

# INVIPIEA

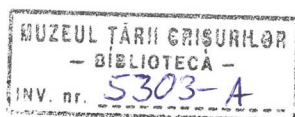
MUZEUL ȚĂRII CRIȘURILOR, ORADEA



2010

**MUZEUL ȚĂRII CRIȘURILOR**

**NYMPHAEA  
FOLIA NATURAE BIHARIAE  
XXXVII**



**Editura Muzeului Țării Crișurilor  
Oradea 2010**

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## The presence of the genus *Ptilophyllum* in the Lower Jurassic flora of Romania

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**Abstract.** New statistics enumerates the published *Ptilophyllum* record of the Romanian Lower Jurassic flora. The genus *Ptilophyllum* is present in this fossil flora with the taxa *Ptilophyllum* cf. *acutifolium* Morris, *P. imbricatum* (Ettingshausen) Krasser, *P. rigidum* (Andrae) Krasser, *P. aff. jurassicum* Kimura & Ohana, *P. maculatum* Givulescu, *P. aninaensis* Czier, *P. cf. aninaensis* Czier, *P. acifolium* Givulescu, *P. curvatum* Givulescu, *P. grandis* Givulescu, *P. romanicum* Givulescu, *P. sp.* The validity of *Ptilophyllum acifolium* is questionable. *Ptilophyllum curvatum*, *P. grandis*, and *P. romanicum*, are invalid species. Nobody should confound *Ptilophyllum aninaensis* with *P. maculatum*. The so-called problem of priority created by Givulescu is visionary.

**Keywords.** Macroflora, Mesophytic, Romania.

### Introduction

*Ptilophyllum* is a common Bennettitalean genus of the Mesophytic. Referring to Seward (1917), Andrews (1970) notes in his catalogue the genotype *Ptilophyllum acutifolium* Morris 1840, a cycadophyte leaf from south of Charivar Range, India. Harris (1969) was who gave generic emended diagnosis, in his ample monograph on the Yorkshire Jurassic Flora. The complete name of the genus is *Ptilophyllum* Morris em. Harris.

The Lower Jurassic continental sequences in Romania yield rich *Ptilophyllum* material. Leaves attributed to this genus are known from Braşov County (Cristian, Holbav, Vulcan), Caraş-Severin County (Anina, Doman, Pietrele Albe), Gorj County (Crasna, Pleşa, Porcului valley, Vierzuroiu mine, Vierzuroiu valley), and from an unknown locality situated probably in the Southern Carpathians. The specimens discussed in this study originate from various stratigraphical units, defined by Mrazec (1898), Preda (1981), Bucur (1991), Stănoiu *et al.* (1997), Czier (1999, 2000a, 2000b).

Ettingshausen (1852), Andrae (1855), Štúr (1855, 1860a, 1860b), Hantken (1878), Römer (1879), Roth v. Telegd (1906), Krasser (1921), Thomas (1930), Semaka (1954, 1958, 1962a, 1963, 1970), Oarcea & Semaka (1962), Humml (1963), Zborea *et al.* (1966), Semaka *et al.* (1972), Givulescu & Farcaşiu (1989), Givulescu (1990, 1997), Popa (1994), Czier (1995, 2001a), refer to a considerable number of *Ptilophyllum* specimens. On the other hand, the only macroscopically described specimens and especially those noted in lists, which have no attached description or figuration, are suggestible to new determination. Before of such a major research, statistics should enumerate the whole *Ptilophyllum* record, taking into consideration all the published determinations and revisions. The first scope of this paper is to present such a statistics. The second aim is to elucidate the so-called „problem of priority” elaborated by Givulescu (1998a). The data below show that this problem is not of priority, nor of synonymy, but at the most one of microscopy.

### Cuticular studies

Despite of the relative abundance of the *Ptilophyllum* specimens in the Lower Jurassic flora of Romania, only four authors, namely Schenk (1867), Thomas (1930), Givulescu (1992b), Czier (1995), published major studies on the cuticles of such leaves. The old-fashioned studies of Schenk and Thomas, and the other papers of Givulescu, do not bring new arguments for the presence of the genus *Ptilophyllum*. Their cuticular preparations originate from unidentifiable hand specimens, or their published data may refer to other genera; many of their descriptions and figurations are copies from other works, moreover some of their species are invalid.

Givulescu (1998a) published a critical paper dealing with the two most important species of *Ptilophyllum* from the early Jurassic of Romania, one of them being *P. maculatum* Givulescu 1992, the other *P. aninaensis* Czier 1995. Based on some photos from the first plate of his paper, Givulescu concludes that ‘my species’ shows the same cuticular features as ‘his species’. Therefore, he

considers the names of the two species synonyms. Of course, in the context he presented, considering the rule of priority, he proposes the retention of the name *Ptilophyllum maculatum* Givulescu against *Ptilophyllum aninaensis* Czier.

There are many good reasons to reject Givulescu's arguments in this „problem of priority”. Above all, Givulescu (1998a) has confounded the photos of his own plate. From his explanations results, that all the figures of that plate are *P. aninaensis*, but this is false. Nobody can identify photocopies better than the photographer can. Photographers can easily identify unauthorized copies, even if they appear in obscure publications. Unfortunately, the author of the present paper is a photographer who has such a nasty experience. Givulescu's figures 1, 2, 4, from the mentioned plate, are identical with three photos from the doctorate thesis of Czier (1994). He published them without consent. It is sure, therefore, that only figures 1, 2, 4, from Givulescu's plate represent *P. aninaensis*. Figure 3 of the plate is identical with a photo, which Givulescu (1992a, plate II – fig. 1) has earlier published under the name *Ptilophyllum maculatum*. After so a confusion of the photos, it is not a miracle that in Givulescu's opinion the two species are the same.

Givulescu (1998a) presents a comparative table between *P. maculatum* and *P. aninaensis*. His table contains no comparison between the macroscopic characters of the two species, no data regarding the hypodermis and the cuticle of the rachis, not even comparable measurement data. The comparison he gives is incomplete. He compares only the upper and lower cuticles of the two species, and the stomata, in an effort to present them much resemblant. Despite all what he did, from his table result more differences than resemblances. Givulescu gave then a short discussion, arriving at his conclusion, that the two species are identical. He erroneously concluded, „The differences are due more to the manner of description, than to the nature of the material itself”. His „arguments” are few, and not significant. He tendentiously presented them in favour of his premeditated conclusion, to which he decided to arrive. An unacceptable fact in his paper is that he gives not scientific uniformity to the terms, not even to the descriptions from the table. Instead of this, he uses for the same specific feature old and new expressions of different meanings, and gives the same meaning to different terms (e.g. his permanent confusion between cuticle and epidermis). Moreover, as his paper looks, it seems insufficiently checked for errors. Would be his submitted manuscript thoroughly examined by competent reviewers, were much fewer spelling mistakes and unscientific misunderstandings in his publication.

To demonstrate that the two species are identical, Givulescu (1998a) alters the meaning of the diagnosis and description of *Ptilophyllum aninaensis*, writing, „Both formes have upper cuticles made up of star like cells”. Nevertheless,



the star-shaped, moreover papillate cells are characteristic only for *Ptilophyllum maculatum*. The diagnosis, description and figuration of *Ptilophyllum aninaensis* does not refer to „star like cells”, but to isodiametrical, squarish, and short-rectangular cells.

Givulescu (1998a, p. 83) argued „in order to compare and to find evidence”, that „Givulescu studied 14 species of *Ptilophyllum* of the palaeobotanical literature, Czier only studied three, to which he added *P. maculatum*.” What can I say about this statement? As about the only fourteen species of *Ptilophyllum* studied by Givulescu, this number is far not enough to create a new species. The only macroscopically and in light microscopy studied species *Ptilophyllum maculatum* is not one of the most relevant in the world. Scientists investigate the most relevant species also by means of modern methods and high quality instruments, like the Scanning Electron Microscope (SEM). Givulescu has worked only light microscopy, and the SEM researches intrigued him. The second part of his statement is ridiculous. Has somebody idea, which are those three species of *Ptilophyllum* to which he had thought? The author of this paper has not. Who may know better the number of species studied, than the author of the paper? If not a joke, the response must be nobody. The present author, when compared the new species *Ptilophyllum aninaensis*, published comparisons with *the most resemblant* species, to show that the new species differs even from those. International scientific journals have no tens of supplementary pages for useless comparisons with hundreds of very different species. Although there are numerous negatives in the ‘critical paper’ of Givulescu, wishing to maintain a good *memoriam*, no more examples of this brand will follow.

Prof. Givulescu realized later, that it is not ethical to ignore the opinion of a living author about such a problem of synonymy. He invited him to Cluj, to examine together the species *Ptilophyllum maculatum*, at the Geological-Palaeontological Chair of the „Babeş-Bolyai” University. The author has accepted the invitation. I saw with my own eyes his preparations under their old microscope, and said only a few words. He expected from my part to confirm the synonymy, but I could not. Then he came to the microscope, to show cuticular characters, in order to argue the pretended resemblance between the two species. However, the shown characters are not specific for both species. In fact, he insisted only regarding the upper cuticle, saying that it looks like that of the other species. „There are a lot of characters, which are particularly specific for each species”, said I, and continued in this manner: „The two species are distinct, and I do not change my mind. For example, the upper cuticle of *Ptilophyllum maculatum* indicates epidermal cells with extremely sinuous walls, and this confers a very characteristic feature to the species. *Ptilophyllum aninaensis* has different upper cuticle, but I had this already

published.” Givulescu looked once again in the microscope, and stated that „the upper epidermal cells” of his species are like some „very strongly coupled cog-wheels”. I found this essential remark very good in that verbal discussion, but I could not skip adding some homely remarks: „Unlike *Ptilophyllum aninaensis*, the cog-wheel-shaped epidermal cells of *P. maculatum* possessed each a strong papilla. There are differences also in the characters of the lower cuticle, as I had already noted them in a paper published at Stuttgart in 1995”. He began to smile, saying, the last problem is that the type specimens of both species are from the same locality. I remember well my response, „This is not a serious problem. If the characters show relevant differences, the species are distinct. The type locality matters little. Even if the specimens originate from the same stratigraphical or geographical unit, the species are different, if they present differences in the specific characters. This statement might be true not only concerning two species of the form-genus *Ptilophyllum*, but even in cases of resemblant biological species of which the spreading areas may overlap.”

In year 2004, Prof. Givulescu came to Oradea. He visited the town, then the Țării Crișurilor Museum. At the end of his visit, we sat on a bench in the park. He told, he is in the eighties, retires, and promises to comment published opinions anymore. He gave a photo (Pl. I), saying that he gives a free hand to publish it, ‘if I will, where I will, and when I will’. I accepted the gift with many thanks, and then we said a short good-bye. After three years, he deceased.

### **Systematic palaeontology**

Gymnospermatophyta  
Cycadopsida  
Bennettitales

***Ptilophyllum*** Morris 1840 em. Harris 1969

*Type species. Ptilophyllum acutifolium* Morris 1840

***Ptilophyllum*** cf. ***acutifolium*** Morris 1840

2001a *Ptilophyllum* cf. *acutifolium* Morris. Czies, p. 35

*Locality.* Anina.

*Lithostratigraphic unit.* The Valea Terezia Sandstone Member of the Steierdorf Formation.



*Biostratigraphic unit.* The *Banatozamites chlamydostomus* Subzone of the *Clathropteris meniscioides* Biozone.

*Age.* Hettangian *pro parte* – Sinemurian.

*Discussion.* Czier (2001a) has identified the species in the palaeobotanical collection of the Hungarian Natural History Museum, Budapest. The material is under study.

***Ptilophyllum imbricatum* (Ettingshausen 1852) Krasser 1921**

1. 1852 *Pterophyllum imbricatum* Ettingsh. Ettingshausen, p. 7, plate 1, fig. 1
2. 1855 *Zamites gracilis* Kurr. Andrae, p. 40, plate 11, figs. 4, 5
3. 1921 *Ptilophyllum imbricatum* (Ettingsh.). Krasser, p. 361
4. 1930 *Ptilophyllum imbricatum* (Ett.) Krass. Thomas, p. 390, text-figs. 1, 2
5. 1963 *Zamites gracilis* Kurr. Humml, p. 198
6. *non* 2001a *Ptilophyllum imbricatum* (Ettingshausen) Krasser. Czier, p. 35

*Locality.* Anina.

*Lithostratigraphic units.* 1, 3. The Steierdorf Formation – possibly the Dealul Budinic Conglomerate Member, but most probably the Valea Terezia Sandstone Member. 2, 4. Most probably the Steierdorf Formation, but possibly the Valea Sodol Marl Member of the Dealul Zânei Marl Formation. 5, 6. The Valea Terezia Sandstone Member of the Steierdorf Formation.

*Biostratigraphic units.* 1, 3. The *Clathropteris meniscioides* Biozone – most probably the *Banatozamites chlamydostomus* Subzone. 2, 4. Most probably the *Clathropteris meniscioides* Biozone or the *Carpolithes liasinus* Biozone. 5, 6. The *Banatozamites chlamydostomus* Subzone of the *Clathropteris meniscioides* Biozone.

*Ages.* 1, 3. Hettangian - Sinemurian. 2, 4. Hettangian - Toarcian. 5, 6. Hettangian *pro parte* - Sinemurian.

*Discussions.* 1. Based on a macroscopical study of „a cycadacean leaf” from the „arenaceo formationis Lias ad Steierdorf Banati”, Ettingshausen (1852) has described and figured a new species, which he named *Pterophyllum imbricatum*. Andrae (1855) has not accepted this species, and placed the material in other genus, as *Zamites gracilis* Kurr. Although Langer (1947), Semaka (1954, 1957, 1962a), Givulescu (1960, 1989a), Jongmans & Dijkstra (1965) cite the name *Zamites gracilis* Kurr, it must be remarked that the revision of Andrae is unacceptable, because the characters of the specimen do not allow assignment to the genus *Zamites*. Schenk (1867) maintains Ettingshausen's species *Pterophyllum imbricatum*, and gives a cuticular description, but there is no pro or

contra evidence that he has studied the original material of Ettingshausen or not. Štúr (1871) and Hantken (1878) cite the material, under the name *Pterophyllum imbricatum* Ettingshausen. Schimper (1872) maintained the species, but placed it in his own genus *Ctenophyllum*. Fontaine (1883) agreed this assignment, and accepted the combination *Ctenophyllum imbricatum* (Ettingshausen) Schimper. Krasser (1921) had other opinion. He revised the old determinations, and placed the species in genus *Ptilophyllum*. The combination *Ptilophyllum imbricatum* (Ettingshausen) Krasser is largely accepted since Thomas (1930) also gave a cuticular description. There is, however, a major problem with the description of Thomas: it almost surely does not refer to the material on which Ettingshausen has created the species. Although the combination is accepted by Givulescu (1989a), and cited by Czier (1999, 2000c), it would be advisable to restudy the material. A very fortunate event should happen to identify it, because its present keeping place, as well as its keeper, is unknown.

2. Andrae (1855) has described and figured new hand specimens from „Steierdorf Banati”, under the name *Zamites gracilis* Kurr. He has not noted how many specimens of this species he has studied. His plate 11, figures 4 and 5, shows two rock samples, each of them bearing one leaf fragment. There were thus probably two specimens. Schimper (1872) has not accepted the determination, and has attributed the material to *Ctenophyllum imbricatum*. Fontaine (1883) remarked that the specimens are like the plant of Ettingshausen (i.e. *Pterophyllum imbricatum*), but he cited the material as *Zamites gracilis*. He has not accepted the assignment of the material to any genus other than *Zamites*, and has maintained the determination of Andrae. Langer (1947), Semaka (1954, 1957, 1962a), Givulescu (1960), Jongmans & Dijkstra (1965) also cite the material under the original name *Zamites gracilis* Kurr, though the species was earlier revised by Schenk (1867), as a synonym of *Pterophyllum imbricatum*. Krasser (1921) was who assigned the material to *Ptilophyllum imbricatum*. It is cited under this name, by Semaka (1965), Givulescu (1989a), Givulescu & Czier (1990), and by Czier (1999, 2000c).

3. Krasser (1921) has recorded from the „lower Liassic of Steierdorf” new material. He has not mentioned the number of the specimens; therefore, there was at least one specimen. Givulescu (1989a), Givulescu & Czier (1990), and Czier (1999), cite it *Ptilophyllum imbricatum* (Ettingshausen) Krasser.

4. Thomas (1930) gave a very short and inconclusive macroscopic description and a good cuticular description for a *Ptilophyllum imbricatum* specimen originating from the „Liassic of Steierdorf”. The cuticle preparation has been made earlier by Prof. Robert Zeiller. Thomas noted himself that the specimen from which the cuticle preparation originate „could not be discovered”. He was able to figure

only the cuticles, not the leaf. This implicitly indicates the impossibility of studying the material even at that time. The determination is still accepted by Czier (1999, 2000c), but a general revision of the species nevertheless is necessary. Not just in order to make comparisons with the meantime appeared literature, but also because Thomas affirmed, „the specimen from which Zeiller’s preparations were made came from the Lias of Steierdorf, and was closely similar in external form to some examples of *Ptilophyllum pecten* (Phill.) from the Oolites of Yorkshire.” It is unknown, the original specimen of Thomas still exists, or not, and in the improbable case if it exists where could it be. At the beginning of the 20<sup>th</sup> Century, it was kept probably at „École des Mines” Paris, but this information is unsure, because Thomas added, „There were, however, certain difficulties which detract from the value of some of the observations given below. At the time when the work was done, Prof. Zeiller was confined to his room by the illness, which terminated fatally, and I had no means of discovering the specimens from which the cuticle preparations had been made. Several specimens were found in the collections of the Ecole des Mines, which bore the same names and localities as the preparations, and which were almost certainly the examples from which the preparations had been derived, but the sources of other material could not be discovered, and we have to rely on the labels which the slides bore.”

5. Humml (1963) enclosed in his catalogue the name *Zamites gracilis* Kurr for a specimen collected from Ponor shaft at Anina. Czier (1998) nomenclaturally assigns it to *Ptilophyllum imbricatum* (Ettingshausen) Krasser. Czier (1999) cites it under this name, however, the study of the material continues. The analysis of the macro- and microscopic features will clarify many questions. In this moment, nothing sure is to be communicating, because the material might belong to *Ptilophyllum*, *Zamites*, or perhaps to *Otozamites*. According to Gothan (1914), *Zamites gracilis* Kurr 1845 is similar to *Otozamites brevifolius* F. Braun in Münster 1843. According to Harris (1961), *Otozamites brevifolius* is a possible synonym of *Otozamites bechei*, but for the sure determination of the specimens, cuticular analysis is necessary. According to Menéndez (1966), *Otozamites bechei* is a synonym of *Otozamites obtusus* (Lindley & Hutton 1834) Brongniart 1849. Andrews (1970) stipulates *Otozamites obtusus* type species for the genus *Otozamites*. Therefore, the Anina specimen can be even a reliable *Otozamites*.

6. Owing to the study of some *Ptilophyllum imbricatum* leaves and stems identified by Czier (2001a) in the palaeobotanical collection of the Hungarian Natural History Museum, Budapest, they belong to other genera. The leaves belong to the new species *Banatozamites calvus* Czier (2009), and the stems to *Bucklandia aninaensis* Czier (2009).

***Ptilophyllum rigidum*** (Andrae 1855) Krasser 1921

1. 1855 *Pterophyllum rigidum* And. Andrae, p. 42, plate 11, fig. 1
2. 1855 *Pterophyllum (Divonites) rigidum* Andrae. Štúr, p. 345
3. 1860a *Pterophyllum (Dioonites) rigidum* Andrae. Štúr, p. 58 (*partim*)
4. 1860b *Pterophyllum rigidum* Goeppert. Štúr, p. 58
5. 1878 *Pterophyllum rigidum*. Hantken, p. 69
6. 1878 *Pterophyllum rigidum*. Hantken, p. 71 (spelling error for *rigidum*)
7. 1878 *Pterophyllum rigidum*. Hantken, p. 72
8. 1879 *Pterophyllum rigidum*. Römer, p. 54 (spelling error for *Pterophyllum*)
9. 1930 *Ptilophyllum rigidum* (Andrae) Krass. Thomas, p. 392, text-figs. 3, 4
10. 1954 *Pterophyllum rigidum* Göp. Semaka, p. 847, figs. 25 - 30
11. 1958 *Pterophyllum rigidum* Andrae. Semaka, p. 409, tab. 1 (*partim*)
12. 1958 *Pterophyllum rigidum* Andrae. Semaka, p. 411, tab. 2
13. 1962 *Pterophyllum rigidum* Andrae. Oarcea & Semaka, p. 241 (*pro parte*)
14. 1962 *Pterophyllum rigidum* Andrae. Oarcea & Semaka, p. 241 (*pro parte*)
15. 1962 *Pterophyllum rigidum* Andrae. Oarcea & Semaka, p. 241 (*pro parte*)
16. 1963 *Ptilophyllum rigidum* (Andrae) Krasser. Semaka, p. 166, 169, tab. 1
17. 1963 *Ptilophyllum rigidum* (Andrae) Krasser. Humml, p. 196, 197
18. 1966 *Ptilophyllum rigidum* (Andrae) Krasser. Zborea *et al.*, p. 49
19. 1972 *Pterophyllum rigidum* Andrae. Semaka *et al.*, p. 436
20. 1972 *Ptilophyllum rigidum* (Andrae) Krasser. Semaka *et al.*, p. 439, tab. 1 (*pro parte*)
21. 1972 *Ptilophyllum rigidum* (Andrae) Krasser. Semaka *et al.*, p. 439, tab. 1 (*pro parte*)
22. 1972 *Ptilophyllum rigidum* (Andrae) Krasser. Semaka *et al.*, p. 439, tab. 1 (*pro parte*)

*Localities.* 1, 5, 6, 7, 9, 13, 14, 17. Anina. 2, 4, 10. Holbav. 3. Cristian. 8, 11. Vulcan. 12, 15. Doman. 16. Pleșa. 18, 22. Crasna. 19. Porcului valley. 20. Viezuroiu valley. 21. Viezuroiu mine.

*Lithostratigraphic units.* 1, 12, 13. The Valea Terezia Sandstone Member of the Steierdorf Formation. 2, 4, 8, 10, 11. The Vulcan Sandstone Member of the Codlea-Vulcan Formation. 3. The Valea Schneebrich Sandstone Member of the Cristian Formation. 5. The Dealul Zânei Marl Formation. 6, 7. The Valea Sodal Marl Member of the Dealul Zânei Marl Formation. 9. Most probably the Steierdorf Formation, but possibly the Valea Sodal Marl Member of the Dealul Zânei Marl Formation. 14, 15, 17. The Steierdorf Formation – possibly the Dealul Budinic Conglomerate Member, but most probably the Valea Terezia Sandstone Member. 16, 19, 20, 21. The Schela Formation (Mrazec 1898, *sensu* Preda 1981). 18, 22. The Baia de Aramă Formation.

*Biostratigraphic units.* 1, 2, 4, 8, 10, 11, 12, 13. The *Banatozamites chlamydostomus* Subzone of the *Clathropteris meniscioides* Biozone. 3. The *Pterophyllum marginatum* Biozone. 5, 6, 7. Undefined. 9. Most probably the *Clathropteris meniscioides* Biozone or the *Carpolithes liasinus* Biozone. 14, 15, 17. The *Clathropteris meniscioides* Biozone – most probably the *Banatozamites chlamydostomus* Subzone. 16, 18, 19, 20, 21, 22. The *Clathropteris meniscioides* Biozone.

*Ages.* 1, 2, 4, 8, 10, 11, 12, 13. Hettangian *pro parte* – Sinemurian. 3. Sinemurian. 5. Aalenian. 6, 7. Toarcian. 9. Hettangian – Toarcian. 14, 15, 16, 17, 19, 20, 21. Hettangian – Sinemurian. 18, 22. Sinemurian *pro parte*.

*Discussions.* 1. Andrae (1855) has described and figured a new species from „Steierdorf im Banate”, naming it *Pterophyllum rigidum*. He has not mentioned the number of the specimens. It was, however, much probably just one, eventually were two or three, because the pinnae fragments presented on fig. 1 of Andrae’s plate 11 seem to belong to three leaves, likely belonging to the same plant. Roth v. Telegd (1906), Codarcea (1940), Oncescu (1951, 1957, 1965), Semaka (1954, 1957, 1962a, 1962b), Răileanu *et al.* (1957, 1964a, 1964b), Givulescu (1960), Năstăseanu (1964, 1984), Boersma & Broekmeyer (1982), Dijkstra & Van Amerom (1985), Bițoianu (1987), Mutihac (1990), cite in their lists the species, as *Pterophyllum rigidum* Andrae, and/or *Pterophyllum rigidum* Goeppert. Schenk (in: Zittel 1890) has not accepted Andrae’s species, and considered the material belonging to *Dioonites cf. pennaeformis*.

Langer (1947) agreed Schenk’s opinion, although Krasser (1921) placed earlier Andrae’s species in the genus *Ptilophyllum*. Givulescu (1975) exactly repeats the description and figuration from the monograph of Andrae, and cites the old determination *Pterophyllum rigidum* Andrae. The combination *Ptilophyllum rigidum* (Andrae) Krasser is accepted and cited by Thomas (1930), later also by Semaka (1965), Jongmans & Dijkstra (1968), Petrescu & Dragastan (1981), Givulescu (1989a), Givulescu & Czier (1990), Czier (1995, 1999, 2000c, 2001a). It may be still accepted as somewhat useful, but in the absence of a cuticular study, it is difficult to say if the specimen indeed is a *Ptilophyllum* or not. Nobody knows where it is; therefore, no cuticular study is possible. The assignment of the specimen and of the species to *Ptilophyllum* may be equally contested. The emended diagnosis of the genus stipulates also cuticular characters of the leaf, but Andrae has only macroscopically described and figured the type material.

2. Štúr (1855) has recorded from the ‘coal-bearing Lias formation of Hollbach’ a fossil flora assemblage, assigning the most frequent appearing specimens to *Pterophyllum (Dioonites) rigidum*. Štúr (1860b) gave later a description combined

with a very short discussion. Štúr (1872) notes the names of the collectors, Fr. v. Hauer and Ferd. v. Richthofen, but not the name of the keeper too. He publishes no figures or photos showing the specimens. Hantken (1878), Herbich (1878), and later Mutihac (1990), still cite the name *Pterophyllum (Dioonites) rigidum*, or simply *Pterophyllum rigidum*. Krasser (1921) assigns the specimens to the genus *Ptilophyllum*. Semaka (1967), Givulescu (1992c), Czier (2000c), cite the material under the name *Ptilophyllum rigidum (Andrae)* Krasser. However, in the absence of a cuticular study, any assignment to the genus *Ptilophyllum* is unsure.

3. Štúr (1860a) has shortly described a *Pterophyllum (Dioonites) rigidum* specimen from the 'Liassic of Neustadt near Kronstadt'. According to Štúr (1872), Prof. Meschendörfer has collected the specimen from fine granular sandstones. Štúr wrote nothing regarding the repository, thus it is not known where was kept the material, and where is now. Hantken (1878), and Herbich (1878), cite it as *Pterophyllum rigidum Andrae*. Krasser (1921) nomenclaturally revised the material, when he placed the species in *Ptilophyllum*. Semaka (1965, 1967), Petrescu & Dragastan (1981), Givulescu (1992c), Czier (2000c), cite the material under the name *Ptilophyllum rigidum (Andrae)* Krasser. The specimen is not figured. Nothing is known about its cuticle, so the assignment to *Ptilophyllum* may be contested.

4. Štúr (1860b) discovered at Holbav new material of *Pterophyllum rigidum*, and enclosed this name in a list of the species. Semaka (1962c), Mutihac (1990), Givulescu (1992c), cite the determination under the name *Pterophyllum rigidum* Goepfert. Semaka (1967) assigns the material to *Ptilophyllum rigidum (Andrae)* Krasser. Mutihac (1974) cites this latter name. The repository and the number of the specimens are unknown. According to Semaka (1967), the material originates from the „middle horizon” of the coal- and fireclay-bearing complex, but the exact positioning in the stratigraphical column of the fossiliferous sampling points only scarcely, in few cases is possible. A good part of the material originates from an outcrop at Holbav. A whole plus a half century has passed from the collecting, but nobody has described or figured the material. I appreciate the memory and the work of the eminent scientist Dionýs Rudolf Josef Štúr, but the generic assignment in this case cannot be sure.

5. Hantken (1878) has recorded in his monograph *Pterophyllum rigidum*, collected in the Anina Shaft, from marls found at 146 meter depth. The record in fact is a citation of an unknown manuscript, in which Štúr determined the fossils, and distinguished several fossiliferous horizons. The Anina Shaft has begun on the 9<sup>th</sup> April 1874. In 1877, the depth reached was 303 meter. The collecting interval is therefore 1874-1877, and the collecting year almost surely 1875 or 1876. The lithological data and the collected fossils were carefully noted in the



mining statistics. Hantken places the horizon with *Pterophyllum rigidum* in „the lower oolitic”, with *Ammonites murchisonae*, *Pecten demissus*, *Inoceramus amygdaloides*, and *Zamites barrei*. Semaka (1962d) argues that these are Upper Aalenian deposits, containing *Ludwigia murchisonae*, *Entolium demissus*, *Entolium gingensis*, *Inoceramus amygdaloides*, and *Rhyncholites* sp. He considers the material belonging to *Ptilophyllum rigidum* (Andrae) Krasser.

Hantken visited Anina in 1877, and examined the collection of rocks and fossils kept there, but published no data concerning the number of the specimens. It is unknown where the material is. Only a palaeobotanical study might confirm or infirm a sure generic attribution. However, to be able doing such a study, the material should be identified.

6. Hantken (1878) mentioned the presence of *Pterophyllum rigidum* also in the micaceous marls collected in the main shaft Anina at 222 meter depth. This is, however, just a citation of the same, supposed manuscript of Štúr. The material has been collected between 1874 and 1877, almost surely in 1876. Hantken placed the horizon with this new appearance of *Pterophyllum rigidum* in „the lowermost level of the lower oolitic”, with *Neaera Kudernatschi*. According to Semaka (1962d), it belongs to an assemblage of Toarcian deposits, consisting of very fine grey marls and calcareous marls with numerous slightly sandy or leafy intercalations, containing *Ludwigia murchisonae*, *Neaera kudernatschi*, *Cucullea cancellata*, *Posidonia opalina*, and a questionable *Cardium striatum*. Semaka has nomenclaturally revised the material under the name *Ptilophyllum rigidum* (Andrae) Krasser. However, the material is lost, if not, the keeper is unknown.

7. Hantken (1878) notes over again the presence of *Pterophyllum rigidum* in the Anina Shaft, now in leafy, sandy, bituminous marls, collected from 289 meter depth. The mentioned manuscript of Štúr constitutes the base of this information too. The collecting interval is 1874-1877, and the collecting year almost surely 1877. The horizon established by Hantken for this depth was the same „lowermost level of the lower oolitic”, of which the age, according to Semaka (1962d), is Toarcian. The data regarding the determination, nomenclatural revision, keeper, are the same as in the previous two cases.

8. Römer (1879) recorded three *Pterophyllum rigidum* specimens from the coal-exploration pit „Concordia” at Vulcan (Wolkendorf). He added no description or figuration to his determination. The material originates from ‘Liassic deposits developed in Gresten facies’. Semaka (1954, 1957), and Bițoiianu (1987), cite Römer’s determination. Semaka (1962a) cites it as *Pterophyllum rigidum* Goeppert, but Givulescu (1992c) as *P. (Dioonites) rigidum* Andrae. Givulescu (1992c) nomenclaturally revises the material, attributing it to *Ptilophyllum rigidum* (Andrae) Krasser.

Cuticular study could not be possible, even if the material would be available, because, according to Römer, only some impressions are preserved. Julius Römer has collected the material himself, but he has not mentioned a keeping place. He has not mentioned the collecting date, but from his paper results that the mining activity has begun in 1875. Because he mentions the material in his paper published in 1879, for the collecting period results the interval 1875-1879. According to Semaka (1957), in 1879 Römer was the keeper of the material. Deposited later perhaps in the „Burzenländer Naturhistorisches Museum” from Braşov (Kronstadt), its actual keeping place is unknown. Owing to all these circumstances, the material should be at the best considered lost, and the attribution to the genus *Ptilophyllum* questioned.

9. Thomas (1930) has published a very short, inconclusive macroscopical description, and a controversial cuticular description and figuration of a so-called *Ptilophyllum rigidum* from the ‘Lias of Steierdorf’. The specimen, from which the cuticle preparation originates, was one of those kept at that time in Zeiller’s collection, at Paris. Thomas gives no macroscopical figuration, so the identification of the specimen, even if it could be found somewhere, is impossible. It might resemble the specimen of Andrae, but there is no evidence to sustain this supposition. Thomas has noted, „Prof. Zeiller gave Schimper’s name of *Dioonites rigidus* to several specimens from the Lias of Steierdorf which seem identical with those described by Andrae and which have been subsequently transferred by Krasser to genus *Ptilophyllum*.” No published data exist regarding the collecting year of the material, the collector name, and the actual repository.

The cuticular description and figuration of Thomas is the only one ever given for *Ptilophyllum rigidum*. However, his description does not refer to the original material on which Andrae has created the species, and is dubious to what kind of specimens refers in fact. Although the determination of Thomas is cited by Petrescu & Dragastan (1981), and by Czies (1995, 2000c), it must firmly stated, that *Ptilophyllum rigidum* (Andrae) Krasser is a species known only by macroscopical characters.

10. Semaka (1954) has macroscopically described and figured under the name *Pterophyllum rigidum* Göppert seven specimens from the ‘Liassic in Gresten facies’ deposits of Holbav. Alexandru Semaka collected the material between the years 1952 and 1953, from the middle of the village, where the sandstones above the coals appeared in a ditch. He deposited it in the palaeobotanical collection of the Geological Institute from Bucharest, but published no inventory numbers. Semaka (1956, 1957, 1962a, 1962c), Givulescu (1960, 1966), and Biţoiianu (1987), cite the determination. Semaka (1958, 1961) revises without explanation his own determination, as *Pterophyllum rigidum* Andrae. After a while, Semaka

(1967) nomenclaturally revises the material, attributing it to *Ptilophyllum rigidum* (Andrae) Krasser. Mutihac (1974), Givulescu (1992c), Czier (2000c), cite it under this name. Finally, Givulescu (1992c) gives a nomenclatural and taxonomical revision. He attributes without explanation the material to the genus *Pterophyllum*, as *Pterophyllum (Dioonites) rigidum* Andrae. A thorough restudy of the material could probably decide this controversial generic assignment.

11. Semaka (1958) encloses in a table the name *Pterophyllum rigidum* Andrae, referring to some specimens that he collected between 1951 and 1954 from „Concordia”. Like in the previous case, Semaka (1967) nomenclaturally revises the material. Mutihac (1974) cites the correct name *Ptilophyllum rigidum* (Andrae) Krasser. Givulescu (1992c) notwithstanding revises the whole flora. By reason of something, he changes back the generic attribution, referring to the material under the name *Pterophyllum (Dioonites) rigidum* Andrae. Alexandru Semaka has deposited the material at the Geological Institute, Bucharest. Somebody should identify the specimens, and subsequently describe them. This might be a hard work, because Semaka published no inventory numbers.

12. Semaka (1958) mentions in his table *Pterophyllum rigidum* Andrae, also from Doman. Givulescu (1960) and Semaka (1961) cite this determination. Next year, Semaka (1962b) cites his own determination as *Pterophyllum rigidum* Goeppert. On the next pages of the same paper, Semaka gives a macroscopical description. In the description, however, he uses the name *Pterophyllum rigidum* Andrae. From the totally seven specimens, he figures only four. In other paper, Semaka (1962a) cites again *Pterophyllum rigidum* Goeppert. *Pterophyllum rigidum* Goeppert and *Pterophyllum rigidum* Andrae are different species, but Semaka frequently confounded them. Răileanu *et al.* (1964a), Preda *et al.* (1985), followed him by citing the name *Pterophyllum rigidum* Goeppert. Givulescu (1966), Dijkstra & Van Amerom (1985) cite the initial determination *Pterophyllum rigidum* Andrae. The confusion even increased, when Semaka (1965) cited incompletely the name *Ptilophyllum rigidum* (Andrae). Readers might think he has created a combination. That was not new one, and Semaka (1968) decided later to use the corrected spelling *Ptilophyllum rigidum* (Andrae) Krasser. Despite this correction, Macarovici & Turculeț (1972) describe and figure the material under the name *Pterophyllum rigidum* Goeppert. Their work adds nothing to the knowledge on the material and on the species. They base their short description on what Semaka (1962b) wrote, and their plate 14, fig. 2 is just as Semaka’s plate 1, fig. 4. Petrescu & Dragastan (1981) and Czier (1995, 1999, 2000c) cite the material as *Ptilophyllum rigidum*. Alexandru Semaka collected in 1955 the material, and deposited it in the collections of the Geological Committee, Bucharest. In the absence of a microscopical study, the generic attribution cannot be sure.

13, 14. Oarcea & Semaka (1962) recorded from Anina four specimens of *Pterophyllum rigidum* Andrae. They note the presence of the material at the Anina School Group. The specimens are perhaps among the much *Ptilophyllum* foliage seen by Teulea (1996) at the museum from Steierdorf, but these are uncertain data. No exact published data exist regarding the collecting years of the specimens, or the names of the collectors. The authors mention the chiefs of the Geodesic Bureau, who cared of the collection's enrichment since the beginning of the 20<sup>th</sup> Century: Géza v. Bene, Árpád Herman, Virgil Uttzas, Johann Hummel, Virgil Ciobanu, and Cornel Oarcea. However, probably they were not the only collectors.

Givulescu (1966) cites exactly the initial determination *Pterophyllum rigidum* Andrae, but Răileanu *et al.* (1964a), Preda *et al.* (1985) alter it for *Pterophyllum rigidum* Goeppert. Semaka (1965) gave meantime a nomenclatural rectification, attributing the material to *Ptilophyllum*, by using the incomplete name *Ptilophyllum rigidum* (Andrae). Givulescu (1989a) uses the complete denomination *Ptilophyllum rigidum* (Andrae) Krasser. Givulescu & Czier (1990), Czier (1999) cite the material under this name. Only a thorough study could establish what this undescribed material is in fact.

15. Oarcea & Semaka (1962) recorded *Pterophyllum rigidum* Andrae also from Doman. The details concerning the repository and the citations are the same as those noted in the case of the Anina specimens.

16. Semaka (1963) has marked in a table the presence in the 'Lower Liassic at Pleșa' of *Ptilophyllum rigidum* (Andrae) Krasser. According to him, Ion Mateescu was who collected the material in 1952. Mutihac (1964) cites this determination in a very wrong manner, as *Pterophyllum rigidum* (Andrae) Krasser. The initial, correct spelling of Semaka, is cited by Givulescu (1966), and later by Czier (1995, 2000c). Mateescu (1967) cites the wrong spelling *Pterophyllum rigidum* (Andrae) Krasser, but on the next pages of his paper describes and figures the specimen under the name *Pterophyllum rigidum* Andrae. Givulescu (1974), Mutihac (1974, 1990), Preda (1981), cite the material under the name *Pterophyllum rigidum*. The identification of the specimen actually is impossible, because the keeper is unknown. The generic assignment, in the absence of a cuticular study, seems doubtful.

17. Humml (1963) has recorded two specimens of *Ptilophyllum rigidum* (Andrae) Krasser. Czier (1998, 1999, 2001b) cites the determination. The material is under study.

18. Zborea *et al.* (1966) described from the 'Liassic beta - Sinemurian of Crasna' four specimens of *Ptilophyllum rigidum* (Andrae) Krasser. That is a macroscopical, very short, inconclusive description, with no attached figures or

photos. Semaka (1972), Mutihac (1974), Dijkstra & Van Amerom (1985) cite the material under the name *Pterophyllum rigidum* Andrae. Givulescu (1974) and Czier (2000c) cite it with the initial spelling, *Ptilophyllum rigidum* (Andrae) Krasser. Romulus Cioată and Anatol Zberea collected the material in 1960 and 1962, and deposited it at the Geological Committee, Bucharest. A microscopical study could clarify the taxonomy.

19. Semaka *et al.* (1972) note the presence of *Pterophyllum rigidum* Andrae in the 'Rhaetian-Liassic' deposits from Porcului valley. They describe the sampling point, situated about ten meters North from where Manolescu (1932) has mentioned for the first time fossil plants in the Schela Formation. Ilie Huică collected the material between 1963 and 1964, and deposited it in the collections of the Geological Institute, Bucharest. Givulescu (1978), Dijkstra & Van Amerom (1985), cite Semaka's initial determination *Pterophyllum rigidum* Andrae, though the material appears under the nomenclaturally revised name *Ptilophyllum rigidum* (Andrae) Krasser in a table of the same paper of Semaka *et al.* (1972). A new research could confirm the generic attribution.

20. Semaka *et al.* (1972) mentioned the presence in the 'Lower Liassic of Viezuroiu valley' of the species *Ptilophyllum rigidum* (Andrae) Krasser. They give no description, no figuration, and no certain collecting data. A determination given many years ago for an unidentifiable material is rather weak evidence for a sure generic attribution.

21. Semaka *et al.* (1972) mentioned *Ptilophyllum rigidum* (Andrae) Krasser from the 'Sinemurian, perhaps also part of the Hettangian' deposits of the mine Viezuroiu too. According to the authors, Ilie Huică collected the material in 1964, and deposited it in the collections of the Geological Institute, Bucharest. A description and figuration should prove the generic attribution.

22. Semaka *et al.* (1972) recorded specimens of *Ptilophyllum rigidum* (Andrae) Krasser from the 'Liassic of Crasna'. The sampling point is identical with that already Zberea *et al.* (1966) had described. Ilie Huică collected the material in years 1963-1964, and deposited it at the Geological Institute, Bucharest. The identification of the specimens is the first step of a research on the material, necessary for sure taxonomical attribution.

### ***Ptilophyllum* aff. *jurassicum* Kimura & Ohana 1988**

2001a *Ptilophyllum* aff. *jurassicum* Kimura & Ohana. Czier, p. 35

*Locality.* Anina.

*Lithostratigraphic unit.* The Valea Terezia Sandstone Member of the Steierdorf Formation.

*Biostratigraphic unit.* The *Banatozamites chlamydostomus* Subzone of the *Clathropteris meniscioides* Biozone.

*Age.* Hettangian *pro parte* - Sinemurian.

*Discussion.* Czies (2001a) notes the presence of *Ptilophyllum* aff. *jurassicum* in the 'Lower Liassic layers with *Clathropteris meniscioides*'. The material is under study.

***Ptilophyllum maculatum*** Givulescu 1992a

- 1989 *Ptilophyllum* sp. Givulescu & Farcașiu, p. 139  
1990 *Ptilophyllum* sp. Givulescu, p. 80  
1992a *Ptilophyllum maculatum* sp. n. Givulescu, p. 11, plate 1, figs. 1, 2, plate 2, figs. 1, 2, plate 3, figs. 1, 2  
1992b *Ptilophyllum maculatum* n. sp. Givulescu, p. 241, plate 1, figs. 1 - 3, text-fig. 1  
? 1996 *Pterophyllum maculatum*. Teulea, p. 2 (possible spelling error for *Ptilophyllum*)  
1998a *Ptilophyllum maculatum* Givulescu. Givulescu, p. 82, plate 1, fig. 3, plate 2, figs. 1 - 4  
1998b *Ptilophyllum maculatum* n. sp. Givulescu, p. 14, 37, 76, plate 5, figs. 1 - 4, 9, plate 9, fig. 3, plate 12, fig. 2, plate 21, figs. 1 - 5, plate 22, figs. 1 - 8, text-figs. 6/4-7, 7/3, tab. 1, tab. 6

*Locality.* Anina.

*Lithostratigraphic unit.* The Valea Terezia Sandstone Member of the Steierdorf Formation.

*Biostratigraphic unit.* The *Banatozamites chlamydostomus* Subzone of the *Clathropteris meniscioides* Biozone.

*Age.* Hettangian *pro parte* - Sinemurian.

*Discussion.* Givulescu & Farcașiu (1989) recorded from the 'Lower Liassic of Anina' specimens of *Ptilophyllum* sp. In other paper published in that year, Givulescu (1989b) writes in a list the name *Ptilophyllum* sp. The listed taxa and the collection indicate that the material is the same in both cases. Next year, Givulescu (1990) presents the material, under the name *Ptilophyllum* sp. He gives a description and figuration, but not figures all the specimens, moreover the figures show only cuticles. The explanations of the figures contain no inventory numbers; therefore, it is uncertain to which hand specimen the cuticular preparation belongs.

Givulescu has frequently changed his mind concerning the age of the material, without explaining why. Givulescu (1990) first accepted „Lower Liassic”, probably because many previous authors had considered this flora Liassic in age, though the Lias coast is far from Anina, and has local meaning. In a next paper, Givulescu (1992a) mentioned „Early Lias - Hettangium”, but nobody has



delimited the Hettangian stage at Anina. Later, Givulescu (1997) considered that the material originates from the interval „Hettangian - lower Sinemurian”. Finally, Givulescu (1998b) denies the presence at Anina of the lower Hettangian plant-bearing deposits, but accepts upper Sinemurian ones, by writing „Upper Hettangian - Sinemurian”.

Givulescu (1992a) published his new species *Ptilophyllum maculatum*, without citing his previous papers dealing with the specimens. He figures only partly the type material. The published inventory numbers, and his figures, show that the material is identical with that he already described and figured under the name *Ptilophyllum* sp. The exact number of the specimens is unknown. Although Givulescu notes that „the author had at his disposal 10 samples, most of them coming from the collection of the Botanical Museum of the University of Cluj-Napoca”, the number of specimens is not necessarily equal with the number of the samples, because the same piece of rock may contain specimens on its both faces. The collectors, and the collecting years also are unknown, moreover the specimens are in four collections, in three cities. Regarding such a type material, the acceptance of a specimen from a collection as holotype, and of other specimens from other collections as paratypes, when the collecting data are unknown, is more than questionable.

In a study simultaneously appeared in other journal, Givulescu (1992b) creates for the second time *Ptilophyllum maculatum* new species. He repeats the diagnosis, description, figuration, and discussion, without citing his other paper (i.e. Givulescu 1992a) in which he has already created this species. Again not referring to his previous publications, Givulescu (1997) publishes a plate that shows the holotype of *Ptilophyllum maculatum*. The figures of the plate are like his already published photos.

Givulescu (1998b) uses the method, of to cite not his own papers, but to present the material repeatedly as being new, also in his booklet. He creates there *Ptilophyllum maculatum* new species for the third time. The description and figuration, in the case of some specimens, however, still is insufficient even for a generic attribution.

According to all the professional and ethical rules, an author should create a species only once. Twice may be an accident of an innocent beginner, but publishing twice a species as new, just in scope to increase the list of the publications, is unacceptable even from the part of beginners. Thrice, however, is a horrible performance. Publishing three times the same species as being „new”, is easy to have more than 300 own publications at the end of a long and productive life. Is the number of the publications more important than their quality? What kind of example is for his fellows an Honorary Academic Professor, who proceeds in this manner?

There are plenty of arguments to carry out a thorough study on all the *Ptilophyllum maculatum* specimens. The diagnosis, description, figuration, should corroborate each other; the hand specimens, cuticular preparations, inventory numbers should concord. Czier (1995, 1999, 2000c) cites the species, and temporarily accepts it. A new research and analysis will decide in a little while if the species is worthy to maintenance or not. Until the results will appear, anybody can believe what will about the generic assignment of the material. Teulea (1996) notes, she saw at the Museum of Steierdorf *Pterophyllum maculatum* specimens. This might be just a spelling error, instead of *Ptilophyllum maculatum*. However, if not written by mistake, Givulescu's *maculatum* species lies in wait for a transfer to the genus *Pterophyllum*.

***Ptilophyllum aninaensis* Czier 1995**

1995 *Ptilophyllum aninaensis* Czier. Czier, p. 748, figs. 3–15

1998a *Ptilophyllum aninaensis* Czier. Givulescu, p. 82, plate 1, figs. 1, 2, 4.

Non plate 1, fig. 3.

*Locality.* Anina.

*Lithostratigraphic unit.* The Valea Terezia Sandstone Member of the Steierdorf Formation.

*Biostratigraphic unit.* The *Banatozamites chlamydostomus* Subzone of the *Clathropteris meniscioides* Biozone.

*Age.* Hettangian *pro parte* - Sinemurian.

*Discussion.* Czier (1995) has validly created the species *Ptilophyllum aninaensis*. He has compared it with the relevant species of *Ptilophyllum*, then has submitted the manuscript to the peer-reviewed journal „Neues Jahrbuch für Geologie und Paläontologie”, which has accepted it. The species is distinct from *Ptilophyllum maculatum*. Givulescu (1998a), however, has confounded the photos, erroneously supposed that the names of the two species are synonyms, and created a false problem of priority in favour of *P. maculatum*. Czier (1999) does not agree this opinion, and cites the material under the name *Ptilophyllum aninaensis*.

***Ptilophyllum* cf. *aninaensis* Czier 1995**

2001a *Ptilophyllum* cf. *aninaensis* Czier. Czier, p. 35

*Locality.* Doman.

*Lithostratigraphic unit.* The Valea Terezia Sandstone Member of the Steierdorf Formation.

*Biostratigraphic unit.* The *Banatozamites chlamydostomus* Subzone of the *Clathropteris meniscioides* Biozone.

*Age.* Hettangian *pro parte* - Sinemurian.

*Discussion.* Czier (2001a) mentions the presence of *Ptilophyllum* cf. *aninaensis* in the coal-bearing layers from Doman. The material is under study.

### ***Ptilophyllum acifolium* Givulescu 1998b**

1962a *Stachyotaxus lippoldi* (Stur) Kräusel. Semaka, p. 533 (*partim*), 542 (*partim*), 551 (*partim*), 554 (*partim*), plate 15, fig. a (*pro parte* - top), tab. 1 (*partim*) (spelling error for *lippoldi*)

*Locality.* Anina.

*Lithostratigraphic unit.* The Valea Terezia Sandstone Member of the Steierdorf Formation.

*Biostratigraphic unit.* The *Banatozamites chlamydostomus* Subzone of the *Clathropteris meniscioides* Biozone.

*Age.* Hettangian *pro parte* - Sinemurian.

*Discussion.* Semaka (1962a) described and figured from the 'Lower Liassic coal complex' opened in the Gustav shaft, a fossil leaf fragment, assigned to *Stachyotaxus lippoldi* (Štúr 1871) Kräusel 1949. Givulescu (1966), Semaka (1970), cite this determination. Based on Semaka's material, Givulescu (1997) creates the new species *Ptilophyllum acifolium*. He provides it with no diagnosis; the denomination thus covers just a new *nomen nudum*. Next year Givulescu (1998b) publishes a description and figuration of the specimen. The descriptions of the two authors differ in some aspects. Unlike Semaka, who gives only macroscopical description, Givulescu describes macro- and microscopically the material, in a more detailed manner. The figuration, however, in both cases is incomplete. Semaka published a plate with a figure showing macroscopically the specimen, whereas Givulescu a drawing, and two photos of the lower cuticle. The not figured upper cuticle is one of the things that cannot fail to be seen. Such a poor presentation scarcely is acceptable as basic documentation for a new species of *Ptilophyllum*. If the figuration of any of the cuticles is absent, there exist no visible proof concerning the hypostomatic character of the lamina, and even the assignment to the order Bennettitales is discussable. For this reason, all authors should describe and figure both cuticles of all the new species of the genus *Ptilophyllum*. The incompletely described or figured species of *Ptilophyllum* are ephemeral. Czier (2000c) cites the species, but possibly will not.

***Ptilophyllum curvatum*** Givulescu 1998b

1997 *Ptilophyllum curvatum* Givulescu. Givulescu, p. 68

*Locality.* Anina.

*Lithostratigraphic unit.* The Valea Terezia Sandstone Member of the Steierdorf Formation.

*Biostratigraphic unit.* The *Banatozamites chlamydostomus* Subzone of the *Clathropteris meniscioides* Biozone.

*Age.* Hettangian *pro parte* - Sinemurian.

*Discussion.* Based on a leaf fragment from the 'Hettangian - lower Sinemurian deposits of Anina', Givulescu (1997) creates the new species *Ptilophyllum curvatum*, without diagnosis, description, and figuration. Next year, Givulescu (1998b) describes and figures the species, but gives no diagnosis. He does not refer to his own paper from 1997, but comparing the lists of the taxa from the two works, readers may conclude that the material is the same. The description and figuration are incomplete for a new species created in the genus *Ptilophyllum*. The upper cuticle is unknown. Nobody could describe and figure a cuticle that is not preserved. This is exactly such a case, because Givulescu (1998b) himself notes, that no upper cuticle is preserved. An experienced palaeobotanist never should create new species of *Ptilophyllum* on incomplete type material. The cuticles must prove equally the characters of the abaxial and adaxial epidermis, but this is possible only if they exist, in other words if the cuticles are preserved. A single specimen, lack of upper cuticle, is not sufficient to create a useful new species. Czier (2000c) cites in his book the species *Ptilophyllum curvatum*, and still cites it herein, but just because the goal of the present paper is not the revision of the genus. *Ptilophyllum curvatum* is a *nomen nudum* of a not diagnosable species. Such a species is not valid.

***Ptilophyllum grandis*** Givulescu 1998b

1997 *Ptilophyllum grandis* Givulescu. Givulescu, p. 68

*Locality.* Anina.

*Lithostratigraphic unit.* The Valea Terezia Sandstone Member of the Steierdorf Formation.

*Biostratigraphic unit.* The *Banatozamites chlamydostomus* Subzone of the *Clathropteris meniscioides* Biozone.

*Age.* Hettangian *pro parte* - Sinemurian.

*Discussion.* Based on the study of a fragment from a large leaf, which originates from the „Hettangian - lower Sinemurian” deposits, Givulescu (1997) has created the new species *Ptilophyllum grandis*. As in the cases of other new species, he gave no diagnosis, no description, and no figuration. In a next paper, Givulescu (1998b) gives again no diagnosis, but just a description and figuration. Therefore, the name *Ptilophyllum grandis* Givulescu is other *nomen nudum*. Givulescu (1998b) also in this case uses his favourite method, of not citing his own papers. However, if we compare the lists of the taxa, the material is that from his paper published in 1997. The figuration of the type material is incomplete. The upper cuticle much probably is not preserved. If it would be, a figure could be present. This is unacceptable in the case of a type material. At least a drawing or photo must illustrate the upper cuticle of a new species of *Ptilophyllum*. Czier (2000c) cites *Ptilophyllum grandis*, though this species is unworthy of maintenance.

***Ptilophyllum romanicum* Givulescu 1998b**

1997 *Ptilophyllum romanicum* Givulescu. Givulescu, p. 68

*Locality.* Anina.

*Lithostratigraphic unit.* The Valea Terezia Sandstone Member of the Steierdorf Formation.

*Biostratigraphic unit.* The *Banatozamites chlamydstomus* Subzone of the *Clathropteris meniscioides* Biozone.

*Age.* Hettangian *pro parte* - Sinemurian.

*Discussion.* *Ptilophyllum romanicum* is a species based on a leaf fossil, of which the collecting data are unknown. Givulescu (1997) has created also this species as *nomen nudum*. He describes and figures *Ptilophyllum romanicum* in a next work (Givulescu 1998b), but even there gives not diagnose. The material supposedly is identical with that from his 1997 paper, but the base of this supposition constitutes only the comparison between the names of the taxa. The figuration of the type material is incomplete. The problem also in this case is with the upper cuticle. Probably it is not preserved, or maybe has been lost in the process of the preparation.

All the palaeobotanists in the world are constrained to work usually on fragmentary material, because completely preserved specimens are extremely rare. If the material is fragmentary, or a cuticle of a specimen is not preserved, this is not a problem when the generic diagnosis does not stipulate entire specimens or cuticular characters. However, in the case of the genus *Ptilophyllum*, some

cuticular characters have diagnostic value. Taxonomists must firmly prove first the generic characters, and then differentiate the specific characters. In the case of a new species, the best possible description and figuration of both cuticles must follow the diagnosis, to prove the specific epidermal characters. A species based on incomplete type material, on which not even the generic characters are present, cannot have valid diagnose, and this is the case of *Ptilophyllum romanicum*. Such species only questionably is attributable to the genus. This is an invalid species, the much so as it has no diagnosis.

For a reason that is not subject of the present paper, Czier (2000c) cites in his book all the *Ptilophyllum* species of Givulescu, and neglects his own species *Ptilophyllum aninaensis*. Since then time has passed, and Czier is not willing to maintain this *status quo*. The *Ptilophyllum romanicum* specimen is under a new research.

#### ***Ptilophyllum* sp. B**

2001a *Ptilophyllum* sp. B. Czier, p. 35

*Locality.* Anina.

*Lithostratigraphic unit.* The Valea Terezia Sandstone Member of the Steierdorf Formation.

*Biostratigraphic unit.* The *Banatozamites chlamydostomus* Subzone of the *Clathropteris meniscioides* Biozone.

*Age.* Hettangian *pro parte* - Sinemurian.

*Discussion.* Czier (2001a) mentions from Banat region four groups of specimens provisorily assigned to *Ptilophyllum* sp. A, B, C, and D. The material from the group „A” is attributed to a species of the genus *Banatozamites* Czier (1996), namely to *B. remotus* Czier (2008). The group „B” is under study.

#### ***Ptilophyllum* sp. C**

2001a *Ptilophyllum* sp. C. Czier, p. 35

*Locality.* Doman.

*Lithostratigraphic unit.* The Valea Terezia Sandstone Member of the Steierdorf Formation.

*Biostratigraphic unit.* The *Banatozamites chlamydostomus* Subzone of the *Clathropteris meniscioides* Biozone.

*Age.* Hettangian *pro parte* - Sinemurian.



*Discussion.* The material, which Czier (2001a) provisorily assigns to the group „C”, is under study.

### ***Ptilophyllum* sp. D**

2001a *Ptilophyllum* sp. D. Czier, p. 35

*Locality.* Doman.

*Lithostratigraphic unit.* The Valea Terezia Sandstone Member of the Steierdorf Formation.

*Biostratigraphic unit.* The *Banatozamites chlamydostomus* Subzone of the *Clathropteris meniscioides* Biozone.

*Age.* Hettangian *pro parte* - Sinemurian.

*Discussion.* This material, provisorily assigned by Czier (2001a) to the group „D”, also is under study.

### ***Ptilophyllum* sp.**

1. 1958 *Stachyotaxus lippoldi* (Stur) Kräusel. Semaka, p. 414, tab. 3 (spelling error for *lipoldi*)
2. 1962a *Stachyotaxus lippoldi* (Stur) Kräusel. Semaka, p. 533, 542, 551, 554, plate 4, fig. 3, plate 5, fig. 1, plate 15, fig. a (*pro parte* - right bottom), text-figs. 5, 6, tab. 1 (spelling error for *lipoldi*)
3. 1963 *Cladophlebis* sp. Humml, p. 194
4. 1963 *Zamites* sp. Humml, p. 198 (*pro parte*)
5. 1963 *Pterophyllum* sp. Humml, p. 198
6. 1963 *Ptilophyllum rigidum* (Andrae) Krasser. Humml, p. 199
7. 1966 *Stachyotaxus* sp. Zborea *et al.*, p. 50
8. 1970 *Stachyotaxus lippoldi* (Stur) Kräusel. Semaka, p. 25, 56, tab. 10 (spelling error for *lipoldi*)
9. 1972 *Stachyotaxus lippoldi* (Stur) Kräusel. Semaka *et al.*, p. 439, tab. 1 (*pro parte*) (spelling error for *lipoldi*)
10. 1972 *Stachyotaxus elegans* Nathorst. Semaka *et al.*, p. 439, tab. 1 (*pro parte*)
11. 1989 *Ptilophyllum* sp. (aff. n. sp.). Givulescu & Farcașiu, p. 139
12. 1994 *Ptilophyllum*. Popa, p. 14 (spelling error for *Ptilophyllum*)
13. 2001b *Ptilophyllum* sp. Czier, p. 38, 45, tab. 1

*Localities.* 1, 2, 4, 5, 11, 12, 13. Anina. 3. Doman. 6. Unknown (probably Southern Carpathians). 7, 9, 10. Crasna. 8. Pietrele Albe.

*Lithostratigraphic units.* 1, 2, 11, 12. The Valea Terezia Sandstone Member of the Steierdorf Formation. 3, 4, 5, 13. The Steierdorf Formation – possibly the Dealul

Budinic Conglomerate Member, but most probably the Valea Terezia Sandstone Member. 6. Unknown. 7, 9, 10. The Baia de Aramă Formation. 8. The Ogașul Vodânișchi Sandstone Member of the Svinița Formation.

*Biostratigraphic units.* 1, 2, 11, 12. The *Banatozamites chlamydomostomus* Subzone of the *Clathropteris meniscioides* Biozone. 3, 4, 5, 13. The *Clathropteris meniscioides* Biozone – most probably the *Banatozamites chlamydomostomus* Subzone. 6. Unknown. 7, 9, 10. The *Clathropteris meniscioides* Biozone. 8. The *Clathropteris meniscioides* Biozone – probably the *Neocalamites carcinoides* Subzone.

*Ages.* 1, 2, 8, 11, 12. Hettangian *pro parte* - Sinemurian. 3, 4, 5, 6, 13. Hettangian - Sinemurian. 7, 9, 10. Sinemurian *pro parte*.

*Discussion.* 1, 2. Between the years 1951 and 1957, Alexandru Semaka (1958) has collected from several sampling points at Anina nineteen specimens of *Stachyotaxus lipoldi* (Štúr) Kräusel. He deposited them at the Geological Committee, Bucharest. Givulescu (1960, 1966), Semaka (1961, 1964, 1965, 1970), Răileanu *et al.* (1964a), cite his determination. Semaka (1962a) describes macroscopically the material, and figures three of the specimens. Givulescu (1990) gives a new determination. In his opinion, the material is *Ptilophyllum* sp. He publishes photos showing the cuticles, but writes nothing regarding the provenance of the cuticular preparations. The photos possibly represent cuticles of some specimens collected by Semaka, or perhaps cuticles of other specimens. Czier (2000c) cites the material using Givulescu's determination *Ptilophyllum* sp. Owing to the controversial origin of the cuticular preparations, the generic assignment is doubtful.

3. Humml (1963) has recorded from the 'Lower Liassic of Doman' a *Cladophlebis* sp. Czier (1998) initially cites this determination. Czier (2001b) gives later the new determination *Ptilophyllum* sp. The material is subject of a supplementary research.

4, 5. Humml (1963) enclosed in his catalogue some specimens from Anina, thought as belonging to *Pterophyllum* sp. and *Zamites* sp. He notes the transfer of the specimens from the collection of the Anina Coal Mining Exploitation to the Banatului Museum Timișoara. Czier (1998) cites both the determinations. In the following years, Czier (2001b) accomplishes a study on the material. He attributes for the moment the specimens to *Ptilophyllum*.

6. Humml (1963) encloses in his catalogue, among others, a specimen assigned to *Ptilophyllum rigidum* (Andrae) Krasser. He mentions in his acknowledgements the name of Alexandru Semaka, who offered him a precious help in the determination, and in the verification of his determinations. The collecting data are unknown. Humml notes the transfer of the material from the Mining Institute Timișoara to the Banatului Museum. This may be a weakly argument to suppose that the specimen originates from the Banat Region. The rather exactly

known, „Lower Liassic” age of the rock, might be other argument regarding the specimen’s origin area, which probably is somewhere in the Southern Carpathians. Czier (1998) initially cites the initial determination *Ptilophyllum rigidum* (Andrae) Krasser, but later, Czier (2001a) determines the specimen, as *Ptilophyllum* sp. A supplementary study is at this time undergoing.

7. Zberea *et al.* (1966) describe from the ‘Lias beta - Sinemurian of Crasna-Jiu (Crasna-Bach)’ a specimen of *Stachyotaxus* sp. The description is macroscopical, very short, inconclusive, and has no attached figures or photos. Romulus Cioată collected the material in 1960, and deposited it at the Geological Committee, Bucharest. Semaka *et al.* (1972) and Givulescu (1974) cite the determination. Owing to a suggestion received from the part of Prof. Răzvan Givulescu, that all the published *Stachyotaxus* specimens of the Romanian fossil flora in fact are specimens of *Ptilophyllum*, Czier (2000c) provisorily attributes the material to *Ptilophyllum* sp. A long-continued research could only confirm or infirm this statement of Givulescu.

8. Semaka (1970) has collected from the ‘Liassic beta sandstone-series at Pietrele Albe - Stanca’ two specimens of *Stachyotaxus lipoldi* (Štúr) Kräusel. He deposited them in the collection of the Geological Institute, Bucharest. Semaka gives in his paper a very short, macroscopical description of the genus, but not of the specimens. Olaru (1980) cites the determination of Semaka. Czier (2000c) attributes the material to the genus *Ptilophyllum*.

9, 10. Semaka *et al.* (1972) mentioned the presence of *Stachyotaxus lipoldi* (Štúr) Kräusel and *S. elegans* Nathorst, in a ‘Liassic fossiliferous site at Crasna’. The site is identical with that previously described by Zberea *et al.* (1966). Ilie Huică collected the material in the years 1963-1964, and deposited it at the Geological Institute from Bucharest. There are no published inventory numbers, and the number of the specimens is uncertain. Czier (2000c) provisorily assigns the material to the genus *Ptilophyllum*.

11. Among the „fossil plants sampled from the Lower Liassic deposits at Anina, which are preserved in the collection of the Botanical Museum within the University of Cluj-Napoca”, Givulescu & Farcașiu (1989) determined a „*Ptilophyllum* sp. (aff. n. sp.)”. The collecting data are unknown, but in the conception of the authors, these data anyway are less important than the others are. The inventory numbers seem to have no importance, because the authors have not mentioned any. Even the number of the specimens assigned to this strange taxon, is unsure. The number of the hand specimens might be just one, because the authors note, that a cuticular preparation, or epidermal preparation corresponds to each fossil plant specimen, respectively. The existence of those epidermal preparations, however, is dubitable. No one has been published, moreover, the author of the

present study has found in the collection no fossil leaves with preserved epidermal layers of cells, but only leaf impressions and some compressions bearing cuticles. Cuticles do not consist from epidermal cells. They just may preserve the shape of the cells.

In a simultaneously published paper, Givulescu (1989b) presents the lower cuticle of „*Ptilophyllum* sp. (n. sp. ?)”. Taking account of the known collection and comparing the lists of the taxa, the figuration refers much probably to the same material. In a next paper, Givulescu & Czier (1990) revise the determination, as *Ptilophyllum* sp. Czier (2000c) cites this latter in his book. The inventory number, however, even at the present time is unknown.

12. Popa (1994) collected a „*Ptillophyllum*” from Ponor quarry. His paper contains no collecting data, nor a description or figuration of the material. Czier (2000c) cites it as *Ptilophyllum* sp.

13. Czier (2001b) provided some plant fossils kept in the collection of the Banatului Museum, Timișoara, with the label *Ptilophyllum* sp. The material is in undergoing research.

## Conclusions

Rich palaeobotanical literature shows, that the genus *Ptilophyllum* is present in the Lower Jurassic flora of Romania with the species *acutifolium*, *imbricatum*, *rigidum*, *jurassicum*, *maculatum*, *aninaensis*, *acifolium*, *curvatum*, *grandis*, and *romanicum*.

The *Ptilophyllum* material from this study is classifiable in four groups. 1. Specimens of *Ptilophyllum imbricatum*, *P. rigidum*, *P. sp.*, which may be lost or unidentifiable, as well as not described, not figured, or only partly described and figured. 2. Specimens that constitute the type material of the questionable *Ptilophyllum acifolium*, and of the invalid species *P. curvatum*, *P. grandis*, *P. romanicum*. 3. Specimens of *Ptilophyllum aninaensis* and *P. sp.*, attributable to the genus *Ptilophyllum*. 4. Specimens of *Ptilophyllum* cf. *acutifolium*, *P. imbricatum*, *P. aff. jurassicum*, *P. maculatum*, *P. sp.*, which actually are in different phases of the researches.

The so-called „problem of priority” - *P. maculatum* against *P. aninaensis* - is Givulescu’s artificial problem. There is no basis to discuss priority or synonymy in the case of these distinct species. A problem of microscopy might arise instead, because the cuticles of *P. maculatum* Givulescu were studied only in classical light microscopy, whereas the cuticles of *P. aninaensis* Czier also with the SEM. *Ptilophyllum aninaensis* is the best studied and the most relevant species of the genus *Ptilophyllum*, present in the Lower Jurassic flora of Romania.

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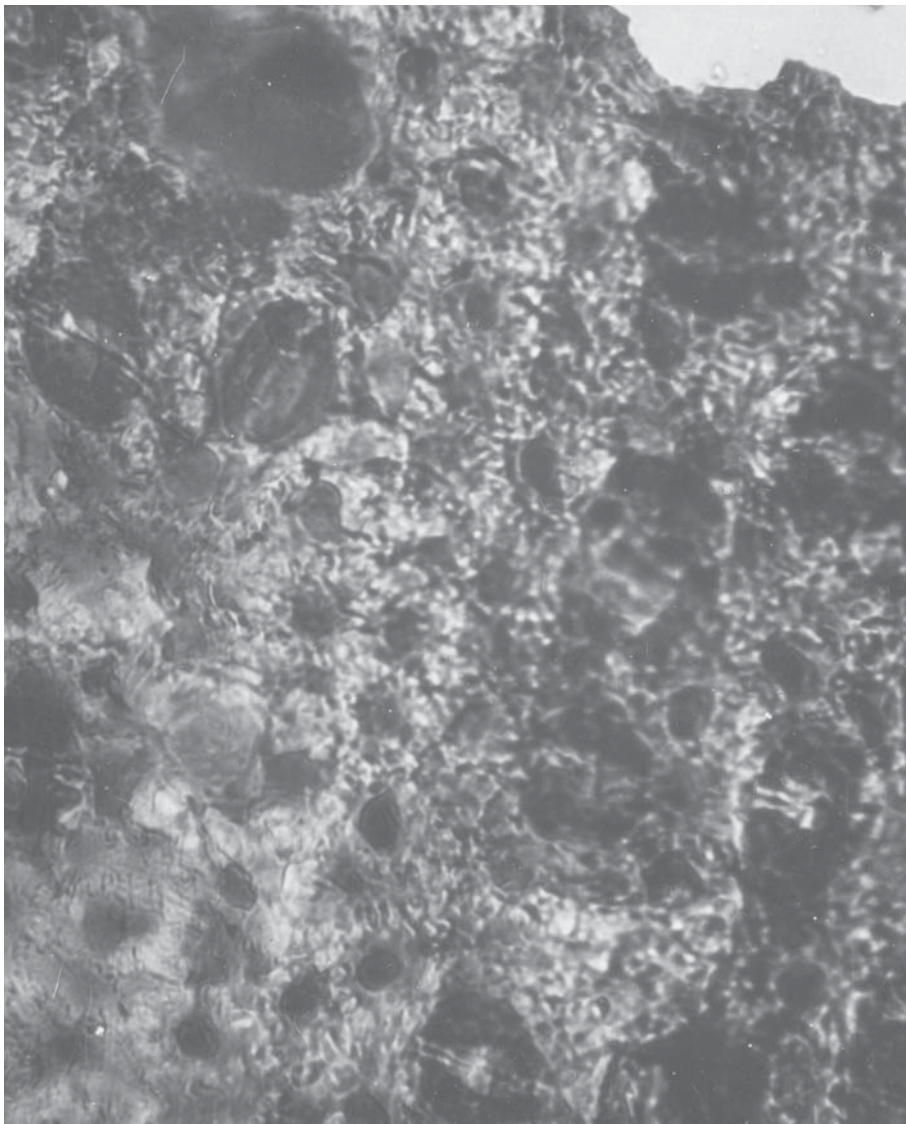


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**Plate I.** *Ptilophyllum maculatum* Givulescu. Lower cuticle preserving impressions of stomata, of papillae, and of epidermal cells disposed in bands. From Anina (Romania, Caraş-Severin County), the Valea Terezia Sandstone Member of the Steierdorf Formation, the *Banatozamites chlamydostomus* Subzone of the *Clathropteris meniscioides* Biozone.

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## **Algal flora from the area of the Poiana Ştiol peatbogs (Rodnei Mountains National Park)**

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**Abstract.** This study focuses on the inventory of the algal flora from the peatbogs, in the Poiana Ştiol, Rodnei Mountains National Park, the determination of their ecology and the evaluation of the water's ecology state with the help of the algae. The main condition, for a peatbog to form, is the lack of nutrients in the water or in the soil, especially the lack of calcium and the total annual precipitations have to be minimum 600 mm. The samples were collected in the 18<sup>th</sup> of august 2009, and the determination of the species was made during a period of six months (October-March).

**Keywords.** Romania, peatbogs, *Sphagnum*, algae, oligotrophic waters

### **Introduction**

The peatbogs occupy only 0,03% of the territory of Romania, but they have a great economic and scientific importance. The scientific importance results from their ability to preserve; the peats, especially the acidic and aseptic ones preserve animal and plant scraps, that serve to the paleontology studies. The main condition,



for a peatbog to form, is the lack of nutrients in the water or in the soil, especially the lack of calcium and the total annual precipitations have to be minimum of 600 mm.

The algae have an important rol in the determination of the pollution degree. The eutrophication phenomenon is understood like a human intervention that accelerates the natural and normal evolution of the aquatic ecosystems from the initiall stage of oligotrophic waters to the finale stage when the pond disappears. Types of phytoplankton:

- oligotrophic – characterized by an extremely low or low number of species; the phytoplankton is very poor or poor;
- mesotrophic - characterized by a moderate to high number of species; the phytoplankton is well developed;
- eutrophic – characterized by a high to extremely high number of species.

The greatest part of the Rodnei Mountains is situated inside of the Rodnei Mountains National Park (Reservation of the Biosphere), which was founded in 1937 (Pietrosul Rodnei Reservation). Today the surface of the Park is bigger, 46 399 ha and the geographical limits are: 47°25'54" - 47°37'28" north latitude and 24°31'30" - 25°01'30" east longitude (Planul de management a PNMR, p.14).

Apart form the Pietrosul Rodnei Scientific Reservation, inside the park, exist three more important areas, which are under major protection: the Scientific Reservation of Piatra Rea, situated to North-East from the Pietrosul Rodnei; and the strictly protected areas of Bila-Lala and Corongiș in the East (Fig.1).



Fig. 1. The Rodnei Mountains National Park with the protected areas

The necessity of this study is justified by the lack of studies on the algal communities from the studied habitats, although there exist's previous studies (Momeu, Péterfi, 1985; Momeu, Péterfi, 1990) but in other areas of the Maramureș mountains.

Poiana Știol belongs to the scientific reserve Piatra Rea, and it is located at an altitude of 1500 m to 1900 m. The geographical limits for the lake Știol are 47°34'20" north latitude and 24°48'49" east longitude, and for the top Știol are 47°35'56" north latitude and 24°48'55" east longitude (Fig. 2).

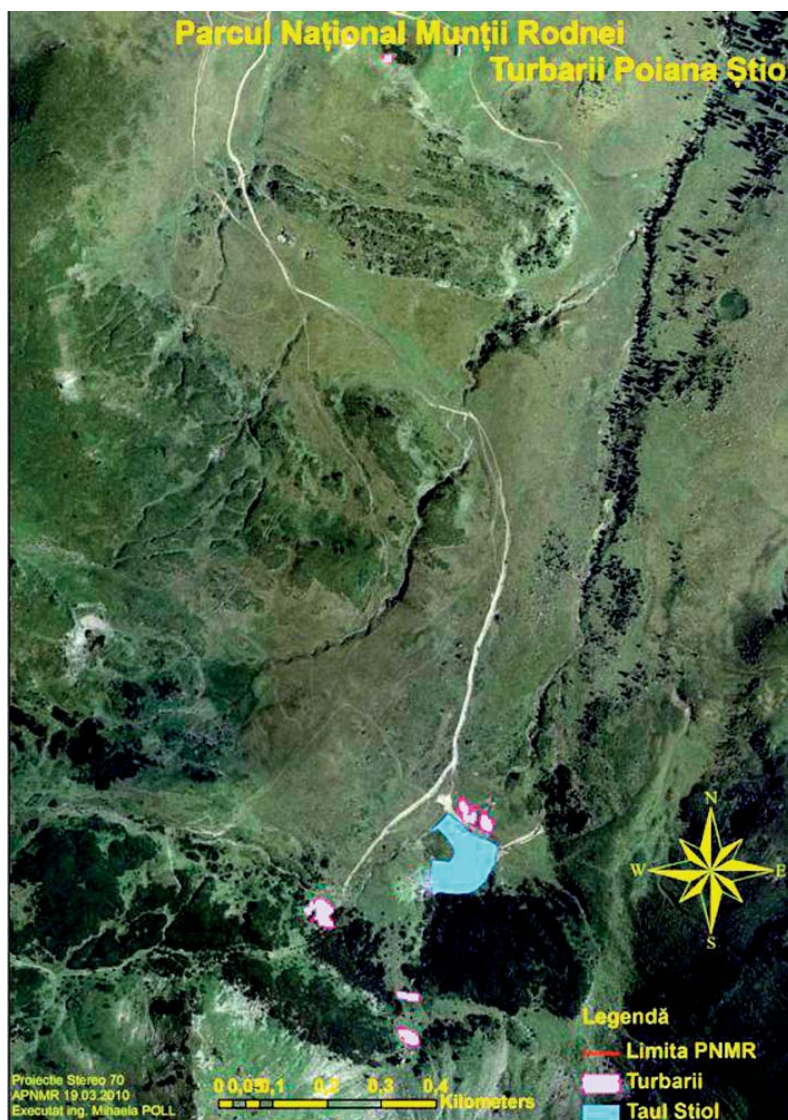


Fig. 2. Poiana Știol with the peatbogs and the Lake Știol

## Materials and methods

The samples were collected in the 18<sup>th</sup> of august 2009 from the peatbogs 1, 2, 3, 5, 8 and from the lake Știol, and the determination of the species was made during a period of six months (October-March), with the help of the microscope Nikon, type Eclipse E 400.

The samples of plankton were collected with a planktonic netting with holes that measure 40  $\mu\text{m}$ , by filtrating 4-5 liters of water to concentrate the algae material. The samples of benthos were collected with a pipette or simple with the hands. The fixation of the material was made with formaldehyde 40%. We used common determination books: Broock, 2005; Ettl, 1983 și 1988; Godeanu, 2002; Komarek, Anagostidis, 1999; Lewis, Dodge, 2005, etc.

To find out the trophicity level and the organic pollution level we used different indicators: Thunmark, 1945 Index; Heinonen Index; Nygaard, 1949 Index; Palmer, 1969 Index; Jaccard's similarity index (PAST).

## Results and discussion

In the nine samples that were analyzed there were identified 107 species of algae. Where it was possible were taken both samples of plankton and benthos (peatbog 1 and 5, and Lake Știol). The 107 species belong to six phylums: Cyanophyta, Euglenophyta, Pyrophyta, Chrysophyta, Xantophyta, Chlorophyta (Table 1).

The majority of the species belong to the order Zygnematales (Desmidiaceae), phylum Chlorophyta (green algae). The ecology of the species indicate that most are oligotrophic species, that prefer acid and clean waters, conditions that are fulfilled by the subalpine and alpine peatbogs. The majority of the species develop among the *Sphagnum* stalks. Also there were found species of algae that prefer mesotrophic and eutrophic waters and contaminated water (*Trachelomonas volvacina*).

The similarity index values are very low, which indicate a low floristic similarity (Fig.3).

The study results chime with studies obtained by other authors in similar habitats in the Rodnei mountains (Momeu & Péterfi, 1985; Momeu & Péterfi, 1990).

Table 1

SPECIES	SAMPLES									
	Peatbog 1		Peatbog 2	Peatbog 3	Peatbog 5		Peatbog 8	Lake Ştiol		
	plank- ton	bentos	bentos	bentos	plank- ton	bentos	bentos	plank- ton	bentos	
<b>Phylum Cyanophyta (Cyanobacteria)</b>										
<b>Order Chroococcales</b>										
<i>Aphanotece microscopica</i>		+								
<i>Chroococcus minor</i>										+
<i>Chroococcus minutus</i>		+								
<i>Chroococcus turgidus</i>		+	+							
<i>Merismopedia glauca</i>										+
<i>Merismopedia punctata</i>										+
<i>Synechococcus aeruginosus</i>		+								
<b>Order Oscillatoriales</b>										
<i>Oscillatoria bormetii</i>										+
<i>Oscillatoria lutea</i>								+		+
<b>Order Nostocales</b>										
<i>Anabaena variabilis</i>										
<i>Nostoc coeruleum</i> var. <i>planctonicum</i>									+	
<b>Order Stigonematales</b>										
<i>Stigonema ocellatum</i>		+								
<b>Phylum Euglenophyta</b>										
<b>Order Euglenales</b>										
<i>Euglena fusca</i>					+					







<i>Closterium venus</i>																				+	
<i>Cosmarium abbreviatum</i>																					+
<i>Cosmarium caelatum</i>												+									+
<i>Cosmarium contractum</i>																					+
<i>Cosmarium crenatum</i>																					+
<i>Cosmarium cucumis</i>																					+
<i>Cosmarium difficile</i>														+							+
<i>Cosmarium formosulum</i>																+					+
<i>Cosmarium hornavanense</i>																+					
<i>Cosmarium laeve</i>																				+	
<i>Cosmarium obtusatum</i>																				+	
<i>Cosmarium ochthodes</i>																					+
<i>Cosmarium paraganatoides</i>																					
<i>Cosmarium praeorsum</i>																					
<i>Cosmarium pyramidatum</i>															+						+
<i>Cosmarium venustum</i>																					
<i>Cylindrocystis brebissonii</i>																					
<i>Cylindrocystis crassa</i>																					
<i>Euastrum affine</i>																					
<i>Euastrum ansatum</i>																					
<i>Euastrum bidentatum</i>																					
<i>Euastrum binale</i>																					
<i>Euastrum didelta</i>																					
<i>Euastrum dubium</i>																					





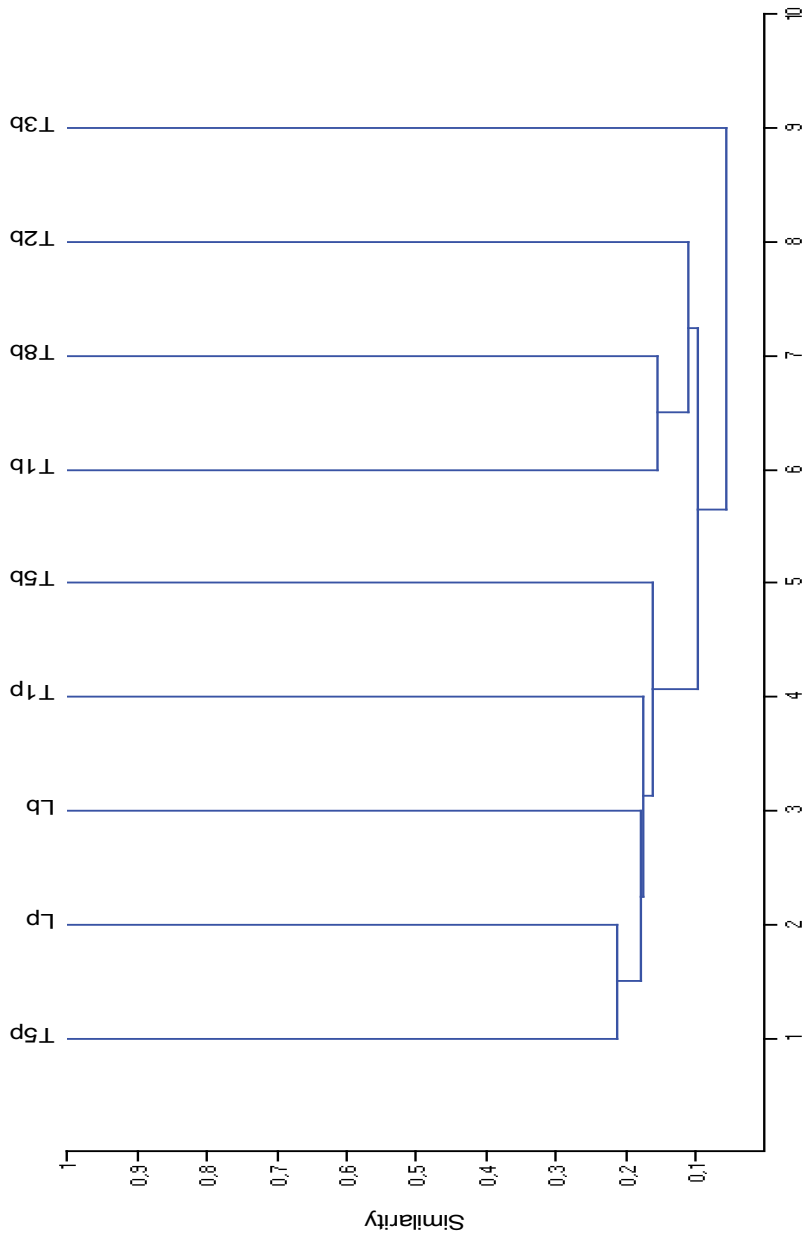


Fig. 3. The floristic similarity degree between the algae community

## Conclusions

If we take all of the information mentioned above we can formulate the next conclusions:

- In the 9 samples that were analyzed there were identified 107 species of algae;
- The 107 species belong to 6 phylums: Cyanophyta, Euglenophyta, Pyrophyta Chrysophyta, Xantophyta, Chlorophyta;
- Most of the species are oligotrophic species, that prefer acid and clean waters;
- Because of the intervention of humans there were identified a series of eutrophic algae: *Ankistrodesmus falcatus*, *Ankistrodesmus gracilis*, *Dictiosphaerum pulchellum*, *Pediastrum boryanum*, *Scenedesmus acutus*, *Cosmarium hornavanense*, *Cosmarium laeve*;
- The similarity index values are very low, which indicate a low floristic similarity.

## Aknowledgements

I want to thank all who made the research possible: conf. dr. Laura Momeu, dr. Claudiu Iusan and all the team of the Administration of the National Park of Rodnei Mountains.

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## Rezumat

Această lucrare are ca subiect inventarierea speciilor de alge din turbăriile din Poiana Știol, Parcul Național Munții Rodnei și determinarea ecologiei acestora. Condiția principală pentru formarea și dănuirea unei mlaștini oligotrofe este carența solului sau a apei în substanțe minerale nutritive și, mai ales, în calciu. Prelevarea probelor s-a efectuat în data de 18 august 2009, iar determinarea speciilor s-a efectuat pe parcursul a șase luni (octombrie-martie).



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## **The Botanical Collection of the Țării Crișurilor Museum Tatiana Tofan's Herbarium (part.I.)**

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**Abstract.** The present paper continues valuing the data and evidence contained in the Botanical collection of the Tarii Crisurilor Museum by presenting the herbarium of Tatiana Tofan, a former botanist of the museum. The material was processed by arranging it in a taxonomical classification which was updated by indicating the accepted names, the location, the date of and the author of its collecting. According to the taxonomical classification employed here (Systema Naturae 2000), the 258 taxons presented belong to 138 genuses and to 51 families.

### **Introduction**

The present paper proceeds to value (subsequent to the presentation of Simonkai Lajos's herbarium – Danciu & Golban 2008, 2009), the corpus and data and information to be found in the Botanical collection of the Tarii Crisurilor Museum by describing the samples collected by Tatiana Tofan, a former botanist of the museum.

The samples introduced in the present paper were collected from Bihor county, the area of the city of Oradea and its surroundings (the villages of Sânmartin and Paleu), as well as from the sandy region in the north-western part of the county (the village of Șimian and from the area of Peștiș near Aleșd).

## Material and method

The examined material consists of herbarium sheets to be found in the collection of the Tarii Crisurilor Museum in Oradea, according to the inventory number following the botanical denomination. When rendering the denomination of the species, we considered the accepted botanical name with the mention of the reference source of its first description. Consequently, to check and update our data, we employed the data of the Royal Botanic Garden Edinburgh – *Flora Europaea*, *Global Biodiversity Information Facility*. (<http://www.gbif.org>), and *uBio Portal* ([www.ubio.org/portal/-5k](http://www.ubio.org/portal/-5k)). To render the units systematically, we consulted the study of V. Ciocârlan (2000) that follows the rules and recommendations of the International Code for Botanic Cataloguing, and the site *Systema Naturae 2000* (<http://taxonomicom.taxonomy.nl>) in order to update the taxonomic classification (the variant entered after October 17, 2009). We also mentioned the present location where the collection was done, the locality, the date and the name of the collector. Where determination was missing, the name of the determinator was mentioned.

Abbreviations used in our study: n.= number of inventory; ref.= reference index for the first description of the species; leg.=the author who collected and determined the plant; Ord.= the order; Fam.= the family.

## Systematic part

Kingdom *Plantae* Haeckel, 1866  
Subkingdom *Viridaeplantae* Cavalier-Smith, 1981  
Phylum *Tracheophyta* Sinnott, 1935 ex Cavalier-Smith, 1998  
Subphylum *Euphyllophytina*  
Infraphylum “*Moniliformopses*” Kenrick & Crane, 1997  
Clas. *Equisetopsida* C. Agardh.  
Ord. *Equisetales* Dumortier, 1829  
Fam. *Equisetaceae* A. Michaux ex Alph. De Candolle, 1804

Gen *Equisetum* L.

*Equisetum arvense* L. - (n. 22.606) – ref.: Sp. Pl. ed. 1 1061 (1753); - Romania, Bihor, Sânmartin, Băile 1 Mai (the Natural Reserve “Peșea Rivulet” ), mesophile meadow; 13.06.2002; T.Tofan.

***Equisetum arvense* L.** – (n. 24.160)– ref.: *Species Plantarum* 2: 1061. 1753.; - Romania, Bihor, Şimian (natural reserve), sands, 16.10.2001; leg. T. Tofan

***Equisetum arvense* L.** -- (n. 24.148; 24.149) - ref.: Sp. Pl. ed. 1 1061 (1753); - Romania, Bihor, Aleşd, Peştiş, Valea Morilor, on the rivulet bank, among alders, 02.08.2001, leg. T.Tofan

***Equisetum variegatum* Weber.** – (n. 24.159)– ref.: Bot. Taschenb. 60, 447. 1807.; - Romania, Bihor, Şimian (natural reserve), meadow on the sands, 16.10.2001; leg. T. Tofan

Clas. ***Polypodiopsida*** Cronquist

Ord. ***Polypodiales*** Link.

Fam. ***Aspleniaceae*** Newman

Gen ***Asplenium*** L.,1753

***Asplenium trichomanes* L.** - (n. 24.152/a.; 24.152/b.; 24.152/c.) - ref.: Sp. pl. 2:1080. 1753; - Romania, Bihor, Aleşd, Peştiş, (Valea Morilor), on the rocks in the rivulet bed, 02.08.2001, leg. T.Tofan

Fam . ***Dryopteridaceae*** Ching, 1965, nom.cons.

Gen ***Dryopteris*** Adanson, 1763, nom.cons.

***Dryopteris filix-mas* (L.) Schott.** - (n. 24.151) - ref.: *Journal für die Botanik* 1800(2): 38. 1801.; - România, Bihor, Aleşd, Peştiş (Valea Morilor), on shady rocks, 02.08.2001, leg. T.Tofan

Fam. ***Woodsiaceae*** (Champ.) Herter

Gen ***Athyrium*** A.W. Roth, 1799

***Athyrium filix-femina* (L.) Roth** - (n. 24.150) - ref.: Tent. Fl. Germ. 3(1): 65. 1800; syn.: - Romania, Bihor, Aleşd, Peştiş (Valea Morilor), on the stream, 02.08.2001, leg. T.Tofan

Infraphylum "***Radiatopses***" Kenrick & Crane, 1997

Clas. ***Magnoliopsida*** Brogniart, 1843

Ord. **Nymphaeales** Dumortier, 1829

Fam. **Cabombaceae** Rich. ex A. Richard, 1828

Gen **Cabomba** Aublet, 1775

**Cabomba caroliniana** L. - (n. 22.643/1; 22.643/2; 22.643/3) – ref. : Ann. Lyceum Nat. Hist. New York 4:46. 1837; - Romania, Bihor, Sânmartin, Băile 1 Mai („The Natural Reserve of the Pețea Rivulet”), the thermal lake Ochiul Mare; 10. - 14.07.2001; leg.: T. Tofan

Fam. **Nymphaeaceae** Salsbury, 1805

Subfam. **Nymphaeoidae**

Gen **Nymphaea** L., 1753

**Nymphaea lotus** L. forma **thermalis** (DC.) Tuzson - (n. 22.646/1; 22.646/2; 22.646/3) – ref.: Math. Természettud. Ért. 25(4):32, 36. 1907; - Romania, Bihor, Sânmartin, Băile 1 Mai (the Natural Reserve “ Pețea Rivulet”), the thermal lake; 14. - 31.07.2001; leg.: T. Tofan

“**monocotyledons**”

Ord. **Alismatales** Dumortier, 1829

Fam. **Araceae** Adans., 1763, nom. cons.

Subfam. **Lemnoideae**

Gen **Lemna** L., 1753

**Lemna trisulca** L. - (n. 22.571) – ref.: Sp. Pl. ed. 1 970 (1753); - Romania, Bihor, Sânmartin, Băile 1 Mai, (the Natural Reserve “ Pețea Rivulet”), the water-lily lake Ochiul Mare; 08.08.2001; leg. T.Tofan

Fam. **Hydrocharitaceae** A.L. de Jussieu, 1789

Subfam. **Anacharidoideae** (Endl., 1837) Thome, 1886

Gen **Elodea** A. Michaux, 1803

**Elodea canadensis** Michx. - (n. 22.534/1; 22.534/2) – ref. Fl. Bor.-Amer. 1: 20 (1803); - Romania, Bihor, Sânmartin, Băile 1 Mai, (the Natural Reserve “ Pețea Rivulet”), the thermal lake Ochiul Mare; 10.07.2001; leg. T.Tofan.

Fam. **Patamogetonaceae** Bercht. & J. Presl, 1823

Gen **Potamogeton** L. 1753

**Potamogeton crispus** L. - (n. 22.626) – ref.: Sp. Pl. ed. 1 126 (1753); - Romania, Bihor, Sânmartin, Băile 1 Mai, (the Natural Reserve “Pețea Rivulet”), the water-lily lake; 02.04.2001; leg. T.Tofan.

**Potamogeton natans** L. - (22.654/1; 22.654/2) – ref. Sp. Pl. ed. 1 126 (1753); - Romania, Bihor, Sânmartin, Băile 1 Mai (the Natural Reserve “Pețea Rivulet”), the water-lily lake Ochiul Mare; 31.07.2001; leg. T.Tofan.

Ord. **Asparagales** Bromhead, 1838

Fam. **Asparagaceae** A. de Jussieu, 1789, nom.cons.

Subfam. **Ruscoideae** (Dumort, 1829) Dippel, 1889

Gen **Ruscus** L., 1753

**Ruscus aculeatus** L. (n. 24.064) – ref.: Sp. Pl. Ed. 1 1041 (1753); - Romania, Bihor, Paleu, Săldăbagiu de Munte, Săldăbagiu forest (phytocenosis with Ruscus), 05.10.2001, leg. T.Tofan

Fam. **Orchidaceae** A.L. de Jussieu, 1789, nom. cons.

Subfam. **Epidendrideae**

Trib **Neottieae**

Gen **Cephalanthera** L.C. Richard, 1818

**Cephalanthera damasonium** (Mill.) Druce - (n. 24.061)– ref.: Ann. Scott. Nat. Hist. 15(60): 225. 1906. ; - Romania, Bihor, Paleu, Săldăbagiu de Munte, Săldăbagiu forest (phytocenosis with Ruscus), 05.10.2001, leg. T.Tofan

“**commelinids**”

Ord. **Poales** Small, 1903

Fam. **Cyperaceae** A.J. de Jussieu, 1789, nom.cons.

Subfam. **Cyperoideae**

Trib **Cypereae**Gen **Cyperus** L., 1753

**Cyperus fuscus** L. - (n. 22.647/1; 22.647/2) - Reference: Sp. Pl. ed. 1 46 (1753); - Romania, Bihor, Sânmartin, Băile 1 Mai (the Natural Reserve “ Pețea Rivulet”), the swampy shore of the water-lily lake; 31.07.2001; leg. T.Tofan.

Subfam. **Caricoideae**Gen **Carex** L., 1753

**Carex hirta** L. - (n. 22.608) – ref. Sp. Pl. ed. 1 975 (1753), - Romania, Bihor, Sânmartin, Băile 1 Mai (the Natural Reserve “ Pețea Rivulet”), the Ochiului Mare shore; 14.05.2002; leg. T.Tofan.

**Carex ovalis** Gooden. – (n. 24.172) – ref.: Trans. Linn. Soc. London 2: 148 (1794); - Romania, Bihor, Simian ( natural reserve), sand hills; 16.10.2001; leg. T. Tofan

**Carex pilosa** Scop. – (n. 24.049) – ref.: Flora Carniolica, Editio Secunda 2: 226. 1772. ; - Romania, Bihor, Paleu, Săldăbagiu de Munte, Săldăbagiu forest (phytocenosis with Ruscus), 05.10.2001, leg. T.Tofan

**Carex spicata** Huds. - (n. 22.607) - Reference: Fl. Angl. ed. 1 349 (1762); - Romania, Bihor, Sânmartin, Băile 1 Mai (the Natural Reserve “ Pețea Rivulet”), coastal xenophiles meadow; 14.05.2002; leg. T.Tofan.

Fam. **Gramineae** A.J. de Jussieu, 1789, nom.cons.Gen **Corynephorus** Palisot de Beauvois, 1812, nom. cons.

**Corynephorus canescens** (L.) Beauv. – (n.24.155/a.; 24.155/b.; 24.155/c.; 24.155/d.) – ref.: Ess. Agrostogr. 90, t. 18, fig. 2. 1812; Romania, Bihor, Șimian (natural reserve), sands, 16.10.2001; leg. T. Tofan

Subfam. **Pooideae**Trib **Aveneae**Subtrib **Alopecuridinae**

Gen **Agrostis** L., 1753

**Agrostis capillaris** L. – (n. 24.132) - ref.: Sp. Pl. ed. 1 62 (1753); - Romania, Bihor, Aleșd, Peștiș (Valea Morilor), in the beech forest , 02.08.2001, leg. T.Tofan

**Agrostis stolonifera** L. – (n. 24.156) – ref.: Sp. pl. 1:62. 1753; - Romania, Bihor, Șimian (natural reserve), sands, 16.10.2001; leg. T. Tofan

Gen **Alopecurus** L.,1753

**Alopecurus geniculatus** L. - (n. 22.617) – ref. Sp. Pl. ed. 1 60 (1753); - România, Bihor, Sânmartin, Băile 1 Mai (the Natural Reserve “Pețea Rivulet”), coastal xerophilous meadow; 14.05.2002; leg. T.Tofan.

Gen **Calamagrostis** Adanson, 1763

**Calamagrostis epigejos (L.) Roth** - (n. 22.620) – ref. Tent. Fl. Germ. 1: 34 (1788); - România, Bihor, Sânmartin, Băile 1 Mai (the Natural Reserve “ Pețea Rivulet”), mesophile meadow; 12.06.2002; leg. T.Tofan.

**Calamagrostis epigejos (L.) Roth** – (n. 24.157) – ref.: Tent. Fl. Germ. 1: 34 (1788); - Romania, Bihor, Șimian (natural reserve), sands, 16.10.2001; leg. T. Tofan

Subtrib. **Aveninae**Gen **Arrhenatherum** Palisot de Beauvois, 1812

**Arrhenatherum elatius (L.) P.Beauv. ex J.Presl & C.Presl** - (n. 22.532/1) – ref.: Fl. C Kechica 17 (1819); - România, Bihor, Sânmartin, Băile 1 Mai (the Natural Reserve “ Pețea Rivulet”), mesophile meadow, the Ochiul Mare shore; 14.05.2002; leg. T.Tofan.

**Arrhenatherum elatius (L.) P.Beauv. ex J.Presl & C.Presl** - (n. 22.532/2) – ref.: Fl. C Kechica 17 (1819); - Romania, Bihor, Sânmartin, Băile 1 Mai , oaktree forest; 31.07.2001; leg. T.Tofan.

Subtrib **Phalaridinae**



Gen ***Anthoxanthum*** L., 1753

***Anthoxanthum odoratum*** L. - (n. 22.612/1; 22.612/2) – ref. Sp. Pl. ed. 1 28 (1753); - Romania, Bihor, Sânmartin, Băile 1 Mai (the Natural Reserve “Peștea Rivulet”), mesophile meadow; 14.05.2002; leg. T.Tofan.

Trib ***Brachypodieae***Gen ***Brachypodium*** Palisot de Beauvois, 1812

***Brachypodium sylvaticum*** (Huds.) P. Beauv. - (n. 22.639) – ref. Agrost. 101 & 155 (1812); - Romania, Bihor, Sânmartin, Băile 1 Mai (the Natural Reserve “Peștea Rivulet”), mesophile meadow; 20.07.2001; leg. T.Tofan.

***Brachypodium sylvaticum*** (Huds.) P. Beauv. - (n. 24.105) - ref.: Ess. Agrostogr. 101, 155, 156, 181. 1812; - Romania, Bihor, Aleșd, Peștiș (Valea Morilor), beech forest, 02.08.2001, leg. T.Tofan

Trib ***Bromeae***Gen ***Bromus*** L., 1753

***Bromus arvensis*** L. - (n. 22.587) – ref. Sp. Pl. ed. 1 77 (1753); - România, Bihor, Sânmartin, Băile 1 Mai (the Natural Reserve “Peștea Rivulet”), the road curb, on area with ruderal plants; 07.08.2001; leg. T.Tofan.

***Bromus hordeaceus*** L. (n. 22.615) – ref. Sp. Pl. ed. 1 77 (1753), - Romania, Bihor, Sânmartin, Băile 1 Mai (the Natural Reserve “Peștea Rivulet”), mesophile meadow on the shore of Ochiului Mare; 14.05.2002; leg. T.Tofan.

***Bromus inermis*** Leyss. - (n. 22.528) – ref. Fl. Hal. ed. 1 16 (1761); - Romania, Bihor, Sânmartin, Băile 1 Mai (the Natural Reserve “Peștea Rivulet”), mesophile meadow; 08.08.2002; leg. T.Tofan.

***Bromus sterilis*** L. - (n. 22.614/1 ; 22.614/2) – ref. Sp. Pl. ed. 1 77 (1753); - Romania, Bihor, Sânmartin, Băile 1 Mai (the Natural Reserve “Peștea Rivulet”), mesophile meadow with ruderal plants; 14.05.2002; leg. T.Tofan.

Trib *Meliceae*Gen *Glyceria* R. Brown, 1810, nom.cons.

*Glyceria fluitans* (L.) R.Br. - (n. 22.579) – ref. Prodr. Fl. Nov. Holl. ed. 1 179 (1810); - Romania, Bihor, Sânmartin, Băile 1 Mai (the Natural Reserve “Pețea Rivulet”), the lake shore at the water brim; 14.08.2002; leg. T.Tofan.

Gen *Melica* L., 1753

*Melica uniflora* Retz. - (n. 24.066) – ref.: Obs. Bot. 1: 10 (1779); - Romania, Bihor, Paleu, Săldăbagiu de Munte, Săldăbagiu forest (phytocenosis with *Ruscus*), 06.08.2001, leg. T.Tofan

Trib *Poeae*Gen *Briza* L., 1753

*Briza media* L. - ( n. 22.599) – ref. Sp. Pl. Ed. 1 70 (1753); - Romania, Bihor, Sânmartin, Băile 1 Mai (the Natural Reserve “ Pețea Rivulet”), mesophile meadow, 14.05.2002; leg. T.Tofan.

Gen *Cynosurus* L.,1753

*Cynosurus cristatus* L. – (n. 24.131) - ref.: Sp. Pl. ed. 1 72 (1753); - Romania, Bihor, Aleșd, Peștiș (Valea Morilor), on the rivulet bank, among alders, 02.08.2001, leg.T.Tofan

Gen *Dactylis* L., 1753

*Dactylis glomerata* L. - (n. 22.551/1; 22.551/2) – ref. Sp. Pl. ed. 1 71 (1753); - Romania, Bihor, Sânmartin, Băile 1 Mai (the Natural Reserve “ Pețea Rivulet”), mesophile meadow; 10.07.2001; leg. T.Tofan.

Gen *Festuca* l.,1753

*Festuca drymeja* Mert. & W. D. J. Koch . – (n. 24.133; 24.134) - ref.: J. C. Röing, Deutschl. Fl. ed. 3, 1:670. 1823; - Romania, Bihor, Aleșd, Peștiș (Valea Morilor), in the beech forest, 02.08.2001, leg. T.Tofan

***Festuca pratensis* Huds.** - (n. 22.613) – ref. Fl. Angl. ed. 1 37 (1762); - Romania, Bihor, Sânmartin, Băile 1 Mai (the Natural Reserve “Pețea Rivulet”), mesophile meadow; 12.06.2002; leg. T.Tofan.

***Festuca rupicola* Heuff.** - (n. 24.208) – ref.:Verh. K. K. Zool.-Bot. Ges. Wien 8:233. 1858; - Romania, Bihor, Sânmartin, Băile 1 Mai (the Natural Reserve “Pețea Rivulet”), Zone III. of the reserve, 14.05.2002, leg. T. Tofan

Gen ***Holcus*** L., 1753

***Holcus lanatus* L.** - (n. 22.616) – ref. Sp. Pl. ed. 1 1048 (1753); - Romania, Bihor, Sânmartin, Băile 1 Mai (the Natural Reserve “Pețea Rivulet”), mesophile meadow; 14.03.2002; leg. T.Tofan.

Gen ***Poa*** L.,1753

***Poa angustifolia* L.** - (n. 22.619) – ref. Sp. Pl. ed. 1 67 (1753); - Romania, Bihor, Sânmartin, Băile 1 Mai (the Natural Reserve “Pețea Rivulet”), coastal xerophile meadow, 14.05.2002; leg. T.Tofan.

***Poa annua* L.** - (n. 22.611/1) – ref. Sp. Pl. ed. 1 68 (1753); - Romania, Bihor, Sânmartin, Băile 1 Mai (the Natural Reserve “Pețea Rivulet”), coastal xerophile meadow; 14.05.2002; leg. T.Tofan.

***Poa annua* L.** - (n. 22.611/2) – ref. Sp. Pl. ed. 1 68 (1753); - Romania, Bihor, Sânmartin, Băile 1 Mai (the Natural Reserve “Pețea Rivulet”), mesophile meadow; 12.06.2002; leg. T.Tofan.

***Poa palustris* L.** - (n. 22.610/1; 22.610/3) – ref. Syst. Nat. ed. 10 2: 874 (1759); - Romania, Bihor, Sânmartin, Băile 1 Mai (the Natural Reserve “Pețea Rivulet”), mesophile meadow, 14 - 16.05.2002; leg. T.Tofan.

***Poa palustris* L.** - (n. 22.610/2) – ref. Syst. Nat. ed. 10 2: 874 (1759); - Romania, Bihor, Sânmartin, Băile 1 Mai (the Natural Reserve “Pețea Rivulet”), mesophile meadow near Ochiul Mare, 14.06.2002; leg. T.Tofan.

***Poa pratensis* L.** - (n. 22.618) – ref. Sp. Pl. ed. 1 67 (1753); - Romania, Bihor, Sânmartin, Băile 1 Mai (the Natural Reserve “Pețea Rivulet”), coastal xerophile meadow, 14.05.2002; leg. T.Tofan.

Subfam. **Chloridoideae**Trib **Eragrostideae**Subtrib **Eleusininae**Gen **Eragrostis** N.M. Wolf, 1776

**Eragrostis minor** Host - (n. 22.589) – ref. Gram. Austr. 4: 15 (1809); - Romania, Bihor, Sânmartin, Băile 1 Mai (the Natural Reserve “Pețea Rivulet”), road curb; 14.08.2001; leg. T.Tofan.

Subfam. **Ehrhartoideae**

## Trib Oryzeae

Gen **Leersia** O. Swartz, 1788, nom.cons.

**Leersia oryzoides** (L.) Sw. - (n. 22.531/1; 22.531/3) – ref. Nov. Gen. Sp. Pl. 21 (1788); - Romania, Bihor, Sânmartin, Băile 1 Mai (the Natural Reserve “Pețea Rivulet”), in the water of Ochiul Pompei stream; 08.08.2001; leg. T.Tofan.

**Leersia oryzoides** (L.) Sw. - (n. 22.531/2;) – ref. Nov. Gen. Sp. Pl. 21 (1788); - Romania, Bihor, Sânmartin, Băile 1 Mai (the Natural Reserve “Pețea Rivulet”), on the shore of the thermal lake; 31.07.2001, leg. T.Tofan.

Subfam. **Panicoideae**Trib **Andropogoneae**Subtrib **Sorghinae**Gen **Sorghum** Moench, 1794, nom. cons.

**Sorghum halepense** (L.) Pers. – (n. 24.076) – ref.: Syn. pl. 1:101. 1805; - Romania, Bihor, Oradea, riverside road curb, 12.09.2001, leg. T. Tofan

Trib **Paniceae**Subtrib **Setariinae**Gen **Setaria** Palisot de Beauvois, 1812, nom. cons.

**Setaria pumila** (Poir.) Schult. - (n.22.530/1; 22.530/2) – ref. Mantissa 2: 274 (1824); - România, Bihor, Sânmartin, Băile 1 Mai (the Natural Reserve “Pețea Rivulet”), weeds, road curb, 07- 14.08.2001; leg. T.Tofan.

***Setaria viridis* (L.) P.Beauv.** - (n. 22.529) – ref. Agrost. 51 & 178 (1812); - Romania, Bihor, Sânmartin, Băile 1 Mai (the Natural Reserve “Pețea Rivulet”), road curb, 07.08.2001; leg. T.Tofan.

Fam. ***Juncaceae*** Durande 1782, nom.cons.

Gen ***Juncus*** L., 1753

***Juncus articulatus* L.** – (n. 24.135) - ref.: Sp. Pl. ed. 1 327 (1753); - Romania, Bihor, Alesd, Peștiș (Valea Morilor), on the stream, 02.08.2001, leg. T.Tofan.

***Juncus articulatus* L.** - (n. 24.153) - ref.: Sp. Pl. ed. 1 327 (1753); - Romania, Bihor, Sânmartin, Băile 1 Mai (the Natural Reserve “Pețea Rivulet”), the left shore of Ochiul Mare , 31.07.2001, leg. T.Tofan

***Juncus effusus* L.** – (n. 24.130) - ref.: *Species Plantarum* 1: 326. 1753.; - Romania, Bihor, Aleșd, Peștiș (Valea Morilor), on the stream, 02.08.2001, leg. T.Tofan

***Juncus inflexus* L.** - (n. 22.547) – ref.: Sp. Pl. ed. 1 326 (1753); - Romania, Bihor, Sânmartin, Băile 1 Mai (the Natural Reserve “Pețea Rivulet”), swampy ground; 14.08.2001; leg. T.Tofan.

***Juncus inflexus* L.** - (n. 22.577) – ref.: Sp. Pl. ed. 1 326 (1753); - Romania, Bihor, Sânmartin, Băile 1 Mai (the Natural Reserve “Pețea Rivulet”), swampy ground on the lake shore, 14.07.2001; leg. T.Tofan.

***Juncus tenuis* Willd.** - (n. 24.147) - ref.: Sp. Pl. 2: 214 (1799) ; - Romania, Bihor, Aleșd, Peștiș, on the stream, 02.08.2001, leg. T.Tofan.

***Juncus spp.*** – (n. 24.209) – ref.: *Species Plantarum* 1: 325-330. 1753. - Romania, Bihor, Suplacul de Barcău, in the village, 24.05.2002, leg. T.Tofan

Fam. ***Typhaceae*** Durande, 1782, nom.cons.

Gen ***Typha*** L., 1753

***Typha angustifolia* L.** - (n. 22.561) – ref.: Sp. Pl. ed. 1 971 (1753); - Romania, Bihor, Sânmartin, Băile 1 Mai (the Natural Reserve “Pețea Rivulet”), the water-lily lake Ochiul Mare; 31.07.2001; leg. T.Tofan.

Ord. **Ranunculales** Dumontier, 1829

Fam. **Ranunculaceae** Adans., 1763, nom. cons.

Subfam. **Ranunculoideae**

Trib **Anemoneae**

Gen **Anemone** L., 1753

**Anemone nemorosa** L. - (n. 22.630) – ref.: Sp. Pl. ed. 1 541 (1753); - Romania, Bihor, Sânmartin, Băile Felix, hornbean and oaktree forest, 19.03.2002, leg. T. Tofan.

**Anemone nemorosa** L. – (n. 24.068; 24.069) – ref.: Sp. pl. 1:541. 1753; - Romania, Bihor, Sânmartin, Haieu, the Şomleu Hills, 31.03.2002, leg. T. Tofan

Tribe **Ranunculeae**

Gen **Ranunculus** L., 1753

**Ranunculus auricomus** L. - (n. 22.629/1; 22.629/2) – ref.: Sp. Pl. ed. 1 551 (1753); - Romania, Bihor, Sânmartin, Băile 1 Mai, (the Natural Reserve “Peţea Rivulet”), the shore of the water-lily lake Ochiul Mare; 19. 03. 2002; leg.: T.Tofan.

**Ranunculus polyanthemus** L. - (n. 22.594) – ref. Sp. Pl. ed. 1 554 (1753); Romania, Bihor, Sânmartin, Băile 1 Mai, (the Natural Reserve “Peţea Rivulet”), the shore of the water-lily lake Ochiul Mare; 14. 05. 2002; leg.: T.Tofan.

**Ranunculus repens** L. - (n. 24.143) - ref.: Sp. pl. 1:554. 1753; - Romania, Bihor, Aleşd, Peştiş (Valea Morilor), in the hazel wood, 02.08.2001, leg. T.Tofan

**Ranunculus sceleratus** L. - (n. 22.580) – ref.: Sp. Pl. ed. 1 551 (1753);– Romania, Bihor, Sânmartin, Băile 1 Mai, (the Natural Reserve “Peţea Rivulet”), swampy ground on the lake shore, 14.08.2001; leg T.Tofan.

Fam. **Papaveraceae** Adans., 1763, nom. cons.

Subfam. **Fumarioideae**

Trib **Fumarieae**

Gen **Corydalis** A.P. de Candolle, in Lamarck & A.P. de Candolle, 1805

**Corydalis solida (L.) Clairv.** - (n. 22.635) – ref.: Svensk Bot. 8: t. 531 (1817); – Romania, Bihor, Sânmartin, Băile 1 Mai (the Natural Reserve “Pețea Rivulet”), meadow on the water-lily lake shore, 14.08.2001; leg T.Tofan.

Ord. **Caryophyllales** Perleb. 1826

Fam. **Amaranthaceae** Adans., 1763 ex A.L. de Jussieu, 1789, nom.cons.

Subfam. **Amaranthoideae**

Trib **Amarantheae**

Gen **Amaranthus** L., 1753

**Amaranthus blitum L.** - (n.22.527) - ref.: Sp. Pl. ed. 1 990 (1753); – Romania, Bihor, the city of Oradea, road curb; 13.09.2001, leg. T.Tofan.

**Amaranthus retroflexus L** - (n.22.548) – ref.: Sp. Pl. ed. 1 991; – Romania, Bihor, Sânmartin, Băile 1 Mai, road curb; 14.07.2001, leg. T.Tofan.

Subfam. **Chenopodioideae**

Trib **Atripliceae** C.A. Mey.

Gen **Atriplex** L., 1753

**Atriplex patula L.** - (n. 22.523) – ref.: Sp. Pl. ed. 1 1053 (1753); – România, Bihor, the city of Oradea, the curb of the street, 24.09.2001; leg. T.Tofan.

Trib **Camphorosmeae**

Gen **Bassia** Allioni, 1766

**Bassia laniflora (S.C. Gmelin) A.J. Scott.** - (n. 24.161)– ref.: Feddes Repert. 89(2-3): 108. 1978.; - Romania, Bihor, Șimian (natural reserve), hayfield on the sand ,16.10.2001; leg. T. Tofan

Trib **Chenopodieae**



Gen ***Chenopodium*** L., 1753

***Chenopodium album* var. *striatum* (Krasan) Kartesz, comb. nov. ined.** - (n. 22.524) –ref.: Festschr. Ascherson 222 (1904); – Romania, Bihor, the city of Oradea, the curb of the street, 24.09.2001; leg. T.Tofan.

***Chenopodium polyspermum* L.** - (n.22.570) – ref. Sp. Pl. ed.1 220 (1753); – Romania, Bihor, Sânmartin, Băile 1 Mai, (the Natural Reserve “Pețea Rivulet”), road curb, area with ruderal plants; 08.08.2001; leg. T. Tofan

Fam. ***Caryophyllaceae*** Durande, 1872, ex A.L. de Jussieu, 1789, nom. cons.

Gen: ***Petrorhagia*** (Seringe) Link, 1831

***Petrorhagia prolifera* (L.) P.W Ball & Heywood** - (n. 24.169) – ref. Bull. Brit. Mus. (Nat. Hist.), Bot. 3:161. 1964; - Romania, Bihor, Șimian (natural reserve), sand hills, 16.10.2001; leg. T. Tofan

Subfam. ***Alsinoideae***Trib ***Alsineae***Gen ***Cerastium*** L., 1753

***Cerastium fontanum* Baumg. subsp. vulgare (Hartm.) Greuter & Burdet** - (n. 22.592) – ref.: Willdenowia 12: 37 (1982); - Romania, Bihor, Sânmartin, Băile 1 Mai (the Natural Reserve “Pețea Rivulet”), coastal xerophile meadow, 14.05.2002; leg. T. Tofan.

***Cerastium glomeratum* Thuill.** - (n. 22.566/1) – ref.: Fl. Paris ed. 2 226 (1799); – Romania, Bihor, Sânmartin, Băile 1 Mai (the Natural Reserve “Pețea Rivulet”), road curb, beaten path, 08.08.2001; leg. T. Tofan.

***Cerastium glomeratum* Thuill.** - (n. 22.566/2) – ref.: Fl. Paris ed. 2 226 (1799); – Romania, Bihor, Sânmartin, Băile 1 Mai, (the Natural Reserve “Pețea Rivulet”), coastal xerophile meadow; 14.05.2002; leg. T. Tofan.

***Cerastium pumilum* Curtis** - (n. 24.164)– ref.: Flora Londinensis 2(6,69): pl. 30. 1794. ; - Romania, Bihor, Șimian (natural reserve), sand hills, 25.05.2002; leg. T. Tofan

***Cerastium semidecandrum* L.** - (n. 22.662) – ref.: Sp. Pl. ed. 1 438 (1753); - Romania, Bihor, Sânmartin, Băile 1 Mai (the Natural Reserve “Pețea Rivulet”), road curb; 07.08.2001; leg. T. Tofan.

***Cerastium semidecandrum* L.** - (n. 24.141; 24.142) - ref.: Sp. pl. 1:438. 1753; - Romania, Bihor, Aleșd, Peștiș (Valea Morilor), in the hazel wood, 02.08.2001, leg. T.Tofan

Gen ***Myosoton*** Moench, 1794

***Myosoton aquaticum* (L.) Moench** - (n. 22.638) – ref.: Meth. 225 (1794); – Romania, Bihor, Sânmartin, Băile 1 Mai, (the Natural Reserve “Pețea Rivulet”), mesophile meadow, 14.05.2002; leg. T. Tofan.

Subfam. ***Caryophylloideae***

Trib ***Caryophylleae***

Gen ***Gypsophila*** L.,1753

***Gypsophila muralis* L.** - (n. 22.593) – ref.: Sp. Pl. Ed. 1 408 (1753); – Romania, Bihor, Sânmartin, Băile 1 Mai, (the Natural Reserve “Pețea Rivulet”), coastal xerophile meadow, 14.05.2002; leg. T. Tofan.

***Gypsophila muralis* L.** - (n. 24.166)– ref.: Sp. Pl. ed. 1 408 (1753); - Romania, Bihor, Șimian (natural reserve), sands,16.10.2001; leg. T. Tofan

Gen ***Saponaria*** L.,1753

***Saponaria officinalis* L.** - (n. 22.542) – ref.: Sp. Pl. ed. 1 408 (1753); – Romania, Bihor, Sânmartin, Băile 1 Mai, (the Natural Reserve “Pețea Rivulet”), the shore of the thermal lake Ochiul Mare, 10.07.2001; leg. T. Tofan.

Trib ***Sileneae***

Gen ***Cucubalus*** L.,1753

***Cucubalus baccifer* L.** - (n. 22.658/1; 22.658/2; 22.658/3; 22.658/4) – ref.; Sp.

Pl. ed. 1 414 (1753); - Romania, Bihor, Sânmartin, Băile 1 Mai, oaktree forest, 31.07.2001; leg. T.Tofan.

Gen ***Lychnis*** L., 1753

***Lychnis flos-cuculi*** L. - (n. 22.598/1; 22.598/2) – ref.: Sp. Pl. ed. 1 436 (1753);– Romania, Bihor, Sânmartin, Băile 1 Mai, (the Natural Reserve “ Pețea Rivulet”), coastal xerophilous meadow, 14.05.2002; leg. T. Tofan.

Gen ***Silene*** L., 1753

***Silene vulgaris (Moench) Garcke*** - (n. 22.526) – ref. : Fl. Nord-Mittel-Deutschl. ed. 9 64 (1869), – Romania, Bihor, the city of Oradea, the railroad embankment; 12.09.2001; leg. T. Tofan.

Fam. ***Polygonaceae*** A.L. de Jussieu, 1789, nom. cons.

Subfam. ***Polygonoideae***

Trib ***Polygoneae***

Gen ***Fallopia*** Adanson, 1763

***Fallopia convolvulus (L.) A.Löve.*** - (n. 22.567) – ref.: Taxon 19: 300 (1970);– Romania, Bihor, Sânmartin, Băile 1 Mai, (the Natural Reserve “ Pețea Rivulet”), the shore of the water-lily lake, 08.08.2001; leg. T. Tofan.

***Fallopia dumetorum (L.) Holub*** - (n. 22.569) – ref.: Folia Geobot. Phytotax. (Praha) 6: 176 (1971); – Romania, Bihor, Sânmartin, Băile 1 Mai Spas, (the Natural Reserve “ Pețea Rivulet”), on area with ruderal plants, 07.08.2001; leg. T. Tofan.

Gen ***Polygonum*** L., 1753

***Polygonum lapathifolium*** L. - (n. 22.568) – ref. : Sp. Pl. ed. 1 360 (1753); – Romania, Bihor, Sânmartin, Băile 1 Mai (the Natural Reserve “ Pețea Rivulet”), on area with ruderal plants, 14.08.2001; leg. T. Tofan.

***Polygonum minus*** Huds. - (n. 24.123; 24.124) - ref.: *Flora Anglica* 1: 148. 1762; - Romania, Bihor, Alesd, Pestis (Valea Morilor), on the stream; 02.08.2001, leg. T.Tofan

***Polygonum mite Schrank*** - (n. 24.122) - ref.: Baier. Fl. 1: 668 (1789); - Romania, Bihor, Alesd, Pestis (Valea Morilor), the road curb, on the water shore; 02.08.2001, leg. T.Tofan

***Polygonum mite Schrank*** – (n. 24.154 /a.; 24.154 /b.) – ref.: Baier. Fl. 1: 668 (1789); - Romania, Bihor, Sânmartin, Băile 1 Mai (the Natural Reserve “Pețea Rivulet”), the left shore of Ochiul Mare, 31.07.2001, leg T. Tofan

***Polygonum mite Schrank*** – (n. 24.052) – ref.: Baier. Fl. 1: 668 (1789); - Romania, Bihor, Paleu, Săldăbagiu de Munte, Săldăbagiu forest (phytocenosis with *Ruscus*) ; 05.10.2001, leg. T.Tofan

***Polygonum persicaria L.*** - (n. 22.588) – ref.: Sp. Pl. ed. 1 361 (1753);– Romania, Bihor, Sânmartin, Băile 1 Mai, (the Natural Reserve “Pețea Rivulet”), the road curb, on areas with ruderal plants, 14.08.2001; leg. T. Tofan.

#### Trib ***Rumiceae***

#### Gen ***Rumex*** L., 1755

***Rumex acetosa L.*** - (n. 22.601) – ref.: Sp. Pl. ed. 1 337 (1753); – Romania, Bihor, Sânmartin, Băile 1 Mai, (the Natural Reserve “Pețea Rivulet”), mesophile meadow, 16.05.2002; leg. T. Tofan.

***Rumex acetosella L.*** - (n. 24.168) – ref.: Species Plantarum 1: 338. 1753.; - Romania, Bihor, Simian (natural reserve), sands, 16.10.2001; leg. T. Tofan

***Rumex conglomeratus Murray*** - (n. 22.604 /1) – ref. Prodr. Stirp. Gotting. 52 (1770); – Romania, Bihor, Sânmartin, Băile 1 Mai, (the Natural Reserve “Pețea Rivulet”), mesophile meadow, 13.06.2002; leg. T. Tofan .

***Rumex conglomeratus Murray*** - (n. 22.604 /2) – ref. Prodr. Stirp. Gotting. 52 (1770); – Romania, Bihor, Sânmartin, Băile 1 Mai, (the Natural Reserve “Pețea Rivulet”), mesophile meadow, 31.07.2001; leg. T. Tofan .

***Rumex hydrolapatum Hudson*** (n. 22.573) – ref.: Fl. Angl. ed. 2 154 (1778); – Romania, Bihor, Sânmartin, Băile 1 Mai, (the Natural Reserve “Pețea Rivulet”), mesophile meadow, 14.08.2001; leg. T. Tofan.

***Rumex obtusifolius* L.** - (n. 22.564) – ref. Sp. Pl. ed. 1 335 (1753); – Romania, Bihor, Sânmartin, Băile 1 Mai, oaktree forest; 31. 07. 2001, leg. T. Tofan.

***Rumex patientia* L.** - (n. 22.602) – ref.: Sp. Pl. ed. 1 333 (1753); – Romania, Bihor, Sânmartin, Băile 1 Mai, (the Natural Reserve “Pețea Rivulet”), coastal xerophile meadow, 14.05.2002; leg. T. Tofan .

Subclas. ***Rosidae*** Takhtajan, 1967

Ord. ***Geraniales*** Dumortier, 1829

Fam. ***Geraniaceae*** A.L. de Jussieu, 1789, nom.cons.

Trib ***Geranieae***

Gen ***Erodium*** L'Herit.

***Erodium cicutarium* (L.) L'Hér.** - (n. 22.555) – ref. Hort. Kew. ed. 1 2: 414 (1789); – Romania, Bihor, Sânmartin, Băile 1 Mai (the Natural Reserve “Pețea Rivulet”), mesophile meadow; 10.07. 2001; leg. T. Tofan.

Gen ***Geranium*** L., 1753

***Geranium phaeum* L.** - (n. 22.627/1) – ref. Sp. Pl. ed. 1 681 (1753); – Romania, Bihor, Sânmartin, Băile 1 Mai (the Natural Reserve “Pețea Rivulet”), mesophile meadow, the Ochiului Mare shore; 14.07.2001; leg. T. Tofan.

***Geranium phaeum* L.** - (n. 22.627/2; 22.627/3) – ref. Sp. Pl. ed. 1 681 (1753); – Romania, Bihor, Sânmartin, Băile 1 Mai, (the Natural Reserve “ Pețea Rivulet”), mesophile meadow, the Ochiului Mare shore; 02.04.2002; leg. T. Tofan.

***Geranium robertianum* L.** - (n. 22.554) – ref. Sp. Pl. ed. 1 681 (1753); – Romania, Bihor, Sânmartin, Băile 1 Mai, (the Natural Reserve “Pețea Rivulet”), mesophile meadow; 10. 07. 2001; leg. T. Tofan.

Ord. ***Myrtales*** Reichenbach, 1828

Fam. ***Lythraceae*** Jaume Saint-Hilaire, 1805

Tribe ***Lythreae***

Gen *Lythrum* L., 1753

*Lythrum salicaria* L. - (n. 22.572) – ref. Sp. Pl. ed. 1 446 (1753); – Romania, Bihor, Sânmartin, Băile 1 Mai (the Natural Reserve “Pețea Rivulet”), the shore of the water-lily lake, 08.08.2001, leg. T.Tofan.

Fam. *Onagraceae* A.L. de Juisseau, 1789, nom cons.

Subfam. *Onagroideae*

Trib *Epilobieae*

Gen *Epilobium* L., 1753

*Epilobium lanceolatum* Sebastiani & Mauri – (n. 24.092) – ref.: Fl. Rom. 138 (1818); - Romania, Bihor, Aleșd, Peștiș (Valea Morilor), on the stream, 02.08.2001, leg. T.Tofan

*Epilobium obscurum* Schreb. - (n. 22.536/1;) - Reference: Spicil. Fl. Lips. 147 & 155 (1771); – Romania, Bihor, Sânmartin, Băile 1 Mai, (the Natural Reserve “Pețea Rivulet”), the swampy shore of the lake; 14.08.2001; leg. T. Tofan.

*Epilobium obscurum* Schreb. - (n. 22.536/2; 22.536/3; 22.536/4) - Reference: Spicil. Fl. Lips. 147 & 155 (1771); – Romania, Bihor, Sânmartin, Băile 1 Mai, (the Natural Reserve “Pețea Rivulet”), mesophile meadow on the shore of the lake; 14.07.2001; leg. T. Tofan.

*Epilobium obscurum* Schreb. - (n. 22.536/5) - Reference: Spicil. Fl. Lips. 147 & 155 (1771); – Romania, Bihor, Sânmartin, Băile 1 Mai, oaktree forest; 31.07.2001; leg. T. Tofan.

*Epilobium montanum* L. subsp. *collinum* (Gmel.) Leveille – (n.; 24.091) – ref.: Sp. Pl. ed. 1 348 (1753); syn.: *Epilobium collinum* C.C.Gmel.; *Epilobium carpetanum* Willk.; - Romania, Bihor, Aleșd, Peștiș (Valea Morilor), on the stream, 02.08.2001, leg. T.Tofan

*Epilobium parviflorum* Schreb. - (n.22.538) - ref.: Spicil. Fl. Lips. 146 & 155 (1771); – Romania, Bihor, Sânmartin, 1 May Spas, (the Natural Reserve “Pețea Rivulet”), swampy ground; 14.08.2001; leg. T.Tofan.

***Epilobium parviflorum* Schreb.** - (n. 24.087; 24.088; 24.089; 24.090) – ref.: Spicil. Fl. Lips. 146 & 155 (1771); - Romania, Bihor, Alesd, Pestis (Valea Morilor), on the stream, in the beech forest, 02.08.2001, leg. T.Tofan

***Epilobium tetragonum* L.** - (n. 22.537) - ref.: Sp. Pl. ed. 1 348 (1753); – Romania, Bihor, Sânmartin, Băile 1 Mai, (the Natural Reserve “Pețea Rivulet”), mesophile meadow; 14.07.2001; leg. T. Tofan.

Trib ***Circaeae***

Gen ***Circaea*** L., 1753

***Circaea lutetiana* L.** - (n. 24.110; 24.114; 24.115) - ref.: Sp. pl. 1:9. 1753; - Romania, Bihor, Alesd, Peștiș (Valea Morilor), on the stream, in the hazel wood, 02.08.2001, leg. T.Tofan

Ord. ***Celastrales*** Baskerville, 1839

Fam. ***Celastraceae*** R. Brown, 1814

Subfam. ***Celastroideae***

Trib ***Euonymae***

Gen ***Euonymus*** L., 1753

***Euonymus europaeus* L.** - (n. 22.657) - ref.: Sp. Pl. ed. 1 197 (1753); – Romania, Bihor, Sânmartin, Băile 1 Mai, the oaktree forest; 31.07.2001; leg. T. Tofan.

Ord. ***Fabales*** Bromhead, 1838

Fam. ***Leguminosae*** A.L. de Jussieu, 1789, nom. cons.

Subfam. ***Papilionoideae*** (Giseke, 1792) DC., 1825

Trib ***Fabeae*** Rchb., 1832

Gen ***Lathyrus*** L., 1753

***Lathyrus vernus* (L.) Bernh.** - (n. 24.059)– ref.: Syst. Verz. Erfurt 247 (1800); - Romania, Bihor, Paleu, Săldăbagiu de Munte, the Săldăbagiu forest (phytocenosis with *Ruscus*), 05.10.2001, leg. T.Tofan



Gen ***Vicia*** L., 1753

***Vicia cracca* L.** - (n. 22.661) – ref. Sp. Pl. ed. 1 735 (1753); – Romania, Bihor, Sânmartin, Băile 1 Mai, the oaktree forest; 07.08.2001; leg. T.Tofan.

***Vicia dumetorum* L.** - (n. 22.553/1; 22.553/2) – ref.: Sp. Pl. ed. 1 734 (1753); – Romania, Bihor, Sânmartin, Băile 1 Mai, (the Natural Reserve “Pețea Rivulet”), mesophile meadow; 10.07.2001; leg. T. Tofan.

***Vicia hirsuta* (L.) Gray** - (n. 22.591) – ref.: Nat. Arr. Brit. Pl. 2: 614 (1821); – Romania, Bihor, Sânmartin, Băile 1 Mai, (the Natural Reserve “Pețea Rivulet”), xerophilous meadow with bushes of *Rosa*; 14.05.2002; leg. T.Tofan.

***Vicia sativa* L.** - (n. 22.590) – ref. Sp. Pl. ed. 1 736 (1753); – Romania, Bihor, Sânmartin, Băile 1 Mai, (the Natural Reserve “Pețea Rivulet”), coastal xerophilous meadow; 14.05.2002; leg. T.Tofan.

Trib ***Galegeae***Gen ***Astragalus*** L., 1753

***Astragalus cicer* L.** - (n. 22.584/2; 22.584/3) - ref.: Sp. Pl. ed. 1 757 (1753); – Romania, Bihor, Sânmartin, Băile 1 Mai, (the Natural Reserve “Pețea Rivulet”), the lake shore, in bushes of *Prunus spinosa*; 14.08. 2001, leg. T. Tofan.

***Astragalus cicer* L.** - (n. 22.584/1) - ref.: Sp. Pl. ed. 1 757 (1753); – Romania, Bihor, Sânmartin, Băile 1 Mai, (the Natural Reserve “Pețea Rivulet”), mesophile meadow – the lake shore, 12.06.2002; leg. T. Tofan.

***Astragalus glycyphyllos* L.** - (n.24.138; 24.139) - ref.: Sp. pl. 2: 758. 1753; -Romania, Bihor, Alesd, Peștiș (Valea Morilor), in the beech forest, 02.08.2001, leg. T.Tofan

Trib ***Trifolieae***Gen ***Ononis*** L., 1753

***Ononis spinosa* subsp. *hircina* (Jacq.) Gams** - (n. 22.625) – ref. Syst. Nat. ed. 10 2: 1159 (1759); – Romania, Bihor, Sânmartin, Băile 1 Mai, (the Natural Reserve

“Pețea Rivulet”), mesophile meadow at the edge of reed beds -; 12.06.2002; leg. T. Tofan.

***Ononis spinosa* L.** - (n. 22.549) – ref.: Sp. Pl. ed. 1 716 (1753); – Romania, Bihor, Sânmartin, Băile 1 Mai, (the Natural Reserve “Pețea Rivulet”), mesophile meadow, the shore of the water-lily lake; 14.07.2001; leg. T. Tofan.

Ord. **Fagales** Engler, 1892

Fam. **Fagaceae** Dumortier, 1829

Subfam. **Quercoidae**

Gen **Quercus** L., 1753

***Quercus ceris* L.** – (n. 24.050) – ref.: *Species Plantarum* 2:997. 1753; - Romania, Bihor, Paleu, Săldăbagiu de Munte, Săldăbagiu forest (phytocenosis with *Ruscus*), 05.10.2001, leg. T.Tofan

***Quercus pedunculiflora* C. Koch** – (n. 24.205) – ref.: *Linnaea* 22: 324. 1849.; - Romania, Bihor, Sânmartin, Băile 1 Mai (the “Ecomuseum” Project), the forest, 07.08.2001; leg.: T. Tofan

***Quercus petraea* (Mattuschka) Lieblein** – (n. 24.051) – ref.: Fl. Fuld. 403. 1784.; - Romania, Bihor, Paleu, Săldăbagiu de Munte, Săldăbagiu forest (phytocenosis with *Ruscus*), 05.10.2001, leg. T.Tofan

***Quercus robur* L.** - (n. 22.600/1) – ref. Sp. Pl. ed. 1 996 (1753); - Romania, Bihor, Sânmartin, Băile 1 Mai, on the natural reserve, 16.05.2002; leg. T.Tofan

***Quercus robur* L.** - (n. 22.600/2) – ref. Sp. Pl. ed. 1 996 (1753); - Romania, Bihor, Sânmartin, Băile 1 Mai, the oaktree forest, 31.07. 2001 ,leg. T.Tofan

***Quercus robur* L.** – (n. 24.204 /a; 24.204 /b; 24.204 /c; 24.204 /d;) – ref.: Sp. pl. 2:996. 1753; - Romania, Bihor, Sânmartin, Băile 1 Mai, (the “Ecomuseum” Project), the forest, 31.07.2001, leg. T. Tofan

***Quercus robur* L.** – (n. 24.206 /a; 24.206 /b; 24.206 /c; 24.206 /d;) – ref.: Sp. pl. 2:996. 1753; - Romania, Bihor, Sânmartin, Băile 1 Mai (the “Ecomuseum” Project), the forest, 07.08.2001, leg. T. Tofan

**Quercus robur L.** – (n. 24.158 /a.; 24.158 /b.) – ref. : Sp. pl. 2:996. 1753 ; - Romania, Bihor, Şimian, forests, 16.10.2001; leg. T. Tofan

Fam. **Betulaceae** Gray, 1821  
Subfam. **Betuloideae**

Gen **Alnus** P. Miller, 1754

**Alnus glutinosa (L.) Gaertn.** - (n. 22.550/1; 22.550/2) – ref.: Fruct. Sem. Pl. 2: 54 (1790); – Romania, Bihor, Sânmartin, Băile 1 Mai, (the Natural Reserve “ Peţea Rivulet”), on the shore of the thermal lake Ochiul Mare; 10.07.2001; leg. T. Tofan.

**Alnus glutinosa (L.) Gaertn.** – (n. 24.078; 24.083) – ref.: Fruct. Sem. Pl. 2: 54 (1790); - Romania, Bihor, Aleşd, Peştiş (Valea Morilor), 02.08.2001, leg. T.Tofan

Ord. **Malpighiales** C. Martius, 1835  
Fam. **Euphorbiaceae** A.L. de Juissieu, 1789, nom. cons.  
Subfam. **Euphorbioideae**  
Trib **Euphorbieae**

Gen **Euphorbia** L.,1753

**Euphorbia helioscopia L.** - (n. 24.137) - ref.: Sp. pl. 1:459. 1753.; - Romania, Bihor, Aleşd, Peştiş (Valea Morilor), on the stream, in the beech forest, 02.08.2001, leg. T.Tofan

**Euphorbia platyphyllos L.** - (n. 22.653) – ref. Sp. Pl. ed. 1 460 (1753);– Romania, Bihor, Sânmartin, Băile 1 Mai, (the Natural Reserve “ Peţea Rivulet”), the mesophile meadow; 31.07.2001; leg. T. Tofan.

**Euphorbia platyphyllos L.** - (n. 24.125; 24.136) - ref.: Sp. pl. 1:460. 1753.; - Romania, Bihor, Aleşd, Peştiş (Valea Morilor), the forest roadside, in the beech forest; 02.08.2001, leg. T.Tofan

**Euphorbia serrulata Thuill.** - (n. 22.543; 22.582); – Romania, Bihor, Sânmartin, Băile 1 Mai, (the Natural Reserve “ Peţea Rivulet”), mesophile meadow; 10.07.2001; leg. T. Tofan.

Fam. **Hypericaceae** A.L. de Jussieu, 1789, nom. cons.

Trib **Hypericeae**

Gen **Hypericum** L., 1753

**Hypericum hirsutum** L. – (n. 24.053) – ref.: Sp. Pl. ed. 1 786 (1753); - România, Bihor, Paleu, Săldăbagiu de Munte, Săldăbagiu forest (phytocenosis with *Ruscus*), 05.10.2001, leg. T.Tofan

**Hypericum hirsutum** L. - (n. 24.106) - ref.: Sp. pl. 2:786. 1753; - Romania, Bihor, Aleșd, Peștiș (Valea Morilor), on the roadside forest, 02.08.2001, leg. T.Tofan

**Hypericum hirsutum** L. - (n. 24.109) - ref.: Sp. pl. 2:786. 1753; - Romania, Bihor, Alesd, Pestis (Valea Morilor), on the stream in the beech forest, 02.08.2001, leg. T.Tofan

**Hypericum richeri** Vill. subsp. **transsilvanicum** (Celak.) Ciocârlan - (n. 24.108) - ref.: Oesterr. Bot. Z. 24: 138. 1874; - Romania, Bihor, Aleșd, Peștiș (Valea Morilor), in the beech forest, 02.08.2001, leg. T.Tofan

**Hypericum tetrapterum** Fr. - (n. 24.107) - ref.: Methodus 128. 1794; - Romania, Bihor, Aleșd, Peștiș (Valea Morilor), on the roadside forest, 02.08.2001, leg. T.Tofan

Fam. **Salicaceae** Mirbel, 1815

Trib **Saliceae**

Gen **Salix** L., 1753

**Salix alba** L. - (n. 22.628) – ref.: Sp. Pl. ed. 1 1021 (1753); – Romania, Bihor, Sânmartin, Băile 1 Mai, (the Natural Reserve “ Pețea Rivulet”), the Ochiului Mare shore; 02.04.2002; leg. T.Tofan.

**Salix triandra** L. - (n. 22.576) – ref. : Sp. Pl. ed. 1 1016 (1753); — Romania, Bihor, Sânmartin, Băile 1 Mai, (the Natural Reserve “ Pețea Rivulet”); the Ochiului Mare shore; 14.08.2001; leg. T. Tofan.

Fam. **Violaceae** Batsch, 1802

Subfam. **Violoideae**

Trib **Violeae**

Gen **Viola** L., 1753

**Viola alba Besser** – (n.24.077) – ref.: Prim. Fl. Galiciae austriac. 1:171. 1809; - Romania, Bihor, Oradea, the courtyard of the Cris County Museum, 28.03.2002, leg. T.Tofan

**Viola odorata L.** – (n. 22.633/1; 22.633/2) – ref. Sp. Pl. Ed. 1 934 (1753); – Romania, Bihor, Sânmartin, Băile 1 Mai, (the Natural Reserve “Pețea Rivulet”), the meadow on the shore of the water-lily lake Ochiul Mare; 10.07. 2001; leg. T.Tofan.

**Viola suavis M. Bieb.** – (n.24.071) – ref.: Fl. Taur.-Cauc. 3: 164 (1819); - Romania, Bihor, Sânmartin, Haieu, the Șomleu Hills, 31.03.2002, leg. T. Tofan

**Viola reichenbachiana** Jord. ex Boreau. – (n. 24.057)– ref. : Fl. Centre Fr. Ed. 3 2 : 78 (1857) ; - Romania, Bihor, Paleu, Săldăbagiu de Munte, Săldăbagiu forest (phytocenosis with Ruscus), 05.10.2001, leg. T.Tofan

**Viola reichenbachiana Boreau** - (n. 24.144) - ref.: Fl. centre France ed. 3., 2:78. 1857; - Romania, Bihor, Aleșd, Peștiș (Valea Morilor), in the beech forest, 02.08.2001, leg. T.Tofan

Ord. **Oxalidales** Heintze, 1927

Fam. **Oxalidaceae** R. Brown, 1818

Gen **Oxalis** L., 1753

**Oxalis stricta** L.-(n.22.641)–ref.:Sp.Pl.Ed.1435(1753);–Romania,Bihor,Sânmartin, Băile1Mai,(theNaturalReserve“PețeaRivulet”),themesophilemeadow;leg.T.Tofan.

Ord. **Rosales** Perleb, 1826

Fam. **Rosaceae** A.I. de Jussieu, 1789, nom.cons.

Trib **Crataegeae**

Gen **Crataegus** L., 1753

**Crataegus laevigata (Poir.) DC.** – (n. 22.660) – ref.: Prodr. 2: 630 (1825); – Romania, Bihor, Sânmartin, Băile 1 Mai, the oak tree forest; 07.08.2001; leg. T. Tofan.

***Crataegus monogyna* Jacq.** – (n. 22.659) – ref.: Fl. Austr. 3: 50 (1775);– Romania, Bihor, Sânmartin, Băile 1 Mai, the oaktree forest; 07.08.2001; leg. T. Tofan.

Trib ***Potentilleae***

Gen ***Potentilla* L.**,1753

***Potentilla supina* L.** – (n. 22.585) – ref.: Sp. Pl. Ed. 1 497 (1753); – Romania, Bihor, Sânmartin, Băile 1 Mai, (the Natural Reserve “Pețea Rivulet”), the lake shore on marl rocks, 14.08.2001; leg. T. Tofan .

Trib ***Roseae***

Gen ***Rosa* L.**,1753

***Rosa canina* L.** – (22.597/1) – ref.: Sp. Pl. Ed. 1 491 (1753);– Romania, Bihor, Sânmartin, Băile 1 Mai, (the Natural Reserve “Pețea Rivulet”), the dry steppe coast; 14.05.2002; leg. T. Tofan .

***Rosa canina* L.** – (22.597/1; 22.597/2) – ref.: Sp. Pl. Ed. 1 491 (1753); – Romania, Bihor, Sânmartin, Băile 1 Mai, (the Natural Reserve “Pețea Rivulet”), the coastal xerophile meadow, 14.05.2002; leg. T. Tofan .

Trib ***Rubeae***

Gen ***Rubus* L.**,1753

***Rubus apiculatus* Weihe & Nees ex Bluff & Fingerh.** – (n. 24.129) - ref.: *Compendium Florae Germaniae* 1: 680. 1825. - Romania, Bihor, Alesd, Pestis (Valea Morilor), on the stream, in the alder forest; 02.08.2001, leg. T.Tofan

***Rubus caesius* L.** – (n. 22.533/1; 22.533/2) – ref.: Sp. Pl. Ed. 1 493 (1753); – Romania, Bihor, Sânmartin, Băile 1 Mai, the oaktree forest; 31.07.2001; leg. T. Tofan.

Ord. ***Brassicales*** Bromhead, 1838

Fam. ***Cruciferae*** A.L. de Jussieu, 1789, nom.cons.

Trib ***Alyseae***

Gen *Alyssum* L., 1753

*Alyssum alyssoides* (L.) L. - (n. 22.539) – ref. Syst. Nat. Ed. 10 2: 1130 (1759);– Romania, Bihor, Sânmartin, Băile 1 Mai, (the Natural Reserve “Pețea Rivulet”); the road curb; 14.07.2001; leg. T.Tofan.

Trib *Arabideae*Gen *Draba* L., 1753

*Draba verna* L. – (n.24.073)– ref.: Sp. pl. 2:642. 1753; - Romania, Bihor, Sânmartin, Haieu, Somleu Hills, 31.03.2002, leg. T. Tofan

Trib *Brassicaceae*Gen *Brassica* L., 1753

*Brassica nigra* (L.) W.D.J.Koch - (n. 22.596/1; 22.596/2) – ref.: Deutschl. Fl. ed. 3 4: 713 (1833); - Romania, Bihor, Sânmartin, Băile 1 Mai, (the Natural Reserve “Pețea Rivulet”); the mesophile meadow; 14.05.2002; leg. T.Tofan.

Trib *Camelineae*Gen *Camelina* Crantz, 1762

*Camelina microcarpa* Andr. ex DC. - (n. 22.552) – ref. Veg. Syst. Nat. 2: 517 (1821); - Romania, Bihor, Sânmartin, Băile 1 Mai (the Natural Reserve “Pețea Rivulet”), the mesophile meadow with ruderial plants; 10.07.2001; leg. T.Tofan.

Trib *Cardamineae*Gen *Rorippa* Scopoli, 1760

*Rorippa sylvestris* (L.) Besser – (n. 22.545) – ref. Enum. Pl. Volhyn. 27 (1822); - Romania, Bihor, Sânmartin, Băile 1 Mai, (the Natural Reserve “Pețea Rivulet”), the mesophile meadow; 10.07.2001; leg. T.Tofan.

Trib *Lepidieae*



Gen. **Lepidium** L., 1753

**Lepidium campestre** (L.) R.Br. – (n. 24.074) – ref.: Hort. Kew. ed. 2 4: 88 (1812);  
- Romania, Bihor, Sânmartin, Haieu, Șomleu Hills, 31.03.2002, leg. T. Tofan

Trib **Sisymbrieae**

Gen **Sisymbrium** L., 1753

**Sisymbrium loeselii** L. - (n. 22.595) – ref. Cent. Pl. 1: 18 (1755); - Romania,  
Bihor, Sânmartin, Băile 1 Mai, the Natural Reserve “Pețea Rivulet”, the mesophile  
meadow with ruderal plants; 14.05.2002; leg. T.Tofan.

Ord. **Malvales** Dumortier, 1829

Fam. **Malvaceae** A.L. de Jussieu, 1789, nom.cons.

Subfam. **Malvoideae**

Trib **Malveae**

Gen **Althaea** L., 1753

**Althaea officinalis** L. - (n. 22.541) - ref. Sp. Pl. ed. 1 686 (1753); – Romania,  
Bihor, Sânmartin, 1 May Spas, (the Natural Reserve “Pețea Rivulet”); mesophile  
meadow with ruderal plants; 10.07.2001; leg. T.Tofan.

Subfam. **Tilioideae**

Gen **Tilia** L., 1753

**Tilia tomentosa** Moench - (n. 22.556) – ref. Verz. Ausl. Bäume Weissenst. 136  
(1785); – Romania, Bihor, Sânmartin, Băile 1 Mai, (the Natural Reserve “Pețea  
Rivulet”), on the shore of the thermal lake; 10.07. 2001; leg. T.Tofan

**Tilia platyphyllos** Scop - (n. 24.060) – ref.: Fl. Carn. ed. 2 1: 373 (1772); -  
Romania, Bihor, Paleu, Săldăbagiu de Munte, Săldăbagiu forest (phytocenosis  
with *Ruscus*), 05.10.2001, leg. T.Tofan

Subclas. **Asteridae** Takhtajan, 1967

Ord. **Ericales** Dumortier, 1829

Fam. **Balsaminaceae** A. Richard, 1822

Gen *Impatiens* L., 1753

*Impatiens noli-tangere* L. – (n. 24.079; 24.080) – ref.: Sp. pl. 2:938. 1753;  
- Romania, Bihor, Alesd, Pestis (Valea Morilor), on the stream in the alder  
forest, 02.08.2001, leg. T.Tofan

Fam. *Primulaceae* Batsch ex Borkh., 1797, nom.cons.

Subfam. *Myrsinoideae*

Trib *Anagallideae*

Gen *Anagallis* L., 1753

*Anagallis arvensis* L. (n. 22.562) - ref.: Sp. Pl. ed. 1 148 (1753); — Romania,  
Bihor, Sânmartin, Băile 1 Mai, the oaktree forest; 31.07.2001; leg. T.Tofan.

Trib *Lysimachieae*

Gen *Lysimachia* L., 1753

*Lysimachia vulgaris* L. (n. 22.605) – ref. Sp. Pl. ed. 1 146 (1753); – Romania,  
Bihor, Sânmartin, Băile 1 Mai, (the Natural Reserve “Pețea Rivulet”), on the shore  
of the water-lily lake Ochiul Mare, 31.07.2001; leg. T.Tofan.

*Lysimachia vulgaris* L. (n. 22.559) – ref. Sp. Pl. ed. 1 146 (1753); – România,  
Bihor, Sânmartin, Băile 1 Mai, (the Natural Reserve “Pețea Rivulet”), mesophile  
meadow; 13.06.2002; leg. T.Tofan.

Fam. *Boraginaceae* A.L. de Jussieu, 1789, nom. cons.

Subfam. *Boraginoideae* (A.L. de Jussieu, 1789) Am., 1832

Trib *Boragineae* (A.L. de Jussieu, 1789) Rchb., 1831

Gen *Pulmonaria* L., 1753

*Pulmonaria officinalis* L. - (n. 24.104) - ref.: Sp. pl. 1:135. 1753; - Romania,  
Bihor, Aleșd, Peștiș (Valea Morilor), the beech forest on the river bank; 02.08.2001,  
leg. T.Tofan

Ord. **Gentianales** Lindley, 1833  
Fam. **Apocynaceae** A.L. de Jussieu, 1789, nom.cons.  
Subfam. **Asclepiadoideae**  
Trib **Asclepiadeae**  
Gen **Vincetoxicum** N.M. Wolf, 1776

**Vincetoxicum hirundinaria Medik.** - (n. 24.067)– ref.: Hist. Comment. Acad. Elect. Theod.-Palat. 6: 404 (1790); - România, Bihor, Paleu, Săldăbagiu de Munte, Săldăbagiu forest (phytocenosis with *Ruscus*), 06.08.2001, leg. T.Tofan

Subfam. **Rauvolfioideae**  
Trib **Vinceae**

Gen **Vinca** L.,1753

**Vinca minor L.** ( n.22.632) – ref.: Sp. Pl. ed. 1 209 (1753), – Romania, Bihor, Sânmartin, Băile 1 Mai, (the Natural Reserve “ Pețea Rivulet”); the shore of the water-lily lake; 19.03.2002, leg.: T. Tofan

**Vinca minor L.** – (n.24.070)– ref.: Sp. pl. 1:209. 1753; - Romania, Bihor, Sânmartin, Haieu, Somleu Hills, 31.03.2002, leg. T. Tofan

Fam. **Gentianaceae** A.L. de Jussieu, 1789, nom.cons.  
Trib **Chironieae**

Gen **Centaurium** J. Hill, 1756

**Centaurium pulchellum (Sw.) Druce** - (n. 24.127) - ref.: *Flora of Berkshire* 342. 1897.; - Romania, Bihor, Aleșd, Peștiș (Valea Morilor), the forest roadside; 02.08.2001, leg. T.Tofan

**Centaurium erythraea Rafn** – (n. 24.128) - ref.: Danemarks og Holsteens Flora 2: 75 – 77 (1800); - Romania, Bihor, Aleșd, Peștiș (Valea Morilor), on the stream, in the beech forest; 02.08.2001, leg. T.Tofan

**Centaurium erythraea Rafn** - (n. 24.146) - ref.: Danm. Holst. Fl. 2:75. 1800 ; - Romania, Bihor, Aleșd, Peștiș (Valea Morilor), 02.08.2001, leg. T.Tofan

Fam. **Rubiaceae** A.L. de Juisseau, 1789, nom cons.

Subfam. **Rubioideae**

Trib **Rubieae**

Gen **Galium** L., 1753

**Galium mollugo** L. (n. 22.583) – ref.: Sp. Pl. ed. 1 107 (1753); – Romania, Bihor, Sânmartin, Băile 1 Mai, (the Natural Reserve “Pețea Rivulet”); mesophile meadow; 14.08.2001, ; leg. : T. Tofan

**Galium rubioides** L. (n. 22.586) – ref.: Sp. Pl. ed. 1 105 (1753); – Romania, Bihor, Sânmartin, Băile 1 Mai, (the Natural Reserve “Pețea Rivulet”); the lake shore, in Prunus spinosa bushes; 14.08.2001; leg.: T. Tofan

**Galium schultesii** Vest. (n. 22.622/1; 22.622/2) – ref. Flora (Regensb.) 4: 530 (1821); – Romania, Bihor, Sânmartin, Băile 1 Mai, (the Natural Reserve “Pețea Rivulet”), 12.06.2002, mesophile meadow; leg: T. Tofan.

**Galium sylvaticum** L.– (n. 24.054; 24.055; 24.056;) – ref.: Sp. Pl. ed. 2 155 (1762); - Romania, Bihor, Paleu, Săldăbagiu de Munte, Săldăbagiu forest (phytocenosis with Ruscus), 05.10.2001, leg. T.Tofan

**Galium sylvaticum** L. – (n. 24.081; 24.082) – ref.: Sp. Pl. ed. 2 155 (1762); - Romania, Bihor, Aleșd, Peștiș (Valea Morilor), on the stream, 02.08.2001, leg. T.Tofan

**Galium verum** L. - (n. 22.623) – ref. Sp. Pl. ed. 1 107 (1753); – Romania, Bihor, Sânmartin, Băile 1 Mai, (the Natural Reserve “Pețea Rivulet”), mesophile meadow; 13.06.2002; leg.: T. Tofan.

Ord. **Solanales** Dumortier, 1829

Fam. **Convolvulaceae** A.L. de Jussieu, 1789

Trib **Cuscutae**

Gen **Cuscuta** L., 1753

**Cuscuta epithimum** (L.) L. (n. 22.666/1; 22.666/2) - ref.: Syst. Veg. ed. 13 140

(1774); — Romania, Bihor, Sânmartin, Băile 1 Mai, the oaktree forest (on *Achillea millefolium*); 31.07.2001, leg. T.Tofan.

***Cuscuta europaea* L.** (n. 22.603) – ref. Sp. Pl. ed. 1 124 (1753); – România, Bihor, Sânmartin, Băile 1 Mai, (the Natural Reserve “Pețea Rivulet”), the mesophile meadow (pe Rumex), 13.06.2002, leg.: T. Tofan

Ord. **Lamiales** Bromhead, 1838

Fam. **Labiatae** A.L. de Jussieu, 1789, nom.cons.

Subfam. **Lamioideae**

Trib **Lamieae**

Gen **Galeobdolon** Adanson

***Galeobdolon luteum* Huds.** - (n. 24.063)– ref.: Flora Anglica, Editio Altera 1: 258. 1778.; - Romania, Bihor, Paleu, Săldăbagiu de Munte, Săldăbagiu forest (phytocenosis with *Ruscus*), 05.10.2001, leg. T.Tofan

Gen **Galeopsis** L.,1753

***Galeopsis ladanum* L.** - (n. 24.102; 24.103) - ref.: Sp. pl. 2:579. 1753; - Romania, Bihor, Aleșd, Peștiș (Valea Morilor), the beech forest; 02.08.2001, leg. T.Tofan

***Galeopsis speciosa* Mill.** - (n. 22.664/1; 22.664/2) – ref. Reference: Gard. Dict. ed. 8 no. 3 (1768); – Romania, Bihor, Sânmartin, Băile 1 Mai, the oaktree forest; 31.07.2001. leg. T.Tofan.

Gen **Lamium** L.,1753

***Lamium purpureum* L.** - (n. 22.636) – ref. Sp. Pl. ed. 1 579 (1753); – Romania, Bihor, Sânmartin, Băile 1 Mai, (the Natural Reserve “Pețea Rivulet”), the meadow on the water-lily lake shore; 19.03.2002; leg. T.Tofan.

Gen **Stachys** L.,1753

***Stachys annua* (L.) L.** - (n. 22.624) – Reference: Sp. Pl. ed. 2 813 (1763); sin.: *Stachys neglecta* Klokov; – Romania, Bihor, Sânmartin, Băile 1 Mai, (the Natural Reserve “Pețea Rivulet”), the mesophile meadow; 12.06.2002; leg. T.Tofan.

Subfam. **Nepetoideae**

Trib **Mentheae**

Subtrib **Nepetinae**

Gen **Glechoma** L., 1753

**Glechoma hederacea** L. - (n. 22.634) – ref. Sp. Pl. ed. 1 578 (1753); – Romania, Bihor, Sânmartin, Băile 1 Mai, (the Natural Reserve “Pețea Rivulet”), the meadow on the water-lily lake shore; 19.03.2002; leg. T.Tofan.

Subtrib **Menthinae**

Gen **Clinopodium** L.; 1753

**Clinopodium nepeta** (L.) Kuntze subsp. **glandulosum** (Req.) Govaerts – (n. 24.085; 24.086) – ref.: World Checklist Seed pl. 3:18. 1999; - Romania, Bihor, Alesd, Pestis (Valea Morilor), on the stream, in the beech forest; 02.08.2001, leg. T.Tofan

**Clinopodium vulgare** L. - (n. 24.126; 24.140) - ref.: Sp. pl. 2:587. 1753; - Romania, Bihor, Alesd, Pestis (Valea Morilor), on the stream, in the beech forest; 02.08.2001, leg. T.Tofan

Gen **Mentha** L., 1753

**Mentha aquatica** L. - (n. 22.652/1; 22.652/2) – ref. Sp. Pl. ed. 1 576 (1753); – Romania, Bihor, Sânmartin, Băile 1 Mai, (the Natural Reserve “Pețea Rivulet”), the swampy shore of the water-lily lake; 31.07.2001; leg. T.Tofan.

**Mentha arvensis** L. - (n. 22.650) – ref. Sp. Pl. ed. 1 577 (1753); – Romania, Bihor, Sânmartin, Băile 1 Mai, the oak tree forest ; 31.07.2001; leg. T. Tofan.

**Mentha longifolia** (L.) Huds. - (n. 22.651) - Reference: Fl. Angl. ed. 1 221 (1762);– Romania, Bihor, Sânmartin, Băile 1 Mai, (the Natural Reserve “Pețea Rivulet”), the mesophile meadow; 07.08.2001; leg. T.Tofan.

**Mentha longifolia** (L.) Huds. - (n. 22.640) - Reference: Fl. Angl. ed. 1 221 (1762);– Romania, Bihor, Sânmartin, Băile 1 Mai, the oak tree forest; 31.07.2001; leg. T.Tofan.

Gen **Lycopus** L., 1753

**Lycopus europaeus** L. - (n. 22.560) – ref.: Sp. Pl. ed. 1 21 (1753); - Romania, Bihor, Sanmartin (the Natural Reserve “Pețea Rivulet”), the swampy shore of the water-lily lake, 31. 07. 2001, leg. T.Tofan.

Gen **Thymus** L.; 1753

**Thymus pannonicus** All. – (n. 24.171) – ref.: Fl. Pedem. i 20. 1785; - Romania, Bihor, Simian (natural reserve), sand hills; 16.10.2001; leg. T. Tofan

Subtrib **Salviinae**Gen **Salvia** L., 1753

**Salvia verticillata** L. - (n.22.574) – ref. Sp. Pl. ed. 1 26 (1753); syn.: *Salvia peloponnesiaca* Boiss. & Heldr; – Romania, Bihor, Sânmartin, Băile 1 Mai, (the Natural Reserve “Pețea Rivulet”), the mesophile meadow; 14.08.2001; leg. T.Tofan.

Subfam. **Scutellarioideae**Gen **Scutellaria** L., 1753

**Scutellaria altissima** L. - (n. 24.065) – ref.: Sp. Pl. ed. 1 600 (1753); - Romania, Bihor, Paleu, Săldăbagiu de Munte, Săldăbagiu forest (phytocenosis with *Ruscus*), 05.10.2001, leg. T.Tofan

Fam. **Plantaginaceae** A.L. de Juisseau, 1789, nom cons.

Subfam. **Antirrhinoideae**Trib **Antirrhineae**Gen **Cymbalaria** J.Hill, 1756

**Cymbalaria muralis** P.Gaertn., B.Mey. & Scherb. - (n. 22.525) – ref.: Fl. Wetter. 2: 397 (1800); - Romania, Bihor, the city of Oradea on old limy walls; 30.08.2001; leg. T. Tofan.

Gen *Linaria* P. Miller

***Linaria vulgaris* Mill.** - (n. 22.575) - ref.: Gard. Dict. ed. 8 no. 1 (1768); – Romania, Bihor, Sânmartin, Băile 1 Mai, (the Natural Reserve “Pețea Rivulet”), the area with ruderal plants to roadside land; 14.08. 2001; leg. T.Tofan.

Subfam. *Digitalidoideae*Trib *Veroniceae*Gen *Veronica* L., 1753

***Veronica anagallis-aquatica* L.** - (n. 22.655/1) – ref.: Sp. Pl. ed. 1 12 (1753); – Romania, Bihor, Sânmartin, Băile 1 Mai, (the Natural Reserve “Pețea Rivulet”), in the water-lily lake, near the shore, 14.08. 2001; leg. T.Tofan.

***Veronica anagallis-aquatica* L.** - (n. ; 22.655/2) – ref.: Sp. Pl. ed. 1 12 (1753); – Romania, Bihor, Sânmartin, Băile 1 Mai, (the Natural Reserve “Pețea Rivulet”), the swampy ground on the lake shore; 14.08. 2001; leg. T.Tofan.

***Veronica anagallis-aquatica* L.** - (n. 22.655/3) – ref.: Sp. Pl. ed. 1 12 (1753); – Romania, Bihor, Sânmartin, Băile 1 Mai, (the Natural Reserve “Pețea Rivulet”), in the water-lily lake Ochiul Mare; 31.07.2001; leg. T.Tofan.

***Veronica hederifolia* L.** - (n. 22.631) – ref.: Sp. Pl. ed. 1 13 (1753); – Romania, Bihor, Sânmartin, Băile 1 Mai, (the Natural Reserve “Pețea Rivulet”), area with ruderal plants on the shore of the water-lily lake Ochiul Mare; 19.03. 2002; leg. T.Tofan.

***Veronica persica* Poir.** - (n. 22.565/1) – ref.: Encycl. Méth. Bot. 8: 542 (1808); – Romania, Bihor, Sânmartin, Băile 1 Mai, (the Natural Reserve “Pețea Rivulet”), the meadow on the water-lily lake shore, 19.03. 2002; leg. T.Tofan.

***Veronica persica* Poir.** - (n. 22.565/2) – ref.: Encycl. Méth. Bot. 8: 542 (1808); – Romania, Bihor, Sânmartin, Băile 1 Mai, (the Natural Reserve “Pețea Rivulet”), the road curb, the beaten path; 08.08.2001; leg. T.Tofan.

***Veronica persica* Poir.** - (n. 24.072) – ref.: Encycl. Méth. Bot. 8: 542 (1808); - Romania, Bihor, Sânmartin, Haieu, Șomleu Hills, 31.03.2002, leg. T. Tofan



***Veronica verna* L.** - (n. 24.163) – ref.: Sp. Pl. ed. 1. 14 (1753); - Romania, Bihor, Şimian (natural reserve), sand hills, 24.05.2002; leg. T. Tofan

Subfam. ***Gratioloideae*** (Augier, 1801 ex Martinov, 1820) Luer., 1822

Trib ***Gratioleae*** (Augier, 1801 ex Martinov, 1820) Benth., 1822

Gen ***Limnophila*** R. Brown, 1810, nom. cons.

***Limnophila sessiliflora* (Vahl) Blume** – (24.033/a; 24.033/b; 24.033/c);- ref.: Bijdr. 749. 1826; - Romania, Bihor, Sânmartin, Băile 1 Mai (I the Natural Reserve “Peţea Rivulet”), near the bridge, downstream, 14.07.2001, leg. T. Tofan

***Limnophila sessiliflora* (Vahl) Blume** – (24.207 /a; 24.207 /b; )- ref.: Bijdr. 749. 1826; - Romania, Bihor, Sânmartin, Băile 1 Mai (the Natural Reserve “Peţea Rivulet”), Zone III. of the reserve, 14.05.2002, leg. T. Tofan

Subfam. ***Plantaginoideae*** (A.L. de Jussieu, 1789) Eaton, 1836

Gen ***Plantago*** L., 1753

***Plantago lanceolata* L.** - (n. 22.578/1) – ref. Sp. Pl. ed. 1 113 (1753) – Romania, Bihor, Sânmartin, Băile 1 Mai, (the Natural Reserve “Peţea Rivulet”), the swampy ground; 14.08.2001; leg. T. Tofan.

***Plantago lanceolata* L.** - (n. 22.578/2) – ref. Sp. Pl. ed. 1 113 (1753) – Romania, Bihor, Sânmartin, Băile 1 Mai, (the Natural Reserve “Peţea Rivulet”), the lake shore, on marl rocks, 14.08.2001; leg. T. Tofan

***Plantago major* L.** - (n. 22.546) – ref.: Sp. Pl. ed. 1 112 (1753) – Romania, Bihor, Sânmartin, Băile 1 Mai, (the Natural Reserve “Peţea Rivulet”), the mesophile meadow; 10.07.2001; leg. T. Tofan.

Fam. ***Orobanchaceae*** Ventenat, 1799

Trib ***Rhinantheae***

Gen ***Melampyrum*** L., 1753

***Melampyrum bihariense*** A. Kern. - (n. 22.648) – ref. Sched. Fl. Exsicc. Austro-

Hung. 1: 35 (1881); – Romania, Bihor, Sânmartin, Băile 1 Mai; the oaktree forest; 31.07.2001; leg. T.Tofan.

***Melanpyrum bihariense*** A. Kern. – (n. 24.058)– ref.: Sched. Fl. Exsicc. Austro-Hung. 1: 35 (1881); - Romania, Bihor, Paleu, Săldăbagiu de Munte, Săldăbagiu forest (phytocenosis with *Ruscus*), endemic, 05.10.2001, leg. T.Tofan

Trib ***Orobancheae***

Gen ***Orobanche*** L., 1753

***Orobanche uniflora*** L. – (n.24.075) – ref.: *Species Plantarum* 2: 633. 1753.; - Romania, Bihor, Sânmartin, Haieu, Şomleu Hills, 31.03.2002, leg. T. Tofan

Fam. ***Scrophulariaceae*** A.L. de Juisseau, 1789, nom.cons.

Trib ***Scrophularieae***

Gen ***Scrophularia*** L., 1753

***Scrophularia nodosa*** L. - (n. 24.111) - ref.: *Species Plantarum* 2: 619-620. 1753. ; - Romania, Bihor, Alesd, Pestis (Valea Morilor), on the stream, 02.08.2001, leg. T.Tofan

Gen ***Verbascum*** L.,1753

***Verbascum nigrum*** L. (n. 22.557) – ref.: *Sp. Pl. ed. 1* 178 (1753); .; – Romania, Bihor, Sânmartin, Băile 1 Mai, (the Natural Reserve “Peţea Rivulet”), the mesophile meadow; 07.08.2001; leg. T.Tofan.

Fam. ***Verbenaceae*** Jaume Saint-Hilaire, 1805, nom.cons.

Trib ***Verbeneae***

Gen ***Verbena*** L.,1753

***Verbena officinalis*** L. (n.22.656) – ref. *Sp. Pl. ed. 1* 20 (1753);– Romania, Bihor, Sânmartin, Băile 1 Mai, the oaktree forest; 30. 07. 2001; leg. T.Tofan.

Ord. **Apiales** Nakai, 1930

Fam. **Umbelliferae** A.L. de Jussieu, 1789, nom cons.

Subfam. **Apioideae**

Trib **Angeliceae**

Gen **Angelica** L., 1753

**Angelica sylvestris** L. - (n. 22.637) – ref.: Sp. Pl. ed. 1 251 (1753);– România, Bihor, Sânmartin, Băile 1 Mai, (the Natural Reserve “Pețea Rivulet”), the mesophile meadow; 26.06.2002; leg. T.Tofan.

Trib **Apiaceae**

Gen **Pimpinella** L., 1753

**Pimpinella saxifraga** L. - (n. 24.112) - ref.: Sp. Pl. ed. 1 263 (1753); - Romania, Bihor, Aleșd, Peștiș (Valea Morilor), on the stream; 02.08.2001, leg. T.Tofan

Trib **Caucalideae**

Gen **Caucalis** L., 1753

**Caucalis platycarpus (L.) Hoffm.** - (22.563) – ref.: Sp. Pl. ed. 1 241 (1753); syn.: *Caucalis lappula* Grande; *Caucalis daucoides* L. (1767), non (1753); – Romania, Bihor, Sânmartin, Băile 1 Mai, the oaktree forest; 31.07.2001; leg. T.Tofan.

Trib **Scandiceae**

Gen **Chaerophyllum** L., 1753

**Chaerophyllum aromaticum** L. - (n. 22.645) - ref.: Sp. Pl. ed. 1 259 (1753); – Romania, Bihor, Sânmartin, Băile 1 Mai, (the Natural Reserve “Pețea Rivulet”), the mesophile meadow; 14.07. 2001; leg. T.Tofan.

**Chaerophyllum aromaticum** L. - (n. 22.645 /2; 22.645 /3) - ref.: Sp. Pl. ed. 1 259 (1753); – Romania, Bihor, Sânmartin, Băile 1 Mai, (the Natural Reserve “Pețea Rivulet”), mesophile meadow; 10.07. 2001; leg. T.Tofan.

Trib **Tordylieae**Gen **Heracleum** L., 1753

**Heracleum sphondylium** L. *ssp. sphondylium* - (22.535) - Reference: Sp. Pl. ed. 1 249 (1753); – Romania, Bihor, Sânmartin, Băile 1 Mai, the oak tree forest; endemic, 14.07.2001; leg. T.Tofan.

Gen **Pastinaca** L., 1753

**Pastinaca sativa** L. - (22.642) – ref.: Sp. Pl. ed. 1 262 (1753); – Romania, Bihor, Sânmartin, Băile 1 Mai, (the Natural Reserve “ Pețea Rivulet”), the mesophile meadow; 14.07. 2001; leg. T.Tofan.

Subfam. **Saniculoideae**Gen **Saniculeae** L., 1753

**Sanicula europaea** L. - (n. 24.113) - ref.: *Species Plantarum* 1: 235. 1753. ; syn.: *Sanicula elata* Buch.-Ham. ex. D. Don.; - Romania, Bihor, Aleșd, Peștiș (Valea Morilor), the alder forest along the stream; 02.08.2001, leg. T.Tofan

Ord. **Asterales** Lindley, 1833Fam. **Campanulaceae** A.I. de Jussieu, 1789, nom. cons.Subfam. **Campanuloideae**Trib **Campanuleae**Gen **Campanula** L., 1753

**Campanula patula** L. - (n. 24.094; 24.095) – ref.: Sp. pl. 1:163. 1753; - Romania, Bihor, Aleșd, Peștiș (Valea Morilor), on the stream, in the beech forest; 02.08.2001, leg. T.Tofan

**Campanula patula** L. *subsp. abientina* (Griseb.) Simonk. - (n. 24.096) – ref.: Enum. fl. transsilv. 383. 1887; - Romania, Bihor, Aleșd, Peștiș (Valea Morilor), in the beech forest, 02.08.2001, leg. T.Tofan

***Campanula patula var. flaccida* Syr.** - (n. 24.093) – ref.: Acta Botanica Hungarica 17(1-2): 124. 1971 publ'72.; - Romania, Bihor, Aleşd, Peştiş (Valea Morilor), in the beech forest, on the steep bank; 02.08.2001, leg. T.Tofan

***Campanula persicifolia* L.** - (n. 24.097; 24.098; 24.116; 24.117) – ref.: Sp. pl. 1:164. 1753; - România, Bihor, Aleşd, Peştiş (Valea Morilor), in the beech forest; 02.08.2001, leg. T.Tofan

***Campanula rapunculoides* L.** - (n. 24.118; 24.119 ) - ref.: *Species Plantarum* 1: 165. 1753.; syn.: - România, Bihor, Aleşd, Peştiş (Valea Morilor), the beech forest; 02.08.2001, leg. T.Tofan

***Campanula trachelium* L.** -- (n. 24.099; 24.100; 24.101) - ref.: *Flora Lusitanica* 1: 287. - Romania, Bihor, Aleşd, Peştiş (Valea Morilor), in the beech forest; 02.08.2001, leg. T.Tofan

Fam. **Compositae** Giseke, 1792, nom.cons.

Subfam. **Asteroideae**

Trib **Anthemideae**

Subtrib **Achilleinae**

Gen **Achillea** L.; 1753

***Achillea collina* Becker ex Rchb.** - (n. 24.162) – ref.: Fl. exs. Austro-Hung. no. 991. 1883 (H. G. L. Reichenbach, Fl. germ. excurs. 850. 1832, nom. inval.); - Romania, Bihor, Şimian (natural reserve), on the sands, 16.10.2001; leg. T. Tofan

Subtrib **Leucantheminae**

Gen **Leucanthemum** P. Miller, 1754

***Leucanthemum vulgare* Lam.** - (n. 22.540)- ref. : Fl. Fr. ed. 1 2: 137 (1779); – Romania, Bihor, Sânmartin, Băile 1 Mai, (the Natural Reserve “ Peţea Rivulet “), the mesophile meadow; 14. 07. 2001, leg. T. Tofan

Trib **Gnaphalieae**

Subtrib **Gnaphaliinae**

Gen *Filago* L.; 1753

*Filago minima* (Sm.) Pers. - (n. 24.165)– ref.: Novit. Fl. Suec. 268. ; - Romania, Bihor, Simian (natural reserve), on the sands, 16.10.2001; leg. T. Tofan

Trib *Inulae*

Gen *Inula* L., 1753

*Inula britannica* L. - (n. 22.558/1; 22.558/2; ) – ref.: Sp. Pl. ed. 1 882 (1753); – Romania, Bihor, Sânmartin, Băile 1 Mai, (the Natural Reserve “ Pețea Rivulet “), the shore of the water-lily lake; 31.07.2001, leg. T.Tofan

Subfam. *Carduoideae*

Trib *Cardueae*

Subtrib *Carduinae*

Gen *Arctium* L., 1753

*Arctium tomentosum* Mill. - (n. 22.663) – ref.: Gard. Dict. ed. 8 no. 3 (1768); - Romania, Bihor, Sanmartin, Băile 1 Mai (the Natural Reserve “Pețea Rivulet”), the shore of the water-lily lake; 31.07.2001, leg. T.Tofan

Gen *Cirsium* P. Miller, 1754

*Cirsium oleraceum* (L.) Scop. - (n. 24.062) – ref.: Annus Hist.-Nat. 2: 61 (1769); - România, Bihor, Paleu, Săldăbagiu de Munte, Săldăbagiu forest (phytocenosis with Ruscus), 05.10.2001, leg. T.Tofan

Subtrib *Centaureinae*

Gen *Centaurea* L.,1753

*Centaurea phrygia* L. - (n. 22.665) – ref.: Sp. Pl. ed. 1 910 (1753); - Romania, Bihor, Sânmartin, Baile 1 Mai, the oaktree forest, 31.07.2001, leg T.Tofan

Subfam. *Cichorioideae*

Gen ***Mycelis*** Cassini, 1824

***Mycelis muralis*** (L.) Dumort. – (n. 24.084) – ref.: Fl. Belg. 60 (1827); - Romania, Bihor, Alesd, Pestis (Valea Morilor), on the stream, in the alder forest, 02.08.2001, leg. T.Tofan

Trib ***Lactuceae***Subtrib ***Crepidinae***Gen ***Crepis*** L., 1753

***Crepis setosa*** Haller f. (22.544) – ref.: Arch. Bot. (Roemer) 1(2): 1 (1797); - Romania, Bihor, Sanmartin Băile 1 Mai, (the Natural Reserve “Pețea Rivulet”), the mesophile meadow; 10.07.2001, leg. T. Tofan

Gen ***Lapsana*** L., 1753

***Lapsana communis*** L. - (n. 22.649) – ref.: Sp. Pl. ed. 1 811 (1753); - Romania, Bihor, Sanmartin, Baile 1 Mai, 31.07.2001, the oaktree forest, leg. T.Tofan

Subtrib ***Hieraciinae***Gen ***Hieracium*** L., 1753***Hieracium*** subg. ***Hieracium***

***Hieracium sabaudum*** L. – (n. 24.047; 24.048) – ref.: Sp. Pl. ed. 1 804 (1753); - Romania, Bihor, Paleu, Săldăbagiu de Munte, Săldăbagiu forest (phytocenosis with *Ruscus*), 05.10.2001, leg. T.Tofan

***Hieracium*** subg. ***Pilosella***

***Hieracium pilosella*** L. – (n. 24.170) – ref. Sp. pl. 2:800. 1753; - Romania, Bihor, Simian (natural reserve), the sand hills; 16.10.2001; leg. T. Tofan

Subtrib ***Hypochaeridinae***

Gen ***Leontodon*** L., 1753

***Leontodon hirtus* L.** - (n. 24.167)– ref.: Besch. Russ. Reich. iv. 1210.; - Romania, Bihor, Simian (natural reserve), sands, 16.10.2001; leg. T. Tofan

***Leontodon hispidus* L.** - (n. 24.120) - ref.: Sp. pl. 2:799. 1753; - Romania, Bihor, Aleşd, Peştiş (Valea Morilor), on the stream, in the beech forest; 02.08.2001, leg. T.Tofan

***Leontodon hispidus* L. subsp. *danubialis* (Jacq.) Simonk.** - (n. 24.121) - ref.: Enum. Pl. Transs. 353 (1887); - Romania, Bihor, Alesd, Pestis (Valea Morilor), on the stream, in the beech forest; 02.08.2001, leg. T.Tofan

Subtrib ***Lactucinae***Gen ***Lactuca*** L.,1753

***Lactuca saligna* L.** (n. 22.581/1)- ref.: Sp. Pl. Ed. 1 796 (1753), – Romania, Bihor, Sânmartin, Băile 1 Mai, (the Natural Reserve “Peţea Rivulet “), the mesophile meadow, 14.08.2001, leg.: T. Tofan

***Lactuca saligna* L.** (n. 22.581/2)- ref.: Sp. Pl. Ed. 1 796 (1753), – Romania, Bihor, Sânmartin, Băile 1 Mai, (the Natural Reserve “Peţea Rivulet ); 14.08.2001, weeds, road curb; leg. : T. Tofan

Subtrib ***Scorzonerinae***Gen ***Tragopogon*** L.,1753

***Tragopogon pratensis* L.** (n. 22.621) – ref.: Sp. Pl. Ed. 1 789 (1753), – Romania, Bihor, Sânmartin, Băile 1 Mai, (the Natural Reserve “Peţea Rivulet “), the mesophile meadow; 12.06.2002, leg.: T. Tofan

Subtrib ***Sonchinae***Gen ***Sonchus***L., 1753

***Sonchus oleraceus* L.** - (n. 22.644) – ref.: Sp. Pl. ed. 1 794 (1753); - Romania,



Bihor, Sânmartin, Băile 1 Mai (the Natural Reserve "Pețea Rivulet"), the mesophile meadow; 14.07.2001, leg. T. Tofan

Ord. **Dipsacales** Dumortier, 1829

Fam. **Caprifoliaceae** A.L. de Jussieu, 1789, nom.cons.

Trib **Dipsaceae**

Gen **Dipsacus** L., 1753

**Dipsacus pilosus** L. - (n. 24.145) - ref.: *Species Plantarum* 97. 1753. ; - Romania, Bihor, Aleșd, Peștiș (Valea Morilor), on the stream; 02.08.2001, leg. T.Tofan

Gen **Knautia** L., 1753

**Knautia arvensis** (L.) Coult. (n. 22.609/1; 22.609/2; 22.609/3; 22.609/4) – ref.: Mém. Dipsac. 41 (1823); – Romania, Bihor, Sânmartin, Băile 1 Mai, (the Natural Reserve "Petea Rivulet"); 12.06.2002, the mesophile meadow; leg. : T. Tofan.

### Conclusions

The present material, as afore mentioned, contains samples collected in Bihor County, mainly in the area of Oradea (the city and its suburbs, that is, the villages Sânmartin and Paleu) and in the outermost parts of the county, such as the village of Șimian (in the north western part of the county) and the Peștiș region surrounding the town of Aleșd (in the eastern part of the county). The eco-geographical particularities of the area foreground three distinctive situations, namely:

- the area of Oradea, situated at a height of 126 m, lies at the entry of the Crisul Repede valley, in a contact zone between the prolongations of the Apuseni Mountains and the Western Plains, an area connecting the hilly landscapes (the Western Hills, the Hills of Oradea, the Hills of Gepiș) and the plain landscapes;

- the Șimian village (made up of three smaller villages - Șimian, Șilindru and Voievozi), situated in the north-western part of Romania and of Bihor County, lies in the Carei Plains. The sands in the Șimian area, similar to those in the Valea lui Mihai and Curtuișeni, are prolongations of the sandy area of the Carei Plains. On its western side, the Șimian village bounds on sand hills, whereas its eastern part is dominated by a network of streams and canals, the remains of the former swamps that used to dominate the landscape of the Ier Valley;

- in the hilly part of the Plopiș mountains, that are part of the Western Carpathians, situated in their north-western part, there are valleys which drain their slopes and are commonly deep and narrow, intensely shaded, especially those on the northern slope, characterized by a colder and damper topoclimate. The valleys on the northern slope are part of the hydrographic area of Barcău. The valleys on the southern slope are part of the hydrographic area of Crișul Repede river, the most important of them being the Borod valley, the Răchiților valley, the Omul valley, the Gepiș valley, the Peștis valley, the Morii and Sinteiu valleys. In the meadows of these valleys there usually are alluvial soils of medium texture. In the hilly region of the Plopiș mountains lies the village of Peștiș, and the valley where the samples were collected is the Morii valley.

From an administrative viewpoint, the places where the samples were collected are the following : the city of Oradea, and its bordering villages, Sânmartin and Paleu. In Sânmartin the samples were collected in 1 Mai and Felix spas and from the village of Haieu. In Paleu the samples were collected in the villages of Paleu and Săldăbagiu de Munte. They also collected samples in the village of Șimian in the rural area of Șimian, and in Suplacul de Barcău. Samples were also collected in the area of Peștiș, belonging to the town of Aleșd.

Bihor county has a moderate temperate continental climate. The landscape layers and their peculiarities (the exposure of the slopes, the size difference of the valleys, their level of coverage with forests, the albedo of the different forms of relief) determine a weather variation demonstrated by the very existence of topoclimates. The air temperature is characterized by some variations of average and extreme values. The average annual temperature in the Criș valley is of 10-11 centigrades, in the hilly region is of 8-10 centigrades, and in the mountains is of 7-8 centigrades (on the mountain tops can be of 2-7 centigrades). The average multiannual rainfalls in the plains have values of 500-700 mm, in the hillsides of 700-1000 mm, and in the mountains of 1000-1200 mm (on the mountain tops can exceed 1400 mm.). Regarding the wind conditions of the county, this is characterized by the high frequency of winds blowing from the southern regions (about 28% in December and 17% in August).

The rivers of the Bihor county belong to the Criș hydrographic area, consisting of Crișul Repede, Crișul Negru, Barcău and Ier that reaches the territories of the county downstream Andrid, being a typically plain river in the western part of the country. These rivers are also completed by their tributary streams. There are several natural lakes, too, such as Șerpilor and Stuf lakes close to Salonta, the Ochiul Mare Lake on the Peța rivulet, Tăul Mare lake in the Bihor Mountains.

The subterrean waters greatly differ according to lithological, structural, and

weather conditions, as well as the particularities of the draining and its dynamics. The deep waters are situated in aqueous horizons of hydrostatic pressure that conditions their ascensional nature (sometimes even artesian in drillings). They usually have a low degree of mineralization. A particular case is that of the waters connected by fault systems affecting the underground of the western side of the Apuseni Mountains. In such cases, highly mineralized waters reach the surface as do the carbonated streams of Tinca and the thermal waters of Oradea, Felix and 1 Mai Spas and Răbăgani.

The vegetation is represented as follows: the forest steppe of the plain region is mainly covered by cultivated lands, acacia plantations and pastures altering with clusters of oak trees. The region of deciduous forests consists of cerris and hornbeam forests, and of cerris, oak tree and evergreen oak forest alternating with secondary pastures and cultivated lands. The layer of deciduous forests (up to 1000 m) is represented by oak forests, by cerris and evergreen oak forests, by evergreen oak and hornbeam, elm, ash tree forests, by beech and hornbeam forests, by beech forests, and by beech and spruce fir forests. The coniferous region (1000-1700 m.) is made up of spruce fir forests. The interzonal and azonal vegetation is represented by the meadow vegetation, the salt marsh vegetation in the damp areas, and by the arenicolous vegetation in the sandy areas.

When it comes about the fauna, the forest steppe is inhabited by rodents, whereas the forests are populated with deer, stags, wild boars, bears, squirrels, lynxes, martens, pheasants, etc. The mountain streams are good for the trout, the hillside rivers are specific to the grayling, the chub and the broad snout, and the plain area rivers are favourable to the carp and the perch.

With regard to the protected areas, in Bihor country there are 64 protected areas, out of which several are situated in the geographical perimeters that we refer to, namely, the *Corynephorus pasture of Voievozi*, the village of Șimian, *the Natural reserve of Peța rivulet in Baile 1 Mai*, *the village of Sânmartin*, *the Valea Roșie hayfield* of Săldăbagiu de Munte, the village of Paleu and *the Fossiliferous Spot of Valea Lionii – Peștiș* in the town of Aleșd.

Botanical studies were carried out mostly referring to the thermal ecosystem on the Peța rivulet, initiated by Paul Kitaibel, the first botanist who informed on the existence of the thermal water lily in this area (Waldstein & Kitaibel, 1802), followed by A. Mayer (1861) who described the area of the episcopal therms nearby Oradea, and Lajos Simonkai (1890) who described the fauna of Oradea and its surroundings. In the year 1888, A.P. Alexi, a Romanian botanist of the Bistrița-Năsăud region, happening to be in Oradea, described the thermal water

lily as „the Flower of the Fairies” in the *Familia* literary gazette. In 1908, J. Tuzson, the botanist, decides that the scientific name of the thermal water lily be *Nymphaea lotus* var. *thermalis* (DC. Tuzs.), and professor Alexandru Borza, the initiator of the nature protection project in Romania, showed a special interest for the area of the Peța rivulet, publishing a number of articles and studies (1917;1924; 1926; 1928; 1930; 1940; 1941; 1947), and declaring the thermal water lily a Nature Monument in 1931; in 1932 the Peța rivulet becomes a Natural Reserve. There were other botanists who examined the area, such as: Tr. Stefureac (1953), Tr. Săvulescu and E. Țopa (1955), Cornelia Olteanu-Cosma (1959; 1977; 1991) and Ana Marossy (1974;1976), I. Pop and I. Hodișan (1972; 1973). We have to mention that the author of the herbarium herself published „The systematic synopsis of the vascular flora of the natural reserve of the Peța rivulet - Baile 1 Mai (Bihor county)” in 2003 as an outcome of the collected materials. In 2002 she co-authored studies on the vegetation of the thermal lake on the Peța rivulet; in 2003 she and Marton Venczel published a study on the vegetation on the Săldăbagiu de Munte hills (see also the paper of Ștefan E. in 1972). The vegetation of the Plopiș mountains is investigated in the study of Gh. Coldea (1970).

The material was processed by arranging it in a taxonomical classification which was updated by indicating the accepted names and the main synonyms, the location, the date of and the author its collecting. According to the taxonomical classification employed here (Systema Naturae 2000), the 258 taxons presented belong to 138 genres and to 51 families.

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- \*\*\* Species 2000 & ITIS Catalogue of Life: 2007 Annual Checklist.
- \*\*\* International Information System on Crop Wild Relatives ([www.genres.de/CF/ipgri\\_cwr/.../authors.cfm...](http://www.genres.de/CF/ipgri_cwr/.../authors.cfm...))

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## **Data on the mollusc fauna of Pădurea Craiului Mountains (Romania)**

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**Abstract.** We compiled the malacofaunistic data from the Pădurea Craiului Mountains (Western part of Apuseni Mountains) based on references and on our malacologic material collected from 55 new sampling sites. Our faunistic investigation was focused primarily on the following taxa: Family Clausiliidae and Subfamily Vitreinae, *Bradybaena fruticum*, *Monachoides vicina*, *Helicigona* / *Drobacia banatica*, *Helix lutescens* and *Kovacsia kovacsi*. The malacofauna of the studied area consists of 96 terrestrial snails (Extinct: *Pomatias rivulare*), 40 freshwater snails (Extinct: *Theodoxus fluviatilis*, *T. danubialis*, *T. prevostianus*, *Anisus leucostoma*) and 10 mussels (Bivalvia). The faunal record includes altogether 146 taxa (from which five extinct species) and about 700 new units.

**Keywords:** snails, bivalves, taxonomy, distribution, extinction, Western Romania.

### **Introduction**

Pădurea Craiului Mountains covers about 750 km<sup>2</sup> and lies in the north-western part of the Apuseni Mountains, bordered by the Vad-Borod Basin on the North and by the Beiuș Basin on the South; the eastern border is demarcated by

the Iadului Valley. The Vârciorog-Dobrești alignment divides this fingered platform into an eastern unit with higher altitudes (e.g. the peak of Hodrângușa: 1026 m) and in a western unit with gradually dropping altitudes, called Pădurea Craiului Hills.

The geologic structure of the Pădurea Craiului Mountains exhibits a great variety of rocks in a mosaic-like arrangement. The deposits mostly belong to the Bihor Unit and Apusenides (Balintoni 1997, 2001). This structural unit represents a thick-skinned nappe with Variscan basement complex and its Mesozoic sedimentary cover (Haas & Péro 2004). The crystalline basement exposed to the east and southeast consist mainly of gneiss and micaschist. The sedimentary cover, as a result of early Alpin evolution, consists of Triassic-Jurassic-early Cretaceous carbonate sequences and includes limestones, dolomites and detritic complexes. The late Cretaceous (Senonian) detritic formations outcrop in the Roșia Basin, in the Remeți graben and Vad Basin (sandstones, conglomerates, clays). In the Vad-Borod and Beiuș Basins Neogene sediments (marls, sands, gravels, argillaceous shales, clays) overlie the Mesozoic formations. Long-term erosion in the karst terrains (more than 330 km<sup>2</sup>) produced a great variety of feature including gorges, karst capture depressions and plateaus penetrated by sinkholes and caves. In the Pădurea Craiului carbonate deposits a great variety of karst valleys were developed (see Onac 2002). The drainage-areas belong to the hydrographic basins of Crișul Repede and Crișul Negru rivers.

The annual rainfall in the Pădurea Craiului Mountains increases from west to east and ranges between 800-1200 mm (Orășanu 2010). Conversely, the mean annual temperature increases from east to west ranging between 4-8°C. The vegetation developed in these conditions consists of forests and grasslands. Important areas of this mountain range are covered by mixed deciduous forests (Groza 2006).

The study area in the east runs along the Iad River. At the outflow of Iad it changes to westward and follows the direction of Crișul Repede River into Vadu Crișului. Afterwards it follows the Birtin – Săbălciu – Oșorhei – Oradea direction. After that the study area follows in a line the Pețea rivulet – Sutului Valley – Cotiglet – Luncasprrie – Remetea – Meziad – Iadului Valley. The study area is presented on the sketch map (Fig.1; see also Bordea 1978).

The malacofaunistic research of Pădurea Craiului Mountains gives an outline of one-sidedness, since it was researched only in the environs of the eastern (Vadul Crișului Gorge and its surroundings) and the western part (mainly Episcopiei Resort and Oradea) of the mountains. The past malacofaunistic data on the area comes from Kertész 1890 (Table 1/A, 1/B: column 1); Csiki 1902 (Table 1/A,



1/B: column: 2); Kormos 1904, 1905a, 1905b; Rotarides 1931 (included Kormos 1904, 1911a, 1911b and Soós 1915 (Table 1/A, 1/B: column 3); Soós 1943 (Table 1/A, 1/B: column 4); Bába & Kovács 1975 (included Rotarides 1942,1943 –Table 1/A,1/B column: 5.); Kovács 1977 (Table 1/A, 1/B: column 6); Vánca 2006 (leg. Kovács in1960 – 1990: Table 1/A, 1/B: column 7) as well as Sîrbu 2006. Sîrbu's lots of data are shown in Table1/B: column 8 and later in the check-list referring to the freshwater mollusc fauna from our study area (Fig. 1; Bordea 1978).

Data from the collections of Munkácsy Mihály Museum (Békéscsaba) and the Hungarian National History Museum (Budapest) are shown in column 9 (Bába et al. 2005, Domokos & Vánca 2005; Table1/A, 1/B: column 9.a, 9.b) and 10.

Some more information is derived from the monographic work of Grossu [1981,1983: *Arion ater* (Oradea), *Ceciliodes acicula* (Oradea: Lacul Pețea/ Episcopiei Resort), *Helicigona banatica* (Oradea: Lacul Pețea / Episcopiei Resort), *H. maeotica* (Stâna de Vale: upper course of Iad river), *Helicopsis instabilis* (Oradea: Mai 1 /Episcopiei Resort), *Laciniaria plicata* (Vadu Crișului: Peștera Ungurului), *Lehmannia valentiana* (Oradea: Mai 1 / Episcopiei Resort )] and from Majoros et al. [2008: *Biomphalaria tenagophila* (Răbăgani)].

In the molluscs collection of Alexandru V. Grossu from the study area the recent molluscs cannot be found in Muzeul Țării Crișurilor (Oradea) (Gagiu 2007).

Taking all into account, the number of discovered species in the study area (Fig.1) based on references is 136.

### Description of the sampling sites

Sampling sites in chorological order (Fig. 2):

1. Meziad – Valea Peșterii, wooded Triassic limestone rock wall at the end of the gorge, 100 m far northward and southward from the bridge. The biotope faces west and is covered with dead leaves and mosses.  
4 May 2009
2. Meziad – Valea Peșterii, Peștera Meziad. Woody (hornbeam, beech) rock-glacier at the ramp of the cave. It is covered with dead leaves of forest and great burdock.  
4 May 2009
3. Meziad – 3 km far eastward from the settlement. Near to the left-side of the Meziad brook.  
4 May 2009

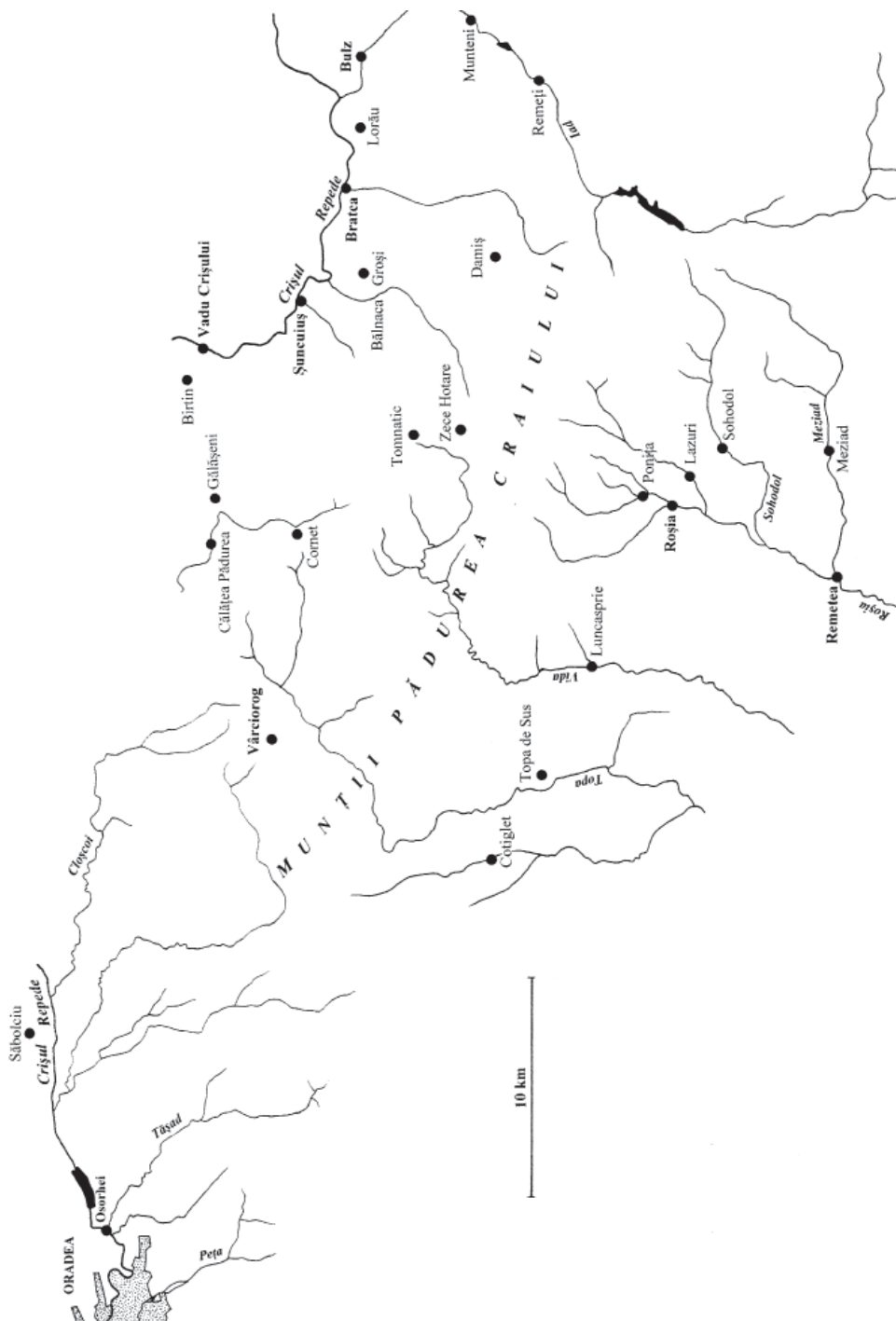


Fig. 1. The topographic sketch map of the study area

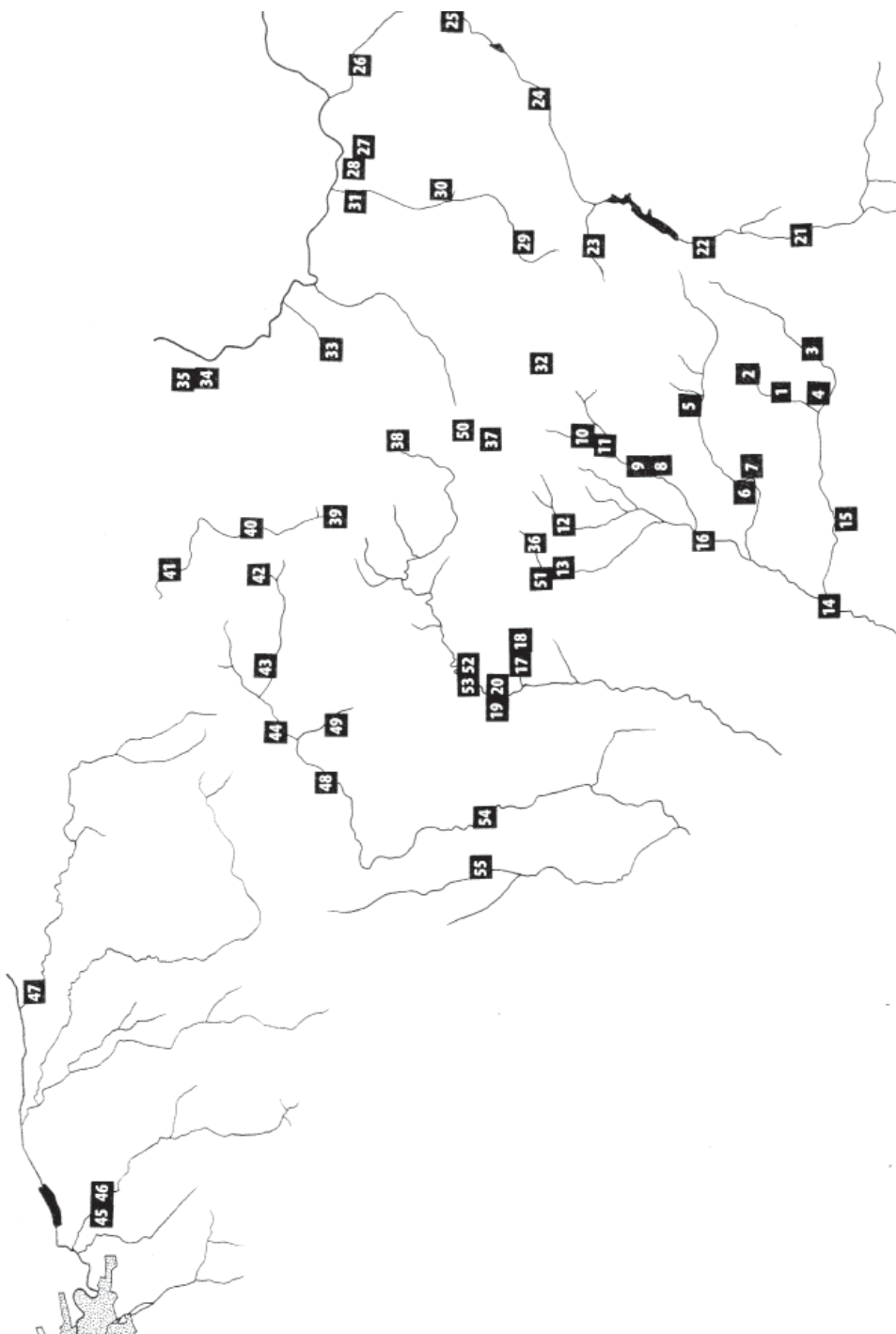


Fig. 2. The sketch map of the sampling sites in chronological order

4. Meziad – Valea Șasa, near to the settlement. Stony and sunny biotope. We found here a typical rock-vegetation.  
4 May 2009
5. Sohodol – Left side of the Sohodol brook. The sampling site is 3 km far from the church of the settlement. The green corridor is not symmetrical, since there is a forest only on the left (southern) bank of the brook. The right side of the brook is a plough-land. Sampling was carried out by using different methods: via singling and via mass. We also collected from the scum.  
5 May 2009
6. Sohodol – This biotope is between Căbești and Sohodol. Rock masses (exposed to west and covered by redzina and dead leaves of forest) on the left bank of the Sohodol brook under Vf. Ogoarelor. A relatively open biotope.  
5 May 2009
7. Sohodol – Right side of the Sohodol brook in front of sampling site No.6. It is a typical shrub-wooded and grassy brook side.  
5 May 2009
8. Lazuri – Cheile Lazurie, on rocks of the Șoimuș brook bed.  
5 May 2009
9. Lazuri – Cheile Lazurie, rock-vegetation, a relatively open biotope exposed to north.  
5 May 2009
10. Ponița – Valea Soimuș, the collected species were fixed on the stones of the Roșia brook.  
5 May 2009
11. Ponița – Travertine wall near to the bridge of Valea Roșie at the curve of an important unpaved road.  
5 May 2009
12. Ponița – Cheile Cuților, Pestera Cuților, rock vegetation. The sampling was carried out by using different methods: via singling and via mass collection. Thick humid and mouldy dead leaves (beech, hornbeam, cornus, lime) of forest. Living *Helix pomatia* specimens are frequent.  
5 May 2009
13. Roșia (Țarina) – Cheile Albioarei, rocks (exposed to west) under Peștera Uricioșii, near to the road. It is a stony and forest litter biotope.  
5 May 2009

14. Remetea / Magyarremete – Shrub and woody (willow, alder and poplar) left side of the Roșia brook near to the football field. A relatively dry green corridor (5 meters wide) biotope. We took samples from under small standing dead trees and bark of tree fallen to pieces.  
5 May 2009
15. Remetea / Magyarremete – Seasonal current between Remetea and Meziad. This is a sedgy biotope in the forest (willow, alder) on the north side of the asphalted road. The biotope is 20 meters wide, very humid and drenched.  
6 May 2009
16. Roșia – The green corridor is 300 m far southward from the water-mill, between the road and the brook arm. This Alnetum with great burdock (*Urtica*, *Petasites*, *Equisetum*) is situated on the left side of the Roșia brook. This very humid sampling site is only 5-3 meters wide.  
6 May 2009
17. Luncasprie – Valea Toplița. The bed of the Toplița brook. The species were fixed on the stones of the brook bed, high up the brook.  
6 May 2009
18. Luncasprie – Valea Toplița. We took samples in the environ of the cave (Peștera Toplița). A rock-glacier biotope with rock-vegetation (great burdock) close to the karst spring.  
6 May 2009
19. Luncasprie – Cheile Vida. The sampling site is northward from a small bridge. The collected species were fixed on the stones of the Vida brook.  
6 May 2009
20. Luncasprie – Cheile Vida. Cliffs on the right side of the gorge, in the close proximity of the bridge (fluviometer). Sampling method: via mass from detritic rock vegetation and soil.  
6 May 2009
21. Meziad – Valea Iadului, 2 km far northward from Cascada Iadolina close to the bridge. We took samples from sunny (rock vegetation) and shady (bridge pillar) biotopes.  
9 July 2009
22. Leșu – Valea Iadului, Leșu recreation area. There are cliffs near to the tour route marked with blue triangle, on the left side of Iad brook. This biotope is opposite to Valea Guga.  
9 July 2009

- 23.** Remeți – Poiana – Valea Leșului, Peștera cu apa, rock glacier. The sampling site is exposed to south and situated along the tour route marked with red triangle. Rock vegetation.  
9 July 2009
- 24.** Remeți –Valea Boții, 500 m far from the asphalted road (DJ 108J). A limestone quarry with rock vegetation.  
9 July 2009
- 25.** Munteni – Humid (flood) inundation area of the lad brook. This is a shady green corridor (willow, alder) with great burdock. From a part of the sampling might be scum!  
10 July 2009
- 26.** Bulz – Valea Iad. Loess vegetation on the left side of the lad brook. A relatively open and warm mossy biotope.  
10 July 2009
- 27.** Lorău – Valea Boiului. Great burdock on the alluvia of the brook, 100 m far northward from the Cascada Boiului.  
10 July 2009
- 28.** Lorău – Valea Boiului. On the left side of the brook, 500 m far north-westward from the Cascada Boiului. The sampling site (rock masses and beech forest litter) is on the downhill, at the foot of the rock wall.  
10 July 2009
- 29.** Damiș – Valea Mare (15 km far south-westward from Bratca). Mica schist outcrop of the downhill on the right side of the brook.  
10 July 2009
- 30.** Bratca – Valea Arsura. Loose travertine, forest litter (beech, walnut) on the right side of the brook.  
10 July 2009
- 31.** Bratca – karst spring (Izbuc Bratcanilor).The sampling site is covered by great burdock (bramble, nettle) and forest litter. The soil is hidden under ivy here and there and beaten by forest animal.  
11 July 2009
- 32.** Poiana Damiș – Ponorul Runcșor, his is the surroundings (Salix, beech) of the south end of the settlement. We collected from forest litter, logging stumps and fine logging, woody debris of hornbeam grove.  
11 July 2009
- 33.** Șuncuiuș – Cliffs over the karst spring (Izbuc Izbăndis) north-westward from the settlement. The examined narrow rock-shelves are wooded (Fagus) and covered with forest litter. The cliffs are exposed to north-

- east. This sampling site is shady and relatively cool.  
11 July 2009
- 34.** Birtin – Natural cutting of the temporary course were examined. The sampling site is southward from the settlement. The cutting is steep and covered with dead leaves of forest (locust, maple) and fine logging woody debris on both sides.  
11 July 2009
- 35.** Birtin – This site can be found on the brook bed (bed of a concreted canal!) in the settlement, southward from the church.  
11 July 2009
- 36.** Roșia (Țarina) – Forester's lodge northward from Peștera Ciur Iz buc. Pattern material originating from the ridges of the rock wall could be found by the side of the unpaved road (→ Ponița) edging the wood. The biotope is relatively open and exposed to north-west.  
11 July 2009
- 37.** Zece Hotare – Limestone rock masses on both sides of the road DJ 764, in the surroundings of Peștera Sohodol and the road junction.  
11 July 2009
- 38.** Tomnatic – sunny and humid marsh (*Carex*, *Iuncus*, *Lysimachia*) at the sharp curve of the road DJ 764. Many living specimens.  
11 July 2009
- 39.** Cornet – 3,7 km far from the settlement, near to a sharp curve of the road DJ 764, bed grove, dead leaves of forest (beech).  
12 July 2009
- 40.** Gălășeni – Valea Mnierei, at the curve of the road DJ 764, 5 km far from the settlement. It is a typical dry rock vegetation.  
12 July 2008
- 41.** Călățeștea Pădurea – The sampling site is near to the signboard of the settlement, rock vegetation at the edge of pine-grown. It is a relatively very dry biotope near to the road DJ 764.  
12 July 2008
- 42.** Cornet – Wetland at the sharp turn of the road DJ 764, 1,9 km W from settlement. The sampling site is covered with great burdock.  
12 July 2008
- 43.** Vârciorog – Peștera Osoi, detritic rock at the foot of the rock wall in the surroundings of the cave. This is a shady but dry nettle biotope on the rubble soil.  
12 July 2008

44. Vârciorog – At the sharp turn of the Topa brook, southward from the settlement. We took samples from rock masses situated on the right side of the Topa. This green corridor (willow, alder, nettle and bramble) is some meters wide only.  
12 July 2009
45. Oșorhei – dried out concreted bed of the Tășad brook (covered by silt and dried out aquatic plant community). The studied area lies under the bridge and in its surroundings south-eastward from the national road (No. 1, E60). The sampling site is 2.5 km far from Crișul Repede, from the inflow of the Tășad rivulet.  
26 September 2009
46. Oșorhei – It is the grassy right side of the Tășad brook being exposed to west. The biotope lies south-eastward from the national road (Nr.1, E60).  
26 September 2009
47. Săbolciu – It is the marshy (Salicetum) biotope of the Cloșcoi brook between the national road (No.1, E60) and the railway.  
26 September 2009
48. Vârciorog – Valea Topa, this sunny and dry sampling site is 3 km far from the parting of the ways (Dl. Șermaș). The Arduous cliffs face the Peștera De sub Stan. Sampling via singling and mass.  
26 September 2009
49. Vârciorog – 2.7 km far southward from Șermas parting of the ways this is an Alnetum on the left side of the Vârciorogul brook. The ground is covered with moss humid dead leaves of forest (alder).  
26 September 2009
50. Zece Hotare – Prislop, it is 750 m far south-eastward from Chicera Buglei (784 m), the edge of beech forest, along the road DJ 764. We collected samples from rock masses as well as forest litter.  
26 September 2009
51. Roșia (Țarina) – Cheile Albioarei, moss rock vegetation on the western side of the gorge, 500 m far southward from the road junction (DJ 767C). Sampling via mass.  
27 September 2009
52. Luncasprie – Cheile Vida. The left side of the Vida brook. The rock masses of the gorge are exposed to north-west, overgrown with moss and covered by forest litter (Fagus).  
27 September 2009



53. Luncaspie – Cheile Vida. The examined biotopes face south-east and are close to Peștera Sifonaelor. We took samples on the right side of the Vida brook, from under the rock vegetation of the rock outcrop, as well as, we collected scum 1-2 m above brook level. The scum was surpassingly rich in species!  
27 September 2009
54. Topa de Sus – It is on the right side of the Topa brook, near to the bridge, between Ceișoara and Topa de Sus, about 150 m height above sea level.  
27 September 2009
55. Cotiglet – Valea Satului, at the bridge of the road (DC 197). Sandy and shady slope on the right side of the brook. Forest litter (alder, willow). About 200 m height above sea level.  
27 September 2009

### Methods

We took plotless samples from dead leaves of forest, big standing dead trees (snag), litters and fine woody debris, scum, etc. via singling (60 minutes/site) and via mass. It is generally known that singling increases the proportion of species of larger-size; therefore, we took the samples via singling, by hand in favour of species of larger-size (Familia Clausiliidae and subfamilia Vitreinae as well as *Bradybaena fruticum*, *Monachoides vicina*, *Drobacia / Helicigona banatica*, *Helix lutescens*, *H. pomatia*, *Kovacsia kovacsi*, *Lozekia transsylvanica*). We planed to glean in the central part of the mountain, too. The field research was carried out during 2009. This year was very droughty.

The sampling sites were selected from the mountain and in a few cases lowland areas according to the geomorphologic, hydrologic and accessibility features.

After cleaning and drying, we selected out and classified shells coming from malacologic material. In order to identify the species we used the taxonomic books or papers from Soós (1943); Pintér (1975); Grossu (1981, 1983); Kerney et al. (1983); Kiss & Pintér (1985); Nordsieck (1993, 2006); Pelbárt (2000). Our nomenclature follows A.V. Grossu (1993) with some modifications approximately and Glöer & Sîrbu (2005) in the case of freshwater Mollusc. From among the enumeration of species we reduced the subspecies and different forms, with the exception of Familia Clausiliidae. In this case, we used the nomenclature by the recommendation of Milkács Szekeres 2010.

## Results

During the investigation time (compilation and gleaning) 146 Mollusc taxa and approximately 700 new units were found (Table 1A, 1B, 2/1, 2/2, 2/3, 2/4, 3).

Among the species of relatively large size we found the rare (frequency was lower than 25 %) *Acicula polita*, *Clausilia dubia*, *C. pumila*, *Helix lutescens*, *Macrogastra borealis*; *Bulgarica cana*, *Perforatella dibothrion*; *Orcula jetschini*; *Isognomostoma isognomostoma*; *Bradybaena fruticum*, *Vitrea transsylvanica*; *Acicula microspira*; *Vitrea diaphana*; *Trichia hispida*, *Pseudalinda stabilis*; *Euomphalia strigella*, *Monachoides vicina*; *Vitrea erjavecii* (in increasing order of the frequency), etc.

*Ruthenica filograna*, *Helicigona banatica*, *Kovacsia kovacsi*, *Bulgarica vetusta*, *Cochlodina laminate*, *Laciniaria plicata*, *Helix pomatia*, *Sphyradium doliolum*, *Trichia bielzi* are relatively frequent (the frequency was higher than 25%), taxa succeed one another in decreasing order of the frequency) in the Pădurea Craiului Mountains.

Our experience shows following taxa are absent in the Munții Pădurea Craiului: *Argna*, *Agardhiella* (→Munții Meseșului, Munții Șesului), *Discus*, *Helicodiscus* /*Lucilla*. (→ Meseșului, Șesului and Codru-Moma Mountains). On the other hand *Acicula microspira*, *Ceciliodes acicula*, *Clausilia dubia*, *Orcula jetschini*, *Pyramidula rupestris*, *Vitrea erjavecii*, *Vitrea subrimata*, *Vitrea transsylvanica* were found in the actual sampling sites.

The number of aquatic snails (Gastropoda) and mussels (Bivalvia) is 40 and 10, respectively. Owing to the sampling methods the aquatic species of the Șesului, Meseșului and Codru–Moma Mountains cannot be compared.

In the comments of the check list there are some zoogeographical and bibliographical information relating to the individual species to be read.

### Check list in systematic order of the molluscs (Grossu 1993)

(This catalogue is based on all mentioned references and the author's information, gained in the Pădurea Craiului Mountains in 2009.)

#### Class Gastropoda

##### Subclass Prosobranchia

Familia Neritidae Rafinesque, 1815

*Theodoxus fluviatilis* (Linnaeus, 1758)

**Comments:** From the Pece / Pețea rivulet (near to Püspökfürdő / Episcopiei Resort) collected by A. Mayer (Kertész 1890). Present day status: extinct.

*Theodoxus danubialis* (C. Pfeiffer, 1828)

**Comments:** Püspökfürdő / Episcopiei Resort [col. of the Siebenbürgischer Verein für Naturwissenschaften in Hermannstadt: col. M. and R.W. von Kimakowicz (quoted by Sîrbu 2006) as well as Soós 1943].

According to Fehér et al. 2009b one Slovenian clade (Bušeča vas) of the *Theodoxus danubialis* is positioned on the central clades of the Bayesian COI tree of the *Theodoxus prevostianus* – *T. danubialis* group, near to the Romanian clade (Răbăgani) of the *T. prevostianus*. In our opinion one of furcation of these species was proceeding in the thermal water in the environs of Oradea and Răbăgani, along a fault line.

*Theodoxus prevostianus* (C. Pfeiffer, 1828)

**Comments:** Püspökfürdő / Episcopiei Resort [(1870 Mocsáry S. quoted Soós 1943). Sampled by Wagner J. in 1912, Papp J. in 1959, Kovács Gy. in 1960, 1982; Emődi J. and Perjési Gy. in 1984; Fehér Z. in 2001 (ex col. Hungarian Natural History Museum from Budapest = HNHM)].

For today this species is extinct (according to IUCN category) in Episcopiei Resort. By Sîrbu's opinion (2006) this presence was reported erroneously by Soós (1943), Grossu (1986, 1993) and Sárkány-Kiss et al. (1997), because to this extinct species exactly *T. danubialis*.

*Theodoxus prevostianus* sampled from Robogány / Răbăgani (col. of the Siebenbürgischer Verein für Naturwissenschaften in Hermannstadt: M. and R.W. von Kimakowicz; Soós 1943, Jurcsák 1969, Kovacs (Váncsa 2006) and Domokos in 1984 (ex col. Munkácsy Mihály Museum, Békéscsaba), Sîrbu 1999 (ex col. Hungarian Natural History Museum, Budapest = HNHM), 2001, Gagiú 2004, Sîrbu & Benedek 2005.

“In Romania collected at Răbăgani–Bihor and Băile Felix–Oradea.” (Grossu 1993).

According to Fehér et al. 2009b *Theodoxus prevostianus* can be found between the central clade of the Bayesian COI tree of the *Theodoxus prevostianus* – *Theodoxus danubialis* group.

This species is known in Hungary, from the scum of the Sebes Körös / Crişul Repede River, at Körösladány settlement (ET00) (Pintér & Suara 2004). Maybe this scum was carried off from Episcopiei Resort.

E. Krolopp found fossil *Theodoxus* cf. *prevostianus*, *Fagotia acicularis* and *Fagotia esperi* in Lower Pleistocene layer series (173-174 m) of the alluvial cone of the Criş / Körös Rivers at the Vésztő settlement in Hungary (Rónai 1985).

## Familia Viviparidae Gray, 1847

*Viviparus acerosus* Bourguignat, 1862

**Comments:** Only from the Pece/Pețea rivulet at Nagyvárád / Grosswardein /Oradea (col. of the Siebenbürgischer Verein für Naturwissenschaftlichen in Hermannstadt and Bielz 1867, as well as Kertész 1890) and near Nagyvárád / Oradea (Soós 1915).

## Familia Valvatidae Thomson, 1840

*Valvata cristata* O.F. Müller, 1774

**Comments:** Püspökfürdő / Episcopiei Resort near to Nagyvárád / Oradea (Kormos 1904, Sîrbu 2006)

*Valvata piscinalis* O.F. Müller, 1774

**Comments:** Nagyvárád / Oradea (Kertész 1890, Csiky 1902, Rotaridesz 1931, Soós 1943). We gleaned from the dried out, concreted bed of the Tășad brook (Oșorhei).

## Familia Pomatiasidae Gray, 1852

*Pomatias rivulare* Eichwald, 1829

**Comments:** Rontó / Rontău (Kormos 1911). Kormos states the existence of this species as subfossil. By our knowledge, since 1911 nobody has found the species alive in that site. Present day status: extinct.

## Familia Aciculidae Gray, 1850

*Acicula / Platyla polita* Hartmann, 1840 (→ Fig.3, Plate III: 4)

**Comments:** “In humid dead leaves on the forest ground; in Banat” (Grossu 1993). Firstly quoted by Kovács 1977 (col. 1975) from Defileul Crișului Repede (the gorge between Vadu Crișului and Șuncuiuș). We found it in a rocky biotope in Valea Peșterei close to Meziad and in Cheile Vida (Luncasprie).

*Acicula perpusilla* Reinhardt, 1890

**Comments:** It was gleaned by Deli and Domokos in 2005 from the Defileul Crișul Repede (the gorge at Vadu Crișului).

*Acicula transsylvanica* A.Wagner, 1912

**Comments:** This species was earlier mentioned by Bába & Kovács 1975 as *Acicula perpusilla* Reinhard, 1880. (They collected between Vadu Crișului and Șuncuiș along the gorge). Later Kovács 1977 reconsidered the determination of the species based on P. Subai's revision, and changed its name *Acicula transsylvanica/similis* (Boeters et al. 1989).

*Acicula similis* Reinhardt, 1880

**Comments:** According to Boeters et al. 1989 = *Acicula transsylvanica* A. Wagner, 1912. Kovács (1977) notice it in the Defileul Crișului Repede (the gorge between Vadu Crișului and Șuncuiș). His units were revised by Subai. Subsequently this species cannot be found in the references (Vánca 2006).

*Acicula microspira* Reinhardt, 1880 (→ Fig.3)

**Comments:** It cannot be found in Grossu's catalogue of the Molluscs from Romania (Grossu 1993), but this species is in the Molluscs collection of Kovács (sampled in 1974, 1975, 1982), part of the Molluscs collection of the Hungarian Natural History Museum (Vánca 2006). By our opinion in rocky biotope it is more frequent compared to *Acicula polita*.

## Familia Moitessieridae Bourguignat, 1863

*Paladilhia/Paladilhiopsis transsylvanica* Rotarides, 1943 (Plate II: 8, 9)*Paladilhia/Paladilhiopsis leruthi* Boettger, 1940*Paladilhia/Paladilhiopsis carpatica* Soós, 1940

**Comments:** All three species were collected from karstic springs (● P.t.: Șuncuiș: Peștera Ungurului, Peștera Napiștealeu / Unguru Mic Cave, Izbândiș / Șuncuiș spring; Vadu Crișului: Vadu Crișului Cave, Peștera cu apă. ●● P.l.:

Călătea: Pestera Cuglis; Şuncuiuş: Moanei Cave and scum from the Vida brook at Luncasprie. ●●● P.c.: Călătea: Pestera Cuglis.) Cited by, Boettger 1940; Rotaridesz 1943; Soós 1943; Grossu & Negrea 1963, 1984; Negrea 1966; Grossu 1981, 1986; Bába & Kovács 1975, Sîrbu in 2006. Their systematic status is doubtful (Sîrbu, 2006).

Familia Bythinellidae Radoman, 1976

*Bythinella austriaca* Frauenfeld, 1859 (Plate II: 8, 9)

**Comments:** It was found only near to Şuncuiuş, in a small rivulet of the Mişid Valley (Sîrbu & Benedek 2004, Sîrbu 2006).

Familia Lithoglyphidae Troschel, 1857

*Lithoglyphus naticoides* (C. Pfeiffer, 1828)

**Comments:** “In the Holod rivulet downstream of Răbăgani” (Sîrbu 2006).

Familia Bithyniidae Gray, 1849

*Bithynia tentaculata* Linnaeus, 1758

**Comments:** Only from the Peţea rivulet near to Oradea (Sîrbu 2006)

Familia Thiaridae Troschel, 1857

*Fagotia acicularis* Férussac, 1823 (syn. *Esperiana daudebartii acicularis*)

**Comments:** Robogány / Răbăgani [col. SVNH, col. Bielz, col. Kimakowicz. Cited by Clessin 1887, Csiki 1902, Soós 1943, Jurcsák 1969, Vánca 2006 (leg. Kovács 1984), Sîrbu 2006. Some individuals were collected by Domokos in 1984 (col. Munkácsy Mihály Museum, Békéscsaba, Hungary)]. E. Krolopp found fossil *Fagotia acicularis* and *F. esperi* in the Lower Pleistocene layer series (173-174 m) of the alluvial cone of the Criş / Körös Rivers at the Vésztő settlement in Hungary (Rónai 1985).

*Melanopsis parreyssi* Philippi, 1847

**Comments:** It is a relict and endemic species in Romania and Bulgaria (Angelov 2000). In Romania it was found in the thermal-water of the “Ochiul Mare” thermal lake (Püspökfürdő / Episcopiei Resort) (coll. of the Siebenbürgischer Verein für Naturwissenschaften in Hermannstadt: M. and R.W. von Kimakowicz; Kertész 1890; Kormos 1904, 1905a; Csiki 1906; Rotaridesz 1931; Soós 1943; Grossu 1981, 1986, 1993. Item sampled by Mikussay J. in 1933, Agócsy P. in 1943, Streda R. in 1952, Papp J. in 1959, Kovács in 1960, 1982 (Vánca 2006), Pócs T. in 1965, Wiesinger M. in 1972, Kátai S. in 1976, Perjési Gy. in 1984, Orbán G. in 1998, Fehér Z. in 2001, Sîrbu 2001, 2006 (ex col. Hungarian Natural History Museum, = HNHM)].

Unanimously the Episcopiei Resort is a favourite sampling site for the malacologists from the beginning. Some individuals were gleaned by Gossu in 1951, Stoicescu in 1970, Voicu in 1974 from Băile Felix near to Oradea (ex col. HNHM). Wenz found a *Melanopsis* taxon in the lacustrine sedimentary layers of Băile 1 Mai / Episcopiei Resort (in tanatocoenosis with *Helicigona maeotica*) as well as in Miocene deposit (Prahova-Muscel) (Wenz 1942).

*M. parreyssi* is known in Hungary, from the scum of the Sebes Körös / Crişul Repede River, at Körösladány settlement (ET00, 80 river-km from Episcopiei Resort) (Pintér & Suara 2004). By our opinion this shell was carried off from Episcopiei Resort.

**Subclass Pulmonata**

Familia Ellobiidae Adams, 1855

*Carychium minimum* O.F. Müller, 1774*Carychium tridentatum* (Risso, 1826)**Comments:** These two species are in humid dead forest litter.

Familia Physidae Fitzinger, 1833

*Physa fontinalis* Linnaeus, 1758

**Comments:** It was sampled by P. M. Bănărescu from the Ochiul Mare thermal lake at Episcopiei Resort near to Oradea (Sîrbu, 2006)

*Physella acuta* Draparnaud, 1805

**Comments:** It was gleaned from the Ochiul Mare at Episcopiei Resort near to Oradea (Kovács sampled in 1982 quoted by Vánca 2006; Sîrbu 2006).

*Aplexa hypnorum* Linnaeus, 1758

**Comments:** At Nagyvárad / Grosswardein / Oradea (Kertész 1890; coll. of the Siebenbürgischer Verein für Naturwissenschaften in Hermannstadt, coll. Kimakowicz - leg Riess 1899; Csiki 1902; Rotaridesz 1931; Soós 1943).

## Familia Ancyliida Rafinesque, 1815

*Ancylus fluviatilis* O. F. Müller 1774

**Comments:** It was found in the rapid flowing clean water of the brook, fixed on stones. It was sampled from Peștera cu Apă Bulz (Valea Iadului, Bulz), dam lake (Remeți) and Crișul Repede River at the outflow of Iad as well as in the Izbândis karstic spring (Șuncuiuș) and the brooks of the Mișid Valley (Sárkány-Kiss et al. 1997, Sîrbu 2006). Gy. Kovács found it on the paved side of the Fehér-Körös/ Crișul Alb River at Gyula -Városerdő settlement in Hungary (ES 26 – Bába at al. 2005). We sampled it from Lazuri (Lazuri), Roșia (Ponița), Toplița (Luncasprie) and Vida (Luncasprie) brooks.

## Familia Acroloxidae Thiele, 1931

*Acroloxus lacustris* (Linnaeus, 1758)

**Comments:** Püspökfürdő / Episcopiei Resort (Kormos, 1904) and Răbăgani (Jurcsák 1969).

## Familia Ferrissidae Zilch, 1960

*Ferrisia wautieri* Miroli, 1960

**Comments:** Ochiul Mare thermal lake close to Episcopiei Resort (Kovács in 1982 cited by Vánca 2006). Newly found in studied area by Sîrbu at Răbăgani (Sîrbu 2006).



## Familia Planorbidae Rafinesque, 1815

*Planorbis planorbis* (Linnaeus, 1758)

**Comments:** Nagyvárad / Grosswardein / Oradea (Mauritius and Richard Winnicki von Kimakowicz collection from Sibiu; Püspökfürdő / Episcopiei Resort (Kertész 1890, Kormos 1904); Nagyvárad / Oradea (Csiki 1902, Rotaridesz 1931).

*Anisus spirorbis* (Linnaeus, 1758)

**Comments:** Püspökfürdő / Episcopiei Resort (Kertész 1890, Csiki 1902, Soós 1943); Răbăgani (Sîrbu 2006).

*Anisus leucostoma* (Millet, 1813)

**Comments:** Püspökfürdő / Episcopiei Resort (Kormos, 1904, Soós 1943). It is absent from the catalogue of the Molluscs from Romania (Grossu 1993). Presently it appears in the catalogue (Falkner et al. 2001) as *Anisus septemgyratus*. In our opinion the state of existence of *A. leucostoma* is (sub)fossil or extinct.

*Anisus vortex* Linnaeus, 1758

**Comments:** Püspökfürdő / Episcopiei Resort (Soós 1943). This species is not be found in Grossu's catalogue.

*Gyraulus albus* O. F. Müller 1774

**Comments:** Nagyvárad / Oradea (Kertész 1890, Csiki 1902, Rotaridesz 1931, Soós 1943); Răbăgani (Sîrbu 2006).

*Armiger / Gyraulus crista* Linnaeus, 1758

**Comments:** Püspökfürdő / Episcopiei Resort near to Oradea (Rotaridesz 1931, Soós 1943).

*Hippeutis complanatus* Linnaeus, 1758

**Comments:** Puddles of the Crișul Repede River at Nagyvárad / Grosswardein/Oradea (col. Kimakowicz – 1883), Nagyvárad / Oradea (Csiki 1902) as well as Răbăgani (Sîrbu 2006).

*Segmentina nitida* (O.F. Müller, 1774)

**Comment:** Nagyvárad / Oradea (Kertész 1890, Csiki 1902, Rotarides 1931).

*Planorbarius corneus* Linnaeus, 1758

**Comment:** At Nagyvárad / Grosswardein/Oradea; Pețea rivulet and ponds (col. of the Siebenbürgischer Verein für Naturwissenschaften in Hermannstadt, Kimakowicz – leg. Ries, 1866); Ochiul Mare thermal lake at Episcopiei Resort (Sîrbu, 2006).

*Planorbella anceps* (Menke, 1830)

**Comments:** It is an adventive species, first sampled by M. Petrescu in 1999 from the thermal artificial pools in Felix Resort (Sîrbu 2006).

*Biomphalaria tenagophila* Orbigny, 1835

**Comments:** This species is not found in the Grossu's catalogue of the Molluscs from Romania, because this adventive planorbid was sampled first only in 2005 at Răbăgani (Majoros et al. 2008). Natural population of these snails are usually found in subtropical area (South America and Africa), in standing water or freshwater. In Răbăgani it lives in a hypothermal spring (25°C) finding vital condition.

## Familia Lymnaeidae Rafinesque, 1815

*Lymnaea stagnalis* (Linnaeus, 1758)

**Comments:** Nagyvárad / Grosswardein / Oradea in water mill and pools (col. SVNH and col. Kimakowicz leg. 1879), Püspökfürdő / Episcopiei Resort (Kertész 1890).

*Pseudosuccinea columella* (Say, 1758)

**Comments:** It is an adventive species, first sampled by Sîrbu in 1999 from the Ochiul Mare thermal artificial pools in Episcopiei Resort (Sîrbu 2006).

*Stagnicola palustris* (O.F. Müller, 1774)

**Comments:** Püspökfürdő / Episcopiei Resort and other sites near to Nagyvárád / Grosswardein / Oradea (col. Kimakowicz leg.1879, Soós 1943, Sárkány-Kiss et al.1997)

*Stagnicola turricula* Held, 1836

**Comment:** Nagyvárád / Grosswardein /Oradea and Püspökfürdő / Episcopo Resort (col. Kimakowicz leg. 1883). Its presence is still doubtful, because there is no authentic anatomical evidence (Sîrbu 2006).

*Radix auricularia* (Linnaeus, 1758)

**Comments:** In the thermal lake (Ochiul Mare) and the Pece / Pețea rivulet at Püspökfürdő / Episcopiei Resort near to Nagyvárád / Oradea (Kormos 1904, Sîrbu 2006) as well as in Nagyvárád / Oradea (Soós 1915).

*Radix ovata* (Draparnaud 1805) syn. *Radix balthica* (Linné, 1758)

**Comments:** Nagyvárád / Grosswardein / Oradea (col. of the Siebenbürgischer Verein für Naturwissenschaften in Hermannstadt and col. Kimakowicz as well as Sîrbu 2006) and in the thermal brook at Robogány/Răbăgani (leg. Riess in 1879 cited by Sîrbu 2006).

*Radix peregra* (O.F. Müller, 1774) syn. *Radix labiata* Rossmässler, 1835

**Comments:** Episcopiei and Felix Resort (col. Kimakowicz quoted by Sîrbu 2006), Iad tributaries near to Remeți (Sárkány-Kiss et al.1997). "All these *Radix* quotations are doubtful because there is no anatomical evidence of these samplings and taxonomical criteria are strictly focused on such clues, at present" (Sîrbu 2006).

*Galba truncatula* (O.F. Müller, 1774)

**Comments:** Sampling sites: Nagyvárád / Oradea (Csiki 1902), Püspökfürdő / Episcopiei Resort near to Oradea (Kormos 1904), Crișul Repede riverbed at Șuncuiuș as well as at Vadu Crișului (leg. Kovács in 1974 quoted by

Váncsa 2006) and brooks in the Mişid Valley (Sîrbu, 2006), item the bed of the brook in the Valea Boiului (Lorău), Sohodol (Sohodol) and Vida (Luncasprrie).

Familia Succinaeidae Beck, 1857

*Succinea oblonga* Draparnaud, 1805

**Comments:** This species is commonly referred as ubiquitous in the relevant literature (Horváth 1954; Krolopp 1961, 1963; Ložek 1963; Wagner 1977).

*Succinea putris* (Linnaeus, 1758)

*Oxyloma elegans* (Risso, 1826)

**Comments:** In this area, it is very often difficult to tell them (*Succinea putris* and *Oxyloma elegans*) apart on the basis of shell morphology. All three species well-know from early references (Kertész 1980, Csiki 1902, Rotaridesz 1931) from Nagyvárad / Oradea and his environment.

Familia Cochlicopidae Pilsbry, 1900

*Cochlicopa lubrica* (O.F. Müller, 1774)

*Cochlicopa lubricella* (Porro, 1838)

**Comments:** Both species are common in the study area. In many case there is no difference between them.

Familia Orculidae Pilsbry, 1913

*Orcula dolium* (Draparnaud, 1801)

**Comment:** Mézged / Meziad (Csiki 1902). It is a misidentification. Exactly it is *Orcula jetschini* (Soós 1943).

*Sphyradium doliolum* (Bruguère, 1792) (→ Fig. 4)

**Comments:** These species are frequent in rocky biotopes. It was found in Hungary

in the scum of the Tisza and Maros Rivers, at the settlement of Szeged (DS 32) (Pintér & Suara 2004). Maybe these scums derive from the Crişana or catchment area of the Mureş / Maros River.

*Orcula jetschini* M. Kimakowicz, 1883 (→ Fig.5, Plate I: 4, 5)

**Comments:** Only sporadically. Living specimens can be found very rare. First it was quoted from Mézged / Meziad by Soós 1943. This species is known from Hungary, from the scum of the Tisza River (DS 32: Szeged) (Pintér & Suara 2004). It may originate from Crişana.

Familia Pyramidulidae Wenz, 1923

*Pyramidula rupestris* (Draparnaud, 1801)

**Comments:** On the calcareous rocks.

Familia Valloniidae, Morse, 1864

*Vallonia pulchella* (O.F. Müller, 1774)

*Vallonia costata* (O.F. Müller, 1774)

**Comments:** Both are ubiquitous species.

*Achanthinula aculeata* (O.F. Müller, 1774)

**Comments:** This tiny species can be found in humid dead leaves of forest.

Familia Vertiginidae Fitzinger, 1833

*Vertigo pusilla* (O.F. Müller, 1774)(→Plate II: 7)

*Vertigo alpestris* (Alder, 1830)

**Comments:** First it was mentioned by Kovács 1977 from Defileul Crişului Repede (the gorge between Vadu Crişului and Şuncuiuş).

*Vertigo antivertigo* (Draparnaud, 1801)

*Vertigo pygmaea* (Draparnaud, 1801)

*Vertigo angustior* Jeffrey, 1830

*Columella edentula* (Draparnaud, 1805)

**Comments:** *Vertigo pusilla* and *V. alpestris* were sampled first in 1975, 1982, but *Columella edentula* in 1972, 1974 by Kovács from the Defileul Crișului Repede (the gorge between Vadu Crișului and Șuncuiuș) (Bába & Kovács 1975, Kovács 1977, Váncsa 2006). All these tiny species live in grass, in rock-vegetation, in humid (pro tempore dew--covered, vaporous) biotopes.

*Truncatellina cylindrica* (Férussac, 1822)

**Comments:** Usually it can be found in drier biotopes than the foregoing vertiginids.

Familia Pupillidae Turton, 1821

*Pupilla muscorum* (Linnaeus, 1758)

**Comments:** Ubiquitous species.

Familia Chondrinidae Steenberg, 1925

*Granaria frumentum* (Draparnaud, 1801)

*Chondrina clienta* (Westerlund, 1883)

*Chondrula tridens* (O.F. Müller, 1774)

**Comments:** We collected this tiny specimen (7.5/3.8 mm) from Cheile Cușilor (Ponița).

*Merdigera obscura* (O.F. Müller, 1774)

**Comments:** It is rare in the sampling area. This species is known from

scum of the Sebes-Körös River close to the settlement of Körösszegapáti ( ET41 – Pintér & Suara 2004) originated from Crişana.

Familia Clausiliidae Schmidt, 1857

*Cochlodina laminata* (Montagu, 1803) (→ Fig.6)

**Comments:** Püspökfürdő / Episcopiei Resort (Kertész 1890), Mézged / Meziad (Csiki 1902). Domokos found it in scum of the Hármas-Körös River at Békésszentadrás (DS59) (Pintér & Suara 2004).

*Ruthenica filograna* (Rossmässler, 1836) (→ Fig.7)

**Comments:** First it was quoted by Csiki (1902) from Mézged / Meziad. This is the most frequent Clausiliid in the Western Carpathian Mountains. The dimensions of shells are very varied. It is known from scum of the Tisza River (DS32: Szeged – Pintér & Suara). Maybe this scum originates from the catchment area of the Criş / Körös River. This is a typical hydrochoria.

*Clausilia dubia* Draparnaud, 1805 (→ Fig.8, Plate I: 1-3)

**Comments:** Defileul / Gorge Crişul Repede (Bába & Kovács 1975). It is rare in area sampling (Valea Topa, Valea Cuţilor).

*Clausilia pumila* C. Pfeiffer, 1828 (→ Fig.8)

**Comments:** It is relatively rare. We found it in Valea Roşia at Roşia and Remetea / Magyarremete. This species was found at Doboz (ES27) from the river scum (Domokos et al. 2003), the result of hydrochoria of Pădurea Craiului or Bihor Mountains.

*Macrogastra borealis bielzi* Nordsieck, 1993 (→ Fig. 8, Plate I: 1, 3)

**Comments:** This species and its forms are present as *M. latestriata* in 'The catalogue of the Molluscs from Romania' (Grossu, 1993). It is rare being only in Valea Topa and Valea Vida. It was found in Hungary, in the alluvia (scum) of the Tisza River, at the settlements of Tizaszalka, Tiszavid (EU93), Tiszatelek (EU53), Szolnok (DT32) and Szeged (DS31, 32). Maybe these scums, in case of Szeged,

originate from the catchment area of the Körös / Criş River (Crişana) (Pintér & Suara 2004). It is a typical river transport.

*Laciniaria plicata* Draparnaud, 1805 (→ Fig.9, Plate III: 1-3)

**Comments:** Püspökfürdő / Episcopiei Resort (Kertész 1890), Mézged / Meziad (Csiki 1902, Soós 1915), Rév / Vadu Crişului (Csiki 1902, Grossu 1983). In Hungary it lives in woody flood plain (Snail Forest) of the Fekete-Körös River at the settlement of Gyulavári-Dénesmajor (ES26).

*Balea / Alinda biplicata* (Montagu, 1803)

**Comments:** Mézged/ Meziad (Csiki 1902), Defileul /Gorge Crişului Repede (Bába & Kovács 1975, Kovács 1977). In the studied area it is rare. We found only in the environs of Sohodol (sampling site No. 5) and Damiş (No. 29). This genus is in Grossu's catalogue (Grossu 1983) as *Balea biplicata*. After Szekeres (pers. com.) it is *Alinda biplicata*.

*Balea / Pseudalinda stabilis* (I. Pfeiffer, 1847) (→Fig.10)

**Comments:** This genus is in Grossu's catalogue (Grossu, 1983) as *Balea stabilis*. After Szekeres (pers. com.) it is *Pseudalinda stabilis*. It is rare in the studied area. We collected only on the eastern part of Pădurea Craiului.

*Bulgarica vetusta* (Rossmässler, 1836) (→ Fig.11, Plate I: 6-8)

**Comments:** Püspökfürdő / Episcopiei Resort (Kertész 1890), Barátka/ Bratca, (HNHM: Rotarides, Streda in 1912), Luncasprie (HNHM: Domokos in 1983), Bălnaca (HNHM: Kovács in 1975). This species is relatively common in the Western Carpathian Mountains, on the western part of Mţii. Apuseni (Domokos & Lennert 2007, 2009).

*Bulgarica cana* (Held, 1836) (→ Fig.8)

**Comments:** Mézged / Meziad (Csiki 1902). It is rare in area studied. We found this species only in the lad Valley (Valea ladului), on the eastern side of the Pădurea Craiului Mountains.



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Familia Ferussaciidae Bruguière, 1883

*Cecilioides acicula* (O.F. Müller)

**Comments:** Püspökfürdő / Episcopiei Resort (Kormos 1904, Soós 1943, Grossu 1983).

Familia Endodontidae Pilsbry, 1894

*Punctum pygmaeum* (Draparnaud, 1805)

Familia Arionidae Gray, 1841

*Arion ater* Linnaeus, 1758

**Comments:** In the wood close to Püspökfürdő / Episcopiei Resort (Kertész 1890, Grossu 1983).

*Arion subfuscus* Draparnaud, 1801

*Arion circumscriptus* Johnston, 1828

**Comments:** Both species are determined based on specimens morphology and colour. In one instance (sampling site No.42) *A. circumscriptus* was identified by G. Majoros by means of anatomical investigation.

*Arion hortensis* Férussac, 1819

**Comments:** It is quoted by Kertész 1890 from Püspökfürdő / Episcopiei Resort.

Familia Vitrinidae Fitzinger, 1883

*Phenacolimax pellucida* (O.F. Müller, 1774)

Familia Zonitidae Mörch, 1864

*Zonitoides nitidus* (O.F. Müller, 1774)

*Vitrea transsylvanica* (Clessin, 1877) (→ Fig.12)

*Vitrea diaphana* (Studer, 1820) (→ Fig.12)

*Vitrea maritae* (M. Kimakowicz, 1890)

**Comments:** See below as *V. subrimata* (Ex verb. P. Subai and T. Deli.)

*Vitrea erjavecii* Brusina, 1870 (→ Fig.13)

**Comments:** According to Grossu (1993) this species is *Vitrea densegyrata* (M. Kimakowicz, 1890) collected by M. Kimakowicz from Borszék / Borsec in Görgényi-havasok / Munții Giurgeu (Soós 1943). Contrary to the contention of Grossu (1993) the authors are in a common view with Soós (1943). The experiences show *Vitrea erjavecii* as one of most frequent species of the *Vitrea* genus in Pădurea Craiului.

*Vitrea crystallina* (O.F. Müller, 1774)

**Comments:** Püspökfürdő / Episcopiei Resort (Kormos 1904). We gleaned it only near to Roșia (sampling site No.16).

*Vitrea subrimata* (Reinhardt, 1871)

**Comments:** This species is mentioned by Kovacs 1977 from the gorge between Vadu Crișului and Bănlăca.

*Vitrea* sp.

**Comments:** Specimens included in this place are undeterminable. All these *Vitrea* taxa are revised by T. Deli. From the seven *Vitrea* taxa two (*V. transsylvanica*, *V. diaphana*: Bába & Kovács 1975) and respectively three (*V. transsylvanica*, *V. diaphana*, *V. subrimata*: Kovács 1977) can be found in the references too.

*Nesovitrea hammonis* (Ström, 1765)

**Comments:** Defileul Crișului Repede (the gorge between Vadu Crișului

and Șuncuiuș) (Rotarides 1942). We found it in Valea Iad close to Bultz (No.26). In the Pădurea Craiului Mountains it is extremely rare.

*Aegopinella minor* (Stabile, 1864)

**Comments:** It is *Retinella nitens* in Grossu's (1993) opinion. According to CLECOM *Aegopinella nitens* (Michaud, 1831) is not the synonym of *Aegopinella minor* (Stabile, 1864).

*Aegopinella nitens* (Michaud, 1831)

**Comments:** In Pintér's opinion this species is in the Defileul / Gorge Crișului Repede at Vadu Crișului (Kovács 1977).

*Aegopinella epipedostoma* (Fagot, 1869)

**Comments:** According to Grossu 1993 it is *Retinella nitidula*. The systematic status of all three *Aegopinella* species is doubtful in the lack of anatomical investigation.

*Aegopinella pura* (Alder 1830)

*Oxychilus draparnaudi* (Beck, 1837)

*Oxychilus glaber* (Westerlund, 1881)

*Oxychilus depressus* (Sterki, 1880)

*Oxychilus montivagus* (M. Kimakowicz, 1890)

**Comments:** It is relatively frequent.

*Oxychilus* sp.

**Comments:** It is an undeterminable genus.

Familia Daudebardiidae Pilsbry, 1908

*Daudebardia kimakowiczi* A.J. Wagner, 1895

**Comments:** It is known from the literature (Bába & Kovács 1975, Kovács 1977, Vánca 2006) but cannot be found in Grossu's catalogue (Grossu 1993).

*Deudebardia transsylvanica* E.A. Bielz, 1859

**Comments:** It is mentioned by Kertész (1890) from Püspökfürdő / Episcopiei Resort.

*Carpathica calophana* Westerlund, 1881

**Comments:** In three instances (sampling sites No.14, 27, 39 – Remetea/ Magyarremete, Lorău, Tomnatic) it was determined by G. Majoros by means of anatomical investigation.

Familia Milacidae Germain, 1930

*Milax / Tandonia rusticus/a* Millet, 1843

**Comments:** It is quoted from Nagyvárad / Oradea (Csiki 1902, Wagner 1930).

*Milax sp.*

**Comments:** It is an undeterminable genus.

Familia Limacidae Rafinesque, 1815

*Limax maximus* Linnaeus, 1758

*Limax cinereoniger* Wolf, 1803

**Comments:** Püspökfürdő / Episcopiei Resort (Kertész 1890). We took samples from a beech forest near to Cornet (sampling site No.39) and resolved to anatomical investigation by G. Majoros yet.

*Limax* sp.

**Comments:** It is an undeterminable genus.

*Lehmannia marginata* O: F. Müller, 1774

**Comments:** This species was collected in Püspökfürdő / Episcopiei Resort (Kertész 1890)

*Lehmannia valentiana* Férussac, 1823

**Comments:** Oradea Mai 1 / Episcopiei Resort (Grossu 1983). "In greenhouses synanthrop. In the humid area of mountains zone; on trees and stumps." (Grossu 1993).

*Bielzia coerulans* (M. Bielz, 1851)

**Comments:** It is very rare being observed only in the Mişid Valley in 2004 by Domokos.

*Deroceras laeve* (O.F. Müller, 1774)*Deroceras agreste* Linnaeus, 1758

**Comments:** This slug is cited by Kertész 1890 from Püspökfürdő/Episcopiei Resort.

*Deroceras reticulatus* (O.F. Müller, 1758)

**Comments:** This species is determined based on specimens morphology and colour.

*Deroceras* sp.

**Comments:** It is an undeterminable genus.

Familia Euconulidae H. B. Baker, 1928

*Euconulus fulvus* (O.F. Müller, 1774)

**Comments:** Based on the CLECOM, this species is *Euconulus praticola* (Reinhardt, 1883); according to Kerney et al. 1983, it is *Euconulus alderi* (Gray, 1840) [syn.: *E. fulvus* var. *alderi*].

Familia Bradybaenidae Pilsbry, 1939

*Bradybaena fruticum* (O.F. Müller, 1774) (→ Fig.14)

**Comments:** It is only in humid biotope.

Familia Helicidae Refinesque, 1815

*Helicella obvia* (Menke, 1828)

**Comments:** Püspökfürdő / Episcopiei Resort (Kertész 1890, Csiki 1902, Rotaridesz 1931, Soós 1943). This species is very rare in the studied area (Fig.1). We gleaned it only in Valley / Valea Iadolina close to settlement Bulz (→ sampling site No. 26).

*Helicopsis instabilis* (Rossmässler, 1838)

**Comments:** Oradea: Episcopiei Resort (Grossu 1983).

*Monacha cartusiana* (O.F. Müller, 1774)

*Perforatella bidentata* Gmelin, 1788)

**Comments:** Unique sampling site (No.16) was found near to Roşia 300 m far southward from the water-mill in Alnetum.

*Perforatella dibothrion* (M. Kimakowicz, 1890) (→ Fig. 5, Plate II: 4-6)

**Comments:** It is rare in Munţii Pădurea Craiului. First it was collected by Domokos in 2004 close to the Peşteră Moanei Cave (Bălnaca–Groşi).

*Monachoides vicina* (Rossmässler 1842) (→ Fig.15, Plate IV: 1-3)

**Comments:** This species is absent from the Munții Codru–Moma (Domokos & Lennert, 2007). The young *Monachoides vicina* individuals can be easily mixed up with *Hygromia* / *Lozekia transsylvanica* (Westerlund, 1876) or *Kovacsia kovacsi* (Varga & Pintér, 1972) individuals (Fehér et al. 2008).

*Zenobiella rubiginosa* (A. Schmidt, 1853)

*Trichia filicina* (L. Pfeiffer, 1841)

**Comments:** It is quoted by Soós 1943 from Jád-völgy / Valea Iadolina. This species is missing from Grossu's catalogue (1993).

*Trichia bielzi* (A. Schmidt, 1860) (→ Fig.16, Plate IV: 4-6)

*Trichia sericea* (Draparnaud, 1805)

**Comments:** It is difficult to tell *Z. rubiginosa* and *T. sericea* apart based on shell-morphology. Quoted by Bába & Kovács 1975.

*Trichia hispida* (O.F. Müller, 1774) (→ Fig.16)

*Euomphalia strigella* (Draparnaud, 1801) (→ Fig.17)

*Kovacsia kovacsi* Varga and Pintér, 1972 (→ Fig.18, Plate I: 9-11)

**Comments:** This genus (Varga & Pintér 1972) is a second clad (k-2) of the *Kovacsia kovacsi* (Fehér et al, 2008, 2009a), because *Kovacsia kovacsi* can be found in the Munții Pădurea Craiului, Munții Codru–Moma and Munții Zărand (Fehér et al, 2008, 2009a). In Hungary it is on the south-eastern part of the Hungarian Great Plain, in the woody area of the Körös-Maros interfluves (Pintér & Suara 2004). *Kovacsia kovacsi*'s earlier presence was erroneously reported as *Hygromia kovacsi* (Nordsieck 1993, Fehér et al. 2008, 2009a).

*Isognomostoma isognomostoma* (Gmelin, 1788) (→ Fig.19, Plate III: 5, 6)

**Comments:** This species is very rare in the studied area.

*Helicigona / Drobacia banatica* (Rossmässler, 1838) (→ Fig. 20)

**Comments:** It is generally received in area studied also in the Munții Apuseni. (Domokos & Lennert, 2007, 2009). It can be found in Hungary, in the mansion park of Geszt (ES49) as well as in a flood plain forest (Dénesmajori Csigás-erdő, ES36) near to the settlement of Gyulavári (Pintér & Suara 2004). These biotopes result from the catchment area of the Criș Rivers (C. Repede respectively C. Negru.), from Crișana (Criș Rivers Basin, Romania). This is a typical hydrochoria. In Arsura Valley, close to the asphalted road (sampling site No. 30), we found fossil individuals (width of the shell on average: 30 mm) in the loose travertine wall. With width average to be fallen in at Vadu Crișului in Defileul Crișului Repede to.

*Helicigona maeotica* Wenz, 1926

**Comments:** By the side of the upper course lad brook scrubby specimens of *Helicigona banatica* (average shell width of 26.8 mm) can be found in coexistence with *Helicigona arbustorum*. According to Lupu 1966 and Grossu 1983 these scrubby specimens (average shell width of 24.1 mm) at Stâna de Vale have a living-place of the recent *Helicigona maeotica*. Wenz found this species in lacustrine sedimentary layers of Băile 1 Mai / Episcopiei Resort (in tanatocoenosis with *Melanopsis* taxon) as well as in deposit Miocene (Prahova-Muscel) (Wenz 1928, 1942). It surprises us, but *Helicigona maeotica* was found both in cool (Stâna de Vale) and warm (Miocene) environments!

*Helicigona / Arianta arbustorum* (Linneus, 1758) ( Plate II: 1, 3)

**Comments:** Püspökfürdő / Episcopiei (Kertész 1890). In our opinion this species can be found only in the mountain forest of the higher regions (the upper course of lad brook) of the Padurea Crăiului.

*Campylea / Helicigona faustina* (Rossmässler, 1835)

**Comments:** Defileul Crișului Repede (the gorge between Vadu Crișului and Șuncuiuș) (Bába & Kovács 1975, Kovács 1977, Vánca 2006).By our calculations its frequency is only 12% in studied area. It is a typical denizen of the limestone gorge.



*Cepaea vindobonensis* (Férussac, 1821)

**Comments:** In Valea Topa (sampling site No.48) near to Vârciorog settlement we observed an interesting specimen with thick dark streak.

*Cepaea hortensis* (O.F. Müller, 1774)

**Comments:** We have information from Püspököfűrdő / Episcopiei Resort (Kertész 1980, Csiki 1902, Soós 1904). This adventive species is absent from Grossu's catalogue (1993). Maybe this species is extinct in spite of the fact in Hungarian Great Plan sporadically (Pintér & Suara 2004) however the climate there is more extreme.

*Helix pomatia* Linnaeus, 1758 (→ Fig. 21)

**Comments:** In Cheile Cuților (sampling site No.12) we fell in with mass occurrence of this species in month of May.

*Helix lutescens* (Rossmässler, 1837) (→ Fig. 21)

**Comment:** It is rare in the studied area. It is interesting that this species had no occurrences in the Munții Codru–Moma (Domokos & Lennert, 2007).

**Class Bivalvia****Subclass Palaeiheterodonta Newell, 1965**

## Familia Unionidae Fleming, 1828

*Unio crassus* Lamarck, 1819

**Comments:** Pece/Pețea rivulet at Nagyvárad / Grosswardein / Oradea (col. Kimakowicz: leg. Riess in 1879), Sebes-Körös / Criș Repede at Nagyvárad / Oradea (Soós 1915) as well as Pețea rivulet upstream Oradea (Sîrbu 2006). We collected in the Tășad brook, 2.5 km far from the Crișul Repede River. These species were in the mud or sand bottom of rivers and rivulets.

*Anodonta cygnaea* Linnaeus 1758

**Comments:** It was observed only in the Pece / Pețea rivulet and

Püspökfürdő / Episcopiei Resort in the 19<sup>th</sup> century (col. Kimakowicz, leg Riess in 1878; Kertész 1890, Csiki 1902),

*Sinanodonta woodiana* (Lea, 1834)

**Comments:** Adventive species from China. Lots of individuals were sampled by Sîrbu in 2006 from the Ochiul Mare thermal lake (Episcopiei Resort) (Sîrbu 2006).

### **Subclass Heterodonta Newmayer, 1884**

Familia Pisidiidae Gray, 1857

*Pisidium amnicum* (O.F. Müller, 1774)

**Comments:** Leg. Domokos in 1982 from Lacul Peștera cu apă at Vadu Crișului, (col. Munkácsy Mihály Museum as well as Bába at al. 2005) and Sîrbu from the Holod River and Băii brook at Răbăgani (Sîrbu 2006).

*Pisidium casertanum* (Poli, 1791)

**Comments:** Peștera cu apă (Vánca 2006: leg. Kovács in 1982) and Lacul Peștera cu apă at Vadu Crișului (Bába at al. 2005: leg. Domokos in 1982). The spring near to the Mișid brook, close to the entrance of Unguru Mic Cave / Peșteră Napișteleu as well as Băii rivulet at Răbăgani (Sîrbu 2006).

*Pisidium subtruncatum* Malm, 1855

**Comments:** Sampling sites: Lacul Peștera cu apă at Vadu Crișului (Bába at al. 2005: leg. Domokos in 1984), Munteni dam lake in Valea Iadului and spring near the Mișid flow in the Crișul Repede River as well as Băii rivulet at Răbăgani (Sîrbu 2006).

*Pisidium personatum* Malm, 1855

**Comments:** In the karstic brook flowing out from the cave from Bulz as well as in rivulets and spring near to the Mișid flowing into the Crișul Repede River (Sîrbu 2006).

*Pisidium nitidum* Jenins, 1832

**Comments:** It is known from Munteni dam lake in Iad Valley (Sîrbu 2006).

*Pisidium* sp.

**Comments:** This specimen was included by us in the *Pisidium* genus category.

*Sphaerium corneum* (Linnaeus, 1758)

**Comments:** At Oradea (col. Muzeul Țării Crișurilor). Newly we found it in catchment area of the Criș Repede River, exactly one or two km far from the Criș Repede River in brook Tăsad (Oșorhei) and rivulet Cloșcoi (Săbolciu).

*Sphaerium* / *Musculium lacustre* (O.F. Müller, 1774)

**Comments:** Sampled from „pool of concrete on the Băii Brook at Răbăgani” (Sîrbu 2006).

### Acknowledgement

We wish to thank M. Szekeres, G. Majoros, P. Subai, T. Deli and E. Petró who were generous in helping us to determine Familia Clausiliidae (M. Sz.); slugs, some helicids (G. M.); *Acicula*, *Vitrea* genus (P. S. & T. D.) and Familia Pisidiidae (E. P.). A great thank to Z. Fehér and I. Lányi for their powerful help.

We dedicate this paper to the great Hungarian malacologists: Mihály Rotaridesz (1893-1950), Lajos Soós (1879-1972) and Gyula Kovács (1932-1996). They had an active part in malacologic research of the Pădurea Craiului Mountains.

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**Table 1/A.** Sampling sites and land snail taxa (recent name according to Pelbárt 2000) of the study area based on references

Taxa	1.	2.	3.	4.	5.	6.	7.	9.a	9.b	10.
1. <i>Acanthinula aculata</i>				+	(+)	+	+	+		
2. <i>Acicula</i> / <i>Platyla microspira</i>							+		+	+
3. <i>Acicula perpusilla</i>					+			+		
4. <i>Acicula</i> / <i>Platyla polita</i>						+	+			
5. <i>Acicula transsylvanica</i> !						+				
6. <i>Aegopinella minor</i>					+		+	+		
7. <i>Aegopinella nitens</i>		+				+	+		+	
8. <i>Aegopinella pura</i>					+	+	+	+	+	+
9. <i>Alinda</i> / <i>Balea biplicata</i>		+			+	+	+	+		
10. <i>Bielzia coerulans</i>								++		
11. <i>Arion ater</i>	+									
12. <i>Arion hortensis</i>	+									
13. <i>Bradybaena fruticum</i>	+	+	+		+	+	+	+	+	+
14. <i>Bulgarica cana</i>		+			+					
15. <i>Bulgarica vetusta</i>	+				+	+	+	+	+	+
16. <i>Campylea</i> / <i>Helicigona faustina</i>					+	+	+	+	+	
17. <i>Carychium minimum</i>			+		+		+			
18. <i>Carychium tridentatum</i>					+	+	+	+	+	+
19. <i>Cecilioides acicula</i>			+	+						
20. <i>Cepaea hortensis</i>	+	+	+	+						
21. <i>Cepaea vindobonensis</i>	+				+	+	+	+	+	+
22. <i>Chondrina clienta</i>	+	+			+	+	+	+	+	+
23. <i>Chondrula tridens</i>	+	+	+						+	
24. <i>Clausilia dubia</i>					+					
25. <i>Cochlodina laminata</i>	+				+	+	+	+	+	+
26. <i>Cochlicopa lubrica</i>	+	+	+						+	
27. <i>Cochlicopa lubricella</i>									+	
28. <i>Columella edentula</i>					+			+		
29. <i>Deroceras agreste</i>	+									
30. <i>Daudebardia kimakowiczi</i>					+	+	+			
31. <i>Daudebardia transsylvanica</i>	+									
32. <i>Euconulus fulvus</i>									+	
33. <i>Euomphalia strigella</i>	+	+	+		+	+	+	+		+
34. <i>Granaria frumentum</i>	+	+			+	+	+	+	+	+
35. <i>Helicella obvia</i>	+	+	+	+				+		+



36. <i>Helicigona / Arianta arbustorum</i>	+		+						+	
37. <i>Helicigona / Drobacia banatica</i>	+	+	+	+	+	+	+	+	+	+
38. <i>Helix lutescens</i>	+	+	+				+	+		
39. <i>Helix pomatia</i>	+		+		+	+	+	+		
40. <i>Hygromia/Lozekia transsylvanica</i> → <i>Kovacsia kovacsi</i>					+	+	+	+	+	
41. <i>Isognomostoma isognomostoma</i>						+	+	+	+	
42. <i>Laciniaria plicata</i>	+	+	+		+	+	+	+		+
43. <i>Lehmannia marginata</i>	+	+	+							
44. <i>Limax cinereoniger</i>	+		+							
45. <i>Limax maximus</i>		+								
46. <i>Merdigera / Ena obscura</i>							+	+		
47. <i>Milax rusticus</i>		+	+	+						
48. <i>Monacha cartusiana</i>	+	+	+				+	+		
49. <i>Monachoides vicina</i>								+	+	
50. <i>Nesovitrea hammonis</i>					(+)					
51. <i>Orcula jetschini</i>				+				+		
52. <i>Orcula dolium</i>		+	!							+
53. <i>Oxychilus depressus</i>				+	+	+	+	+		
54. <i>Oxychilus glaber</i>				+	+	+	+	+		
55. <i>Oxychilus montivagus</i>							+		+	+
56. <i>Oxyloma elegans</i>	+	+	+				+			
57. <i>Perforatella dibothrion</i>								+		
58. <i>Phenacolimax / Vitrina pellucida</i>		+			+	+	+	+		+
59. <i>Pomatias rivulare</i>	+	!	+	!						
60. <i>Pseudalinda / Balea stabilis</i>								+	+	
61. <i>Punctum pygmaeum</i>					+	+	+			+
62. <i>Pupilla muscorum</i>	+	+	+							
63. <i>Pyramidula rupestris</i>		+			+	+	+			
64. <i>Ruthenica filigrana</i>		+			+	+	+	+	+	+
65. <i>Sphyradium / Orcula doliolum</i>					+	+	+	+		
66. <i>Succinea oblonga</i>	+	+	+						+	
67. <i>Succinea putris</i>	+	+	+							
68. <i>Trichia bielzi</i>		+			+	+	+	+	+	+
69. <i>Trichia filicina</i>				+						
70. <i>Trichia hispida</i>					+					
71. <i>Trichia sericea</i>					+					
72. <i>Truncatellina cylindrica</i>					+	+	+			

73. <i>Vallonia costata</i>		+	+				+	+			
74. <i>Vallonia pulchella</i>		+	+		+			+		+	
75. <i>Vertigo alpestris</i>							+	+			
76. <i>Vertigo angustior</i>			+	+							
77. <i>Vertigo pusilla</i>							+	+			
78. <i>Vitrea crystallina</i>			+							+	
79. <i>Vitrea diaphana</i>					+	+	+				
80. <i>Vitrea erjavecii</i>										+	
81. <i>Vitrea subrimata</i>							+	+			
82. <i>Vitrea transsylvanica</i>					+	+	+	+			
83. <i>Zenobiella rubiginosa</i>				+						+	
84. <i>Zonitoides nitidus</i>	+	+	+								
<b>Total by column</b>	<b>29</b>	<b>30</b>	<b>27</b>	<b>12</b>	<b>38</b>	<b>36</b>	<b>44</b>	<b>38</b>	<b>27</b>	<b>19</b>	

**Table 1/B.** Sampling sites and freshwater mollusc taxa (recent name according to Pelbárt 2000) of the study area based on references (++ – Newly found in this area by Sírbu 2006, Majoros et al. 2008; bold letters denote that these taxa are adventives).

<b>Snail taxa</b>	<b>1.</b>	<b>2.</b>	<b>3.</b>	<b>4.</b>	<b>5.</b>	<b>7.</b>	<b>8.</b>	<b>9.</b>	<b>10.</b>
1. <i>Acroloxus lacustris</i>			+				+		
2. <i>Ancylus fluviatilis</i>							+	+	+
3. <i>Anisus leucostoma</i>			+!	+					
4. <i>Anisus spirorbis</i>	+	+	+	+			+	+	
5. <i>Anisus vortex</i>			+	+					
6. <i>Aplexa hypnorum</i>	+	+	+	+			+		
7. <b><i>Biomphalaria tenagophila</i></b>									++
8. <i>Bithynia tentaculata</i>							++		
9. <i>Bythinella austriaca</i>							++		
10. <i>Fagotia acicularis</i>	+					+	+	+	+
11. <i>Ferrissia wautieri</i>						+	+		
12. <i>Galba truncatula</i>		+	+			+	+	+	
13. <i>Gyraulus albus</i>	+	+	+	+			+	+	
14. <i>Gyraulus cista</i>			+	+			+		
15. <i>Hippeutis conplanatus</i>		+	+	+			+		
16. <i>Lithoglyphus naticoides</i>							+		
17. <i>Lymnaea stagnalis</i>	+						+	+	
18. <i>Melanopsis parreyssi</i>	+	+	+	+		+	+		+
19. <i>Paladilhia carpatica</i>							++		

20. <i>Paladilhia leruthi</i>				+			+		
21. <i>Paladilhia transsylvanica</i>				+	+	+	+	+	+
22. <i>Physa fontinalis</i>							++		
23. <i>Physella acuta</i>						+	+		+
24. <i>Planorbarius corneus</i>	+	+	+				+		
25. <b><i>Planorbella anceps</i></b>							++		
26. <i>Planorbis planorbis</i>	+	+	+			+			
27. <b><i>Pseudosuccinea columella</i></b>							++		
28. <i>Radix auricularia</i>		+	+				+	+	+
29. <i>Radix ovata / balthica</i>		+	+				+		
30. <i>Radix peregra / labiata</i>	+	+	+			+	+	+	
31. <i>Segmentina nitida</i>	+	+	+						
32. <i>Stagnicola palustris</i>	+		+	+			+		
33. <i>Stagnicola turricula</i>		+					+		
34. <i>Theodoxus danubialis</i>	+								
35. <i>Theodoxus fluviatilis</i>	+								
36. <i>Theodoxus prevostianus</i>		+	+	+		+	+	+	+
37. <i>Valvata cristata</i>			+				+		
38. <i>Valvata piscinalis</i>	+	+	+	+			+		+
39. <i>Viviparus acerosus</i>	+		+				+		
<b>Bivalve taxa</b>									
1. <i>Anodonta cygnaea</i>	+	+	+				+		
2. <i>Pisidium amnicum</i>							+	+	
3. <i>Pisidium casertanum</i>						+	+	+	
4. <i>Pisidium nitidum</i>							++		
5. <i>Pisidium personatum</i>							++		
6. <i>Pisidium subtruncatum</i>							+	+	
7. <b><i>Sinanodonta woodiana</i></b>							++		
8. <i>Sphaerium corneum</i>	+						+		
9. <i>Sphaerium lacustris</i>							++		
10. <i>Unio crassus</i>	+		+				+		
<b>Total by column</b>	<b>18</b>	<b>16</b>	<b>23</b>	<b>13</b>	<b>1</b>	<b>10</b>	<b>42</b>	<b>13</b>	<b>9</b>

Sampling sites of 1) **Kertész**: Nagyvárad / Oradea, Püspökfürdő / Episcopiei Resort; 2) **Csiki**: ►Nagyvárad / Oradea – *Anodonta cygnaea*, *Aplexa hypnorum*, *Bradybaena fruticum*, *Chondrula tridens*, *Cochlicopa lubrica*, *Galba truncatula*, *Gyraulus albus*, *Helicogona banatica*, *Helix lutescens*, *Hippeutis complanata*, *Laciniaria plicata*

*Lechmannia marginata*, *Limax maximus*, *Monacha cartusiana*, *Planorbarius corneus*, *Planorbis planorbis*, *Radix peregra*, *Segmentina nitida*, *Stagnicola palustris*, *Succinea oblonga*, *Vallonia costata*, *Valvata piscinalis*, *Zonitoides nitidus* ►Püspökfürdő / Episcopiei Resort – *Anisus spirorbis*, *Cepaea hortensis*, *Euomphalia strigella*, *Helicella obvia*, *Helicigona banatica*, *Limax maximus*, *Melanopsis parreyssi*, *Monacha cartusiana*, *Oxyloma elegans*, *Pupilla muscorum*, *Radix auricularia*, *Radix ovata*, *Radix peregra*, *Stagnicola palustris*, *Succinea putris*, *Theodoxux prevostianus*, *Vallonia pulchella* ►Félicsfürdő / Felix Resort: – *Limax maximus* ►Mézged / Meziad – *Aegopinella nitens*, *Alinda* / *Balea biplicata*, *Bulgarica cana*, *Chondrula clienta*, *Granaria frumentum*, *Orcula dolium?* (→jetschini), *Pupilla muscorum*, *Pyramidula rupestris*, *Ruthenica filograna*, *Trichia bielzi*, *Vitrina* / *Phenacolimax pellucida* ►Rév / Vadul Crişului – *Euomphalia strigella*, *Laciniaria plicata*; **3) Rotarodesz**: Félicsfürdő / Felix Resort, Nagyvárad / Oradea, Pecszenmárton / Sânmartin, Püspökfürdő / Episcopiei Resort, Rontó / Rontáu; **4) Soós**: Jád-völgy / Valea Iadului, Kalota / Călăţea, Körösbánlaka / Bálnaca, Mézged / Meziad, Nagyvárad / Oradea, Püspökfürdő / Episcopiei Resort, Rév / Crişul Repede; **5) Bába & Kovács**: Defileul Vadu Crişului / Rév [(+) only in the paper of Rotaridesz]; **6) Kovács**: between Vadu Crişului and Bálnaca along the gorge; **7) Váncsa**: (sampling sites of Kovács: Băila 1 Mai / Episcopiei Resort, Bálnaca, Vadu Crişului, Meziad); **8) Sîrbu**: Bultz, Episcopiei Resort, Felix Resort, Oradea, Peţea rivulet, Răbăgani, Remeti, Şuncuiuş, Vadu Crişului; **9) Data of Munkácsy Mihály Museum (Békéscsaba, Hungary)**: a) between Vadu Crişului and Bálnaca-Groşi along the gorge as well as Valea Luncilor, b) Meziad, Valea Iadului (Stâna de Vale), Luncasprîe - column 9 includes some more items (Sárkány-Kiss et al. 1997); **10) Data of the Hungarian National History Museum (HNHM) without the data of Kovács**, which are shown in columns 6-7).

Table 2/1. Sampling sites and terrestrial snail taxa of the study area

	Taxa	Sampling sites														
		1.	2.	3.	4.	5.	6.	7.	9.	11.	12.	13.	14.	15.		
1.	<i>Acanthinula aculeata</i>	+				+					+					
2.	<i>Acicula microspira</i>	+									+					
3.	<i>Acicula polita</i>	+														
4.	<i>Aegopinella epipedostoma</i>	+	+						+		+	+				
5.	<i>Aegopinella minor</i>															
6.	<i>Aegopinella pura</i>															
7.	<i>Alinda biplicata</i>					+										
8.	<i>Arion circumscriptus</i>				+											
9.	<i>Arion subfuscus</i>														+	
10.	<i>Bradybaena fruticum</i>														+	
11.	<i>Bulgarica cana</i>															
12.	<i>Bulgarica vetusta</i>	+	+		+	+	+		+	+	+	+				
13.	<i>Campylea faustina</i>								+	+	+					
14.	<i>Carpatica calophana</i>	+				+									+	
15.	<i>Carychium minimum</i>					+		+								
16.	<i>Carychium tridentatum</i>	+				+					+					
17.	<i>Ceciliooides acicula</i>															
18.	<i>Cepaea vindobonensis</i>				+						+	+	+			

19.	<i>Chondrina clienta</i>	+	+		+		+	+	+	+		
20.	<i>Chondrula tridens</i>									+		+
21.	<i>Clausilia dubia</i>									+		
22.	<i>Clausilia pumila</i>											+
23.	<i>Cochlicopa lubrica</i>					+		+				+
24.	<i>Cochlicopa lubricella</i>					+	+			+		
25.	<i>Cochlodina laminata</i>	+	+			+			+	+	+	+
26.	<i>Columella edentula</i>					+		+				+
27.	<i>Deroceras laevis</i>					+						
28.	<i>Deroceras reticulatum</i>	+										
29.	<i>Deroceras</i> sp.											
30.	<i>Euconulus fulvus</i>					+		+				
31.	<i>Euomphalia strigella</i>							+		+		+
32.	<i>Granaria frumentum</i>	+	+			+			+	+	+	+
33.	<i>Helicella obvia</i>											
34.	<i>Helicigona/Drobacia banatica</i>	+	+	+		+	+	+				+
35.	<i>Helix lutescens</i>	+										
36.	<i>Helix pomatia</i>					+		+		+		+
37.	<i>Isognomostoma isognomostoma</i>											
38.	<i>Kovacsia kovacsi</i>	+	+	+		+		+	+	+	+	+
39.	<i>Laciniaria plicata</i>	+	+			+			+	+		+
40.	<i>Limax cinereoniger</i>					+						
41.	<i>Limax maximus</i>								+			
42.	<i>Limax</i> sp.											
43.	<i>Macrogaster borealis</i>											
44.	<i>Merdigera obscura</i>						+		+	+		+
45.	<i>Milax</i> sp.	+										
46.	<i>Monacha cartusiana</i>						+					
47.	<i>Monachoides vicina</i>											
48.	<i>Nesovitrea hammonis</i>											
49.	<i>Orcula jetschini</i>						+					
50.	<i>Oxychilus depressus</i>						+					
51.	<i>Oxychilus draparnaudi</i>											
52.	<i>Oxychilus inopinatus</i>											
53.	<i>Oxychilus montivagus</i>	+	+	+		+			+	+	+	+
54.	<i>Oxychilus</i> sp.										+	
55.	<i>Oxyloma elegans</i>							+				
56.	<i>Perforatella dibothrion</i>						+					
57.	<i>Perforatella bidentata</i>											
58.	<i>Phenacolimax/Vitrina pellucida</i>	+	+	+		+	+		+	+	+	+
59.	<i>Pseudalinda stabilis</i>	+	+			+						
60.	<i>Punctum pygmaeum</i>						+					
61.	<i>Pupilla muscorum</i>										+	
62.	<i>Pyramidula rupestris</i>										+	
63.	<i>Ruthenica filograna</i>	+	+	+		+	+	+	+	+	+	+
64.	<i>Sphyradium doliolum</i>								+	+		+
65.	<i>Succinea oblonga</i>						+					+
66.	<i>Succinea putris</i>						+					
67.	<i>Trichia bielzi</i>	+	+			+			+	+		+
68.	<i>Trichia hispida</i>											
69.	<i>Truncatellina cylindrica</i>										+	
70.	<i>Vallonia costata</i>						+		+		+	
71.	<i>Vallonia pulchella</i>						+	+		+		
72.	<i>Vertigo angustior</i>											
73.	<i>Vertigo antivertigo</i>						+					
74.	<i>Vertigo pusilla</i>						+					



54.	<i>Oxychilus</i> sp.													
55.	<i>Oxyjoma elegans</i>	+												
56.	<i>Perforatella dibothrion</i>													
57.	<i>Perforatella bidentata</i>	+												
58.	<i>Phenacolimax/Vitrina pellucida</i>	+	+	+				+		+	+	+	+	
59.	<i>Pseudolinda stabilis</i>					+	+			+	+	+		
60.	<i>Punctum pygmaeum</i>													
61.	<i>Pupilla muscorum</i>													
62.	<i>Pyramidula rupestris</i>													
63.	<i>Ruthenica filograna</i>		+	+	+			+	+		+	+	+	
64.	<i>Sphyradium dolioolum</i>	+		+						+	+		+	
65.	<i>Succinea oblonga</i>	+								+				
66.	<i>Succinea putris</i>													
67.	<i>Trichia bielzi</i>		+			+		+			+	+		
68.	<i>Trichia hispida</i>								+		+			
69.	<i>Truncatellina cylindrica</i>				+					+				
70.	<i>Vallonia costata</i>	+								+				
71.	<i>Vallonia pulchella</i>	+		+						+				
72.	<i>Vertigo angustior</i>													
73.	<i>Vertigo antivertigo</i>													
74.	<i>Vertigo pusilla</i>													
75.	<i>Vertigo pygmaea</i>													
76.	<i>Vitrea crystallina</i>	+												
77.	<i>Vitrea erjavecii</i>		+					+	+		+	+		
78.	<i>Vitrea diaphana</i>					+	+	+				+		
79.	<i>Vitrea subrimata</i>													
80.	<i>Vitrea transsylvanica</i>		+	+				+			+			
81.	<i>Vitrea</i> sp.													
82.	<i>Zenobiella rubiginosa</i>	+												
83.	<i>Zonitoides nitidus</i>	+									+			
	<b>Number of taxa</b>	<b>24</b>	<b>18</b>	<b>19</b>	<b>6</b>	<b>10</b>	<b>14</b>	<b>15</b>	<b>11</b>	<b>10</b>	<b>18</b>	<b>14</b>	<b>3</b>	<b>12</b>

Table 2/3. Sampling sites and terrestriell snail taxa of the study area

	Taxa	Sampling sites													
		31.	32.	33.	34.	36.	37.	38.	39.	40.	41.	42.	43.	44.	
1.	<i>Acanthinula aculeata</i>	+													
2.	<i>Acicula microspira</i>						+								
3.	<i>Acicula polita</i>														
4.	<i>Aegopinella epipelestoma</i>			+										+	
5.	<i>Aegopinella minor</i>	+				+				+	+		+		
6.	<i>Aegopinella pura</i>	+											+		
7.	<i>Alinda biplicata</i>														
8.	<i>Anion ciorcumsriptus</i>														
9.	<i>Anion subfuscus</i>											+			
10.	<i>Bradybaena fruticum</i>				+										
11.	<i>Bulgarica cana</i>														
12.	<i>Bulgarica vetusta</i>	+		+		+	+			+			+	+	
13.	<i>Campylea faustina</i>			+											
14.	<i>Carpatia calophana</i>	+							+						
15.	<i>Carychium minimum</i>											+			
16.	<i>Carychium tridentatum</i>							+				+			
17.	<i>Cecilioides acicula</i>														
18.	<i>Cepaea vindobonensis</i>			+	+						+				
19.	<i>Chondrina clienta</i>					+	+			+					
20.	<i>Chondrula tridens</i>										+				
21.	<i>Clausilia dubia</i>														
22.	<i>Clausilia pumila</i>														
23.	<i>Cochlicopa lubrica</i>							+				+		+	
24.	<i>Cochlicopa lubricella</i>	+		+			+	+		+			+		
25.	<i>Cochlodina laminata</i>	+		+		+								+	
26.	<i>Columella edentula</i>							+				+			
27.	<i>Deroceras laevis</i>							+							





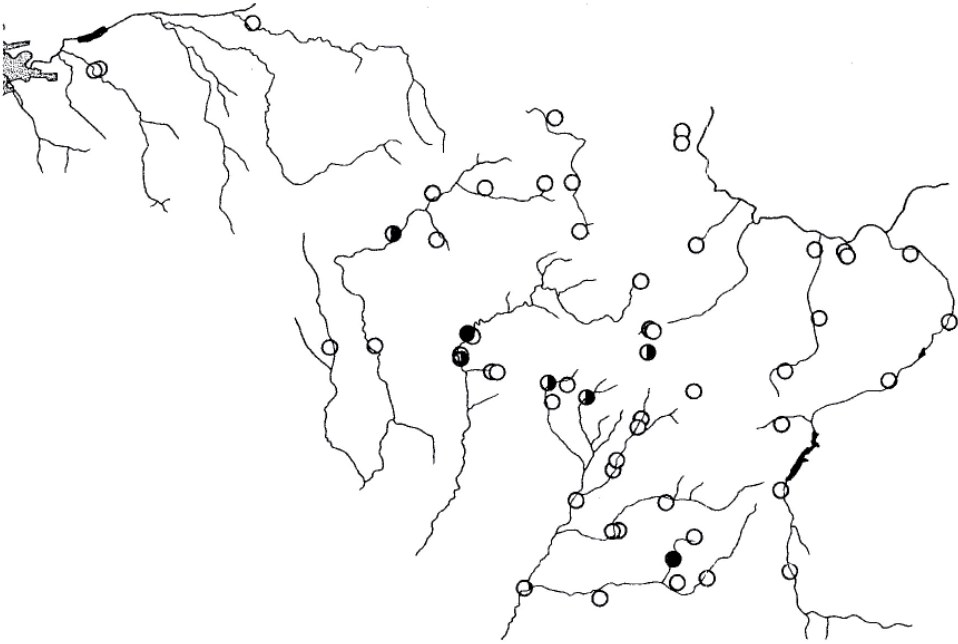
Table 2/4. Sampling sites and terrestriell snail taxa of the study area

	Taxa	Sampling sites										1-55
		46.	47.	48.	49.	50.	51.	52.	53.	54.	55.	
1.	<i>Acanthinula aculeata</i>			+				+				8
2.	<i>Acicula microspira</i>			+			+	+				7
3.	<i>Acicula polita</i>							+				2
4.	<i>Aegopinella epipedostoma</i>			+								10
5.	<i>Aegopinella minor</i>					+			+			13
6.	<i>Aegopinella pura</i>											5
7.	<i>Alinda biplicata</i>											2
8.	<i>Arion circumscriptus</i>											1
9.	<i>Arion subfuscus</i>											3
10.	<i>Bradybaena fruticum</i>										+	6
11.	<i>Bulgarica cana</i>											2
12.	<i>Bulgarica vetusta</i>			+		+	+		+			26
13.	<i>Campylea faustina</i>								+			7
14.	<i>Carpatia calophana</i>							+				8
15.	<i>Carychium minimum</i>		+						+			6
16.	<i>Carychium tridentatum</i>						+		+			8
17.	<i>Cecilioides acicula</i>								+			1
18.	<i>Cepaea vindobonensis</i>	+	+	+			+		+	+	+	15
19.	<i>Chondrina clienta</i>						+		+			15
20.	<i>Chondrula tridens</i>									+		4
21.	<i>Clausilia dubia</i>			+								2
22.	<i>Clausilia pumila</i>											2
23.	<i>Cochlicopa lubrica</i>						+		+	+		13
24.	<i>Cochlicopa lubricella</i>						+			+		15
25.	<i>Cochlodina laminata</i>			+		+	+	+	+		+	25
26.	<i>Columella edentula</i>								+			8
27.	<i>Deroceras laevis</i>		+									3
28.	<i>Deroceras reticulatum</i>											2
29.	<i>Deroceras sp.</i>											3
30.	<i>Euconulus fulvus</i>								+			6
31.	<i>Euomphalia strigella</i>			+					+			12
32.	<i>Granaria frumentum</i>						+		+			14
33.	<i>Helicella obvia</i>											1
34.	<i>Helicigona/Drobacia banatica</i>			+	+	+		+	+		+	29
35.	<i>Helix lutescens</i>	+										3
36.	<i>Helix pomatia</i>	+		+								19
37.	<i>Isognomostoma isognomost.</i>			+					+			5
38.	<i>Kovacsia kovacsi</i>			+			+	+	+			31
39.	<i>Laciniaria plicata</i>			+		+		+				21
40.	<i>Limax cinereoniger</i>											1
41.	<i>Limax maximus</i>			+								2
42.	<i>Limax sp.</i>							+	+			6
43.	<i>Macrogastra borealis</i>								+			2
44.	<i>Merdigera obscura</i>					+						12
45.	<i>Milax sp.</i>			+								3
46.	<i>Monacha cartusiana</i>	+								+		7
47.	<i>Monachoides vicina</i>				+				+	+	+	14
48.	<i>Nesovitrea hammonis</i>											1
49.	<i>Orcula jetschini</i>								+			4
50.	<i>Oxychilus depressus</i>											2
51.	<i>Oxychilus draparnaudi</i>	+								+		5
52.	<i>Oxychilus inopinatus</i>											1
53.	<i>Oxychilus montivagus</i>			+				+	+			21
54.	<i>Oxychilus sp.</i>											1
55.	<i>Oxyloma elegans</i>	+	+									4
56.	<i>Perforatella dibothrion</i>								+			3

57.	<i>Perforatella bidentata</i>																							1	
58.	<i>Phenacolimax/Vitrina pellucida</i>			+					+				+												29
59.	<i>Pseudalinda stabilis</i>																								11
60.	<i>Punctum pygmaeum</i>								+				+												4
61.	<i>Pupilla muscorum</i>								+			+		+											4
62.	<i>Pyramidula rupestris</i>			+					+			+													5
63.	<i>Ruthenica filograna</i>			+			+	+	+	+	+	+													32
64.	<i>Sphyradium dolium</i>			+			+					+		+											18
65.	<i>Succinea oblonga</i>																						+		7
66.	<i>Succinea putris</i>			+																					2
67.	<i>Trichia bielzi</i>			+			+			+	+														18
68.	<i>Trichia hispida</i>			+		+						+		+											9
69.	<i>Truncatellina cylindrica</i>			+					+			+													8
70.	<i>Vallonia costata</i>			+					+			+													10
71.	<i>Vallonia pulchella</i>			+					+			+		+											17
72.	<i>Vertigo angustior</i>												+												2
73.	<i>Vertigo antivertigo</i>			+																					2
74.	<i>Vertigo pusilla</i>												+												2
75.	<i>Vertigo pygmaea</i>								+																3
76.	<i>Vitrea crystallina</i>												+												2
77.	<i>Vitrea erjaveczi</i>												+												13
78.	<i>Vitrea dlaphana</i>			+							+	+													11
79.	<i>Vitrea subrimata</i>												+												2
80.	<i>Vitrea transsylvanica</i>			+		+						+													9
81.	<i>Vitrea sp.</i>												+												2
82.	<i>Zenobiella rubiginosa</i>	+	+			+																	+		6
83.	<i>Zonitoides nitidus</i>	+	+			+							+	+											15
	<b>Number of taxa</b>	<b>8</b>	<b>8</b>	<b>27</b>	<b>6</b>	<b>9</b>	<b>19</b>	<b>10</b>	<b>46</b>	<b>12</b>	<b>7</b>	<b>695</b>													

Table 3. Sampling sites as well as aquatic snails (1-8) and valves (1-3) taxa of the study area

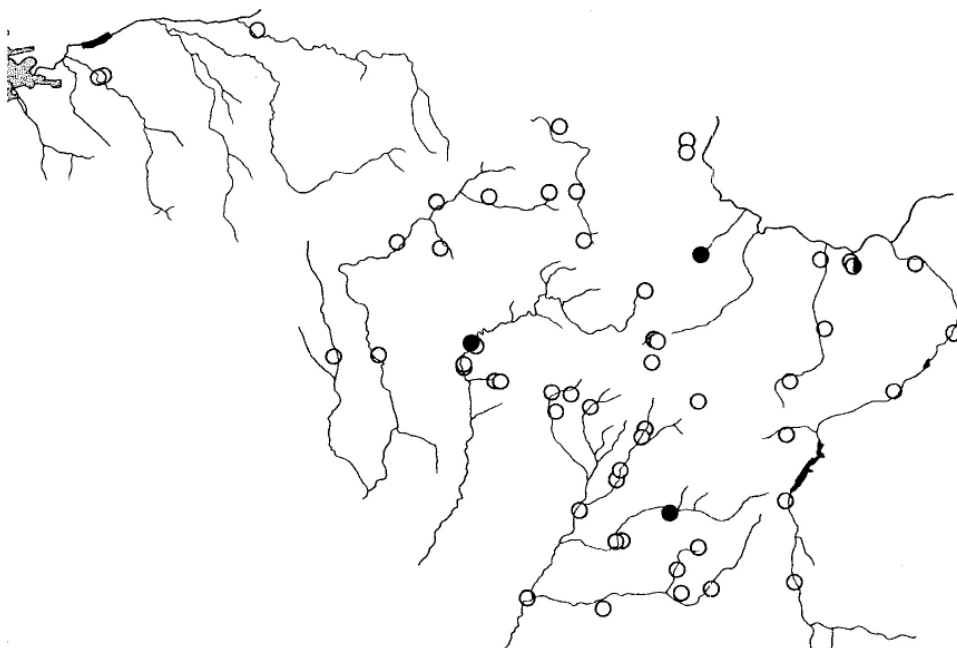
Taxa	Sampling sites													
	5.	7.	8.	10.	16.	17.	19.	27.	35.	45.	47.	53.	54.	1-55.
1. <i>Ancylus fluviatilis</i>			+	+		+	+					+		5
2. <i>Anisus spirorbis</i>												+		1
3. <i>Lymnaea truncatula</i>	+	+						+				+		4
4. <i>Paladilhiopsis sp.</i>												+		1
5. <i>Radix auricularia</i>									+					1
6. <i>Radix labiata</i>		+	+	+	+	+	+	+	+	+		+		9
7. <i>Radix sp.</i>	+													1
8. <i>Valvata piscinalis</i>										+	+			2
1. <i>Pisidium sp.</i>												+	+	2
2. <i>Sphaerium corneum</i>										+	+			2
3. <i>Unio crassus</i>										+				1
<b>Number of taxa</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>1</b>	<b>2</b>	<b>2</b>	<b>1</b>	<b>1</b>	<b>5</b>	<b>2</b>	<b>6</b>	<b>1</b>	<b>29</b>



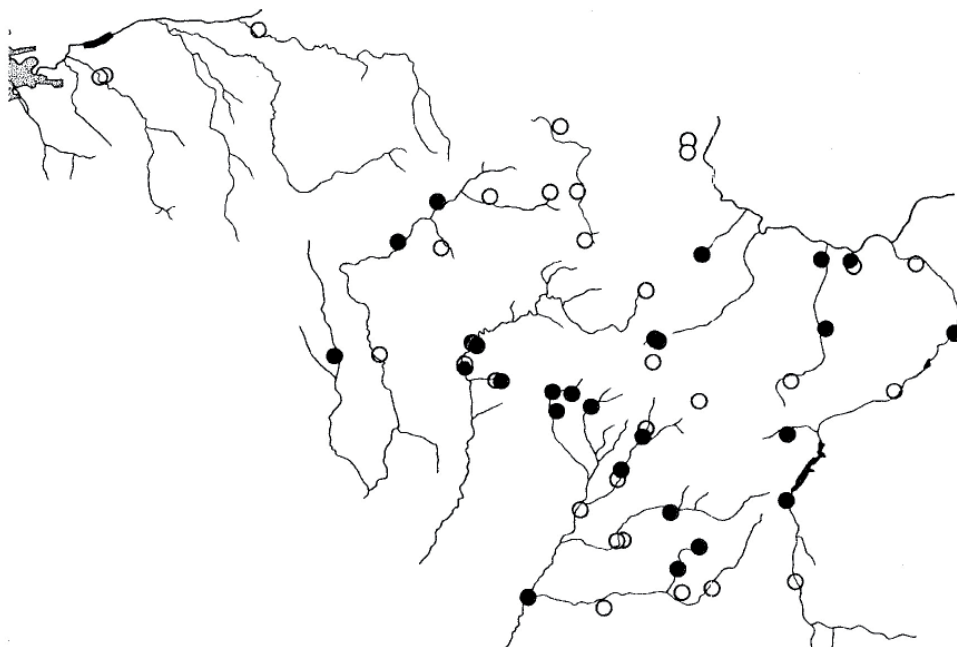
**Fig. 3.** Distribution of *Acicula polita* (full circles) and *Acicula microspira* (full circles as well as semi-full circles from left to right white and black) in the Pădurea Craiului Mts.



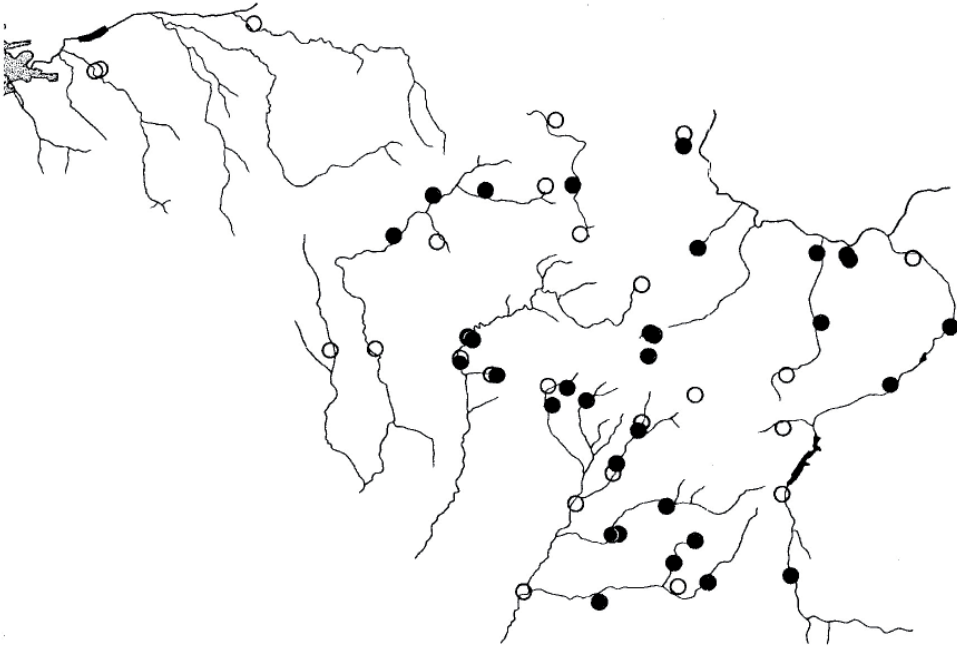
**Fig. 4.** Distribution of *Sphyradium doliolum* in the Pădurea Craiului Mts. (Full circles where *S. d.* was found.)



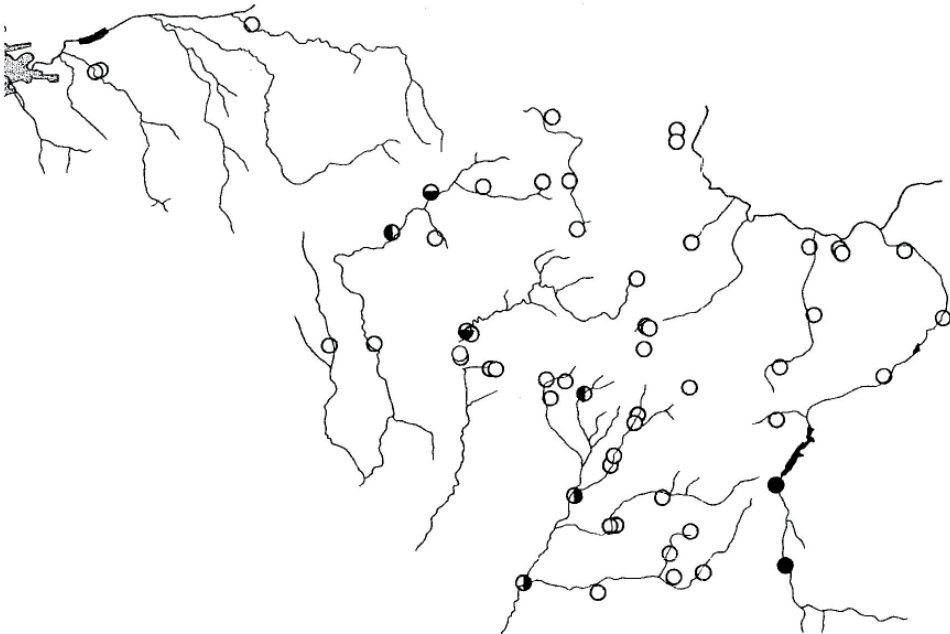
**Fig. 5.** Distribution of *Orcula jetschini* and *Perforatella dibothrion* in the Pădurea Craiului Mts. (full circles: both species, semi-full circles/ from left to right white and black we collected only *O.j.*)



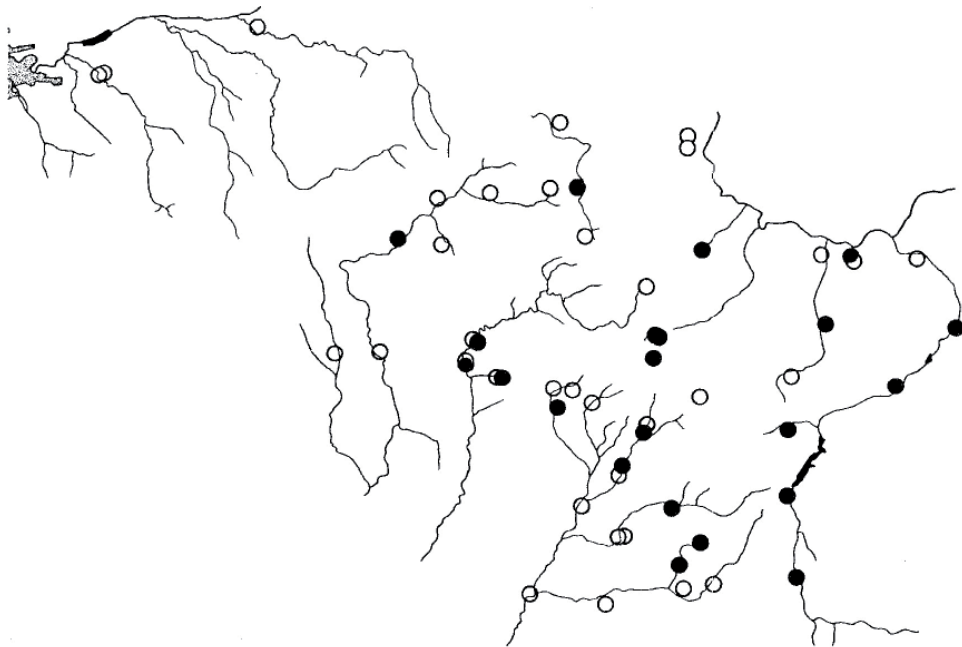
**Fig. 6.** Distribution of *Cochlodina laminata* in the Pădurea Craiului Mts. (Full circles where *C.l.* was found.)



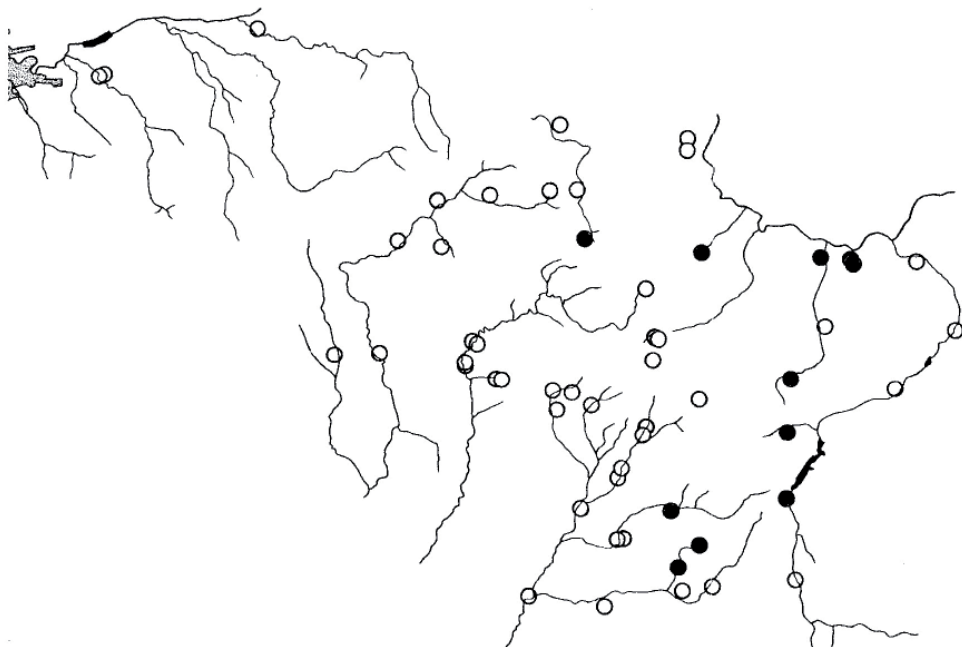
**Fig. 7.** Distribution of *Ruthenica filigrana* in the Pădurea Craiului Mts.  
(Full circles where *R. f.* was found.)



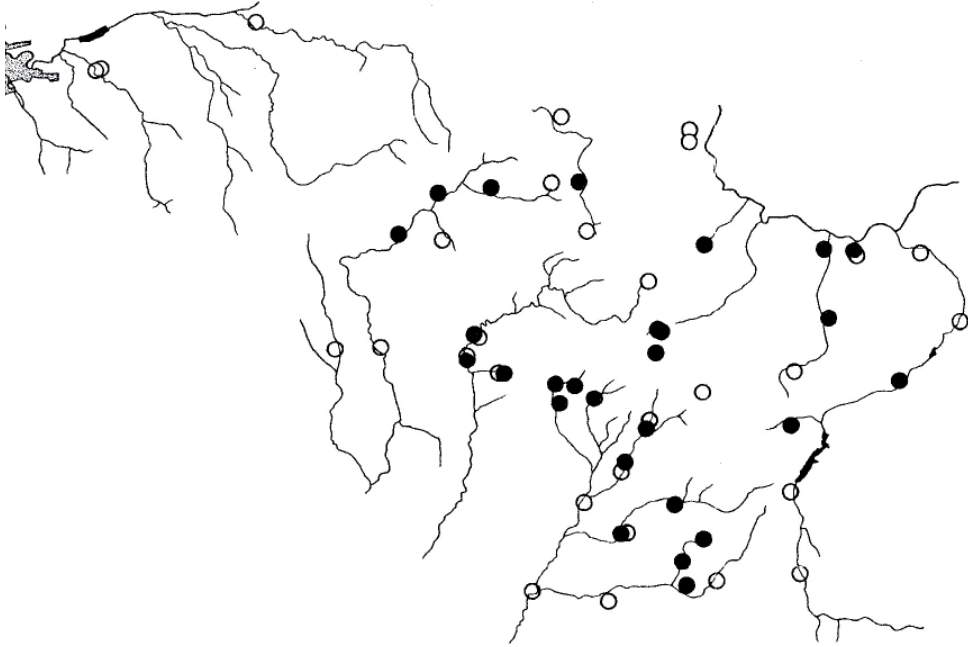
**Fig. 8.** Distribution of *Clausilia dubia* (semi-full circles/from left to right black and white), *Clausilia pumila* (semi-full circles from left to right white and black), *Macrogastrea borealis bielzi* (semi-full circles over to lower white and black) and *Bulgarica cana* (full circles) in the Pădurea Craiului Mts.



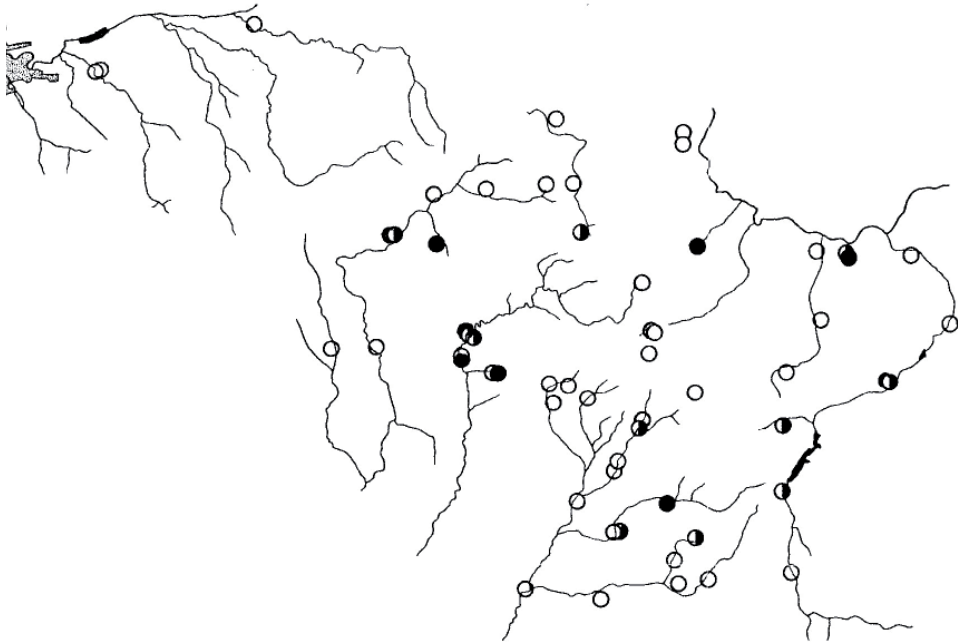
**Fig. 9.** Distribution of *Laciniaria plicata* in the Pădurea Craiului Mts.  
(Full circles where *L. p.* was found.)



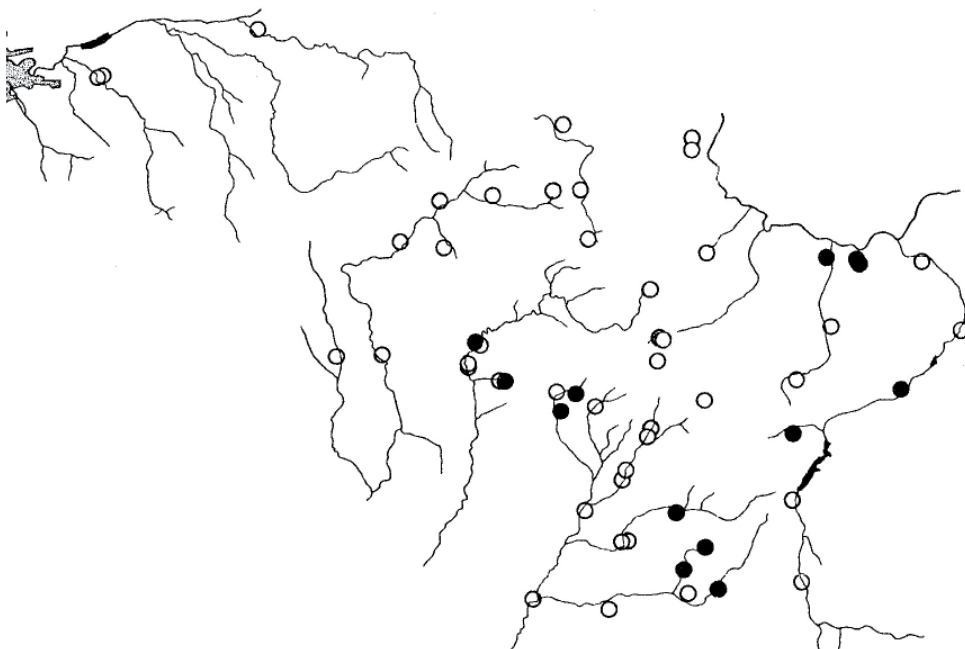
**Fig. 10.** Distribution of *Pseudalinda stabilis* in the Pădurea Craiului Mts.  
(Full circles where *P. s.* was found.)



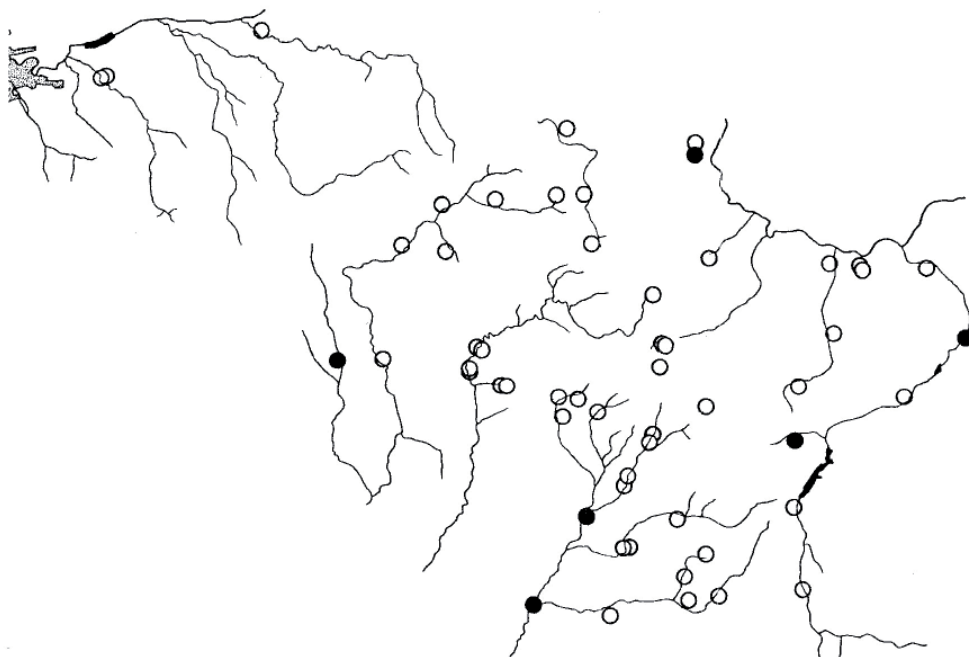
**Fig. 11.** Distribution of *Bulgarica vetusta* in the Pădurea Craiului Mts.  
(Full circles where *B. v.* was found.)



**Fig. 12.** Distribution of *Vitrea transsylvanica* (full circles) and *Vitrea diaphana* (Semi-full circles/ from left to right white and black) in the Pădurea Craiului Mts.



**Fig. 13.** Distribution of *Vitrea erjavecii* in the Pădurea Craiului Mts. (Full circles where *V. e.* was found.)

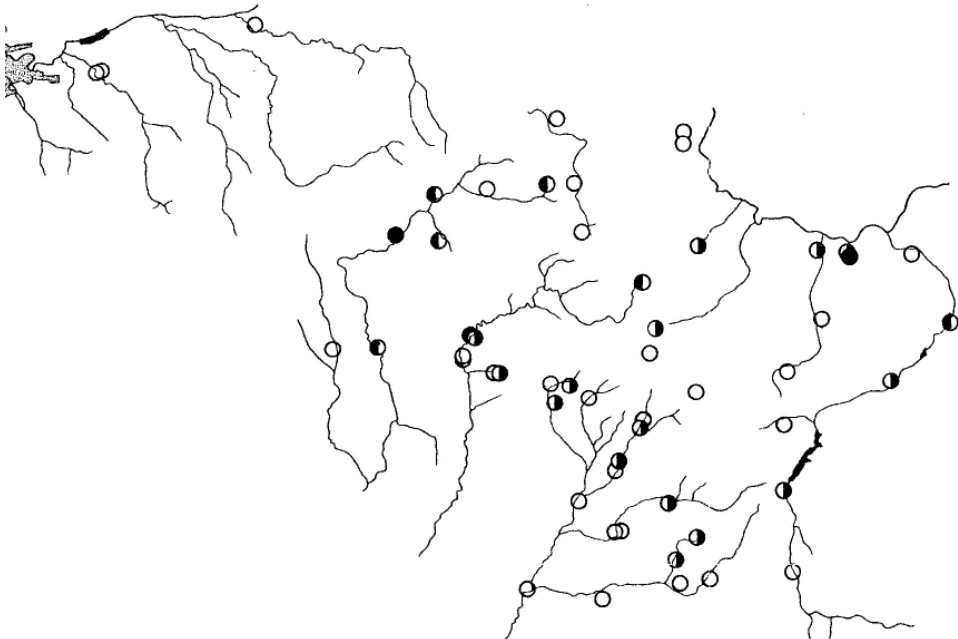


**Fig. 14.** Distribution of *Bradybaena fruticum* in the Pădurea Craiului Mts. (Full circles where *B. f.* was found.)

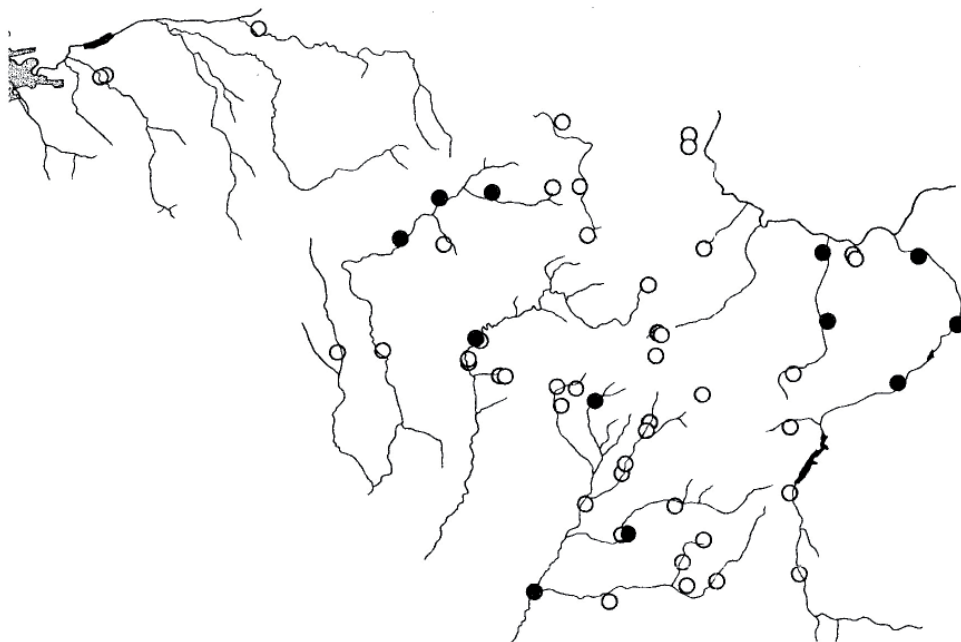




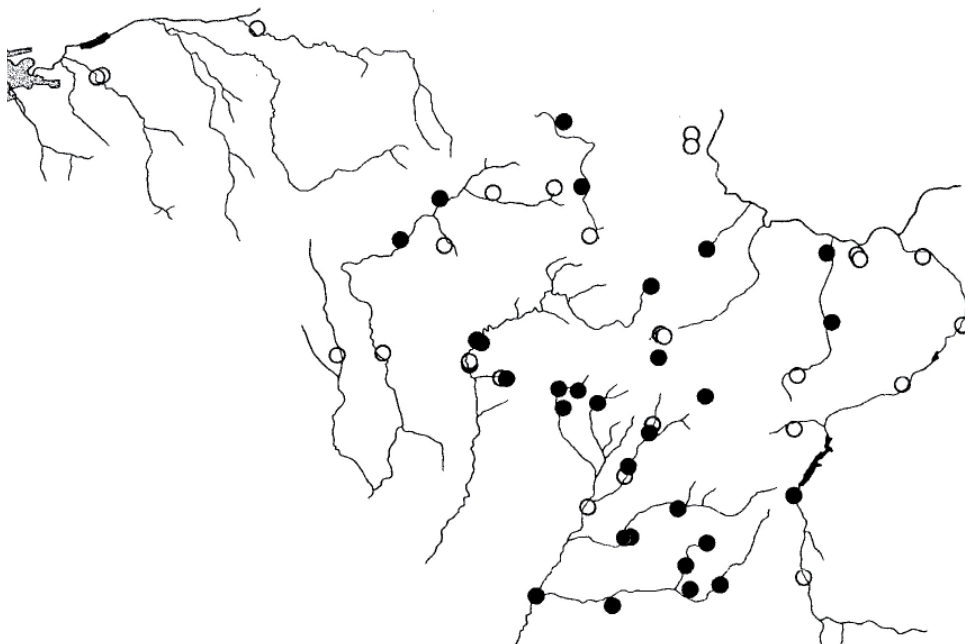
**Fig. 15.** Distribution of *Monachoides vicina* in the Pădurea Craiului Mts. (Full circles where *M. c.* was found.)



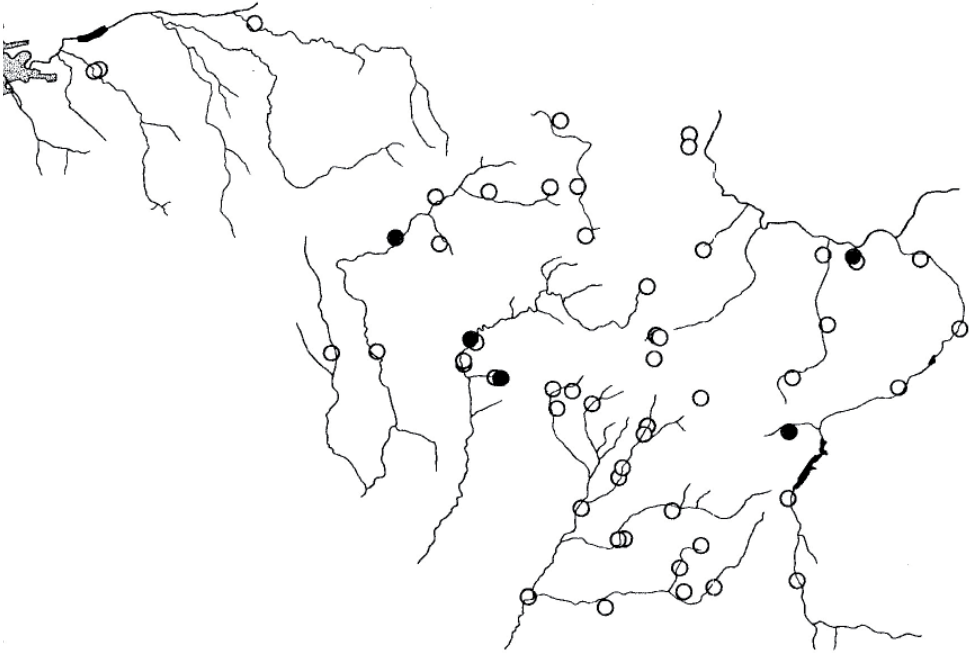
**Fig. 16.** Distribution of *Trichia bielzi* (Full and semi-full circles/ from left to right white and black.) and *Trichia hispida* (Full and semi-full circles/ from left to right black and white.) in the Pădurea Craiului Mts.



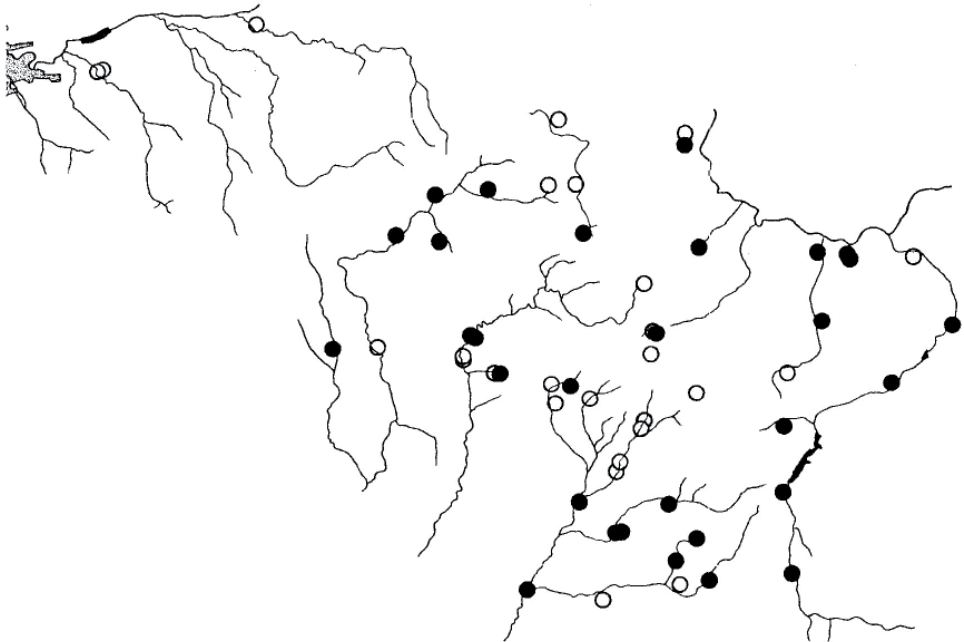
**Fig. 17.** Distribution of *Euomphalia strigella* in the Pădurea Craiului Mts. (Full circles where *E. s.* was found.)



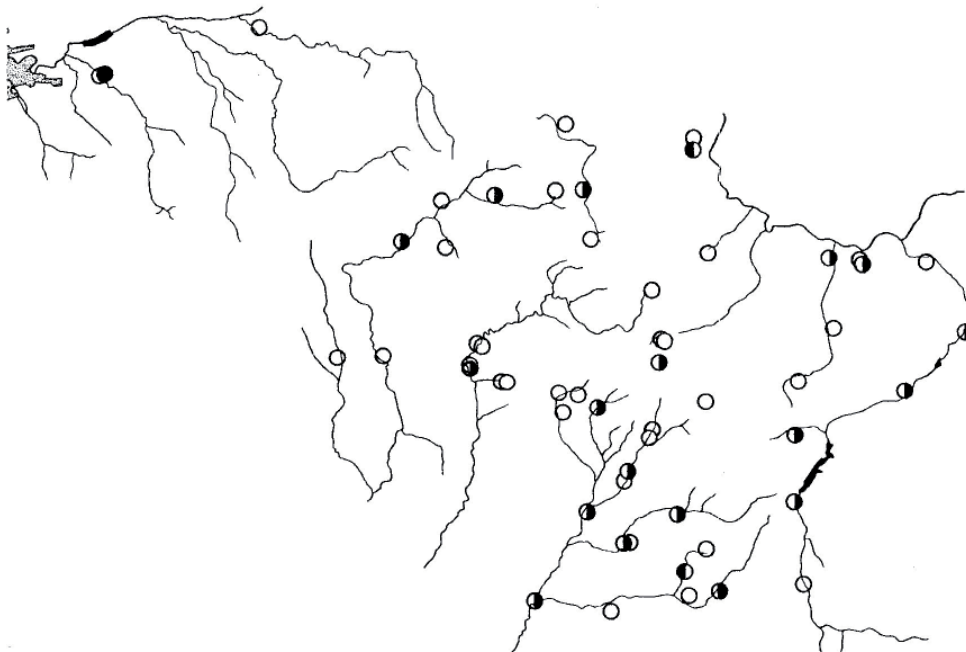
**Fig. 18.** Distribution of *Kovacsia kovacsi* in the Pădurea Craiului Mts. (Full circles where *K. k.* was found.)



**Fig. 19.** Distribution of *Isognomostoma isognomostoma* in the Pădurea Craiului Mts. (Full circles where *I. i.* was found.)



**Fig. 20.** Distribution of *Helicigona/Drobacia banatica* in the Pădurea Craiului Mts. (Full circles where *H. b.* was found.)



**Fig. 21.** Distribution of *Helix pomatia* (semi-full circles/from left to right white and black), and *Helix lutescens* (semi-full circles/from left to right black and white) in the Pădurea Craiului Mts.

### Explanation of Plates

Plate I: 1–3: *Macrogaster borealis*; 4, 5: *Orcula jetschini*; 6–8: *Bulgarica vetusta*; 9–11: *Kovacsia kovacsi*. Scale equals 2 mm

Plate II: 1–3: *Helicigona* / *Arianta arbustorum*; 4–6: *Perforatella dibothrion*; 7: *Vertigo pusilla*; 8, 9: *Paladilhia* / *Paladilhiopsis*. Scale equals 2 mm

Plate III: 1–3: *Laciniaria plicata*; 4: *Acicula polita*; 5, 6: *Isognomostoma isognomostoma*. Scale equals 2 mm

Plate IV: 1–3: *Monachoides vicina*; 4–6: *Trichia bielzi*. Scale equals 2 mm

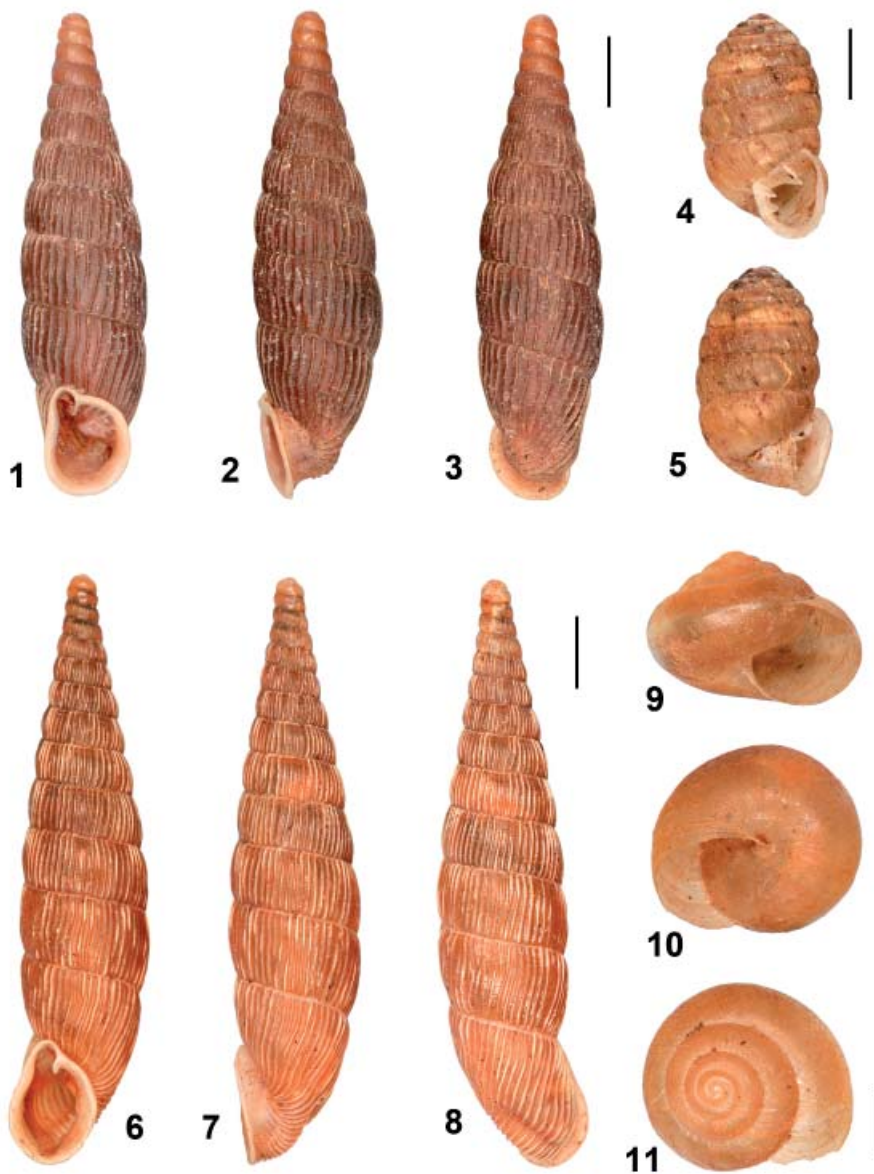


Plate I.



Plate II0



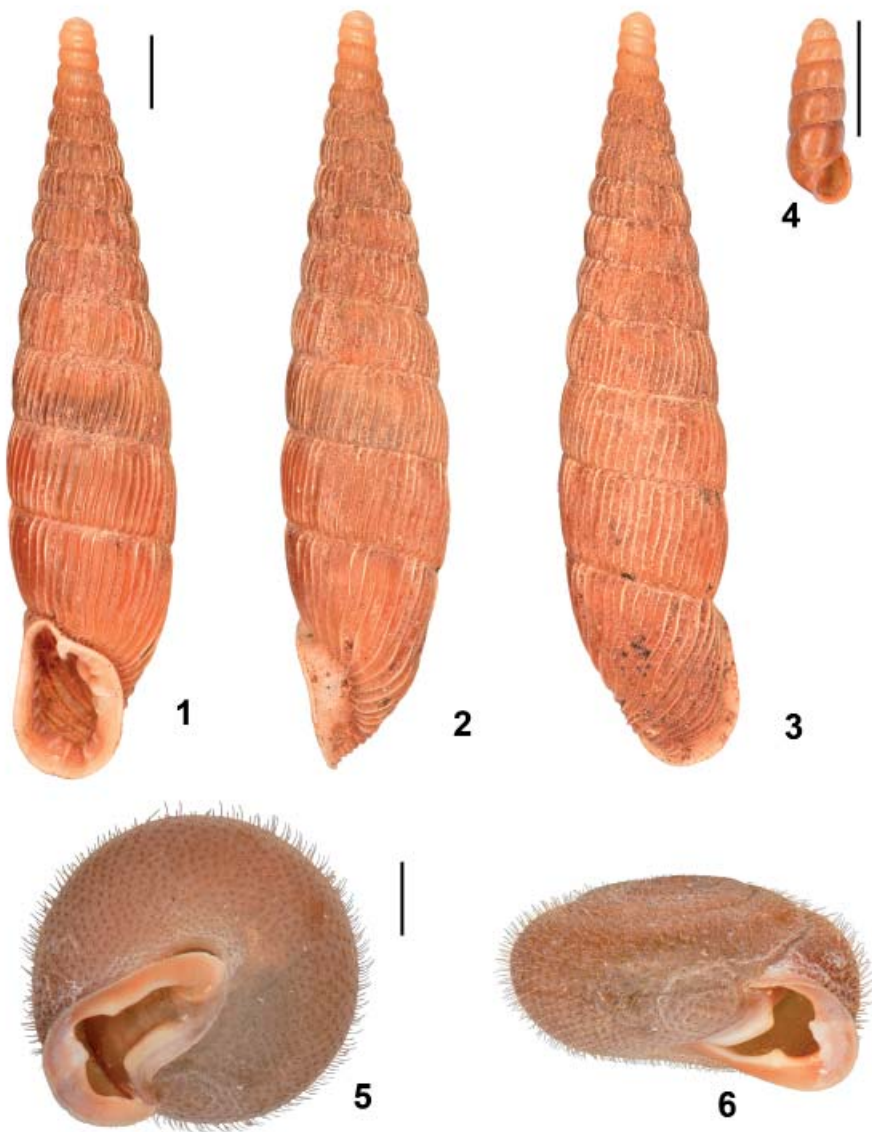


Plate III.



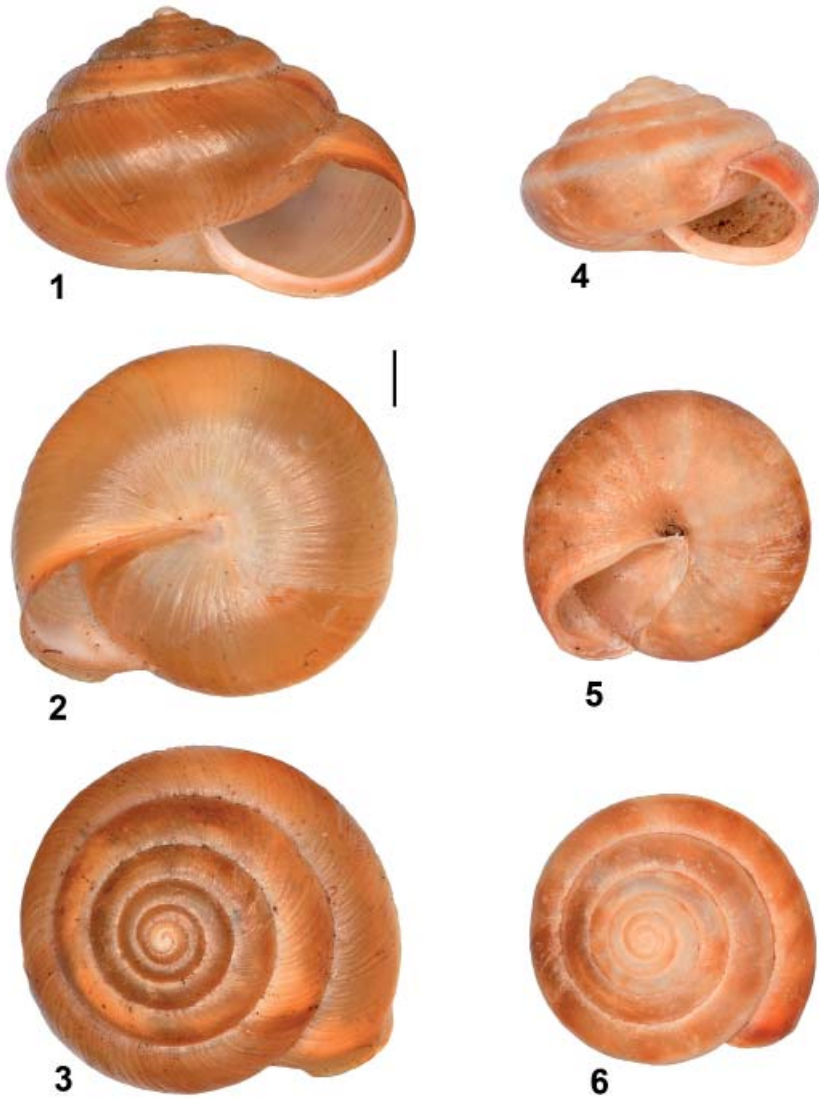


Plate IV.

<b>NYMPHAEA</b> Folia naturae Bihariae	<b>XXXVII</b>	<b>171 - 186</b>	<b>Oradea, 2010</b>
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## **The entomological collection of Adalbert Takács deposited in Țării Crișurilor Museum, Oradea**

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**Abstract.** The catalog lists the data on the 315 specimens of Palaearctic, Nearctic, Afrotropic, Neotropic, Australasian and Indo-Malayan insects from the collection of Adalbert Takács deposited in Țării Crișurilor Museum, Oradea, Romania. The collection consists of 56 species of Coleoptera (45 Carabidae, 3 Cerambycidae, 2 Lucanidae, 6 Scarabaeidae) and 9 species of Lepidoptera (6 Papilionidae and 3 Nymphalidae), including 20 endemic species and subspecies, one IUCN Red List species and 3 species of European community interest.

### **Introduction**

On several occasions during 2002-2004, the amateur entomologist Adalbert Takács (b. 1924, Takács Béla in Hungarian) from Zalău, Sălaj County, in northwestern Romania, sold to the Țării Crișurilor Museum parts of his private entomological collection. The collection has been formed as a result of his many collecting trips in Romania (mainly in his native region around Zalău, but also in the north and southwest, in Dobruđja, the Danube Delta and the Carpathians), and through exchanges of entomological materials with private collectors from 20 countries.

Adalbert Takács worked as economist, but his lifelong passion for nature and especially for insects allowed him to achieve a solid knowledge on Romanian carabids and to form a valuable collection of Coleoptera and Lepidoptera, which included a number of endemic and rare species. Other parts of his collection were sold to other Romanian museums (mostly in 1984 to the History and Art Museum in Zalău), or were included in temporary exhibitions at the natural history museums in Bucharest, Timișoara and Sibiu, proving once again the scientific interest for his valuable collected material (Pop et al. 2006). His enthusiasm for coleopterans was manifest also in his scientific publications in *Acta Musei Porolissensis*, in which he acted sometimes more like a “splitter” (e. g. Takács 2002a, 2002b).

The aim of the present paper was to revise the coleopterans and lepidopterans from the collection of Adalbert Takács deposited in Țării Crișurilor Museum, honoring thus the activity of an enthusiast amateur entomologist.

### Materials and methods

The specimens were revised according to monographic and more recent publications (Panin 1955, Deloya & Moron 1994, Edmonds 1994, Price 2007, 2009, Rubio-G. et al. 2009, Vigna Taglianti 2009, Gillett & al. 2010, Paulsen & Smith 2010) and online databases (Anichtchenko et al. 2008, Paulsen 2008, Lucanidae of the World, [www.cerambycoidea.com](http://www.cerambycoidea.com), [www.lamiinae.org](http://www.lamiinae.org), [www.phanaeionline.co.uk](http://www.phanaeionline.co.uk), [www.scarabnet.org](http://www.scarabnet.org)). The synonymies and other obsolete taxon names, such as forms and aberrations, were not mentioned. The original labels were transcribed and arranged in uniform manner and the localities names were corrected and updated when necessary. Some entries from the original labels were mentioned between quotation marks (“ ”). Months were transcribed in Roman numerals.

For the Romanian localities, the county names were included abbreviated in capital letters between round brackets. The numbers of specimens were included in square brackets.

### Abbreviations

AB = Alba, AR = Arad, B = Bucharest, BH = Bihor, BM = Baia Mare, BT = Botoșani, BV = Brașov, CJ = Cluj, CS = Caraș-Severin, CT = Constanța, CV = Covasna, GR = Giurgiu, HD = Hunedoara, HR = Harghita, IF = Ilfov, MM = Maramureș, MS = Mureș, NT = Neamț, PH = Prahova, SJ = Sălaj, SM = Satu Mare, SV = Suceava, TM = Timiș, VL = Vâlcea.

I. = island, Mt. = mount(ains), Păd. = forest, V. = valley, Vf. = peak.

**Systematic list****ORD. COLEOPTERA L. 1758****Subord. Adephaga Schellenberg 1806****Fam. Carabidae Latreille 1802****Subfam. Cicindelinae (Latreille 1802)****Tribus Cicindelini Latreille 1802**

*Pseudoxysteira bipustulata* (Latreille 1811)

Santo Domingo de los Colorados (Ecuador) II 1982 [1].

**Subfam. Carabinae Latreille 1802****Tribus Carabini Latreille 1802**

*Carabus (Archicarabus) montivagus montivagus* Palliardi 1825

Mt. Zarand (AR) VI 1980 [2]; Râmnicu Vâlcea (VL) VII 1994 [1]; Gilău (CJ) VI 2001 [4].

*C. (Archiplectes) apollo tenebricosus* Kurnakov 1962

V. Aapsta, Mt. Caucasus (Abkhazia, Georgia) 12 V – 7 VII 1990 [1].

*C. (Aulonocarabus) nangnimicus* Blumenthal & Deuve 1984

Mt. Tchouma (?) (Korea) VII 1993 [1] ♀.

*C. (Chaetocarabus) intricatus* L. 1761

Herculane (CS) VII 1971 [1]; Mt. Carso, Trieste (Mt. Cucco) (Italy) 25 III 1982 [1]; Vişeu de Sus (MM) VII 1989 [1].

*C. (Chrysocarabus) auronitens auronitens* Fabricius 1792

St. Gilgen (Austria) X 1973 [2].

*C. (Chrysocarabus) auronitens costellatus* Gehin 1882

Neuville (France) 27 XII 1976 [2].

*C. (Chrysocarabus) auronitens escheri* Palliardi 1825

Mt. Breţcu (CV) VI 1980 [1]; Baia Borşa (MM) VI 1981 [1]; Detunata (AB) VI 1981 [1]; Mt. Gutâi (BM) VI 1984 [1]; Vatra Dornei (SV) VI 1988 [1]; Mt. Meseş (SJ) VI 1991 [2]; Mt. Gutâi (BM) VI 1993 [2], VI 1999 [1].

*C. (Chrysocarabus) auronitens festivus* Dejean 1826  
Aude (France) 6 VI 1978 [3].

*C. (Chrysocarabus) hispanus* Fabricius 1787  
Gard (France) I 1985 [1].

*C. (Chrysocarabus) lineatus lineatus* Dejean 1826  
Valencia (Spain) XI 1987 [1].

*C. (Chrysocarabus) lineatus lateralis* Chevrolat 1840  
León (Spain) VI 1987 [1]; Salamanca (Spain) VI 1987 [1].

*C. (Chrysocarabus) rutilans rutilans* Dejean 1826  
Barcelona (Spain) VI 1987 [1].

*C. (Chrysocarabus) solieri solieri* Dejean 1826  
Pélasque Le Suquet (France) 4 VI 1981 [2].

*C. (Chrysocarabus) splendens* Olivier 1790  
Navarra (Spain) VI 1987 [1].

*C. (Cytilocarabus) cribratus porrectangulus* Gehin 1885  
Izmir (Turkey) 18 VIII 1978 [2].

*C. (Eucarabus) arcensis carpathus* Born 1902  
Cean (SM) VII 1982 [1]; Crişeni (SJ) V 1990 [2].

*C. (Eucarabus) catenulatus catenulatus* Scopoli 1763  
Mt. Grisa (Slovenia) 22 VIII 1975 [2].

*C. (Eucarabus) catenulatus fontanellae* Reitter 1896  
I. Cres (Croatia) 1 V 1982 [2].

*C. (Eucarabus) deyrollei deyrollei* Gory 1839  
Oviedo (Spain) XI 1987 [1].

*C. (Eucarabus) obsoletus obsoletus* Sturm 1815  
Trenčín (Slovakia) VI 1973 [4]; Mt. Gutâi (BM) VI 1976 [1]; Borşa (MM) VI 1979 [2],  
V 1996 [1], VI 1999 [1]; Vişeu de Sus (MM) VII 1999 [1], VII 2001 [3].

*C. (Eucarabus) obsoletus carpathicus* Palliardi 1825

Mt. Zarand (AR) VI 1980 [1]; Pojoga (HD) VI 1988 [1]; Zlatna (AB) VI 1990 [2]; Mt. Tâmpa (BV) VII 1990 [2]; Mt. Semenic (CS) VII 2001 [2].

*C. (Eucarabus) obsoletus fossulifer* Fleischer 1893

Mt. Meseş (SJ) VI 1985 [5], V 1986 [1], VI 1988 [1], VI 1989 [1]; Păniceni (CJ) VII 1995 [3], VII 2001 [7].

*C. (Eucarabus) obsoletus prunneri* Mallasz 1901

Detunata (AB) VI 1981 [2].

*C. (Eucarabus) ullrichii ullrichii* Germar 1824

Bizusa (SJ) V 1972 [1]; Băneasa (B) V 1977 [1]; Comana (GR) VII 1981 [1]; Jibou (SJ) IX 1984 [1]; Gilău (CJ) VI 1991 [1]; Zalău (SJ) VIII 2001 [2].

*C. (Eucarabus) ullrichi fastuosus* Palliardi 1825

Herculane (CS) VI 1964 [1], VI 1979 [1]; Sasca Montană (CS) VI 1979 [2]; Herculane (CS) VI 1984 [2]; Mt. Domogled (CS) VI 1984 [1].

*C. (Hygrocarabus) variolosus* Fabricius 1787

Mt. Meseş (SJ) VI 1990 [3]; Gilău (CJ) VI 2001 [2].

*C. (Macrothorax) morbillosus constantinus* Kraatz 1899

I. Sardinia (Italy) XII 1973 [2].

*C. (Megodontus) caelatus dalmatinus* Duftschmid 1812

Mt. Velebit (Croatia) 28 VII 1982 [2].

*C. (Megodontus) caelatus schreiberi* Kraatz 1877

Postojna (Slovenia) 12 VIII 1971 [3].

*C. (Megodontus) violaceus violaceus* L. 1758

Mt. Gilău (CJ) VI 1988 [1]; Mt. Gutâi (BM) VI 1988 [1], VI 1999 [1]; Mt. Gilău (CJ) VII 1999 [1]; Răcăţău (CJ) VII 1999 [1]; Zalău (SJ) VI 2001 [1]; Vişeu de Sus (MM) VII 2001 [3]; Zalău (SJ) VII 2002 [1].

*C. (Megodontus) violaceus andrzejuscii* Fischer von Waldheim 1823

Hilişeu-Horia (BT) VI 1982 [1]; Râmnicu Vâlcea (VL) VII 1990 [1].

*C. (Megodontus) violaceus azurescens* Dejean 1826

Mt. Velebit (Croatia) 20 VIII 1974 [2], 22 VIII 1974 [2].

*C. (Megodontus) violaceus germarii* Sturm 1815

Mt. Krim (Slovenia) 3 XI 1975 [2].

*C. (Megodontus) violaceus wolffi* Dejean 1826

Moldova Nouă (CS) VI 1976 [1]; Sasca Montană (CS) VI 1977 [1]; Baia Borșa (MM) VI 1981 [1]; Vatra Dornei (SV) VII 1982 [2], VII 1988 [2].

*C. (Mesocarabus) lusitanicus brevis* Dejean 1826

Sierra de Guadarrama (Spain) 29 V 1983 [2].

*C. (Mesocarabus) lusitanicus molossoides* Lasalle 1984

Cáceres (Spain) VI 1987 [1].

*C. (Mesocarabus) macrocephalus macrocephalus* Dejean 1826

Puerto de Ibañeta, Mt. Pyrenees (Spain) 22 V 1983 [1]; Oviedo (Spain) XI 1987 [1].

*C. (Mesocarabus) problematicus problematicus* Herbst 1786

Bicaz Gorge (NT) VII 1987 [2].

*C. (Morphocarabus) comptus* Dejean 1831

Nădrag (TM) VI 1982 [1]; Constantin Daicoviciu (Căvăran) (CS) VI 1985 [1]; Mt. Gilău (CJ) VI 1987 [1], VI 1988 [2], VI 1998 [2].

*C. (Morphocarabus) excellens* Fabricius 1798

Hilișeu-Horia (BT) VI 1982 [2].

*C. (Morphocarabus) hampei* Kuster 1846

Mt. Meseș (SJ) V 1972 [1]; Oradea (BH) V 1973 [1]; Năsăud (BN) VI 1973 [2]; Pojoga (HD) VI 1985 [1]; Zalău (SJ) VI 1985 [1]; Groși (MM) alt. 400 m. VII 1985 [1]; Negrești (AB) VIII 1985 [1]; B. Felix (BH) VI 1986 [1]; Gligorești (AB) VII 1987 [1]; Mt. Gutâi (BM) VI 1989 [2]; Mt. Meseș (SJ) VI 1989 [1]; Bacea (Iliia, HD) VII 1989 [3]; Micula (SM) VI 1992 [2]; Zalău (SJ) VI 1992 [6]; Mt. Gutâi (BM) VI 1993 [1]; Păd. Crișeni (SJ) VI 1994 [1]; Mt. Gutâi (BM) VI 1999 [2].

*C. (Morphocarabus) hampei incompsus* Kraatz 1880

Mt. Tâmpa (BV) 600 m. VI 1989 [1].

*C. (Morphocarabus) kollari* Palliardi 1825  
Sasca Montană (CS) VI 1977 [4]; Mt. Locvei (CS) VI 1982 [1].

*C. (Morphocarabus) regalis* Fischer von Waldheim 1822  
Mt. Altai (Russia) 10 VII 1992 [1] ♀.

*C. (Morphocarabus) rothi rothi* Dejean 1829  
Nemeșești (TM) VI 1997 [3]; Vânători (MS) VIII no year, [1].

*C. (Morphocarabus) rothi alutensis* Săvulescu 1972  
Râmnicu Vâlcea (VL) VII 1986 [1], VIII 1989 [1]; Călimănești (VL) VII 1994 [1];  
Râmnicu Vâlcea (VL) VII 1994 [1].

*C. (Morphocarabus) scheidleri scheidleri* Panzer 1799  
Český Krumlov (Czech Republic) VIII 1983 [6] (incl. 2 ♀).

*C. (Morphocarabus) zawadzki seriatissimus* Reitter 1896  
Mt. Maramureș (MM) VII 1987 [2].

*C. (Ohomopterus) dehaani dehaani* Chaudoir 1848  
Mt. Rokkō (Hyōgo, Japan) 23 III 1978 [2].

*C. (Ohomopterus) lewisianus* Breuning 1932  
Atami (Japan) 26 XII 1976 [3].

*C. (Oreocarabus) glabratus* Paykull 1790  
Broșteni (SV) VII 1982 [1]; Lacu Roșu (HR) VII 1988 [2]; Vatra Dornei (SV) VII  
1988 [2].

*C. (Oreocarabus) glabratus extensus* Kraatz 1885  
Crișeni (SJ) VI 1968 [1]; Tușnad (HR) VI 1983 [1]; Crișeni (SJ) VI 1987 [2], V 1989 [2].

*C. (Orinocarabus) linnaei linnaei* Panzer 1812  
Vf. Caraiman (PH) alt. 2200 m. VIII 1969 [1]; Broșteni (SV) VII 1982 [5]; Mt.  
Považský Inovec (Slovakia) VII 1982 [4]; Mt. Gutâi (BM) VI 1984 [5].

*C. (Orinocarabus) sylvestris transylvanicus* Dejean 1826  
Piatra Arsă (Mt. Bucegi) (PH) 2100 m VIII 1969 [1].



*C. (Platycarabus) irregularis* Fabricius 1792

Mt. Krim (Slovenia) 9 X 1971 [2].

*C. (Platycarabus) irregularis montandoni* Buysson 1882

Mt. Gutâi (BM) VI 1993 [1].

*C. (Platycarabus) irregularis ramanus* Sokolar 1909

Mt. Krim (Slovenia) 28 X 1976 [2].

*C. (Procrustes) coriaceus coriaceus* L. 1758

Mt. Locvei (CS) VI 1973 [1]; Herculane (CS) VI 1984 [2], VI 1990 [2].

*C. (Procrustes) coriaceus cerisyi* Dejean 1826

Neptun (CT) IX 1982 [2]; Mt. Pindos (Greece) 12 V 1985 [1].

*C. (Procrustes) coriaceus rugifer* (Kraatz 1877)

Comana (IF) VI 1977 [2]; Mt. Gilău (CJ) VI 1985 [1]; Borșa (MM) VI 1986 [4].

*C. (Rhabdotocarabus) melancholicus submeridionalis* Breuning 1975

Huelva (Spain) V 1985 [1].

*C. (Tachypus) cancellatus cancellatus* Illiger 1798

Sf. Gheorghe (CV) VIII 1974 [1]; Mt. Brețcu (CV) VI 1980 [1]; Borșa (MM) VI 1996 [2].

*C. (Tachypus) cancellatus graniger* Palliardi 1825

Mt. Locvei (CS) VI 1973 [1]; Florești (CJ) VIII 1978 [1]; Sasca Montană (CS) VI 1980 [1]; Comana (GR) V 1981 [1]; Balaureni (MS) VII 1982 [1]; Râmnicu Vâlcea (VL) VII 1989 [1].

*C. (Tachypus) cancellatus tibiscinus* Csiki 1905

Sighetu Marmăției (MM) VII 1982 [1]; Mt. Gutâi (BM) VI 1984 [2], VI 1985 [1], VI 1987 [1], V 1989 [1]; Micula (SM) VI 1990 [1]; Borșa (MM) V 1996 [1]; Vișeu de Sus (MM) VI-VII 1997 [3].

*C. (Tachypus) cancellatus tuberculatus* Dejean 1826

Mt. Meseș (SJ) V 1995 [1]; Păd. Crișeni (SJ) V 1995 [1]; Crișeni (SJ) V 1989 [1], V 1990 [1].

*C. (Tomocarabus) convexus convexus* Fabricius 1775  
Păd. Crișeni (SJ) VI 1987 [1]; Mt. Meseș (SJ) VI 1990 [1].

*C. (Tomocarabus) marginalis* Fabricius 1794  
Varghiș (HR) IX 1999 [1].

*C. (Trachycarabus) scabriusculus lippii* Dejean 1826  
Groși (MM) VII 1986 [1]; Râmnicu Vâlcea (VL) VII 1986 [1].

**Subfam. Harpalinae Bonelli 1810**  
**Tribus Lebiini Bonelli 1810**

*Mormolyce phyllodes* Hagenbach 1825  
Cameron Highlands (Pahang, Malaysia), no other data [1].

**Subord. Polyphaga Emery 1886**  
**Fam. Cerambycidae Latreille 1802**  
**Subfam. Lamiinae Latreille 1825**  
**Tribus Batocerini Lacordaire 1869**

*Rosenbergia weiskei* (Heller 1902)  
Kerowagi (Papua New Guinea) VI 1990 [1].

**Tribus Lamiini Latreille 1825**

*Celosterna pollinosa* Buquet 1859  
Suphan Buri (Thailand) VIII 1976 [1].

**Tribus Petrognathini Blanchard 1845**

*Petrognatha gigas* (Fabricius 1792)  
Danyi prefecture (Plateaux region, Togo) („Plateau de Daye, Togo”) III 1988 [1] ♀.

**Fam. Lucanidae Latreille 1804**  
**Subfam. Lucaninae Latreille 1804**  
**Tribus Chiasognathini Burmeister 1847**

*Chiasognathus latreillei* Solier 1851

Cherquenco (Cautin province, Chile) 17 II 1978 [1].

**Tribus Lucanini Latreille 1804***Hexarthrius parryi paradoxus* Mollenkamp 1897

I. Sumatra (Indonesia), no other data [1] ♂.

**Fam. Scarabaeidae Latreille 1802****Subfam. Scarabaeinae Latreille 1802****Tribus Phanaeini MacLeay 1819***Phanaeus (Ph.) demon* Laporte-Castelnau 1840

„Brazil” (sic), no other data [1] ♂.

*Ph. (Notiophanaeus) splendidulus* (Fabricius 1781)

São Bento (Brazil) II 1991 [1] ♂.

**Subfam. Cetoniinae Leach 1815***Coelorrhina aurata* Westwood 1841

Africa, no other data [1].

*Mecynorrhina (Amaurodes) harrisi harrisi* (Moser 1905)

Congo (formerly Zaire), no other data [1] ♂.

*M. (Amaurodes) harrisi procera* Kolbe 1894 (f. *haroldi*)

Katanga province (Congo) (formerly Shaba, Zaire) IV 1991 [1] ♂.

**Subfam. Dynastinae MacLeay 1819***Eupatorus hardwickei cantori* Hope 1831 (black form)

Kaziranga National Park (?) („Khasi”) (Assam, India) VIII 1978 [2] ♂, ♀.

*E. siamensis* Laporte-Castelnau 1867

India, no other data [1] ♂.

**ORD. LEPIDOPTERA L. 1758**  
**Subord. Ditrysia Börner 1925**  
**Fam. Papilionidae (Latreille 1802)**  
**Subfam. Papilioninae Latreille 1802**  
**Tribus Leptocircini Kirby 1896**

*Graphium endochus* (Boisduval 1836)

No data [1].

**Tribus Papilionini Latreille 1802**

*Papilio lormieri* Distant 1874

“Nlong” (?) (Cameroon) 15 IV 1971 [1].

*P. thoas brasiliensis* (Rothschild & Jordan 1906)

Brazil, no other data [1] ♀.

**Tribus Troidini Talbot 1939**

*Cressida cressida* (Fabricius 1775)

Cairns (Queensland, Australia) 14 IV 1983 [1] ♂.

*Ornithoptera (Schoenbergia) goliath procus* (Rothschild 1914)

I. Seram (Maluku province, Indonesia) 1989 [2] ♂, ♀.

**Subfam. Parnassiinae Duponchel 1835**

**Tribus Parnassiini Duponchel 1835**

*Parnassius phoebus* (Fabricius 1793)

Albany (USA), no other data [1].

**Fam. Nymphalidae Rafinesque 1815**

**Subfam. Satyrinae Boisduval 1833 (incl. Morphinae)**

**Tribus Brassolini (Boisduval 1836)**

*Caligo eurilochus* (Cramer 1775)

Peru, no other data [1].

**Tribus Morphini Newman 1834***Morpho thamyris* Felder 1867

São Bento (Brazil) III 1992 [1].

Nymphalidae indet.

Cameron Highlands (Malaysia), no other data [2] ♂, ♀.

**Discussion**

The collection includes 315 specimens, mostly Carabinae (289 specimens): 21 Carabinae subgenera with 43 species and 53 subspecies, 1 Cicindelinae species, 1 Harpalinae species, 3 Cerambycidae (Lamiinae), 2 Lucanidae (Lucaninae), 6 Scarabaeidae species (2 Scarabaeinae, 2 Cetoniinae, 2 Dynastinae), and 9 Lepidoptera species: 6 Papilionidae and 3 Nymphalidae. For all the material from Romania the collector was Adalbert Takács, but for the exotic specimens the respective collectors remain unknown.

The best represented subgenera are *Eucarabus* (63 specimens) and *Morphocarabus* (60 specimens), while the most abundant species is *C. obsoletus* (41 specimens). The majority of the ground beetles specimens were collected by Adalbert Takács in Romania, mostly in the northwestern region around Zalău, but also in other regions, such as the Mediterranean-influenced Banat in the southwest, in the Carpathians or in the northern region Maramureş. The insects from abroad (Palaeartic, Nearctic, Afrotropic, Neotropic, Australasian and Indo-Malayan) were obtained by him through exchanges with private collectors. The known collecting data range between 1964 and 2002.

A number of remarkable species are represented, such as the mountaineous tiger beetle *Pseudoxycheila bipustulata* (distributed in Ecuador, Colombia, Bolivia, and Peru), the violin beetle *Mormolyce phyllodes* (Fig. 1) (distributed in Indonesia and Malaysia), the Lucanine stag beetle *Chiasognathus latreillei* (restricted to areas of southern Chile and southern Argentina), and the rainbow beetle *Phanaeus splendidulus* (distributed in Brazil and Argentina). *Ph. demon* is a Central American species, therefore the sole mention in its original label („Brazil”) is erroneous.

Among the remarkable Lepidoptera there are *Graphium endochus*, though with no data (the species is distributed in Madagascar and Mozambique), *Ornithoptera goliath procus* (Fig. 2) (the second largest butterfly of the world, endemic for the mountaineous area of the Island Seram, Indonesia, and included

in CITES Appendix II), and *Morpho thamyris* (distributed in Paraguay and Brazil).

The endemic and rare ground beetle taxa included are: *Carabus auronitens costellatus*, *C. auronitens festivus*, and *C. hispanus* (endemic for France); *C. lineatus lineatus*, *C. lusitanicus brevis*, and *C. lusitanicus molossoides* (endemic for Spain); the Iberic endemisms *C. lineatus lateralis*, *C. deyrollei deyrollei*, and *C. melancholicus submeridionalis*; *C. catenulatus fontanellae* (endemic for Croatia); *C. obsoletus fossulifer*, *C. comptus*, *C. hampei incompsus*, *C. rothi rothi*, and *C. rothi alutensis* (endemic for Romania); *C. ullrichi fastuosus* and *C. kollari* (distributed in a limited area in southwestern Romania and Serbia); *C. macrocephalus macrocephalus* (distributed in the Pyrenees and Asturia, northwestern Spain); *C. zawadzki seriatissimus* (endemic for Ukraine); *C. dehaani* and *C. lewisianus* (endemic for Japan); *C. irregularis ramanus* (restricted to Austria and former Yugoslavia); the Balkanic endemism *C. coriaceus cerisyi*; and *C. scabriusculus lippii* (restricted to Hungary, Romania and the Republic of Moldova).

The two Western and Central European subspecies *C. violaceus violaceus* and *C. problematicus problematicus* were collected by Adalbert Takács in northwestern Romania between 1988 and 2002, and in Bicaz gorge (Central Romania) in 1987, respectively, thus documenting a possible expansion of the two species.

The only IUCN Red List species in the collection is *C. intricatus* (Lower Risk/near threatened, according to the IUCN Red List ver. 2.3, assessed in 1996, needs updating). The collection includes three species of community interest, in need of strict protection, whose conservation requires the designation of special areas of protection: *C. hampei*, *C. variolosus*, and *C. zawadzki*.

### Acknowledgements

Thanks are due to Mrs. Rodica Serafim („Grigore Antipa” National Museum of Natural History, Bucharest), for her observations which helped improve the manuscript.

The present paper is dedicated to Mr. Adalbert Takács.

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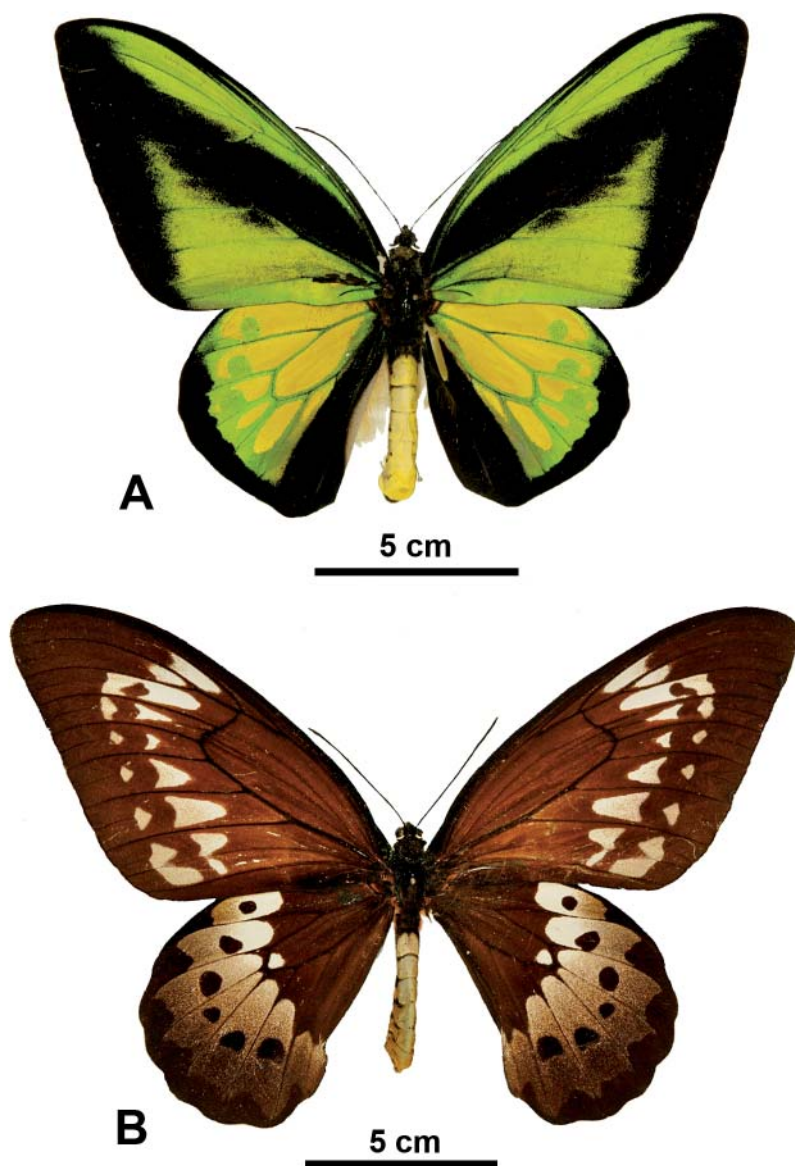
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**Fig. 1.** *Mormolyce phyllodes* Hagenbach 1825, Cameron Highlands (Pahang, Malaysia).





**Fig. 2.** *Ornithoptera (Schoenbergia) goliath procus* (Rothschild 1914), I. Seram (Maluku province, Indonesia) 1989: A – male, B – female.

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## **Estimating population size of *Marmota marmota* in the Rodnei Mountains National Park, Romania**

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**Abstract.** We have not detailed data after 1988 about Alpine marmot populations from the Rodnei Mountains. In 2009, we identified seven burrows of the *M. marmota* above the Iezer Lake (near the Pietrosul Rodnei Peak). After some calculations, we estimate that could be about 47 marmots there and about 126 individuals inside the Rodnei Mountains National Park.

**Keywords.** Alpine marmot, population size, Rodnei Mountains

### **Introduction**

Alpine marmots (*Marmota marmota*) are the largest ground-dwelling squirrels (Allaine, 2004) in Romania. The basic social unit is a family group of 2-20 individuals (Allaine & Theuriau, 2004). *Marmota marmota* is mainly inhabitant of the subalpine and alpine meadows where they dig burrows (Mann et al., 1993).

The past existence of the alpine marmots (*Marmota marmota*) in the Romanian Carpathians is under a big question mark. After some deliberation, in

1972 were introduced 12 individuals in the Pietrosul Rodnei Reservation (Almășan, 1981) (the ancient core of the present Rodnei Mountains National Park, Romania), from the Vanois National Park (France) (Ramousse & La Berre, 1993). These 12 marmots felt good in the new, but similar habitat, and their effectives increased well. After few years, some naturalist observed that the marmots have a tendency for dispersing along the main mountain range, therefore, we can hear now in 7-10 locations the whistling marmots inside the National Park.

It was considered necessarily to estimate the population size of the Alpine marmots from the Rodnei Mountains, because of the incomplete data which was registered along the years after the re(-colonization).

In 2009, above the lake Iezer, in the heart of the Pietrosul Rodnei Scientific Reservation (Eastern Carpathians, Romania), we searched the entrances of the marmot's burrows to estimate the effectives of the alpine marmots population.

### **Material and methods**

We took the field-data during 3-5 July 2009, from the Pietrosul Rodnei Scientific Reservation (Fig. 1.). Inside of the Scientific Reservation is situated the glacial lake Iezer. Above the lake, we searched the entrances of the marmot galleries. The slopes above the lake we divided in 3 major zones, each zone is corresponding for the general exposition of the slopes: zone R (right, general exposition is Northwest) zone C (center, general exposition is North - Northeast) and zone L (left, general exposition is East - Southeast).

Between 6:30 AM and 11:30 AM, we identified the entrances. We noted every entrance with a code with the follow type: the code of the slope (R, C, or L) followed by the order of the burrow system where the entrance is belonging (A, B, C...) and the number of the entrance (1, 2, 3...). For example, the fifth entrance from the right slope, what is belonging to the second burrow-system, we noted with RB5. We also found some single entrances that we noted with S1, S2 or S3. We considered this entrance as a "single", because they are too far from other burrow entrances, which are constitute a burrow-system. We measured the distance between two entries with 30 m long tape measure.

### **Results**

We identified 37 access grouped in 7 burrow-systems:

→zone C (N-NE): 4 galleries = 14 entries (1 gallery with 7 entries and 2 gallery with 3 entries and one single-entrance);



**Fig. 1.** Map of the Rodnei Mountains National Park, Romania. Inside the park is situated the “Pietrosul Rodnei” Scientific Reservation where was located our research. Green stars indicate the presence of the alpine marmots.



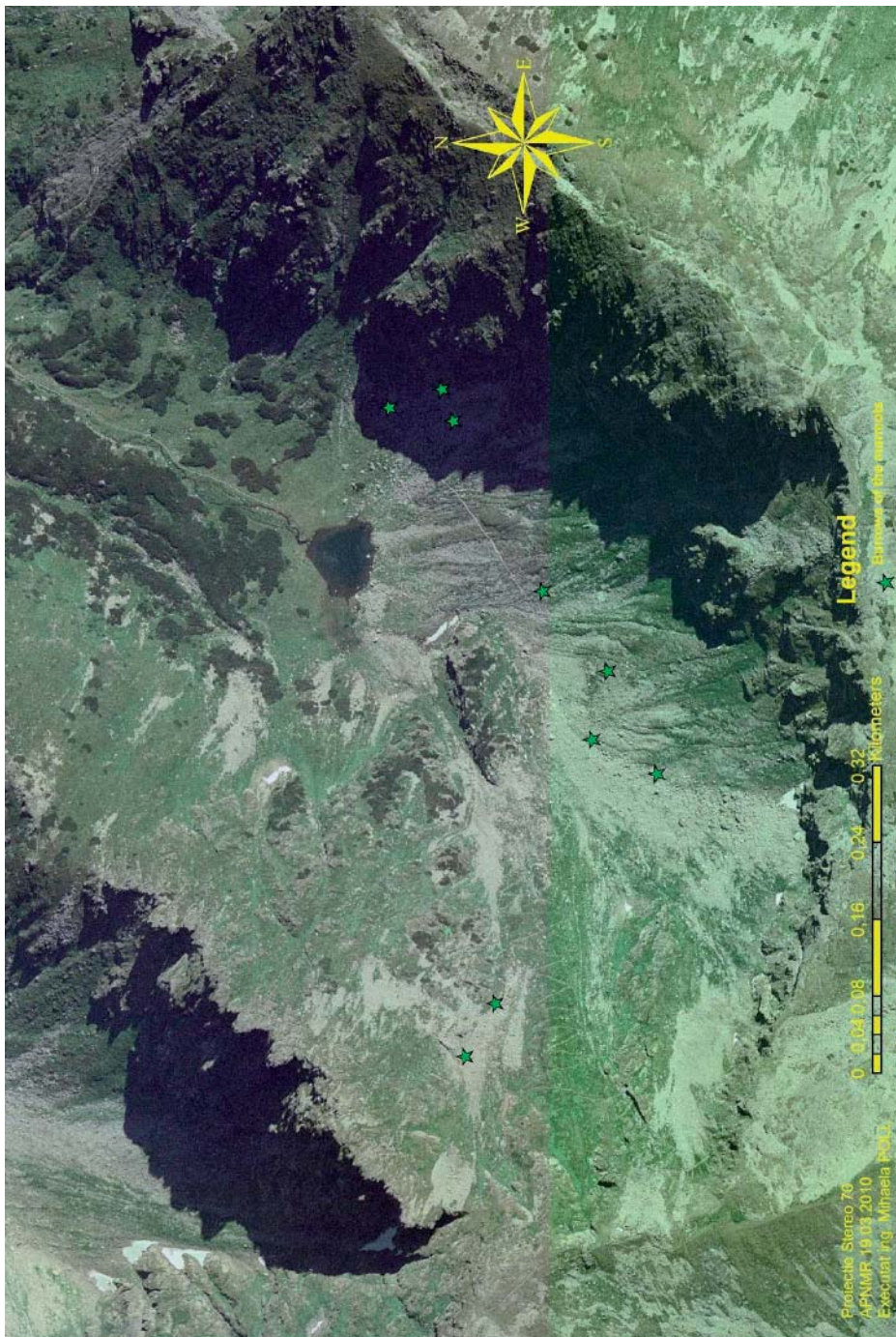


Fig. 2. Map representing the research area. The green stars indicate the burrows of the marmots.

→zone L (E-SE): 3 galleries = 9 entries (1 gallery with 3 entrances and 1 gallery with 6 entrances);

→zone R (N-NW): 2 galleries = 14 entries (2 galleries with 6 entries and 2 single-entrance) (see Fig. 2.).

## Discussions

Almășan (1981) shared some important information about the Alpine marmot populations in the Pietrosul Rodnei Reservation. He related, that in 1974, two years after the colonization, the number of the marmots were about 50-60 individuals. He mentioned also, that from the total 8-9 colonies, four were at the “lezerul Pietros” (at the valley of the lezer glacial lake). Therefore, we can make some easy calculations and we can find that in four colonies (where we considered that one colony live in one burrow (Borgo, 2003)) were 25-27 individuals. So, in 7 galleries what we identified should be 43-47 marmots. These mean, that in 30 years, the alpine marmot population increased well above the glacial lake (Fig. 3.).

Today, we can hear the whistling marmots in many locations inside the National Park (Buhăescu, Zănoaga, lezerul Pietros, under the Laptelui Mare Peak, at the Gărgalău valley, under the Corongișul Mare Peak, under the Negoiasa Peak and between the Ineuț and Roșu Peak). However, using the information from the literature and our results from the presented research, we can observe a fluctuation of the population size of the Alpine marmots from the 19<sup>th</sup> century to 2009 (see Table 1. and Fig. 4.). The cause of this fluctuation in the population size should be the longer and harsh winters along the years, the presence of the natural predators, annoys of the sheepdogs and the intensive tourism.

## Conclusions

1. Maximum 47 marmots could be at “lezerul Pietros” and about 126 individuals inside the National Park. This is mean that the habitat conditions are favorable for the individuals of *M. marmota* to live in the Rodnei Mountains.
2. Marmots present a tendency for dispersion along the main chain of the Rodnei Mountains.
3. Because various causes, the Alpine marmot population size present a fluctuation inside the Rodnei Mountains National Park.

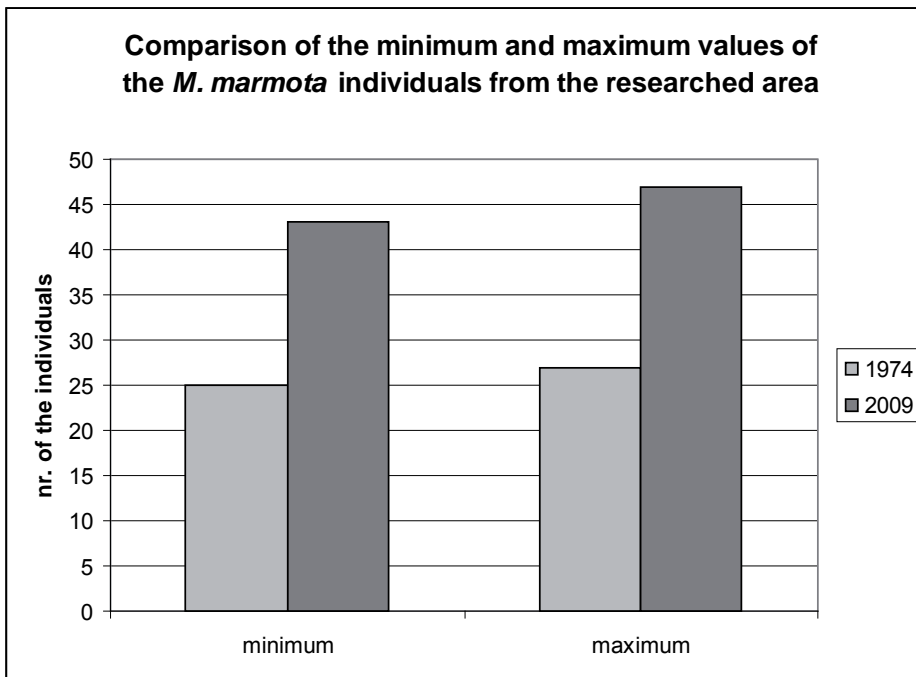


Fig. 3. Comparison between the minimum and the maximum values of the population effectives from 1974 and 2009.

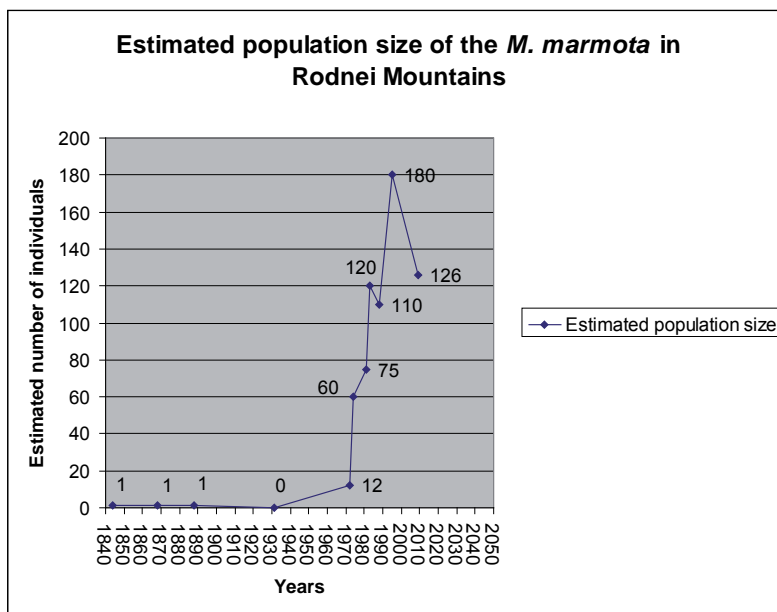


Fig. 4. The fluctuation of the population size of the alpine marmots

**Table 1.** Estimated population size mentioned by different authors between 1844-2009

Years	Authors	Estimated population size
1844	Hanak J. (in Ardelean & Beres, 2000)	1
1868	Odobescu & Aurelian (in Călinescu 1956)	1
1888	Bielz E. A. (in Călinescu 1956)	1
1931	Călinescu R.	0
1972	Almășan H.	12
1974	Almășan H.	60
1981	Almășan H.	75
1983	Nădișan I.	120
1988	Ardelean G. & Beres I.	110
1995	Nădișan I.	180
2009	Szabo B.-M. (present work)	126

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### Rezumat

Informațiile privind mărimea populației de *M. marmota* din Munții Rodnei sunt lacunare. De aceea, în 2009 s-au efectuat cercetări prin identificarea galeriilor de marmotă. Luând în considerare câteva lucrări de referință, am putut estima mărimea populației de marmotă deasupra lacului lezer (Rezervația Științifică Petrosul Rodnei). Conform calculelor, în 2009 puteau fi maximum 47 indivizi în căldarea glaciară lezer și aproximativ 126 marmote pe toată suprafața Parcului Național Munții Rodnei.

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## **Proiect de conservare în noile depozite de zoologie a Muzeului Țării Crișurilor, Oradea**

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**Abstract. Conservation project in the new zoology storage of Tarii Crisurilor Museum, Oradea.** Tarii Crisurilor Museum Oradea faces the situation of relocation of its collections into a new headquarter, a 19<sup>th</sup> century building. The zoology collections of the Natural History Department, containing over 48.000 specimens, need special measures during the planning of its new storage, in order to preserve the great variety of dry and wet specimens (oology, enthomology, malacology, ornithology and mammalogy collections). The new zoological storage was planned according to the latest standards in order to control the range of temperature and relative humidity, to reduce fluctuations of temperature and relative humidity, to prevent damage resulting from light or air pollutants and to eliminate biological infestations. The space saving, compact mobile storage system was designed for the zoological collections to increase the usable space and ensure space in accordance with collections growth.

### **Introducere**

Lucrarea de față își propune prezentarea proiectului de reamenajare a spațiilor destinate depozitelor de zoologie ale Secției de Științele Naturii a Muzeului Țării Crișurilor.

Începând cu 1950 patrimoniul secției a crescut în mod constant, la ora actuală acesta deținând peste 145000 de piese, din care peste 90.000 piese în colecțiile de paleontologie-geologie, peste 48.000 în colecțiile de zoologie și 12000 în colecțiile de botanică (Fig.1).

Colecțiile de zoologie după modul de conservare cuprind (Fig.2):

- **Preparate uscate** (colecția oologică peste 14.000 de piese, entomologie 4180 de piese, malacologie 6062 de piese, naturalizări, balguri, schelete de păsări și mamifere - aprox 6000 de piese)
- **Preparate umede** (nevertebrate și vertebrate - pești, amfibieni, reptile)

În urma retrocedării Palatului Baroc - actualul sediu, Complexul Muzeul Țării Crișurilor Oradea, a fost pus în situația de elabora proiectul de renovare a noului sediu - o clădire construită în stil eclectic la sfârșitul secolului XIX și de a proiecta planul de amenajare a depozitelor, laboratoarelor, spațiilor expoziționale.

### Etapa de documentare

Etapele de dinaintea proiectării au cuprins o etapă de documentare și cercetare, atât teoretică – prin consultarea publicațiilor de specialitate, cât și practică – prin efectuarea unor vizite la câteva muzee europene de istorie naturală recent mutate sau recent renovate (Golban, 2009). Pentru a putea proiecta spațiile destinate depozitelor și laboratoarelor conform celor mai înalte standarde s-au analizat planurile arhitecturale ale noului sediu și a caracteristicilor tehnice ale acestuia: căile de acces, sursele de lumină naturală, sistemul de conducte de apă și canalizare, și s-a făcut inspecția clădirii la fața locului pentru a evalua starea de „sănătate” a clădirii: structura de rezistență, gradul de întreținere, starea zidăriei, gradul de umiditate etc. (Golban, 2009).

Conservatorul a conlucrat cu arhitecții și cu specialiștii muzeului pentru a se asigura că vor fi respectate toate cerințele de conservare încă din faza de proiectare: asigurarea măsurilor de securitate, asigurarea unui microclimat adecvat, a sistemelor de alarmă și stingere a incendiilor, precum și implementarea celor mai potrivite soluții tehnice pentru eliminarea eventualelor riscuri specifice fiecărei colecții (Waller, 1995; Herreman, 1995, Cultural Resources and Planning (LORD), 1999). Tot conservatorul este cel care trebuie să comunice arhitecților caracteristicile tehnice necesare spațiului de depozit, respectiv nivelul optim de lumină, umiditate și temperatură pentru fiecare tip de colecție ce va fi găzduită în depozitul de zoologie.

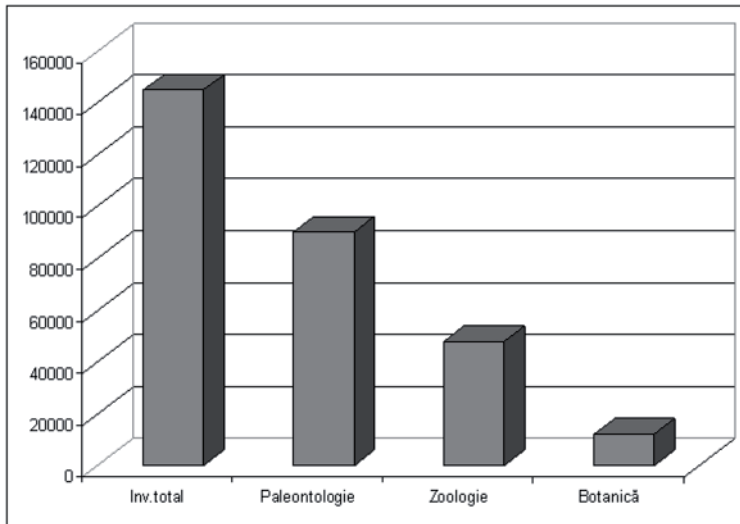


Fig. 1. Distribuția patrimoniului secției pe colecții

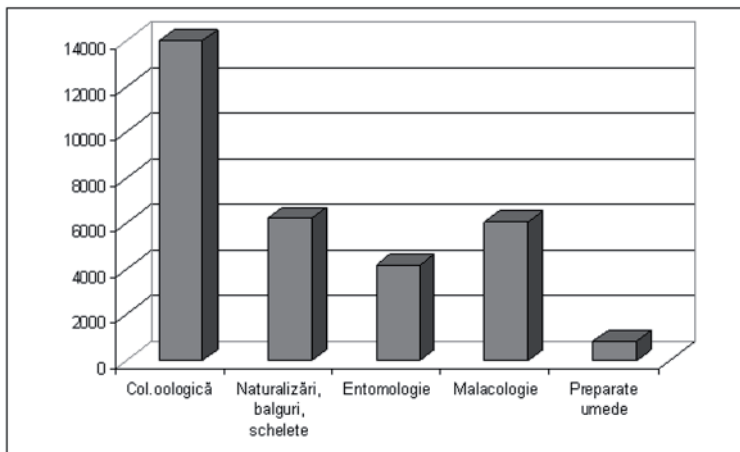


Fig. 2. Colecția de zoologie pe domenii taxonomice

## Proiectarea spațiilor destinate depozitelor de zoologie

În desemnarea spațiilor pentru depozitul de zoologie și al depozitului primar de zoologie, precum și a laboratorului de conservare zoologie s-au avut în vedere următoarele considerente privind specificul colecțiilor de zoologie:

- greutatea și dimensiunea colecțiilor
- asigurarea unui microclimat corespunzător: izolare termică, controlul umidității, eliminarea surselor de praf/poluanți
- existența căilor de acces pentru evacuarea în caz de urgență
- asigurarea de spații pentru depozite primare în apropierea depozitului propriu-zis
- crearea laboratoarelor în vecinătatea depozitelor pentru a scurta drumul obiectelor care necesită lucrări de restaurare/conservare

La fel ca la depozitul de paleontologie/geologie și colecțiile de zoologie pun problemele privind greutatea, sarcina exercitată asupra pardoselii și asupra întregii structuri ale clădirii este ridicată. La calculul capacității de încărcare a pardoselii spațiului de depozitare, la greutatea obiectelor (preparate umede, schelete, naturalizări), se adaugă greutatea mobilierului, care este mai mare decât sarcina suportată pe metru pătrat de către pardoseala clădirilor în cazul (Golban, 2009). mobilierului rulant compact. Acesta, cu șinele și structura de bază aferente trebuie proiectate și instalate astfel încât să crească sarcina de încărcare a pardoselii, ținând cont de caracterul și densitatea de depozitare a colecției, precum și de configurația mobilierului ales.

În procesul de proiectare s-a ținut cont în primul rând de respectarea condițiilor de **microclimat** specifice colecțiilor de zoologie: temperatură, umiditate relativă, poluanți atmosferici și nu în ultimul rând cel de lumină (Viscardi et al, 2006, Utriainen et al, 2007). Colecțiile de zoologie: nevertebrate sau vertebrate, conservate ca preparate umede sau uscate (naturalizări, schelete etc.) conțin materie organică, iar materia organică se deteriorează foarte ușor la variații de umiditate, temperatură, și la expunere la lumină naturală sau UV.

### Umiditatea relativă

Colecțiile de științele naturii, în special cele de zoologie sunt sensibile la variațiile de umiditate relativă (UR). Majoritatea acestor colecții se păstrează foarte bine într-un microclimat relativ uscat, cu o UR de 45-55%. O umiditate relativă mai mică de 40% în colecțiile de zoologie, duc la apariția deteriorarea mecanică (fisurarea suprafețelor expuse) a materialelor organice cum ar fi dinții, oasele

sau cochiliile. Creșterea umidității relative la peste 60% favorizează apariția mucegaiului și infestarea cu dăunători, ce pot deteriora colecțiile de zoologie, în special în cazul preparatelor uscate de tipul naturalizărilor sau balgurilor.

### **Temperatura**

Fluctuațiile de temperatură afectează orice tip de colecție, prin urmare este importantă proiectarea noilor depozite cu asigurarea unei temperaturi optime stabile. Multe studii sugerează o temperatură optimă de 15-22°C, cu o fluctuație zilnică maximă de  $\pm 1$  °C, cu condiția ca această temperatură să se mențină cu o valoare optimă a umidității relative. (Utriainen et al, 2007). Variațiile de temperatură afectează diferit colecțiile de zoologie, în funcție de specificul acestora. Colecțiile de preparate uscate (naturalizări, schelete etc.) și umede la expunere la temperaturi ridicate se pot usca, ducând la deteriorarea pieselor din colecție. La temperaturi joase (sub 12°C), preparatele umede, care sunt încă conservate în formol se pot deteriora, cele conservate în alcool - dacă nu au fost conservate anterior în formol, se conservă mai bine temperaturi scăzute.

### **Lumina**

Majoritatea colecțiilor care conțin materie organică sunt sensibile la expunerea la lumină naturală sau la radiații UV. Expunerea la asemenea radiații duce la pierderea culorii la toate colecțiile de zoologie, preparate umede sau uscate, iar în cazul preparatelor umede, expunerea îndelungată la UV ridicate duce la declanșarea unor reacții fotochimice, care deteriorează lichidul în care se conservă preparatele.

Proiectul noilor depozite prevede izolație termică, sisteme moderne de încălzire, ventilație și aer condiționat, geamuri fi obturate pentru a elimina sursa de lumină naturală. Depozitele vor fi prevăzute cu aparate de măsură a condițiilor microclimatice și cu aparate mobile de umidificare / dezumidificare.

### **Securitate și acces**

În „Proiectul tehnic de renovare și reamenajare în noua clădire a Muzelului Țării Crișurilor”, proiect executat de către firma SC PROIECT BIHOR SA, s-au ales cele mai moderne și cele mai potrivite soluții în infrastructura necesară asigurării condițiilor de siguranță (sistemul de alarmă) și de stingerea incendiilor. Măsurile de securitate impun izolarea spațiilor de depozitare cu uși de acces ignifugate.

Căile de acces și de deschidere au fost corelate cu volumul și masa obiectelor, ambele fiind ridicate în cazul unor preparate uscate din colecția de zoologie. Pentru securitate, accesul în depozit se va face pe baza cartelelor magnetice, pentru înregistrarea utilizatorului și a timpului petrecut în depozit.

Pentru amenajarea depozitului de zoologie, a depozitului primar și a laboratorului de conservare zoologie, conservatorul Secției de Științe ale Naturii a solicitat trei spații situate la primul etaj, corp A, aripa stângă, spații pentru care există în apropiere o cale de acces pentru a asigura evacuarea în caz de urgență (Fig.3). La alegerea acestor spații s-a ținut cont de gruparea celor două depozite, depozitul efectiv de zoologie și al depozitului primar, necesar pentru izolarea pieselor noi sau a celor contaminate. Apropierea celor două depozite asigură scurtarea drumului pe care trebuie să-l parcurgă obiectele muzeale. Din aceleași considerente, lângă depozitul primar s-a ales spațiul pentru laboratorul de zoologie, unde se vor efectua lucrările de preparare, conservare și restaurare a pieselor din colecțiile de zoologie.

### **Proiectarea mobilierului**

Ținând cont de dinamica de dezvoltare a colecțiilor de zoologie a Secției de Științele Naturii a Muzeului Țării Crișurilor în ultimii 10 ani, noile facilități de depozitare trebuie să fie în conformitate cu această dinamică. Prin urmare noul depozit trebuie să satisfacă depozitarea colecțiilor existente și să asigure spațiu de depozitare și pentru piesele noi în următorii 20-30 ani. Mobilierul propus pentru depozitarea acestor colecții este dulapul compact rulant, cu deschidere mecanică, ce va duce la o densitate mai mare a obiectelor depozitate și o folosire rațională a spațiului. Într-un spațiu astfel organizat capacitatea de depozitare crește cu 50-100%.

### **Tipo-dimensionarea**

Obiectele din colecțiile de zoologie variază mult ca dimensiune, de la schelete complete și naturalizări de mamifere mari, ce pot atinge lungimi de 1,5-2 m, până la colecția de entomologie, în care speciile au dimensiuni de câțiva milimetri. În funcție de natura și dimensiunea obiectelor pentru fiecare tip de colecție s-a făcut tipo-dimensionarea, astfel s-au proiectat 2 tipuri de module A-B (Fig. 4) pentru dulapul compact rulant, primul modul fiind fixat de perete, restul modulelor fiind mobile.

Pentru a stabili dimensiunea și numărul sertarelor pentru fiecare tronson s-au corelat datele privind dimensiunea obiectelor din fiecare tip de colecție. Astfel,

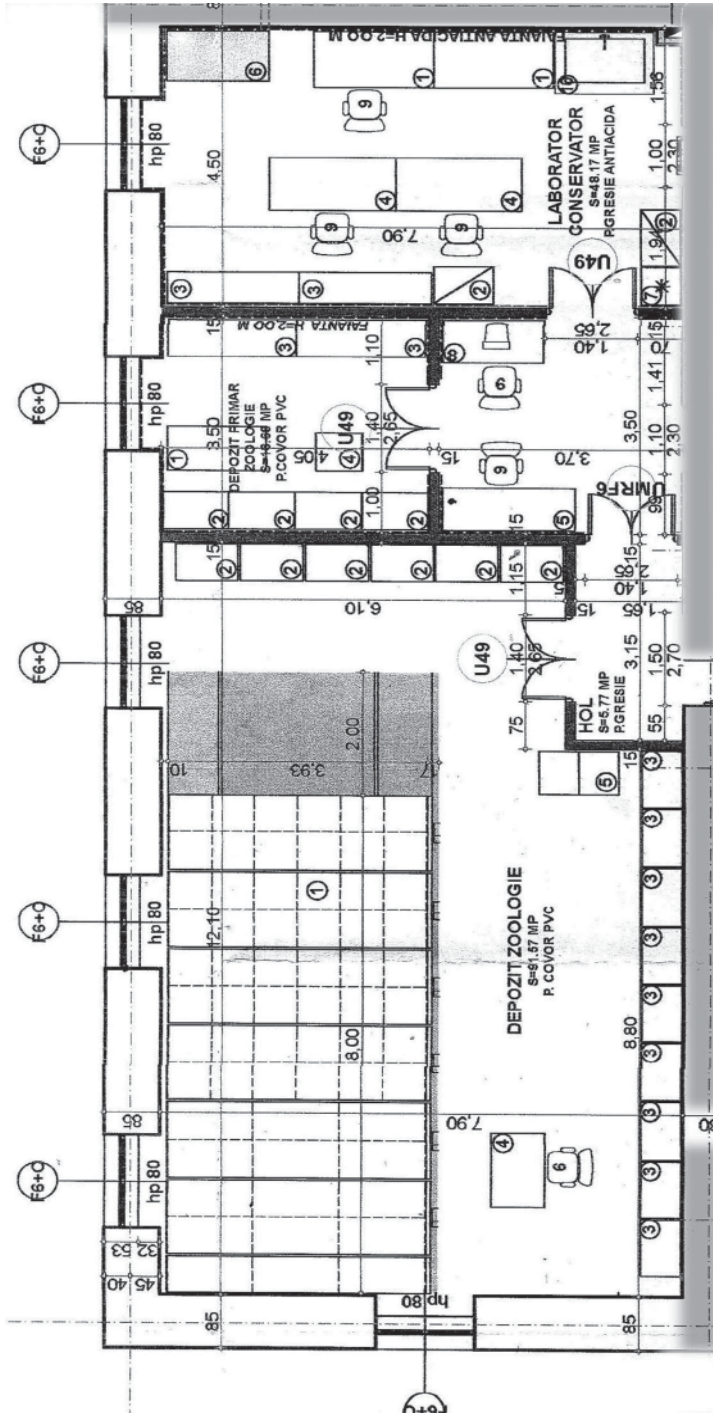


Fig. 3. Amplasarea depozitelor de zoologie în spațiul secției



colecțiile de preparate umede și naturalizări vor fi depozitate în același tip de modul (A), totalizând un număr de 5 module cu 3 tronsoane/modul (Fig. 4). Configurația sertarelor pentru un tronson aferent modulului tip A este de 55 cm x 125 cm x 48 cm (Fig. 5). Colecțiile de balguri, schelete parțiale, entomologia și malacologia vor fi depozitate în module de tip B, totalizând un număr de 8 module împărțite în 6 tronsoane/modul, de dimensiuni 0,60 m x 0,60 m x 2,50 m. Configurația unui tronson (de jos în sus) este după cum urmează: 2 sertare de 55 cm x 55 cm x 6 cm, 14 buc sertare de 55 cm x 55 cm x 12 cm, 2 buc sertare de 55 cm x 55 cm x 24 cm (Fig. 6).

După transportul obiectelor muzeale în noul sediu, obiectul va fi așezat în modulul/ tronsonul/ sertarul stabilit înainte, cu introducerea datelor în calculator, obținându-se astfel o modalitate practică de regăsire rapidă a obiectului respectiv. Proiectul mobilierului din depozit, pe module și tronsoane, ajută la stabilirea locului exact unde va fi așezat obiectul din colecție, eliminându-se astfel manipulările inutile de obiecte.

Colecția oologică, fiind cea mai fragilă, va fi depozitată într-un șir de dulapuri de lemn, cu sertare și uși (100 x 200 x H104) cm, suprapuse două câte două (Fig. 3). Accesul la sertarele superioare va fi facilitat de o scară mobilă. Depozitul va fi dotat cu 9 rafturi metalice deschise cu 5 polițe rezistente fiecare (60 x 100 x H188) cm, pe lângă dulapul de depozitare compact rulând, pentru a depozita scheletele montate și naturalizările de mari dimensiuni (Fig. 3).

Depozitul va fi dotat, de asemenea, cu o masă de lucru cu schelet metalic, blat rezistent, placat cu faianță antiacidă cu roți cu sistem de blocare, pentru facilitarea fazelor de lucru efectuate în colecțiile de zoologie.

Depozitul primar de zoologie este poziționat în imediata apropiere a depozitului de zoologie propriu-zis, ce va cuprinde patru rafturi metalice deschise cu 6 polițe rezistente (60 x 100 x H 200) cm, patru dulapuri din lemn cu 5 polițe și uși glisante, o masă de lucru mobilă, cu schelet metalic și blat rezistent, o scară mobilă și o ladă frigorifică. În depozitul primar se depozitează speciile colectate sau cele recent intrate în colecție prin achiziții/donații, care trebuie izolate pe o perioadă de 3 luni pentru a le stabiliza și a monitoriza eventualele atacuri cu fungi, bacterii etc. De asemenea, în depozitul primar se depozitează speciile aflate în curs de preparare sau cele care necesită intervenții privind starea de conservare și restaurare.

La același nivel este poziționat laboratorul de conservare, lângă depozitul primar de zoologie, pentru a reduce drumul obiectelor care necesită lucrări de restaurare/conservare și a celor proaspăt colectate care urmează a fi. Astfel se reduce la minim distanța la care trebuie transportate și numărul de manipulări

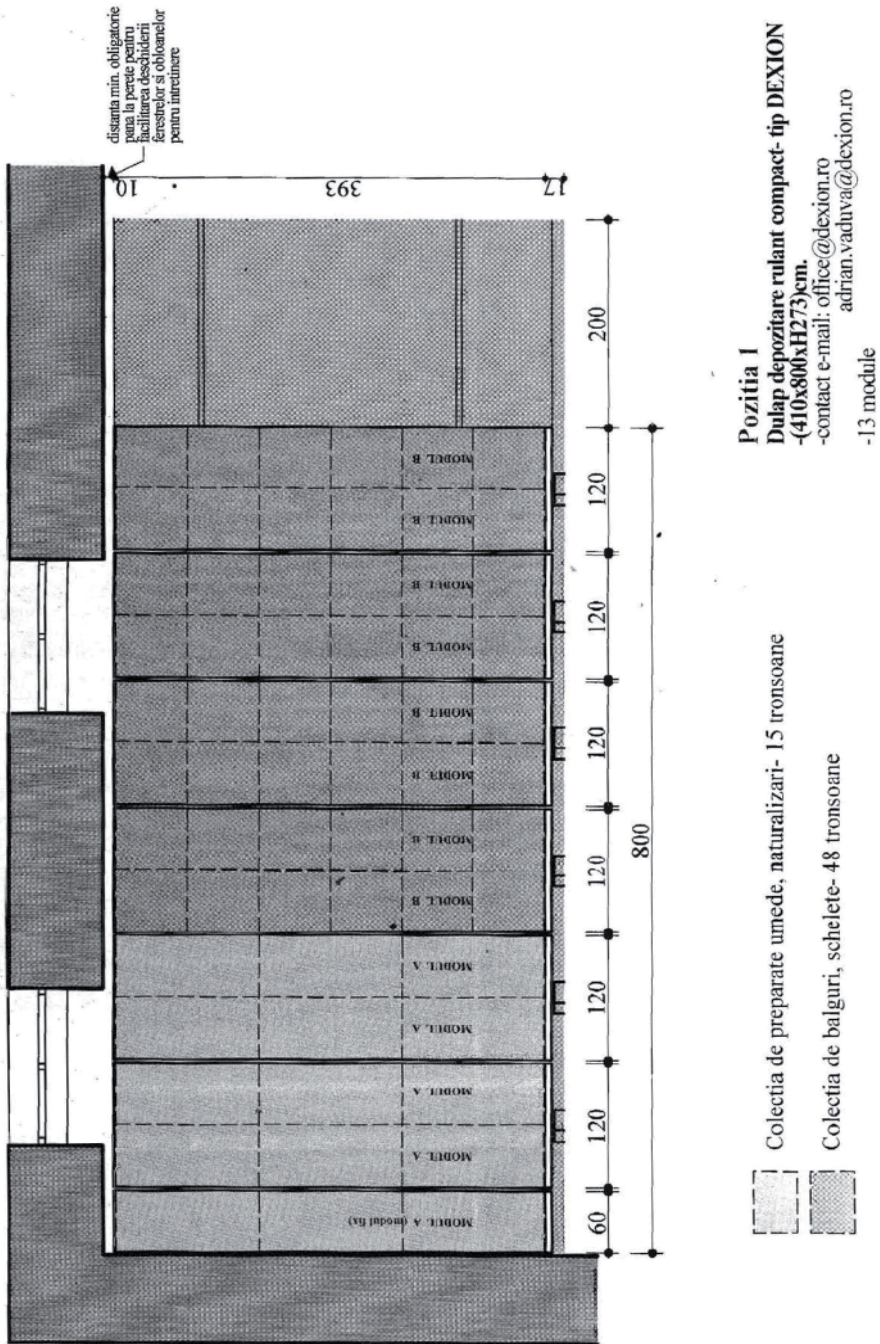


Fig. 4. Dulap modular rulant compact

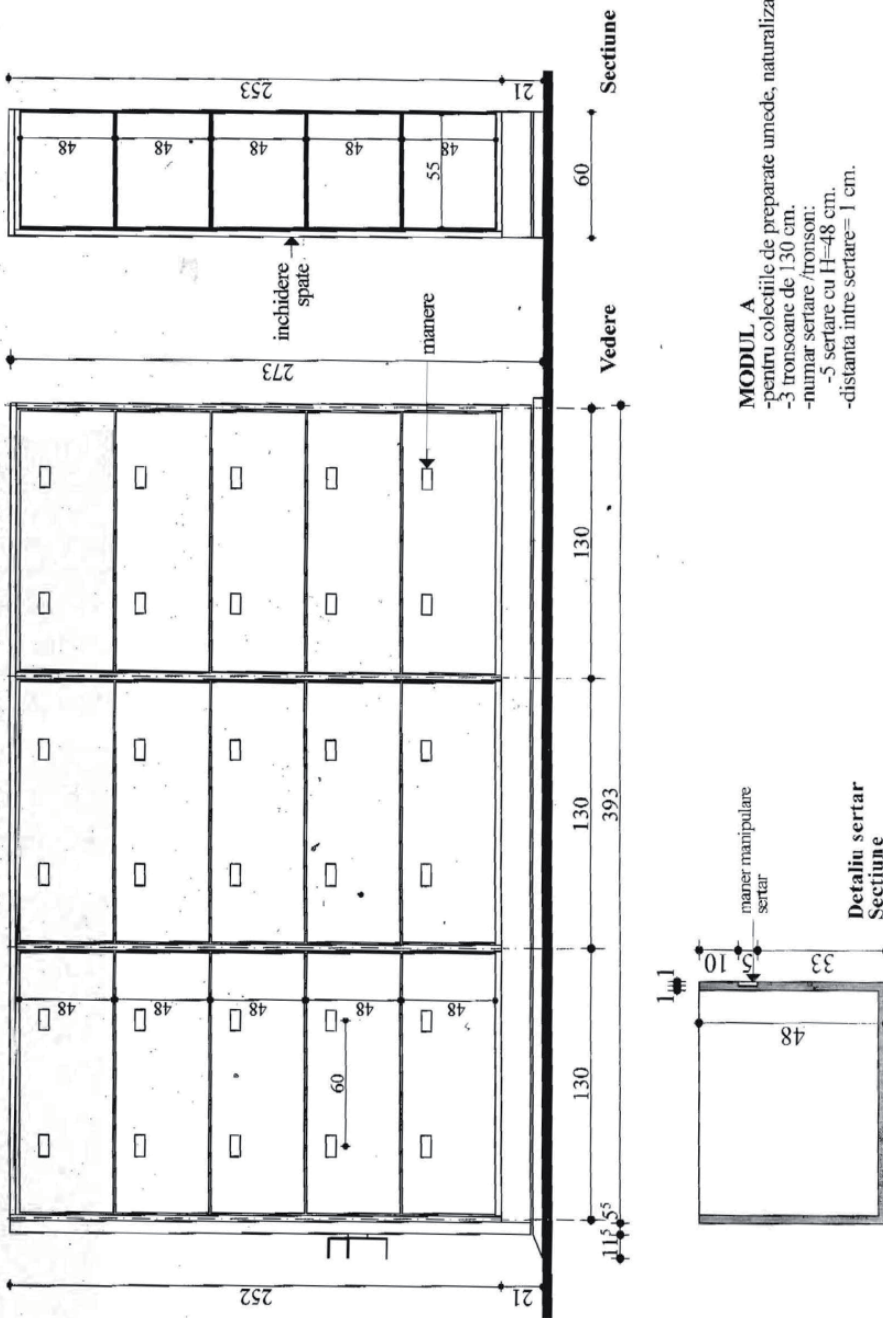


Fig. 5. Modul pentru preparate umede și naturalizări



pentru fiecare obiect. Lista de dotări pentru laboratorul de conservare necesare cuprinde: nișă chimică cu exhaustare și filtre, bazin de spălare cu decantor, dulap metalic pentru substanțe toxice, dulap preparare cu blat, masa preparare fixă cu iluminat, masă microscop, masă calculator etc.

Pentru realizarea tuturor standardelor cerute de conservatorul Secției de Științele Naturii este nevoie de respectarea proiectului tehnic de amenajare a noului sediu al Muzeului Țării Crișurilor și de asigurarea finanțării lucrărilor și a dotărilor depozitelor și laboratoarelor.

Dacă aceste două condiții vor fi respectate, după mutarea colecțiilor în depozitele proiectate, patrimoniul extrem de valoros al Muzeului Țării Crișurilor se va bucura de condiții de conservare și de valorificare științifică și expozițională la standarde europene.

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