factors (M,T,R), the identified flora is characterized by:

From the moisture factor point of view, although the conditions are different (dune, alluvial plain), the xeromezophyt-mezophyt display the highest rate – 125 sp. (17%), followed by xeromezophyt – 98 sp. (13%), xerophyt-xeromezophyt – 76 sp. (11%), xer – 42 sp. (8%).

- a) from the temperature factor point of view, we notice the predominance of subthermal species – 96 sp. (13%).
- b) from the qualitative point of view, the most numerous group is represented by the therophytes – 231 sp. (30%) and hemicriptophytes – 226 sp. (28%), the main elements of the dunes and interdunes. Together with the geophytes (8%), they make up more than 66% of the flora in the area, while the phanerophytes represent only 9%. This statistics proves the forest steppe character of the area. The increased presence of the therophytes (30%), most of which being segetal and ruderal weeds, can be explained by the strong influence of the zoo-anthropic factor in the area.

By analyzing the present state of the flora, we noticed that 70 species are jeopardized; they are on the red list of vascular plants from the southwest Oltenia. The degradation of the floristic biodiversity is mainly due to the man-induced impact upon the natural ecosystems in the area, which is mainly about deforestation.

The following PhD theses are going to be elaborated:

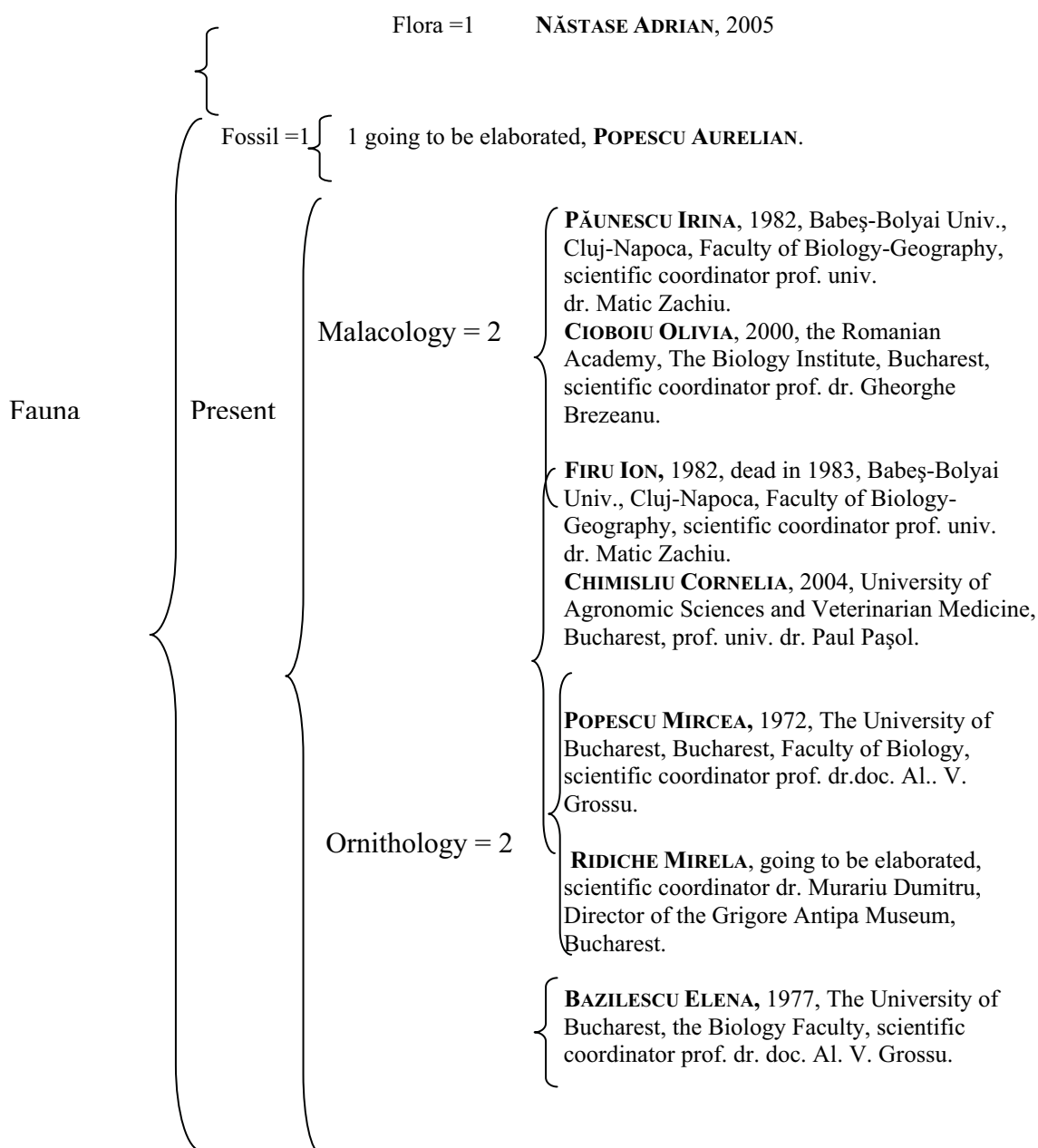
1. The avifauna of the Danube alluvial Plain (sector Calafat-Zăval – Dolj County), the biology, ecology, and preservation status of the species of birds. PhD student, **MIRELA RIDICHE**;
2. The faunas of Pliocene-Pleistocene mammals from Oltenia. PhD student, **AURELIAN POPESCU**.

### CONCLUSIONS

I considered it was necessary to present the seven PhD theses realized by the naturalist museographers from the Oltenia Museum, as well as to mention the other two theses that are to be finished in the near future in order to achieve the title of doctor in biological sciences, as I wanted to underline the field and laboratory research and the ways the museum collection can be enriched.

We also underline the contribution of the zonal museums to the knowledge of the floral and faunal reaches of Romania.





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