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Revision of *Ptilophyllum*-like leaves from the Lower Jurassic of Romania

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Abstract. The sure presence of the taxa in any floristical association should be argued not only by the determination of some specimens and by nomenclatural revisions of the old determinations, but also by the effective publication of at least a short description and a minimal figuration that must be in concordance with the diagnoses. In this context, author accomplishes a revision of the presence of genus *Ptilophyllum* in the Lower Jurassic of Romania. The acceptance or rejection of the presence of genera and species should not depend of the reviser's inclinations, workplace, or of the publication's rank. To eliminate the subjectivity, this study contains a table with a general revision scheme, proposed also for other genera. When the generic assignment is doubtful, revisers should place one of the signs „cf., aff., ?" before the generic name. They should simply delete in these cases the specific name, if it exists, and replace with „sp." If the generic name is fully acceptable for the determined material, but the acceptance of the specific name is problematic, one of the epithets „cf., aff." should precede the specific name. Instead of the old-fashioned and ambiguous „ex. gr.", palaeobotanists should use „aff." By using the revision scheme, the genus *Ptilophyllum* is present in the Lower Jurassic flora of the country only with two species, namely *Ptilophyllum maculatum* Givulescu, and *Ptilophyllum aninaensis* Czier. Many authors have assigned specimens to the genus *Ptilophyllum*, without description or figuration. This is mainly the case of some old collections. Until at least one of the so many insufficiently presented specimens found in the literature will eventually be described and figured, according to the scheme all belong questionably to the genus, or at the most with „cf."

Keywords. Macroflora, Mesophytic, Romania.

Introduction

The last paper dealing with the presence of *Ptilophyllum* in the Lower Jurassic of Romania (Czier 2010) shows that the attribution of the material to the majority of the recorded species is arbitrary. The presence of the genus in some fossil localities is only theoretical.

Many published specimens or even entire collections were lost during the long history of palaeobotany, other specimens are unidentifiable for example because they bear no inventory numbers. A considerable part of them are not described, not figured, or belong to species of which the validity is more or less questionable. Part of the specimens identifiable in the collections is in different phases of the palaeobotanical researches.

A big old problem. When the studied material is vast, long time may pass until the researches come to the end and the researchers elaborate the conclusions. Many years might be necessary to finalize a main research, but the life is finite. This is still not a big problem, or should not be, as scientists can simply accept the fact, or they can work on projects dealing with the lengthening of the life. Even if the results of such projects could considerably prolong our existence, life always has not just a beginning but also an end. Scientists do not constitute exception to this rule.

A big and old problem is, however, that many specimens mentioned just in lists may remain with no proof regarding the determination, if someone neglects the rule. This is the worst of all what may happen. The situation could be much better if that someone would not publish the material. The reason of why is simple. This is because a determination lack of description or figuration, although cannot constitute solid base for further researches, neither can be ignored, nor simply forgotten.

Nobody can be sure, if new publications will follow an actual study or not, but everybody would at once let known something important to the posterity. Perhaps this is why almost all the authors wrote first of all manuscripts that they deposited in supposed safe places, and quickly published lists of taxa concerning the flora that they had more or less thoroughly studied or of which the study they had just begun. The description and figuration of the material, even if existed somewhere, in the most cases never will appear if the authors did not published them during their life. The exigent posterity cannot accept any kind of determinations without believable evidences.

A small new solution. Maintaining the acceptance of the not described, not figured, or lost specimen's determinations, as well as accepting new species based on almost nothing – invalid species, *nomen nudum*, and unidentifiable material – almost surely would lead scientists astray, among others to erroneous biostratigraphical and palaeophytogeographical conclusions. This is the case for example of some never described and never figured lost specimens, recorded in meanwhile lost manuscripts, but cited over and over along the centuries with the statement together that they belong to a species or other. The perpetuation of such citations should anyway stopped, but if the name of a species already appeared in a text or list of taxa, an accurate researcher must take it into consideration, and finally probably will cite it. The solution to this dilemma is an urgent revision, which eliminates the specific name. Then nobody should arrive at conclusions using the name of that species for the fossil flora in case.

The above-proposed method at first sight might appear very drastic one, especially for nostalgic people. They must understand that even if those manuscripts could be somewhere, would be useless for arguing the validity of the palaeofloristic composition. Only the effective and valid publications, which contain not only lists but also relevant descriptions and figures or photos, can plausibly argue the presence of the taxa in any floristical association. Furthermore, if some influential persons, commonly used publishing lists of taxa, concluding anything on their base, and constraining others to accept them without comments, nobody should accept such determinations in the future.

Authors should therefore argue the sure presence of a taxon, not only by the determination of some specimens and nomenclatural revisions of the old determinations, but also by the publication of at least a short description and a minimal figuration. Nobody must accept such a presence without these minimal arguments. The things cannot continue in the manner as hundreds of years ago, and this statement has nothing to do with the reputation of the previous researches and the personality of the famous researchers. Particularly, we can respect the work of all the scientists who published data about the genus *Ptilophyllum*, but still firmly state, that a thorough revision of the presence of this genus in the Lower Jurassic of the country nevertheless is necessary. This is the subject of the present paper.

Principles and rules of the revision. The acceptance or the denial of the presence of genera and species in the fossil flora should be at the maximal possibly objective. In no case should it depend of the reviser's inclinations, nor of the publication's rank. All members of the national and international scientific community should

accept scientifically argued revisions, even if the revisers are not worldwide known, and even if the arguments appear in local publications. The workplace is other thing that must have no importance. It is ethically unacceptable to agree only the ideas of those who work in reputed metropolitan institutions, and to refuse the opinions of the others, just because those others work in less known places, in their small home locality or country. The scientific content grants the value of each palaeobotanical publication, not the names of the institutions, of the authors, or of the publishers.

All the revisions must follow clear objective principles and rules. In order to eliminate the subjectivity, I propose for the genus *Ptilophyllum* a general scheme (Tab. 1). Following with attention the literature, the table gives us the rules of what to do in the case of every specimen. Of course, the scheme could further be developed by introducing supplementary criteria, but it works efficiently even in its present state. It may be useful also in cases of other genera, even without any enhancement.

The scheme refers exclusively to the published material. It is not a determination-key for unpublished specimens, but a recommended verification-key and preliminary revision-key for those published. To prevent confusions, a combination of at most three digits distinguishes each of the possible cases to which the specimens may correspond. Using these combinations, we can shorten very much the discussions at the end of each taxon.

Some other concepts also are subject of clarification. I would embrace the opportunity here and now. The name of a taxon in a published text already means a published status, although it might refer to a not described, not figured, or lost specimen. In all the cases when the generic assignment is doubtful, one of the signs „cf., aff., ?" should placed in front of the generic name – the table shows details in this respect. In such cases, revisers should delete the specific name, if such a name exists, and replace it with „sp.", because no specific determination has sense when the generic assignment is unsure. If the generic name is fully acceptable for the determined material, but the acceptance of the specific name is problematic, one of the epithets „cf., aff." must precede the specific name. The old-fashioned and ambiguous „ex. gr." should not be used in the future. The author of this paper recommends the replacement of „ex. gr." with „aff." Instead indicating affinities to several species to which some specimens might belong, for a maximal clarity it is better to indicate affinity just to one species. This is besides sufficient.

Table 1. Scheme of a simple taxonomic revision based on objective principles.

Specimens	Generic determination	What to do	Specific determination	What to do
Case 1. Described and figured.	Case 1.1. The description and the figuration wholly concord with the characters of the genus, moreover the description and the figuration are sufficient for sure generic assignment.	Accept the generic assignment.	Case 1.1.1. The description and the figuration wholly concord with the characters of the species, moreover the description and the figuration are sufficient for sure specific assignment.	Accept the specific assignment.
			Case 1.1.2. The description and the figuration wholly concord with the characters of the species, but the description and/or the figuration is insufficient for sure specific assignment.	Use „cf.” before the specific name.
			Case 1.1.3. The description and/or the figuration only partly concord with the characters of the species.	Use „aff.” before the specific name.
			Case 1.1.4. The description and/or the figuration do not concord with the characters of the species.	Replace the specific name with „sp.”
	Case 1.2. The description and the figuration wholly concord with the characters of the genus, but the description and/or the figuration is insufficient for sure generic assignment.	Use „cf.” before the generic name.	Case 1.2.1. Always.	Replace the specific name with „sp.”
	Case 1.3. The description and/or the figuration only partly concord with the characters of the genus.	Use „aff.” before the generic name.	Case 1.3.1. Always.	Replace the specific name with „sp.”
	Case 1.4. The description and/or the figuration do not concord with the characters of the genus.	Use „?” before the generic name.	Case 1.4.1. Always.	Replace the specific name with „sp.”

Case 2. Described but not figured.	Case 2.1. The description wholly concords with the characters of the genus.	Use „cf.” before the generic name.	Case 2.1.1. Always.	Replace the specific name with „sp.”
	Case 2.2. The description only partly concords with the characters of the genus.	Use „aff.” before the generic name.	Case 2.2.1. Always.	Replace the specific name with „sp.”
	Case 2.3. The description does not concord with the characters of the genus.	Use „?” before the generic name.	Case 2.3.1. Always.	Replace the specific name with „sp.”
Case 3. Figured but not described.	Case 3.1. The figuration wholly concords with the characters of the genus.	Use „cf.” before the generic name.	Case 3.1.1. Always.	Replace the specific name with „sp.”
	Case 3.2. The figuration only partly concords with the characters of the genus.	Use „aff.” before the generic name.	Case 3.2.1. Always.	Replace the specific name with „sp.”
	Case 3.3. The figuration does not concord with the characters of the genus.	Use „?” before the generic name.	Case 3.3.1. Always.	Replace the specific name with „sp.”
Case 4. Not described and not figured.	Case 4.1. Always.	Use „?” before the generic name.	Case 4.1.1. Always.	Replace the specific name with „sp.”

Systematic palaeontology

GYMNOSPERMATOPHYTA
CYCADOPSIDA
BENNETTITALES
Ptilophyllum Morris 1840 em. Harris 1969

Type species. *Ptilophyllum acutifolium* Morris 1840

Ptilophyllum maculatum Givulescu 1992a

1989 *Ptilophyllum* sp. Givulescu & Farcaşiu, 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
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. Case: 1.1.1. See also the perspective of the material's restudy (Czier, 2010).

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. Case: 1.1.1.

cf. ***Ptilophyllum*** sp.

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. 1855 *Pterophyllum rigidum* And. Andrae, p. 42, plate 11, fig. 1
4. 1855 *Pterophyllum (Divonites) rigidum* Andrae. Štúr, p. 345
5. 1860a *Pterophyllum (Dioonites) rigidum* Andrae. Štúr, p. 58 (*partim*)
6. 1930 *Ptilophyllum imbricatum* (Ett.) Krass. Thomas, p. 390, text-figs. 1, 2
7. 1930 *Ptilophyllum rigidum* (Andrae) Krass. Thomas, p. 392, text-figs. 3, 4
8. 1954 *Pterophyllum rigidum* Göp. Semaka, p. 847, figs. 25 - 30
9. 1958 *Pterophyllum rigidum* Andrae. Semaka, p. 411, tab. 2
10. 1958 *Stachyotaxus lippoldi* (Stur) Kräusel. Semaka, p. 414, tab. 3 (spelling error for *lipoldi*)

11. 1962 *Stachyotaxus lippoldi* (Stur) Kräusel. Semaka, p. 533 (*partim*), 542 (*partim*), 551 (*partim*), 554 (*partim*), plate 4, fig. 3, plate 5, fig. 1, plate 15, fig. a (*pro parte* - right bottom), text-figs. 5, 6, tab. 1 (*partim*) (spelling error for *lipoldi*)
12. 1962 *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 *lipoldi*)
13. 1963 *Ptilophyllum rigidum* (Andrae) Krasser. Semaka, p. 166, 169, tab. 1
14. 1966 *Ptilophyllum rigidum* (Andrae) Krasser. Zberea *et al*., p. 49
15. 1966 *Stachyotaxus* sp. Zberea *et al.*, p. 50
16. 1970 *Stachyotaxus lippoldi* (Stur) Kräusel. Semaka, p. 25, 56, tab. 10 (spelling error for *lipoldi*)
17. 1989 *Ptilophyllum* sp. (aff. n. sp.). Givulescu & Farcaşiu, p. 139
18. 1997 *Ptilophyllum curvatum* Givulescu. Givulescu, p. 68
19. 1997 *Ptilophyllum grandis* Givulescu. Givulescu, p. 68
20. 1997 *Ptilophyllum romanicum* Givulescu. Givulescu, p. 68

Localities. 1, 2, 3, 6, 7, 10, 11, 12, 17, 18, 19, 20. Anina. 4, 8. Holbav. 5. Cristian. 9. Doman. 13. Pleşa. 14, 15. Crasna. 16. Pietrele Albe.
Lithostratigraphic units. 1. The Steierdorf Formation – possibly the Dealul Budinic Conglomerate Member, but most probably the Valea Terezia Sandstone Member. 2, 6, 7. Most probably the Steierdorf Formation, but possibly the Valea Sodol Marl Member of the Dealul Zânei Marl Formation. 3, 9, 10, 11, 12, 17, 18, 19, 20. The Valea Terezia Sandstone Member of the Steierdorf Formation. 4, 8. The Vulcan Sandstone Member of the Codlea-Vulcan Formation. 5. The Valea Schneebrich Sandstone Member of the Cristian Formation. 13. The Schela Formation. 14, 15. The Baia de Aramă Formation. 16. The Ogaşul Vodânischi Sandstone Member of the Sviniţa Formation.
Biostratigraphic units. 1. The *Clathropteris meniscioides* Biozone – most probably the *Banatozamites chlamydostomus* Subzone. 2, 6, 7. Most probably the *Clathropteris meniscioides* Biozone or the *Carpolithes liasinus* Biozone. 3, 4, 8, 9, 10, 11, 12, 17, 18, 19, 20. The *Banatozamites chlamydostomus* Subzone of the *Clathropteris meniscioides* Biozone. 5. The *Pterophyllum marginatum* Biozone. 13, 14, 15. The *Clathropteris meniscioides* Biozone. 16. The *Clathropteris meniscioides* Biozone – probably the *Neocalamites carcinoides* Subzone.
Ages. 1, 13. Hettangian – Sinemurian. 2, 6, 7. Hettangian – Toarcian. 3, 4, 8, 9, 10, 11, 12, 16, 17, 18, 19, 20. Hettangian *pro parte* – Sinemurian. 5. Sinemurian. 14, 15. Sinemurian *pro parte*.
Discussions. The last assignments of the specimens see in Czier (2010). Owing to the revision model from the present paper, they fit in the following cases. 1, 2, 3, 6, 7, 8, 9, 12, 13, 18, 19, 20. Case: 1.2.1. 4, 5, 14. Case: 2.1.1. 10, 15, 16. Case: 2.1. 11. Case: 1.2. 17. Case: 3.1.

? ***Ptilophyllum*** sp.

1. 1860b *Pterophyllum rigidum* Goeppert. Štúr, p. 58
2. 1878 *Pterophyllum rigidum*. Hantken, p. 69
3. 1878 *Pterophyllum rigidium*. Hantken, p. 71 (spelling error for *rigidum*)
4. 1878 *Pterophyllum rigidum*. Hantken, p. 72
5. 1879 *Petrophyllum rigidum*. Römer, p. 54 (spelling error for *Pterophyllum*)
6. 1921 *Ptilophyllum imbricatum* (Ettingsh.). Krasser, p. 361
7. 1958 *Pterophyllum rigidum* Andrae. Semaka, p. 409, tab. 1 (*partim*)
8. 1962 *Pterophyllum rigidum* Andrae. Oarcea & Semaka, p. 241 (*pro parte*)
9. 1962 *Pterophyllum rigidum* Andrae. Oarcea & Semaka, p. 241 (*pro parte*)
10. 1962 *Pterophyllum rigidum* Andrae. Oarcea & Semaka, p. 241 (*pro parte*)
11. 1963 *Cladophlebis* sp. Humml, p. 194
12. 1963 *Ptilophyllum rigidum* (Andrae) Krasser. Humml, p. 196, 197
13. 1963 *Zamites gracilis* Kurr. Humml, p. 198
14. 1963 *Zamites* sp. Humml, p. 198 (*pro parte*)
15. 1963 *Pterophyllum* sp. Humml, p. 198
16. 1963 *Ptilophyllum rigidum* (Andrae) Krasser. Humml, p. 199
17. 1972 *Pterophyllum rigidum* Andrae. Semaka *et al.*, p. 436
18. 1972 *Ptilophyllum rigidum* (Andrae) Krasser. Semaka *et al.*, p. 439, tab. 1 (*pro parte*)
19. 1972 *Ptilophyllum rigidum* (Andrae) Krasser. Semaka *et al.*, p. 439, tab. 1 (*pro parte*)
20. 1972 *Ptilophyllum rigidum* (Andrae) Krasser. Semaka *et al.*, p. 439, tab. 1 (*pro parte*)
21. 1972 *Stachyotaxus lippoldi* (Stur) Kräusel. Semaka *et al.*, p. 439, tab. 1 (*pro parte*) (spelling error for *lipoldi*)
22. 1972 *Stachyotaxus elegans* Nathorst. Semaka *et al.*, p. 439, tab. 1 (*pro parte*)
23. 1994 *Ptillophyllum*. Popa, p. 14 (spelling error for *Ptilophyllum*)
24. *?* 1996 *Pterophyllum maculatum*. Teulea, p. 2 (possible spelling error for *Ptilophyllum*)
25. 2001a *Ptilophyllum* cf. *acutifolium* Morris. Czier, p. 35
26. 2001a *Ptilophyllum* aff. *jurassicum* Kimura & Ohana. Czier, p. 35
27. 2001a *Ptilophyllum* cf. *aninaensis* Czier. Czier, p. 35
28. 2001a *Ptilophyllum* sp. B. Czier, p. 35
29. 2001a *Ptilophyllum* sp. C. Czier, p. 35
30. 2001a *Ptilophyllum* sp. D. Czier, p. 35
31. 2001b *Ptilophyllum* sp. Czier, p. 38, 45, tab. 1

Localities. 1. Holbav. 2, 3, 4, 6, 8, 9, 12, 13, 14, 15, 23, 24, 25, 26, 28, 31. Anina. 5, 7. Vulcan. 10, 11, 27, 29, 30. Doman. 16. Unknown (probably Southern Carpathians). 17. Porcului valley. 18. Viezuroiu valley. 19. Viezuroiu mine. 20, 21, 22. Crasna.
Lithostratigraphic units. 1, 5, 7. The Vulcan Sandstone Member of the Codlea-Vulcan Formation. 2. The Dealul Zânei Marl Formation. 3, 4. The Valea Sodol Marl Member of the Dealul Zânei Marl Formation. 6, 9, 10, 11, 12, 14, 15, 31. The Steierdorf Formation – possibly the Dealul Budinic Conglomerate Member, but most probably the Valea Terezia Sandstone Member. 8, 13, 23, 24, 25, 26, 27,

28, 29, 30. The Valea Terezia Sandstone Member of the Steierdorf Formation. 16. Unknown. 17, 18, 19. The Schela Formation. 20, 21, 22. The Baia de Aramă Formation.

Biostratigraphic units. 1, 5, 7, 8, 13, 23, 24, 25, 26, 27, 28, 29, 30. The *Banatozamites chlamydostomus* Subzone of the *Clathropteris meniscioides* Biozone. 2, 3, 4. Undefined. 6, 9, 10, 11, 12, 14, 15, 31. The *Clathropteris meniscioides* Biozone – most probably the *Banatozamites chlamydostomus* Subzone. 16. Unknown. 17, 18, 19, 20, 21, 22. The *Clathropteris meniscioides* Biozone.

Ages. 1, 5, 7, 8, 13, 23, 24, 25, 26, 27, 28, 29, 30. Hettangian *pro parte* – Sinemurian. 2. Aalenian. 3, 4. Toarcian. 6, 9, 10, 11, 12, 14, 15, 16, 17, 18, 19, 31. Hettangian – Sinemurian. 20, 21, 22. Sinemurian *pro parte*.

Discussions. The last assignments of the specimens see in Czier (2010). Owing to the revision model from the present paper, they fit in the following cases. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 12, 13, 17, 18, 19, 20, 24, 25, 26, 27, 28, 29, 30. Case: 4.1.1. 11, 14, 15, 16, 21, 22, 23, 31. Case: 4.1.

Conclusions

Based on an objective revision using a newly proposed scheme, the genus *Ptilophyllum* appears to be present in the Lower Jurassic flora of Romania only with two species, namely *Ptilophyllum maculatum* Givulescu, and *Ptilophyllum aninaensis* Czier.

Many assignments to the genus *Ptilophyllum*, especially of specimens from old collections, are doubtful, because nobody provided them with description or figuration. Until somebody will describe and figure at least one of them, they are just „cf. *Ptilophyllum* sp.”, or „? *Ptilophyllum* sp.”, respectively. Restudies, however, are possible only on few specimens. The majority of them is not identifiable, or was lost during the centuries passed since the beginning of the palaeobotanical researches.

References

Andrae, K. J. 1855. - Beiträge zur Kenntnis der fossilen Flora Siebenbürgens und des Banates. II. Lias-Flora von Steierdorf im Banate. - *Abh. k. k. Geol. R.A.* 2: 27-48, Wien.

Czier, Z. 1995. - Two new fossil plant species from the Lower Liassic of Anina, Romania: *Ptilophyllum aninaensis* n. sp. and *Williamsonia aninaensis* n. sp. - *N. Jb. Geol. Paläont., Mh.* 12: 747-755, Stuttgart.

Czier, Z. 2001a. - Rezumatul tezei de doctorat „Flora liasică din Crişana şi Banat” (Universitatea Eötvös Loránd - Budapesta, 1994). - *Nymphaea, Folia naturae Bihariae* 28: 27-46, Oradea.

Czier, Z. 2001b. - Determination of the fossil plants kept in Banatului Museum Timişoara. - *Analele Banatului, Şt. Nat.* 5: 37-54, Timişoara.

Czier, Z. 2010. - The presence of the genus *Ptilophyllum* in the Lower Jurassic flora of Romania. - *Nymphaea, Folia naturae Bihariae* 37: 5-38, Oradea.

Ettingshausen, C. 1852. - Begründung einiger neuen oder nicht genau bekannten Arten der Lias- und Oolithflora. - *Abh. k. k. Geol. R.A.* 1: 1-10, Wien.

Givulescu, R. 1990. - Über die wahre Angehörigkeit von *Stachyotaxus lipoldi* (Štúr) Kräusel aus dem Unteren Lias von Anina, Rumänien. - *Contribuţii Botanice*: 79-81, Cluj-Napoca.

Givulescu, R. 1992a. - A new contribution to the knowledge of the fossil flora at Anina, Romania. - *Studia Botanica Hungarica* 23: 9-15, Budapest.

Givulescu, R. 1992b. - *Ptilophyllum maculatum* n. sp., a new *Ptilophyllum* from the Early Lias of Anina/ Romania. - *Cour. Forsch.-Inst. Senckenberg* 147: 241-245, Frankfurt am Main.

Givulescu, R. 1997. - La flore du Lias inférieur d'Anina (Roumanie) (Note preliminaire). - *Natura Silvaniae* 1: 67-81, Jibou.

Givulescu, R. 1998a. - *Ptilophyllum maculatum* Givulescu 1992 or *Ptilophyllum aninaensis* Czier 1995 - a problem of priority. - *Documenta naturae* 117: 81-87, München.

Givulescu, R. 1998b. - *Flora fosilă a Jurasicului inferior de la Anina.* - (Editura Academiei Române) Bucureşti, 90 p.

Givulescu, R., Farcaşiu, V. 1989. - Les Plantes fossiles du Liassique inférieur d'Anina (Roumanie) de la collection du Musée Botanique de Cluj-Napoca. - *Contribuţii Botanice*: 139-140, Cluj-Napoca.

Hantken, M. P. 1878. - *A Magyar Korona országainak széntelepei és szénbányászata.* - (Légrády Testvérek) Budapest, 331 p.

Harris, T. M. 1969. - *The Yorkshire Jurassic Flora. III. Bennettitales.* - (Tr. British Museum, Natural History Ed.) London, 186 p.

Humml, H. 1963. - Catalogul florei fosile păstrate în Muzeul Regional al Banatului, Timişoara. - *St. Cerc. Şt. Acad. R.P.R., Şt. Agr.* 10: 185-201, Timişoara.

Krasser, F. 1921. - Zur Kenntnis einiger fossiler Floren des unteren Lias der Sukzessionsstaaten von Österreich-Ungarn. - *Sb. Akad. Wiss., Math.-naturw. Kl.* 130: 345-373, Wien.

Morris, J. 1840. - Memoir to illustrate a Geological Map of Cutch. - *Trans. Geol. Soc. London* 2: 289-329, London.

Oarcea, C. & Semaka, A. 1962. - Flora liasică din colecţia de la Anina. - *D.S. Şed. Com. Geol.* 46: 239-244, Bucureşti.

Popa, M. E. 1994. - Cariera Ponor (Anina): un viitor perimetru protejat. - *Geomemoria* 1: 12-16, Bucureşti.

Römer, J. 1879. - Die Steinkohlengrube „Concordia" bei Wolkendorf. Geologische Skizze. - *Verh. Mitt. Siebenb. Ver. Naturwiss.* 28: 47-56, Hermannstadt.

Semaka, A. 1954. - Contribuţii la flora liasică de la Vulcan-Codlea. - *Bul. Şt. Acad. R.P.R., Şt. Biol., Agron., Geol., Geogr.* 6: 837-856, Bucureşti.

Semaka, A. 1958. - Über die pflanzenführenden Lias-Schichten Rumäniens (I. Getische Decke). - *N. Jb. Geol. Paläont., Mh.* 8-9: 407-414, Stuttgart.

Semaka, A. 1962. - Flora liasică de la Anina (Banat). - *An. Com. Geol.* 32: 527-569, Bucureşti.

Semaka, A. 1963. - Despre vîrsta formaţiunii de Schela. - *Com. Şt. Asoc. Geol. Carp.-Balc., Stratigr.* 3: 165-173, Bucureşti.

Semaka, A. 1970. - Geologisch-Paläobotanische Untersuchungen im SO-Banater Danubikum. - *Mem. Inst. Geol.* 11: 5-79, Bucureşti.

Semaka, A. & Huică, I. & Georgescu, L. 1972. - Noi puncte cu plante liasice în Formaţiunea de Schela (Carpaţii Meridionali). - *St. Cerc. Geol., Geof., Geogr., S. Geol.* 17: 435-440, Bucureşti.

Štúr, D. 1860a. - Fossile Lias-Pflanzen aus Siebenbürgen. - *Jb. d. k.k. Geol. R.A. Verh.* 11: 57-59, Wien.

Štúr, D. 1860b. - Über das Alter der Steinkohlen von Holbak und Neustadt, nach den darin vorkommenden Pflanzen. - *Verh. Mitth. Siebenb. Ver. Naturwiss.* 11: 58-59, Hermannstadt.

Teulea, G. 1996. - Banat 1995: Geologie şi Paleontologie. - *Geomemoria, Supl.*: 1-9, Bucureşti.

Thomas, H. H. 1930. - Further Observations on the Cuticle Structure of Mesozoic Cycadean Fronds. - *J. Linn. Soc. London, Bot.* 323: 389-415, London.

Zberea, A. & Semaka, A. & Cioată, R. 1966. - Der Lias von Crasna-Jiu (Rumänien). - *N. Jb. Geol. Paläont., Mh.* 1: 44-51, Stuttgart.

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A new passeriform bird from the Middle Miocene of Subpiatră (W-Romania)

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Abstract. Up to present the Middle Miocene locality of Subpiatră 2/1R, western Romania, have yielded at least 13 different bird taxa collectively representing six orders and eleven families. Due to the fragmentary state of most specimens only three species we identified below familial level: *Proardeola walkeri, Anas albae* and *Palaeortyx gallica*. A more detailed study of a distal humeral fragment from the Subpiatră 2/1R locality, assigned previously to Muscicapidae gen. et sp. indet., revealed that it belongs to *Luscinia jurcsaki* n. sp. a new passeriform bird, which differs from its congeners in its larger size and details of distal humeral morphology.

Introduction

The locality of Subpiatră 2 (Bihor County, western Romania) is situated near the town of Aleșd, about 40 km east to Oradea. The fossil locality was identified in the summer of 2004 during a geological survey downward the Rece Creek (a tributary brook of Crișul Repede river) near the village of Subpiatră. The deposit consists of sandy clays and silts, interbedded into clay and calcareous clay layers (Venczel et al. 2005). Up to present the list of vertebrates includes

indeterminate fishes, lissamphibians (*Triturus* sp., *Latonia gigantea*, *Rana* sp.), reptiles (*Diplocynodon* sp., *Ophisaurus* sp., *Lacerta* sp., Varanidae indet., Colubrinae indet., *Vipera* sp.), birds, rodents (*Eurolagus fontannesi*, *Muscardinus sansaniensis*, *Myoglis meini, Megacricetodon* sp., *Democricetodon brevis*) and indeterminate insectivores. The age of the fossil assemblage, based on key rodent taxa, is late Badenian (MN 6) (Hír & Venczel 2005, Kessler & Venczel 2009).

In the present paper we describe a new passeriform bird found at the Miocene site of Subpiatră 2/1R in Bihor County. Previously this specimen, preserving a distal humerus, was listed as Muscicapidae gen.,et sp.indet. (Kessler & Venczel 2009). The fossil described here belongs to the paleontological collection of the Ţării Crişurilor Museum in Oradea, Romania.

Institutional abbreviations: **MTM**, Hungarian Natural History Museum, Budapest, Hungary; **MTC**, Ţării Crișurilor Museum, Oradea, Romania.

Systematic Palaeontology

Aves
Ord. Passeriformes (Linnaeus), 1758
Fam. Muscicapidae Vigors, 1825
Luscinia Forster, 1817

Luscinia jurcsaki sp. n.
(Fig.1 A, B)

Type locality and age: Subpiatra 2/1R, Middle Miocene (MN6).

Holotype: MTC. No. 24460. Left distal humeral fragment.
Measurement: F (= breadth of the distal epiphysis) = 4,48 mm.
Comparative material: Luscinia luscinia (MTM n=1; F= 4,26 mm); *L. megarhynchos* (MTM n=1; F= 4,05 mm).

Diagnosis: An extinct large-sized nightingale species. The holotype is reminiscent of the flycatchers (Muscicapidae). Within this family it is larger than those of *Muscicapa, Saxicola, Erithacus* and *Phoenicurus*, but it is significantly smaller than those of *Oenanthe* and *Monticola*. In lateral view, the *condylus ventralis* is more prominent than those of *Saxicola* and *Oenanthe*. The *processus supracondylaris*

dorsalis is not forked like in the genus *Monticola*.
Derivation of name. After Jurcsák Tibor, a former paleontologist at Țării Crișurilor Museum, Oradea.

*Description of the holotype.*In cranial view, the *epicondylus ventralis* extends onto the distal humeral epiphysis as a moderately prominent line (Fig.1A: a); the *processus flexorius* (Fig.1A: b) is rounded and abutting distally. In lateral view, the *condylus ventralis* (Fig.1A: c) is well-defined and of oval shape; the *incisura intercondylaris* (Fig.1A: d) forms a deep and wide-acutangular fossa. The *condylus dorsalis* (Fig.1A: e) is straight-oval and rounded distally; the *epicondylus dorsalis* (Fig.1A: f) is damaged; albeit somewhat damaged, the *processus supracondylaris dorsalis* (Fig.1A: g) is well-defined and uniramose.

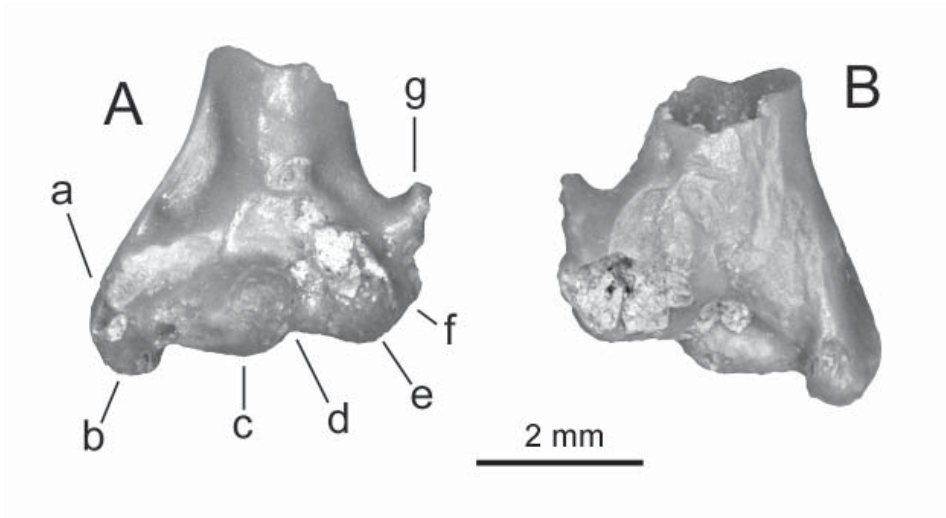

Figure 1. Holotype of *Luscinia jurcsaki* n.sp. A: distal humeral epiphysis in cranial view. a – *epicondylus ventralis*, b – *processus flexorius*, c – *condylus ventralis*, d – *incisura intercondylaris*, e – *condylus dorsalis*, f – *epicondylus dorsalis*, g – *processus supracondylaris dorsalis*. B: distal humeral epiphysis in caudal view.

Distribution: In the Carpathian basin the FAD (= First Appearance Date) of the genus *Luscinia* is known from the late early Miocene (MN 5) of the Litke 2 vertebrate locality in northern Hungary (Kessler & Hír, in press.). The holotype of *Luscinia praeluscinia* Kessler & Hír, 2011 is represented by a coracoid. *Luscinia janossyi* Kessler, 2011 is another extinct species, known from the late Miocene (MN 13)

of Polgárdi 4, Hungary. The holotype of this taxon is based on a distal humeral fragment. The latter is significantly smaller than that known from Subpiatră (F= 3.92 mm) and, like in the case of *L. praeluscinia* from Litke, its size is more close to Recent *Luscinia luscinia*. Outside the Carpathian basin the genus (*L. svecica*) is known from the late Pliocene (MN 16) of Rebielice 1 (Jánossy 1974) and from the Quaternary (Q1) of Stránska Skála, Czech Republic (Jánossy 1972).

The FAD of Recent species are known starting from the Quaternary. The available occurrences from the Carpathian basin are listed below, as follows:

Luscinia luscinia (Linnaeus), 1758
Q1: Betfia 9 (W-Romania), (Gál 2002);

Luscinia megarhynchos C. L. Brehm, 1831
Q1: Betfia 9 (W-Romania), (Gál 2002); **Q4/II:** Bodajk–Rigólyuk (Hungary), (Kordos 1984);

Luscinia janossyi Kessler, 2011
MN 13: Polgárdi 4 (Hungary), (Jánossy 1991, 1995);

Luscinia sp.
Q1: Deutsch–Altenburg 4B, Austria) (Jánossy 1981). After Mlíkovský (1998) this taxon may have belonged to *Sylvia atricapilla*.

The nightingales are small to medium sized passeriform birds. Typically, their main food consists from insects. Actually they are migratory-birds. Their presence in the fossil material indicates scrubs and forests.

References

Gál, E. 2002. - Avifauna pleistocenă a României. Unpublished PhD thesis, Univ. Bucharest, p. 1–263.

Hír, J. & Venczel, M. 2005. - New Middle Miocene vertebrate localities from Subpiatră (Bihor District, Romania). — *Acta Palaeontologica Romaniae* 5: 211–221.

Jánossy, D. 1981. - Die altpleistozänen Vogelfaunen von Deutsch-Altenburg 2 und 4 (Niederösterreich). *Beiträge zur Paläontologie von Österreich* 8: 375–391.

Jánossy, D. 1991. - Late Miocene bird remains from Polgárdi (W-Hungary). *Aquila* 98: 13–35.

Jánossy, D. 1995. - A late Miocene avifauna from Polgárdi, western Hungary. *In:* Peters D.S. (ed.): *Acta palaeornithologica. Courier Forschunsinstitut Senckenberg* 181: 203–206.

Kessler, J. 2011. - *A Kárpát-medence madárvilága az alsó-krétától napjainkig*. GeoLitera, Szeged.

Kessler, J. & Hír, J., in press. - Észak-Magyarország madárvilága a miocénben. *Földtani közlöny.*

Kessler, E. & Venczel, M. 2009. - Bird remains from the Middle Miocene of Subpiatră W-Romania). *Nymphaea, Folia naturae Bihariae* 36: 27–36.

Kordos, L., 1984. - A bodajki Rigó-lyuk újholocén kitöltésének vizsgálata. *Folia Musei Historico-Naturalis Bakonyensis* 3: 31–42.

Mlíkovský, J. 1998. - Early Pleistocene birds of Deutsch-Altenburg, Austria. *Acta Societatis Zoologicae Bohemicae* 62:135–141.

Venczel M., Hír J., Huza, R. R., Popa, E. & Golban, D., 2005. - A new Middle Miocene vertebrate fauna from Subpiatră (Bihor County, Romania). *Nymphaea* 32: 23–38.

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The Botanical Collection of the Ţării Crişurilor Museum - Tatiana Tofan's Herbarium (part II)

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Abstract. The present paper continues to publish the Botanical Collection of the Ţării Crişurilor Museum by presenting the herbarium containing the specimens collected by Tatiana Tofan, a specialized botanist who worked for that museum for a while. Bihor County, as a completion of the one presented in Part I (Danciu & Golban 2020) as well as from other regions of the country that have areas of a real botanical interest. After processing it by using an updated taxonomic classification (Systema Naturae 2000), hereby we present a number of 117 taxa, collected from Bihor and 145 taxa collected from other parts of the country, mostly from protected areas.

Introduction

The present paper continues the publication of the Botanical collection of the Ţării Crişurilor Museum by describing the specimens in the herbarium completed by Tatiana Tofan, a former botanist of the museum. The material comes from different regions of Bihor County and its publication continues our work presented in Part I (Danciu & Golban 2010). The areas of collecting are the City of Oradea and its neighboring communes (Sânmartin and Paleu), the sandy region in the north-western part of the county (Şimian) and the area of

Peştiş near Aleşd. There are also other areas of collection, that of the Criş Valley, respectively the Mişid Valley. The Bratca – Şuncuiuş – Vadu-Crişului – Crişul Repede gorge is a Karst complex in the limestone mountains of Pădurea Craiului.

To this we added the material that comes from different regions of Romania, where there was a certain interest for botanics due to the existence of a protected area, a natural reserve, a botanical garden or simply out of taxonomic interest for a certain species.

Thus we can mention the counties of Constanţa (with the coastal dunes of Agigea), Tulcea (with the Danube Delta and the sandy river banks of river-sea origin), Iaşi (with the material coming from that region, from the Botanical Garden or the flower market), Mureş (with the natural reserve of Zau de Câmpie), Harghita (with the swamp 'Beyond the meadow' from Voşlobeni), Suceava (with the Gorge of Zugreni near Vatra Dornei), Sibiu (with the Făgăraş Mountains, Lake Bâlea, the Iezer-Păpuşa Mountains), Argeş (with Piatra Craiului Mountains, Mt. Capra, Dâmbovicioara Gorge), and Prahova (with the Natural Reserve of Sinaia). The plants were collected between 1996 and 2002. The material was previously stored as unfinished work which was later completed in terms of arrangement and systematization, preparation of herbarium sheets, as well as determination of species by the specialists of the museum.

Material and methods

The examined material consists of herbarium sheets deposited in the collection of the Ţării Crişurilor Museum in Oradea, as indicated by the inventory number following the scientific name. When rendering the names of the species, we considered the accepted scientific name with the mention of the reference source of its first description and its synonyms. We used the database of the Royal Botanic Garden Edinburgh *Flora Europaea*, *Global Biodiversity Information Facility.* (http;// www.gbif.org), and *uBio Portal* (www.ubio.org/portal/-5k). To render the units systematically, we consulted the study of V. Ciocârlan (2000), which 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 updated names of collecting sites, the locality, the date and the name of the collector.

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

Systematic part

Domain ***Eukaryota***
Kindom ***Cromista*** T. Cavalier-Smith, 1981
Subkindom ***Chromobiota*** Cavalier-Smith, 1991
Infrakindom ***Heterokonta*** (Cavalier-Smith, 1996) Cavalier-Smith, 1995
Phylum ***Ochrophyta*** (Cavalier-Smith, 1996) T. Cavalier-Smith, 1995
Subphylum ***Phaeista*** Cavalier-Smith, 1995
Infraphylum ***Chryista*** (Cavalier-Smith, 1995) Cavalier-Smith, 1995
Superclas.: ***Phaeistia*** Cavalier-Smith, 1995
Clas.: ***Phaeophyceae***
Ord.: ***Dactyosiphonales***
Fam.: ***Dactyosiphonaceae***

Gen: ***Dictyosiphon*** Greville, 1830, nom cons.

***Dictyosiphon corymbosus* Kjellman** – (n. 24.212) – ref.: *Dictyosiphon corymbosus* Kjellman 1883: 330, pl. 26, figs 12-15 ; Greville ; - Romania, Constanţa, Agigea, The Black Sea shore, sept. 1996, leg. T. Tofan

Kingdom ***Plantae*** Haeckel, 1866
Subkingdom ***Biliphyta*** Cavalier-Smith, 1981
Phylum ***Rhodophyta*** Wettstein, 1922
Subphylum ***Macrorhodophytina*** Cavalier-Smith, 1998
Clas.: ***Florideophyceae***
Ord.: ***Ceramiales***
Fam.: ***Ceramiaceae***

Gen: ***Ceramium*** A.W. Roth, 1797, nom.cons.

***Ceramium rubrum* (Hudson) .C.A. Agardh.** – (n. 24.210 /a.; 24.211) – ref.: *Ceramium rubrum* C. Agardh 1811: 17 , (Original publication: Agardh, C.A. (1811). *Dispositio algarum Sueciae*, quam publico examini subjiciunt Carl Adolph Agardh. & Johannes Bruzelius, Scanus. Die xi decembris mdcccxi. p. ii. h. & l.s. pp. Pars 2: [i], 17-26. Lund: Berling.); - Romania, Constanţa, Agigea, The Black Sea shore, sept. 1996, leg. T. Tofan

Subkingdom ***Viridaeplantae*** Cavalier-Smith, 1981
Phylum ***Bryophta*** A. Braun, in Ascherson, 1860
Clas. ***Sphagnopsida***
Ord. ***Sphagnales***
Fam. ***Sphagnaceae*** Dum.

Gen ***Sphagnum*** L., 1753

Sphagnum angustifolium **(C.E.O. Jensen ex Russow) C.E.O. Jensen. –** (n. 24.729) – ref.: Bihang till Kongliga Svenska Vetenskaps-Akademiens Handlingar 21 Afd. 3(10): 40. 1896.; - Romania, Harghita, Voşlăbeni, the „După Luncă" swamp, 25.06.2000, leg. T. Tofan.; det. V. M. Danciu

Sphagnum palustre **L. –** (n. 24.730) – ref.: Species Plantarum 2: 1106. 1753; - Romania, Harghita, Voşlăbeni, the „După Luncă" swamp, 25.06.2000, leg. T. Tofan.; det. V. M. Danciu

Phylum ***Tracheophyta*** Sinnott, 1935 ex Cavalier-Smith, 1998
Subphylum ***Lycophytina***
Clas. ***Lycopodiopsida*** Bartl.
Ord. ***Lycopodiales*** Dumortier, 1829
Fam. ***Lycopodiaceae*** Palisot de Beauvois ex Mirbel, in Lamarck & Mirbel, 1802

Gen ***Lycopodium*** L.,1753

Lycopodium selago **L. –** (n. 24.698) – ref.:.Sp. Pl. 2. 1753 ; - Romania, Argeş, Făgăraş Mountains, Mt. Capra, 06.07.1998, leg. T. Tofan.

Ord. ***Selaginellales*** Prantl, 1874
Fam. ***Selaginellaceae*** Willkomm, 1854

Gen: ***Selaginella*** Palisot de Beauvois, 1805, nom. cons.

Selaginella selaginoides **(L.) P. Beauv. ex Mart. & Schrank** – (n. 24.719) – ref.: Hort. Monac. 3 (1829); - Romania, the Southern Carpathians, Piatra Craiului Mountains, 08.07.1998, leg. T. Tofan

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. 24.797 /1; 24.797 /2.) – ref.: Sp. Pl. ed. 1 1061 (1753); - Romania, Bihor, Paleu, the lake shore, 23.05.2002, leg. T. Tofan, det. V. M. Danciu

Equisetum arvense **L.** – (n. 24.863) - ref.: Sp. Pl. ed. 1 1061 (1753); - Romania, Bihor, Şimian, Jungher grassland 2, pigs' fountain**,** 24.05.2002, leg. T. Tofan, det. V. M. Danciu

Equisetum variegatum **Weber** – (n. 24.864) - ref.: Bot. Taschenb. 60: 447 (1807); - Romania, Bihor, Şimian, Jungher grassland 2, pigs' fountain**,** 24.05.2002, leg. T. Tofan, det. V. M. Danciu

Equisetum variegatum **Schleich. -** (n. 24.842 /1.; 24.842 /2; 24.842 /3) – ref. : Bot. Taschenb. 60: 447 (1807); - Romania, Bihor, Şimian, Jungher grassland 1. (natural reserve on sands), 24.05.2002, leg. T. Tofan, det. V. M. Danciu

Clas. ***Polypodiopsida*** Cronquist
Ord. ***Polypodiales*** Link.
Fam. ***Aspleniaceae*** Newman

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

Asplenium ruta-muraria **L.** – (n. 24.828) – ref. : Sp. pl. 2:1081. 1753 ; - Romania, Bihor, Şuncuiuş, Mişid Valley, 08.10.2001, leg. T. Tofan, det. V. M. Danciu

Asplenium scolopendrium **L.** – (n. 24.827 /1.; 24.827 /2.) – ref. : Sp. Pl. ed. 1 1079 (1753); - Romania, Bihor, Şuncuiuş, Mişid Valley, 08.10.2001, leg. T. Tofan, det. V. M. Danciu

***Asplenium trichomanes-ramosum* L.** - (n. 24.686) – ref.: *Species Plantarum* 2: 1082. 1753; - Romania, Sibiu, Tălmaciu, Tămăcel (plai), Iezer-Păpuşa Mountains (at the mouth of the Olt canyon), 08.07.1998, leg. T. Tofan.

Fam. ***Polypodiaceae*** Berchtold & J. Presl, 1820
Subfam. ***Polypodioideae***
Trib. ***Polypodieae***

Gen ***Polypodium*** L., 1753

***Polypodium vulgare* L.** – (n. 24.829) – ref. : Sp. Pl. ed. 1 1085 (1753); - Romania, Bihor, Şuncuiuş, Mişid Valley, the Ungurul Mare Cave, 08.10.2001, leg. T. Tofan, det. V. M. Danciu

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

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

***Athyrium filix-femina* (L.) Roth** – (n. 24.790) – ref.: Arch. Bot. (Leipzig) 2(1):106. 1799; - Romania, Bihor, Aleşd, Peştiş, Valea Morilor, on the water flow, among alders, 02.08.2001, leg. T. Tofan, det. V. M. Danciu

Gen ***Cystopteris*** Bernhardi, 1805, nom. cons.

***Cystopteris fragilis* (L.) Bernh.** – (n. 24.830) – ref.:Neues Jour. Bot. 1(2): 27 (1805) ; - Romania, Bihor, Şuncuiuş, Mişid Valley, the Ungurul Mare Cave, 08.10.2001, leg. T. Tofan, det. V. M. Danciu

Infraphylum "***Radiatopses"*** Kenrick & Crane, 1997
Clas. ***Magnoliopsida*** Brogniart, 1843
"monocotyledons"
Ord. ***Alismatales*** Dumortiert, 1829
Fam. ***Araceae*** Adans., 1763, nom. cons.
Subfam. ***Lemnoideae***

Gen ***Lemna*** L., 1753

***Lemna trisulca* L.** – (n. 24.742) – ref. Species Plantarum 2. 1753; - Romania,

Bihor, Sânmartin, Băile 1 Mai, the "Peţea Rivulet" Natural Reserve, Ferdinand spring, 06.04.2002, leg. T. Tofan

Gen ***Spirodela*** Schleiden, 1839

Spirodela polyrhiza (L.) Schleid. – (n. 24.743) – ref.: Linnaea 13: 392 (1839); - Romania, Bihor, Sânmartin, Băile 1 Mai, the "Peţea Rivulet" Natural Reserve, Ferdinand spring, 06.04.2002, leg. T. Tofan

Fam. ***Hydrocharitaceae*** A.L. de Jussiey, 1789
Subfam. ***Hydrocharitatoideae***

Gen ***Hydrocharis*** L., 1753

Hydrocharis morsus-ranae **L.** – (n. 24.890) – ref.: Sp. pl. 2:1036. 1753; - Romania, Suceava, Vatra Dornei, Zugreni Gorge, 24.05.1996, leg. T. Burac (T. Tofan); det. V. M. Danciu.

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

Gen ***Potamogeton*** . L. 1753

Potamogeton crispus **L.** – (n. 24.735 /a.; 24.735 /b.) – ref.: Sp. pl. 1:126. 1753; syn.: - România, Bihor, Oradea (Peţa Rivulet) , 18.04. 2002, leg. T. Tofan

Potamogeton gramineus L. **–** (n. 24.732) – ref.: *Species Plantarum* 1: 127. 1753.; - Romania, Harghita, Voşlăbeni, the „După Luncă" swamp, 25.06.2000, leg. T. Tofan.; det. V. M. Danciu

Potamogeton pectinatus **L.**– (n. 24.736 /a; 24.736 /b.) – ref.: *Species Plantarum* 1: 127. 1753. ; - Romania, Bihor, Oradea (Peţa Rivulet) , 18.04. 2002, leg. T. Tofan

Fam.: ***Scheuchzeriaceae*** F. Rudolphi, 1830

Gen ***Scheuchzeria*** L., 1753

Scheuchzeria palustris **L. . –** (n. 24.731) – ref.: *Species Plantarum* 1: 338. 1753.; - Romania, Harghita, Voşlăbeni, the „După Luncă" swamp, 25.06.2000, leg. T. Tofan.; det. M.Venczel

Ord. ***Asparagales*** Bromhead, 1838
Fam. ***Alliaceae*** Borkh., 1797, nom.cons.
Subfam. ***Allioideae*** (Borkh., 1797) Herb., 1837
Trib. ***Allieae*** (Borkh., 1797) Dumortier, 1827

Gen ***Allium*** L., 1753

Allium paniculatum **L. –** (n. 24.198) – ref.: *Species Plantarum, Editio Secunda* 2: 1042. 1763; - Romania, Mureş, Zau de Câmpie, the natural reserve, 10.05.1996, leg. T. Burac (T. Tofan).

Allium flavescens **Besser. –** (n. 24.199) – ref.:.Enum. Pl. [Kunth] iv. 459; - Romania, Mureş, Zau de Câmpie, the natural reserve, 10.05.1996, leg. T. Burac (T. Tofan).

Fam. ***Amaryllidaceae*** Jaume Saint-Hilaire, 1805, nom.cons.
Trib ***Galantheae***

Gen ***Leucojum*** L., 1753

Leucojum vernum **L. –** (n. 24.188) – ref.: Sp. pl. 1:289. 1753; - Romania, Iaşi, from the marketplace (brought from Galaţi), 08.03.1997, leg. T. Burac (T. Tofan).

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

Trib ***Hyacintheae***

Gen ***Ornithogalum*** L., 1753

Ornithogalum umbellatum **L. –** (n. 24.193) – ref.: Sp. Pl. ed. 1 307 (1753); - Romania, Mureş, Zau de Câmpie, the natural reserve, 10.05.1996, leg. T. Burac (T. Tofan).

Subfam. ***Convallarioideae***
Trib. ***Polygonateae***

Gen ***Maianthemum*** F.H. Wiggers, 1780, nom. cons.

***Maianthemum bifolium* (L.) F.W.Schmidt** – (n. 24.905) – ref.: Fl. boem. 4:55. 1794 ; - Romania, Suceava, Vatra Dornei, Zugreni Gorge, 24.05.1996, leg. T. Burac (T. Tofan); det. V. M. Danciu.

Gen ***Polygonatum*** P. Miller, 1754

***Polygonatum latifolium* (Jacq.) Desf.** – (n.24.749) – ref.: Ann. Mus. Hist. Nat. (Paris) 9: 50 (1807); - Romania, Bihor, Sânmartin, Băile 1 Mai, the Natural Reserve " Peţea Rivulet", the lake shore Ochiul Mare, 02.04.2002, leg. T. Tofan; det. V. M. Danciu

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

Trib ***Cranichideae***
Subtribe *Goodyerinae*

Gen ***Goodyera*** R. Brown, in W. Aiton & W.T. Aiton, 1813

***Goodyera repens* (L.) R. Brown -** (n. 24.670) – ref.: Hort. Kew. ed. 2 5: 198 (1813); - Romania, Argeş, Rucăr, Dâmboviţa Valley, the Great Gorge of Dâmboviţa, 07.07.1998, leg. T. Tofan.

Trib ***Orchideae***

Gen ***Dactylorhiza*** Necker ex Nevski, 1937

***Dactylorhiza maculata* (L.) Soó** - (n. 24.697) – ref.: Nom. Nov. Gen. Dactylorhiza 7 (1962) ; - Romania, Argeş, the Piatra Craiului Mountains, 08.07.1998, leg. T. Tofan.

Gen ***Gymnadenia*** R. Brown, in W. Aiton & W.T. Aiton, 1813

***Gymnadenia odoratissima* (L.) Rich.** - (n. 24.696) – ref.: Orchid. Eur. Annot. 35 (1817); - Romania, Argeş, Piatra Craiului Mountains, 08.07.1998, leg. T. Tofan.

***Gymnadenia odoratissima* (L.) Rich.** – (n. 24.717) – ref.: Orchid. Eur. Annot. 35 (1817); - Romania, Southern Carpathians, Piatra Craiului Mountains, 08.07.1998, leg. T. Tofan

Gen ***Nigritella*** Rich., 1818

***Nigritella nigra* (L.) Rchb.f. subsp. *rubra* (Wettst.) Beauverd.** - (n. 24.695) – ref.: Bull. Soc. Bot. Genève ser. 2 17: 337 (1926); - Romania, Argeş, the Piatra Craiului Mountains, 08.07.1998, leg. T. Tofan.

Family ***Iridaceae*** A.L. de Jussieu, 1789
Subfam. ***Crocoideae***
Trib. ***Ixieae***

Gen ***Crocus*** L., 1753

***Crocus flavus* Weston –** (n. 24.190) – ref.: Univ. Bot. 2: 237 (1771); - Romania, Iaşi, the marketplace (brought from near Bucharest), 08.03.1997, leg. T. Burac (T. Tofan).

***Crocus vernus* (L.) Hill subsp. *vernus* –** (n. 24.189) – ref.: Veg. Syst. 10: 1 (1765); - Romania, Iaşi, the marketplace, 08.03.1997, leg. T. Burac (T. Tofan).

Ord. ***Liliales*** Perleb, 1826
Fam. ***Colchicaceae***A.P. de Candolle, 1805
Trib. ***Colchiceae***

Gen ***Colchicum*** L., 1753

***Colchicum autumnale* L.** – (n. 24.821) – ref.:. Sp. Pl. ed. 1 341 (1753) ; - Romania, Bihor, Şuncuiuş, Mişid Valley, 08.10.2001, leg. T. Tofan, det. V. M. Danciu

***Colchicum autumnale* L.** – (n. 24.173) – ref. : Sp. Pl. ed. 1 341 (1753); - Romania, Prahova, Sinaia, “Arinişul” natural reserve (reserves of Bucegi), 25.09.1997, leg.: T. Tofan.

Fam. ***Liliaceae***
Subfam. ***Lilioideaae***
Trib ***Lilieae***

Gen ***Lilium*** L., 1753

***Lilium martagon* L.** - (n. 24.677) – ref.: Sp. Pl. ed. 1 303 (1753); - Romania, Argeş, Dâmbovicioara Gorge , 09.07.1998, leg. T. Tofan.

"commelinids"
Ord. ***Poales*** Small, 1903
Fam. ***Cyperaceae*** A.J. de Jussieu, 1789, nom.cons.
Subfam. ***Cyperoideae***
Trib. ***Eleocharideae***

Gen ***Eleocharis*** R. Brown, 1810

***Eleocharis palustris* (L.) Roemer & Schultes** – (n. 24.775. /1.; 24.775./2.) – ref.: Syst. Veg. 2:151. 1817 ; - Romania, Bihor, Paleu, lake shore, 23.05.2002, leg. T. Tofan, det. V. M. Danciu

Subfam. ***Caricoideae***

Gen ***Carex*** L.,1753

***Carex acutiformis* Ehrh. -** (n. 24.752) – ref.: Beitr. Naturk. 4: 43 (1789); - Romania, Bihor, Sânmartin, Băile 1 Mai, the "Peţea Rivulet" Natural Reserve (Ochiul Mare, near the shore), 03.04.2002, leg. T. Tofan; det. V. M. Danciu

***Carex brizoides* L. -** (n. 24.760 /1.; 24.760 /2.; 24.760 /3.) – ref.: Cent. pl. I:31. 1755 (Amoen. acad. 4:293. 1759); - Romania, Bihor, Sânmartin, Băile 1 Mai, the "Peţea Rivulet" Natural Reserve, (the hill on the right side of Ochiul Ţiganului), 03.04.2002, leg. T. Tofan; det. V. M. Danciu

***Carex brizoides* L. -** (n. 24.762 /1.; 24.762 /2.) – ref.: Cent. pl. I:31. 1755 (Amoen. acad. 4:293. 1759); - Romania, Bihor, Sânmartin, Betfia, the Şomleu hill (on the plateau), 31.03.2002, leg. T. Tofan; det. V. M. Danciu

***Carex caryophyllea* Latourr. -** (n. 24.759) – ref.: Chlor. Lugd. 27 (1785) ; - Romania, Bihor, Sânmartin, Băile 1 Mai, the " Peţea Rivulet" Natural Reserve, (the hill on the right side of Ochiului Ţiganul), 03.04.2002, leg. T. Tofan; det. V. M. Danciu

***Carex caryophyllea* Latourr. –** (n. 24.184) – ref.: Chlor. Lugd. 27 (1785); - Romania, Iaşi, the Botanical Garden, 27.04.1996, leg. T. Burac (T. Tofan)

***Carex digitata* L. -** (n. 24.756.) – ref.: Sp. Pl. 2: 975. 1753**;** - Romania, Bihor, Sânmartin, Băile 1 Mai, the "Peţea Rivulet" Natural Reserve, (near Ferdinand spring), 06.04.2002, leg. T. Tofan; det. V. M. Danciu

***Carex hirta* L. .-** (n. 24.757 /1.; 24.757 /2..) – ref.: Sp. Pl. ed. 1 975 (1753)**;** - Romania, Bihor, Sânmartin, Băile 1 Mai, the "Peţea Rivulet" Natural Reserve, (the right shore of the lake – zone III), 24.04.2002, leg. T. Tofan; det. V. M. Danciu

***Carex hirta* L.** – (24.774.) – ref.: Sp. Pl. ed. 1 975 (1753) ; - Romania, Bihor, Paleu, the lake shore, 23.05.2002, leg. T. Tofan, det. V. M. Danciu

***Carex hirta* L.** – (n. 24.848) – ref.: Sp. pl. 2:975. 1753; - Romania, Bihor, Şimian, Jungher grassland 1. (natural reserve on the sands), 24.05.2002, leg. T. Tofan, det. V. M. Danciu

***Carex hirta* L.** – (n. 24.865) - ref.: Sp. pl. 2:975. 1753; - Romania, Bihor, Şimian, Jungher grassland 2, pigs' fountain**,** 24.05.2002, leg. T. Tofan, det. V. M. Danciu

***Carex humilis* Lezser -** (n. 24.758) – ref.: Fl. Hal. Ed.1. 175 (1761); - Romania, Bihor, Sânmartin, Băile 1 Mai, the "Peţea Rivulet" Natural Reserve (the hill on the right shore of Ochiul Ţiganului), 03.04.2002, leg. T. Tofan; det. V. M. Danciu

***Carex humilis* Lezser -** (n. 24.761 /1.; 24.761 /2.; 24.761 /3) – ref.:Fl. Hal. Ed.1. 175 (1761); - Romania, Bihor, Sânmartin, Şomleu hill (on the plateau), 31.03.2002, leg. T. Tofan; det. V. M. Danciu

***Carex nigra* (L.) Reichard -** (n. 24.754) – ref.: Fl. moeno-francof. 2:96. 1778**;** - Romania, Bihor, Sânmartin, Băile 1 Mai, the "Peţea Rivulet" Natural Reserve (Ochiul Mare, near the shore), 02.04.2002, leg. T. Tofan; det. V. M. Danciu

***Carex nigra* (L.) Reichard -** (n. 24.755 /1.; 24.755 /2.) – ref.: Fl. moeno-francof. 2:96. 1778**;** - Romania, Bihor, Sânmartin, Băile 1 Mai, the "Peţea Rivulet" Natural Reserve (near Ferdinand spring), 06.04.2002, leg. T. Tofan; det. V. M. Danciu

***Carex otrubae* Podpera** – (24.773.) – ref.: Publ. Fac. Sci. Univ. Masaryk 12: 15 (1922); - Romania, Bihor, Paleu, the Lake shore, 23.05.2002, leg. T. Tofan, det. V. M. Danciu

***Carex ovalis* Gooden.** – (n. 24.849) – ref. : Trans. Linn. Soc. London 2:148. 1794; - Romania, Bihor, Şimian, Jungher grassland 1 (natural reserve on sands), 24.05.2002, leg. T. Tofan, det. V. M. Danciu

***Carex riparia* Curtis -** (n. 24.753 /1.; 24.753 /2.) – ref.: Fl. londin. 2(4): t. 60. 1783**;** - Romania, Bihor, Sânmartin, Băile 1 Mai, the "Peţea Rivulet" Natural Reserve (Ochiul Mare, the shore facing the greenhouses), 02.04.2002, leg. T. Tofan; det. V. M. Danciu

***Carex tomentosa* L. –** (n. 24.195 /a.; 24.195 /b.) – ref.: Mantissa 123 (1767); - Romania, Mureş, Zau de Câmpie, the natural reserve, 10.05.1996, leg. T. Burac (T. Tofan).

***Carex vulpina* L.** – (n. 24.772 / 1.; 24.772 / 2.) – ref.: Sp. pl. 2:973. 1753; - Romania, Bihor, Paleu, the lake shore, 23.05.2002, leg. T. Tofan, det. V. M. Danciu

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

Gen ***Corynephorus*** **Palisot de Beauvois, 1812, nom. cons.**

***Corynephorus canescens* (L.) P. Beauv.** – (n. 24.850 /1.; 24.850 /2.) – ref. : *Essai d'une Nouvelle Agrostographie* 90, 149, 159. 1812; - Romania, Bihor, Şimian, Jungher grassland 1 (natural reserve on sands), 24.05.2002, leg. T. Tofan, det. V. M. Danciu

***Corynephorus canescens* (L.) P. Beauv** – (n. 24.870 /1. - 8.) - ref.: Ess. Agrostogr. 90, t. 18, fig. 2. 1812 ; - Romania, Bihor, Şimian, Jungher grassland 2, pigs' fountain**,** 24.05.2002, leg. T. Tofan, det. V. M. Danciu

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

Gen ***Agrostis*** L., 1753

***Agrostis capillaris* L. -** (n. 24.856) – ref. : Sp. Pl. ed. 1 62 (1753) ; - Romania, Bihor, Şimian, sands, 16.10.2001, leg. T. Tofan,

***Agrostis stolonifera* L.** – (n. 24.784) – ref.: Sp. Pl. ed. 1 62 (1753); - Romania, Bihor, Paleu, the lake shore, 23.05.2002, leg. T. Tofan, det. V. M. Danciu

Gen ***Calamagrostis*** Adanson, 1763

***Calamagrostis epigejos* (L.) Roth** – (n. 24.810 /1;. 24.810 /2; 24.810 /3.; 24.810/ 4.) – ref.: Tent. Fl. Germ. 1: 34 (1788); - Romania, Bihor, Paleu, the lake shore, 23.05.2002, leg. T. Tofan, det. V. M. Danciu.

Gen ***Phleum*** L., 1753

Phleum paniculatum **Hudson** – (n. 42.786/ 1; 42.786/ 2; 42.786/ 3; 42.786/ 4.) – ref.: Fl. angl. 23. 1762; - Romania, Bihor, Paleu, the lake shore, 23.05.2002, leg. T. Tofan, det. V. M. Danciu

Phleum pratense **L.** – (n.24.745) – ref.: Sp. pl. 1:59. 1753; - Romania, Bihor, Sanmartin, Baile 1 Mai, the "Peţea Rivulet" Natural Reserve, the hill on the right shore of Ochiul Ţiganului, 03.04.2002, leg. T. Tofan; det. V. M. Danciu

Phleum pratense **L.** – (n. 42.785) – ref.: Sp. pl. 1:59. 1753; - Romania, Bihor, Paleu, lake shore, 23.05.2002, leg. T. Tofan, det. V. M. Danciu

Phleum phleoides **(L.) H.Karst.** – (n.24.746) – ref.: Deutsche Fl. ed. 1 374 (1881); - Romania, Bihor, Sanmartin, Baile 1 Mai, the "Peţea Rivulet" Natural Reserve, the hill on the right shore of Ochiul Ţiganului, 03.04.2002, leg. T. Tofan; det. V. M. Danciu

Subtrib ***Phalaridinae***

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

Anthoxanthum odoratum **L** – (n. 24.782) – ref.: *Species Plantarum* 1: 28. 1753.; - Romania, Bihor, Paleu, lake shore, 23.05.2002, leg. T. Tofan, det. V. M. Danciu

Anthoxanthum odoratum **L. -** (n. 24.855 /1; . 24.855 /2)– ref. : Sp. pl. 1:28., 1753 ; - Romania, Bihor, Şimian , Jungher grassland 1 (natural reserve on sands) 24.05.2002, leg. T. Tofan, det. V. M. Danciu

Trib ***Bromeae***

Gen ***Bromus*** L., 1753

Bromus tectorum **L.** – (n. 24.871) - ref.: Sp. pl. 1:77. 1753; - Romania, Bihor, Şimian, Jungher grassland 2, pigs' fountain, 24.05.2002, leg. T. Tofan, det. V. M. Danciu

Trib ***Meliceae***

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

***Glyceria fluitans* (L.) R. Br.** – (n. 24.781) – ref.: Prodr. Fl. Nov. Holl. ed. 1 179 (1810);. - Romania, Bihor, Paleu, the lake shore, 23.05.2002, leg. T. Tofan, det. V. M. Danciu.

Trib ***Nardeae***

Gen ***Nardus*** L., 1753

***Nardus stricta* L.** – (n. 24.817) – ref.: Sp. pl. 1:53. 1753; - Romania, Bihor, Şuncuiuş, Criş Valley, sunny limestone rocks, 08.10.2001, leg. T. Tofan, det. V.M. Danciu

Trib ***Poeae***

Gen ***Cynosurus*** L.,1753

***Cynosurus cristatus* L.** – (24.779 /1.; 24.779 /2.) – ref.: **:** Sp. pl. 1:72. (1753) ; - Romania, Bihor, Paleu, the lake shore, 23.05.2002, leg. T. Tofan, det. V. M. Danciu

Gen ***Dactylis*** L., 1753

***Dactylis glomerata* L.** – (n. 24.783) – ref.:Sp. Pl. 1: 71. 1753; - Romania, Bihor, Paleu, the lake shore, 23.05.2002, leg. T. Tofan, det. V. M. Danciu

Gen ***Festuca*** L,1753

***Festuca ovina* L.** – (n. 24.852 /1; 24.852 /2; 24.852 /3.) – ref. : *Species Plantarum* 1: 73-74. 1753; - Romania, Bihor, Şimian , Jungher grassland 1 (natural reserve on sands) 24.05.2002, leg. T. Tofan, det. V. M. Danciu

***Festuca pratensis* Huds.** – (n.24.747) – ref.: Fl. Angl. ed. 1 37 (1762) ; - Romania, Bihor, Sânmartin, Băile 1 Mai, the "Peţea Rivulet" Natural Reserve, near Rontău footbridge, 18.05.2002, leg. T. Tofan; det. V. M. Danciu

***Festuca pratensis* Hudson.** – (n. 24.780 /1; 24.780 /2.; 24.780 /3.). – ref.: Fl. Angl. 37. 1762 ; - Romania, Bihor, Paleu, the lake shore, 23.05.2002, leg. T. Tofan, det. V. M. Danciu

***Festuca pratensis* Huds.** – (n. 24.875 /1. – 4..) - ref.: Fl. angl. 37. 1762; - Romania, Bihor, Şimian, Jungher grassland 2, pigs' fountain, 24.05.2002, leg. T. Tofan, det. V. M. Danciu

***Festuca pseudovina* Hack. ex Wiesb. -** (n. 24.853 /1; . 24.853 /2)– ref. : Oesterr. Bot. Z. 30:126. 1880*;* - Romania, Bihor, Şimian, Jungher grassland 1 (natural reserve on sands), 24.05.2002, leg. T. Tofan, det. V. M. Danciu

***Festuca rubra* L.** – (n. 24.851.) – ref.: Sp. pl. 1:74. 1753; - Romania, Bihor, Şimian, Jungher grassland 1 (natural reserve on sands), 24.05.2002, leg. T. Tofan, det. V. M. Danciu

***Festuca rubra* L.** – (n. 24.872) - ref.: Sp. pl. 1:77. 1753; - Romania, Bihor, Şimian, Jungher grassland 2, pigs'fountain**,** 24.05.2002, leg. T. Tofan, det. V. M. Danciu

***Festuca rupicola* Heuff.** – (n.24.748) – ref.: Verh. Zool.-Bot. Ges. Wien 8: 233 (1858); - Romania, Bihor, Sânmartin, Băile 1 Mai, the "Peţea Rivulet" Natural Reserve, zone III, 29.04.2002, leg. T. Tofan; det. V. M. Danciu

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

***Poa pratensis* L. -** (n. 24.854 /1; . 24.854 /2)– ref. : Sp. pl. 1:67. 1753, nom. cons.*;* - Romania, Bihor, Şimian, Jungher grassland 1 (natural reserve on sands), 24.05.2002, leg. T. Tofan, det. V. M. Danciu.

***Poa pratensis* L.** – (n. 24.874 /1.; 24.874 /2.) - ref.: Sp. pl. 1:67. 1753, nom. cons.; - Romania, Bihor, Şimian, Jungher grassland 2, pigs'fountain**,** 24.05.2002, leg. T. Tofan, det. V. M. Danciu

Gen ***Sesleria*** Scopoli, 1760

***Sesleria albicans* Kit. ex Schult.** – (n. 24.873) - ref.: Österreichs Fl. ed. 21: 216 (1814) ; - Romania, Bihor, Şimian, Jungher grassland 2, pigs'fountain, 24.05.2002, leg. T. Tofan, det. V. M. Danciu

Trib ***Triticeae***

Gen ***Leymus*** Hochstetter, 1848

***Leymus racemosus* (Lam.) Tzvelev** – (n. 24.178) – ref.: Bot. Mater. Gerb. Bot. Inst. Komarova Akad. Nauk S.S.S.R. 20:429. 1960; Not. Syst. (Leningrad) 20: 429 (1960); - Romania, Tulcea, Crişan, Caraorman (the Danube Delta), Caraorman sands, sandy banks, 30.04.1995, leg.: T. Burac (T.Tofan)

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

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

***Juncus bufonius* L. -** (n. 24.835.) – ref.: Sp. Pl. ed. 1 328 (1753); - Romania, Bihor, Şuncuiuş, Mişid Valley, limestone rocks; 08.10.2001, leg. T. Tofan, det. V. M. Danciu

Juncus conglomeratus– (n. 24.809 /1; 24.809 /2.) – ref.: Sp. Pl. 1: 326. 1753; - Romania, Bihor, Paleu, the lake shore, 23.05.2002, leg. T. Tofan, det. V. M. Danciu

***Juncus filiformis* L.** – (24.776) – ref.: Sp. Pl. ed. 1 326 (1753); - Romania, Bihor, Paleu, the lake shore, 23.05.2002, leg. T. Tofan, det. V. M. Danciu

Gen ***Luzula*** (L.) A.P. de Candolle, in Lamark & A.P. de Candolle, 1805

***Luzula campestris* (L.) DC** – (24.777) – ref.: Fl. Fr. ed. 3 3: 161 (1805); - Romania, Bihor, Paleu, the lake shore, 23.05.2002, leg. T. Tofan, det. V. M. Danciu

Luzula campestris (L.) DC. – (n. 24.866) - ref.: Fl. Fr. ed. 3 3: 161 (1805); - Romania, Bihor, Şimian, Jungher grassland 2, pigs' fountain, 24.05.2002, leg. T. Tofan, det. V. M. Danciu.

***Luzula campestris* (L.) DC.** – (n. 24.883) – ref.: *Flore Française. Troisième Édition* ed. 3 3: 161. 1805; - Romania, Suceava, Vatra Dornei, Zugreni Gorge, 24.05.1996, leg. T. Burac (T. Tofan); det. V. M. Danciu.

Luzula pilosa (L.) Willd. – (n. 24.882) – ref.: Enum. Pl. Horti Berol. 393 (1809); - Romania, Suceava, Vatra Dornei, Zugreni Gorge, 24.05.1996, leg. T. Burac (T. Tofan); det. V. M. Danciu.

" eudicots"
Ord. ***Ranunculales*** Dumontier, 1829
Fam. ***Ranunculaceae*** Adans., 1763, nom. cons.
Subfam. ***Ranunculoideae***

Trib ***Actaeeae***

Gen ***Actaea*** L., 1753

***Actaea spicata* L.** – (n. 24.901) – ref.: Sp. pl. 1:504. 1753; - Romania, Suceava, Vatra Dornei, Zugreni Gorge, 24.05.1996, leg. T. Burac (T. Tofan); det. V. M. Danciu.

Trib ***Anemoneae***

Gen ***Anemone*** L., 1753

***Anemone nemorosa* L.** – (n. 24.884) – ref.: *Species Plantarum* 1: 541. 1753; - Romania, Suceava, Vatra Dornei, Zugreni Gorge, 24.05.1996, leg. T. Burac (T. Tofan); det. V. M. Danciu.

***Anemone transsilvanica* (Fuss) Heuff.** - (n. 24.678) – ref.: Verh. K. K. Zool.-Bot. Ges. Wien 8:42. 1858; - Romania, Argeş, Dâmbovicioara Gorge, 09.07.1998, leg. T. Tofan.

Gen ***Clematis*** L., 1753

***Clematis alpina* (L.) Mill.** – (n. 24.878) – ref.: Gard. Dict., ed. 8. [textus s.n.] Clematis no. 9. 1768; - Romania, Suceava, Vatra Dornei, Zugreni Gorge, 24.05.1996, leg. T. Burac (T. Tofan); det. V. M. Danciu.

Trib ***Helleboreae***

Gen ***Caltha*** L., 1753

***Caltha palustris* L.** – (n. 24.879) – ref.: Sp. Pl. 1 : 558, 1753; - Romania, Suceava, Vatra Dornei, Zugreni Gorge, 24.05.1996, leg. T. Burac (T. Tofan); det. V. M. Danciu.

Trib ***Ranunculeae***

Gen ***Ranunculus*** L., 1753

***Ranunculus acris* L.** – (n. 24.801 /1; . 24.801 /2) – ref.: Sp. Pl. ed. 1 554 (1753); - Romania, Bihor, Paleu, the lake shore, 23.05.2002, leg. T. Tofan, det. V. M. Danciu

Ranunculus auricomus L. – (n. 24.750) – ref.: Reference: Sp. Pl. ed. 1 551 (1753); - Romania, Bihor, Sânmartin, Betfia, Şomleu hill, the forest, 31.03.2002, leg. T. Tofan; det. V. M. Danciu

***Ranunculus auricomus* L** – (n. 24.885) – ref.: *Species Plantarum* 1: 551. 1753.; - Romania, Suceava, Vatra Dornei, Zugreni Gorge, 24.05.1996, leg. T. Burac (T. Tofan); det. V. M. Danciu.

***Ranunculus bulbosus* L.** – (n. 24.887) – ref.: Sp. Pl. ed. 1 554 (1753).; - Romania, Suceava, Vatra Dornei, Zugreni Gorge, 24.05.1996, leg. T. Burac (T. Tofan); det. V. M. Danciu.

***Ranunculus ficaria* L. –** (n. 24.181) – ref.: *Species Plantarum* 1: 550. 1753.; - Romania, Iaşi, Moldova Plain, 27.04.1996, leg. T. Burac (T.Tofan).

***Ranunculus lanuginosus* L.** – (n. 24.886) – ref.: Sp. Pl. ed. 1 554 (1753.; - Romania, Suceava, Vatra Dornei, Zugreni Gorge, 24.05.1996, leg. T. Burac (T. Tofan); det. V. M. Danciu.

Fam. ***Papaveraceae*** Adans., 1763, nom. cons.
Subfam. ***Papaveroideae***
Trib. ***Papavereae***

Gen ***Papaver*** L., 1753

***Papaver alpinum* L. subsp. *corona-sancti-stephani* (Zapal.) Borza** - (n. 24.691; 24.691 /a.; 24.691 /b) – ref.: Sp. Pl. ed. 1 507 (1753); - Romania, Argeş, Piatra Craiului Mountains 08.07.1998, leg. T. Tofan.

***Papaver rhoeas* L.** – (n. 24.798) – ref.: Sp. pl. 1:507. 1753; - Romania, Bihor, Paleu, the lake shore, 23.05.2002, leg. T. Tofan, det. V. M. Danciu

"core eudicots"
Ord. ***Caryophyllales*** Perleb. 1826
Fam. ***Caryophyllaceae*** Durande, 1872, ex A.L. de Jussieu,1789, nom. cons.
Subfam. ***Alsinoideae***
Trib ***Alsineae***

Gen ***Cerastium*** L., 1753

***Cerastium arvense* L. subsp. *lerchenfeldianum* (Schur) Asch. & Graebn. –** (n. 24.660) – ref.: Syn. Mitteleur. Fl. 5(1): 611 (1917); - Romania, Sibiu, Făgăraş Mountains, Lake Bâlea, 06.07.1998, leg. T. Tofan.

***Cerastium holosteoides* Fr.** – (n. 24.895) – ref.: *Novitiae Florae Suecicae* 4: 52. 1817; - Romania, Suceava, Vatra Dornei, Zugreni Gorge, 24.05.1996, leg. T. Burac (T. Tofan); det. V. M. Danciu.

Gen ***Sagina*** L., 1753

***Sagina procumbens* L. -** (n. 24.834) – ref.: Sp.Pl. 128. 1753; - Romania, Bihor, Şuncuiuş, Mişid Valley, limestone rocks; 08.10.2001, leg. T. Tofan, det. V. M. Danciu

Subfam. ***Caryophylloideae***
Trib ***Caryophylleae***

Gen ***Dianthus*** L., 1753

***Dianthus armeria* L.** – (n. 24.818) – ref.: Sp. Pl. ed. 1 410 (1753); - Romania, Bihor, Şuncuiuş, Criş Valley, limestone shore, 08.10.2001, leg. T. Tofan, det. V.M. Danciu.

***Dianthus henteri* Heuff. ex Griseb. & Schenk -** (n. 24.673) – ref.: Arch. Naturgesch. (Berlin) 18(1): 303 (1852); - Romania, Argeş, Rucăr, Dâmboviţa valley, the Great Gorge of Dâmboviţa, 07.07.1998, leg. T. Tofan.

***Dianthus spiculifolius* Schur** - (n. 24.693) – ref.: Enum. pl. Transsilv. 98. 1866; - Romania, Argeş, Piatra Craiului Mountains, 08.07.1998, leg. T. Tofan.

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

***Gypsophila muralis* L. .** – (n. 24.789) – ref.: *Species Plantarum* 1: 408. 1753. - Romania, Bihor, Oradea, on the railway, 18.09.2001, leg. T. Tofan, det. V. M. Danciu.

***Gypsophila muralis* L. .** – (n. 24. 794 /1.; 24. 794 /2.; 24. 794 /3.) – ref.: *Species Plantarum* 1: 408. 1753. ; - Romania, Bihor, Sânmartin, Băile 1 Mai, the "Peţea Rivulet" Natural Reserve, the southern shore of Ochiul Mare, on the slope, 14.08.2001, leg. T. Tofan; det. V. M. Danciu.

***Gypsophila petraea* (Baumg.) Rchb.** - (n. 24.681) – ref.: : Fl. Germ. Excurs. 801 (1832); - Romania, Argeş, Piatra Craiului Mountains, 08.07.1998, leg. T. Tofan.

Trib ***Sileneae***

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

***Silene nutans* L. subsp. *dubia* (Herbich) Zapal. -** (n. 24.671) – ref.: Rozpr. Wydz. Mat.-Przyr. Polsk. Akad. Um. (Biol.) ser. 3 11B: 151 (1911); - Romania, Argeş, Rucăr, Dâmboviţa valley, the Great Gorge of Dâmboviţa, 07.07.1998, leg. T. Tofan.

***Silene pusilla* Waldst. & Kit. –** (n. 24.648) – ref.: *Descriptiones et Icones Plantarum Rariorum Hungariae* 3: 235-236, t. 212. 1812; - Romania, Argeş, Făgăraş Mountains, Mt. Capra, 06.07.1998, leg. T. Tofan.

Subfam. ***Paronychioideae***
Trib. ***Paronychieae***

Gen ***Herniaria*** L.,1753

***Herniaria glabra* L.** – (n. 24.877) - ref.: Sp. pl. 1:218. 1753; - Romania, Bihor, Şimian, Jungher grassland 2, pigs'fountain, 24.05.2002, leg. T. Tofan, det. V. M. Danciu

Fam. ***Droseraceae*** R.A. Salisbury, 1808

Gen ***Drosera*** L., 1753

***Drosera intermedia* Hayne –** (n. 24.723) – ref.: Bot. Bilderb. 3: t. 3, fig. B (1798); J. Bot. (Schrader) 1800(1, 1):37. 1800; - Romania, Harghita, Voşlăbeni, „După Luncă" swamp, 25.06.2000, leg. T. Tofan; det. M. Venczel

***Drosera rotundifolia* L. –** (n. 24.722) – ref.: Sp. pl. 1:281. 1753; - România, Harghita, Voşlăbeni, „După Luncă" swamp, 25.06.2000, leg. T. Tofan

Fam. ***Polygonaceae*** A.L. de Jussieu, 1789, nom. cons.
Subfam. ***Polygonoideae***
Trib ***Polygoneae***

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

Polygonum hydropiper **L.** – (n. 24. 791/ 1.; 24. 791/ 2.; 24. 791/ 3.; 24. 791/ 4.) - ref.: Sp. Pl. ed. 1 361 (1753); - Romania, Bihor, Sânmartin, Băile 1 Mai, the "Peţea Rivulet" Natural Reserve, the shore of Ochiul Mare, 04.10.200, leg. T. Tofan; det. V. M. Danciu

Polygonum viviparum **L.** - (n. 24.694) – ref.: Sp. Pl. ed. 1 360 (1753); - Romania, Argeş, Piatra Craiului Mountains, 08.07.1998, leg. T. Tofan.

Trib ***Rumiceae***

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

Rumex acetosella **L.** – (n. 24.802) – ref.: Sp. Pl. ed. 1 338 (1753); - Romania, Bihor, Paleu, the lake shore, 23.05.2002, leg. T. Tofan, det. V. M. Danciu

Rumex acetosella **L. -** (n. 24.839 /1; 24.839 /2) – ref.: Sp. pl. 1:338. 1753; - Romania, Bihor, Şimian, Jungher grassland 1 (natural reserve on sands) , 24.05.2002, leg. T. Tofan, det. V. M. Danciu

Rumex obtusifolius **L.** – (n. 24.793) – ref. Sp. Pl. ed. 1 335 (1753); - Romania, Bihor, Sânmartin, Băile 1 Mai, the "Peţea Rivulet" Natural Reserve, 10.07.2001, leg. T. Tofan; det. V. M. Danciu.

Rumex scutatus L. – (n. 24.900) – ref.: Sp. pl. 1:337. 1753; - Romania, Suceava, Vatra Dornei, Zugreni Gorge, 24.05.1996, leg. T. Burac (T. Tofan); det. V. M. Danciu

Ord. ***Santalales*** Dumortier, 1829
Fam. ***Santalaceae*** R. Brown, 1810
Trib. ***Thesieae***

Gen ***Thesium*** L., 1753

Thesium dollineri **Murb. - –** (n. 24.186) – ref.: Lunds Univ. Arsskr. 27: 43 (1891); - Romania, Iaşi, the Botanical Garden, 27.04.1996, leg. T. Burac (T. Tofan).

Ord. ***Saxifragales*** Dumortier, 1829
Fam. ***Crassulaceae*** J. St.-Hil., 1805

Subfam. ***Sedoideae***
Trib ***Sedeae***

Gen ***Sedum*** L., 1753

***Sedum acre* L.** – (n. 24.862) - ref.: Sp. pl. 1:432. 1753; - Romania, Bihor, Şimian, Jungher grassland 2, pigs'fountain, 24.05.2002, leg. T. Tofan, det. V. M. Danciu

***Sedum acre* L.** – (n. 24.902) – ref.: Sp. pl. 1:432. 1753; - Romania, Suceava, Vatra Dornei, Zugreni Gorge, 24.05.1996, leg. T. Burac (T. Tofan); det. V. M. Danciu.

***Sedum alpestre* Vill. –** (n. 24.676) – ref.: Prosp. Pl. Dauph. 49 (1779); - Romania, Sibiu, Făgăraş Mountains, Lake Bâlea, 06.07.1998, leg. T. Tofan.

***Sedum dasyphyllum* L. –** (n. 24.707) – ref.: Sp. Pl. ed. 1 431 (1753); - Romania, Argeş, Piatra Craiului Mountains, 08.07.1998, leg. T. Tofan.

***Sedum hispanicum* L.** - (n. 24.669) – ref.: Cent. pl. I:12. 1755 (Amoen. acad. 4:273. 1759); - Romania, Argeş, Rucăr, Dâmboviţa Valley, the Great Gorge of Dâmboviţa, 07.07.1998, leg. T. Tofan.

Fam. ***Haloragaceae*** R. Brown, 1814

Gen ***Myriophyllum*** L.; 1753

***Myriophyllum brasiliense* Cambess.** – (n. 24.741 / 1.; 24.741 / 2.; 24.741 / 3.;) – ref. : A. F. C. P. de Saint-Hilaire, Fl. Bras. merid. 2:252. 1830; - Romania, Bihor, Sânmartin, Băile 1 Mai, the Natural Reserve " Peţea Rivulet", downstream the footbridge Rontau, 03.04.2002, leg. T. Tofan

Fam. ***Paeoniaceae*** Raf., 1815, nom. cons.

Gen ***Paeonia*** L., 1753

***Paeonia tenuifolia* L. –** (n. 24.191 /a; 24.191 /b) – ref.: Syst. Nat. ed. 10 2: 1079 (1759); - Romania, Mureş, Zau de Câmpie, the natural reserve, 10.05.1996, leg. T. Burac (T. Tofan).

Fam. ***Saxifragaceae*** Durande, 1782 ex A.L. de Jussieu, 1789, nom. cons.

Gen ***Saxifraga*** L., 1753

***Saxifraga aizoides* L. –** (n. 24.702) – ref.: Sp. Pl. ed. 1 403 (1753); - Romania, Argeş, Făgăraş Mountains, Mt. Capra, 06.07.1998, leg. T. Tofan.

***Saxifraga bryoides* L. –** (n. 24.658) – ref.: Sp. Pl. ed. 1. 400 (1753); - Romania, Sibiu, Făgăraş Mountains, Lake Bâlea, 06.07.1998, leg. T. Tofan.

***Saxifraga cuneifolia* L. –** (n. 24.657) – ref.: Sp. Pl. ed. 2. 574 (1762); - Romania, Sibiu, Făgăraş Mountains, Lake Bâlea, 06.07.1998, leg. T. Tofan.

***Saxifraga cuneifolia* L. –** (n. 24.703) – ref.: Sp. Pl. ed. 2 574 (1762) ; - Romania, Argeş, Făgăraş Mountains, Mt. Capra, 06.07.1998, leg. T. Tofan.

***Saxifraga paniculata* Mill. –** (n. 24.704) – ref.: Gard. Dict. ed. 8 no. 3 (1768); - Romania, Argeş, Făgăraş Mountains, Mt. Capra, 06.07.1998, leg. T. Tofan.

Subclas. ***Rosidae*** Takhtajan, 1967
Ord. ***Geraniales*** Dumortier, 1829
Fam. ***Geraniaceae*** A.L. de Jussieu, 1789, nom.cons.
Trib ***Geranieae***

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

***Geranium pratense* L. -** (n. 24.835.) – ref.: Sp. Pl. ed. 1 328 (1753); - Romania, Bihor, Şuncuiuş, Mişid Valley, limestone; 08.10.2001, leg. T. Tofan, det. V. M. Danciu

Ord. ***Myrtales*** Reichenbach,1828
Fam. ***Onagraceae*** A.L. de Juisseu, 1789, nom cons.
Subfam. ***Onagroideae***
Trib ***Epilobieae***

Gen ***Epilobium*** L.,1753

***Epilobium montanum* L. –** (n. 24.647) – ref.: Sp. pl. 1:348. 1753; - Romania, Argeş, Făgăraş Mountains, Mt. Capra, 06.07.1998, leg. T. Tofan.

"fabids"

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

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

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

Trib. ***Cytiseae***

Gen ***Cytisus*** Desfontaines, 1798, nom. cons.

***Cytisus austriacus* L. –** (n. 24.197) – ref.: *Species Plantarum, Editio Secunda* 2: 1042. 1763; - Romania, Mureş, Zau de Câmpie, the natural reserve, 10.05.1996, leg. T. Burac (T. Tofan).

***Cytisus hirsutus* L.** – (n. 24.907) – ref.: Sp. pl. 2:739. 1753 ; - Romania, Suceava, Vatra Dornei, Zugreni Gorge, 24.05.1996, leg. T. Burac (T. Tofan); det. V. M. Danciu.

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

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

Lathyrus nissolia L. – (n. 24.808) – ref.: Sp. pl. 2:729. 1753; - Romania, Bihor, Paleu, the lake shore, 23.05.2002, leg. T. Tofan, det. V. M. Danciu.

***Lathyrus vernus* (L.) Bernh.** L. - (n.24.751) – ref.: Syst. Verz. 247. 1800; - Romania, Bihor, Sânmartin, Betfia, Şomleu hill, the forest, 31.03.2002, leg. T. Tofan; det. V. M. Danciu

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

***Vicia grandiflora* Scop.** – (n. 24.740 /1.; 24.740 /2.) – ref. : *Flora Carniolica, Editio Secunda* 2: 65, pl. 42. 1772; - Romania, Bihor, Sânmartin, Băile 1 Mai, the "Peţea Rivulet" Natural Reserve, Ochiul Mare zone, 18.04.2002, leg. T. Tofan

***Vicia grandiflora* Scop.** – (n. 24.792) - – ref. : *Flora Carniolica, Editio Secunda* 2: 65, pl. 42. 1772; - Romania, Bihor, Sânmartin, Băile 1 Mai, the "Peţea Rivulet" Natural Reserve, the shore of Ochiul Mare, 10.07.2001, leg. T. Tofan

***Vicia grandiflora* Scop.** – (n. 24.812 /1; 24.812 /2; 24.812 /3.) – ref.: Fl. Carn. ed. 2 2: 65 (1772); - Romania, Bihor, Paleu, the lake shore, 23.05.2002, leg. T. Tofan, det. V. M. Danciu

***Vicia grandiflora* Scop.** – (n. 24.857)– ref.: Fl. Carn. ed. 2 2: 65 (1772); - Romania,

Bihor, Şimian, Jungher grassland 2, pigs'fountain, 24.05.2002, leg. T. Tofan, det. V. M. Danciu .

***Vicia hirsuta* (L.) S. F. Gray**– (n. 24.811 /1; 24.811 /2; 24.811 /3.) – ref.: Nat. arr. Brit. pl. 2:614. 1822 ("1821"); - Romania, Bihor, Paleu, the lake shore, 23.05.2002, leg. T. Tofan, det. V. M. Danciu

***Vicia sativa* L.** – (n. 24.788) – ref.: Sp. Pl. ed. 1 736 (1753); - Romania, Bihor, Oradea, on the curb, 19.07.2001, leg. T. Tofan, det. V. M. Danciu

Trib ***Trifolieae***

Gen ***Trifolium*** L., 1753

***Trifolium aureum* Pollich**– (n. 24.804 /1.; 24.804 /2.) – ref.: Hist. pl. Palat. 2:344. 1777; - Romania, Bihor, Paleu, lake shore, 23.05.2002, leg. T. Tofan, det. V. M. Danciu

***Trifolium dubium* Sibth.** – (n. 24.803 /1; 24.803 /2) – ref.: Fl. Oxon. 231 (1794); - Romania, Bihor, Paleu, lake shore, 23.05.2002, leg. T. Tofan, det. V. M. Danciu

***Trifolium pratense* L.** – (n. 24.806) – ref.: Sp. Pl. ed. 1 768 (1753); - Romania, Bihor, Paleu, the lake shore, 23.05.2002, leg. T. Tofan, det. V. M. Danciu

***Trifolium repens* L.** – (n. 24.805) – ref.: Sp. Pl. ed. 1 767 (1753); - Romania, Bihor, Paleu, the lake shore, 23.05.2002, leg. T. Tofan, det. V. M. Danciu

Ord. ***Fagales*** Engler, 1892
Fam. ***Betulaceae*** Gray, 1821
Subfam. ***Betuloideae***

Gen ***Alnus*** P. Miller, 1754

***Alnus incana* (L.) Moench. –** (n. 24.174) – ref.: *Methodus Plantas Horti Botanici* 424. 1794; - Romania, Prahova, Sinaia, "Arinişul" natural reserve (reserves of Bucegi), 25.09.1997, 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 cyparissias **L.** – (n. 24.847 /1.; 24.847 /2.) – ref.: Sp. pl. 1:473. 1753; - Romania, Bihor, Şimian, Jungher grassland 1 (natural reserve on sands), 24.05.2002, leg. T. Tofan, det. V. M. Danciu

Euphorbia cyparissias **L. –** (n. 24.200) – ref.: Sp. Pl. ed. 1 461 (1753); - Romania, Mureş, Zau de Câmpie, the natural reserve, 10.05.1996, leg. T. Burac (T. Tofan).

Euphorbia esula **L. –** (n. 24.202) – ref.: Sp. Pl. ed. 1 461 (1753); - Romania, Mureş, Zau de Câmpie, the natural reserve, 10.05.1996, leg. T. Burac (T. Tofan).

Euphorbia helioscopia **L. –** (n. 24.201) – ref.: Sp. Pl. ed. 1 459 (1753); - Romania, Mureş, Zau de Câmpie, the natural reserve, 10.05.1996, leg. T. Burac (T. Tofan).

Fam. ***Salicaceae*** Mirbel, 1815
Trib ***Saliceae***

Gen ***Salix*** L.,1753

Salix retusa **L.** - (n. 24.692.) – ref.: Syst. Nat. ed. 10 2: 1287 (1759); - Romania, Argeş, Piatra Craiului Mountains, 08.07.1998, leg. T. Tofan.

Salix rosmarinifolia **L.** – (n. 24.179) – ref.: Sp. Pl. ed. 1 1020 (1753); - Romania, Tulcea, Crişan, Caraorman (the Danube Delta), the Caraorman sands, sandy banks, 02.05.1996, leg. T. Burac (T.Tofan)

Salix starkeana **Willd. –** (n. 24.728) – ref.: Sp. pl. 4(2): 677. 1806; - Romania, Harghita, Voşlăbeni, the „După Luncă" swamp, 25.06.2000, leg. T. Tofan.; det. V. M. Danciu

Fam. ***Violaceae*** Batsch, 1802
Subfam. ***Violoideae***
Trib ***Violeae***

Gen ***Viola*** L.,1753

Viola arvensis **Murray** – (24.763) – ref.: Prodr. Stirp. Gotting. 73 (1770); -

Romania, Bihor, Paleu, the lake shore, 23.05.2002, leg. T. Tofan, det. V. M. Danciu

***Viola arvensis* Murray** – (n. 24.889) – ref.: Prodr. Stirp. Gotting. 73 (1770); - Romania, Suceava, Vatra Dornei, Zugreni Gorge, 24.05.1996, leg. T. Burac (T. Tofan); det. V. M. Danciu.

***Viola biflora* L. –** (n. 24.664) – ref.: *Species Plantarum* 2: 936. 1753; - Romania, Sibiu, Făgăraş Mountains, Lake Bâlea, 06.07.1998, leg. T. Tofan.

***Viola canina* L.** – (n. 24.888) – ref.: Sp. pl. 2:935. 1753; - Romania, Suceava, Vatra Dornei, Zugreni Gorge, 24.05.1996, leg. T. Burac (T. Tofan); det. V. M. Danciu.

***Viola odorata* L. –** (n. 24.182 / a.; 24.182 / b) – ref.: Sp. Pl. ed. 1 934 (1753); - Romania, Iaşi, Moldova Plain, 27.04.1996, leg. T. Burac (T. Tofan).

***Viola riviniana* Rchb. -** (24.183 / a.; 24.183 / b.) – ref.: Pl. Crit. 1: 81 (1823); - Romania, Iaşi, Moldova Plain, 27.04.1996, leg. T. Burac (T. Tofan).

Ord. ***Oxalidales*** Heintze, 1927
Fam. ***Oxalidaceae*** R. Brown, 1818

Gen ***Oxalis*** L., 1753

***Oxalis acetosella* L.** – (n. 24.891) – ref.: Sp. pl. 1:433. 1753; - Romania, Suceava, Vatra Dornei, Zugreni Gorge , 24.05.1996, leg. T. Burac (T. Tofan); det. V. M. Danciu.

Ord. ***Rosales*** Perleb, 1826
Fam. ***Rosaceae*** A.I. de Jussieu, 1789, nom.cons.
Genus group ***Alchemilla group***

Gen ***Alchemilla*** L., 1753

***Alchemilla vulgaris* L.** – (n. 24.892) – ref.: Species Plantarum 1: 123. 1753; - Romania, Suceava, Vatra Dornei, Zugreni Gorge, 24.05.1996, leg. T. Burac (T. Tofan); det. V. M. Danciu.

***Alchemilla vulgaris* L. –** (n. 24.705) – ref.: Species Plantarum 1: 123. 1753; - Romania, Argeş, Făgăraş Mountains, Mt. Capra, 06.07.1998, leg. T. Tofan.

Trib ***Dryadeae***

Gen ***Dryas*** L.,1753

Dryas octopetala L. – (n. 24.713) – ref.: Sp. pl. 1:501. 1753; - Romania, Southern Carpathians, Piatra Craiului Mountains, 08.09.1998, leg. T. Tofan

Genus group ***Geum group***

Gen. ***Geum*** L., 1753

Geum montanum **L. –** (n. 24.650) – ref.: Sp. Pl. ed. 1 501 (1753); - Romania, Sibiu, the Făgăraş Mountains, Bâlea Lake, 06.07.1998, leg. T. Tofan.

Geum rivale **L.** – (n. 24.897) – ref.: Sp. Pl. ed. 1 501 (1753); - Romania, Suceava, Vatra Dornei, Zugreni Gorge, 24.05.1996, leg. T. Burac (T. Tofan); det. V. M. Danciu.

Trib ***Potentilleae***

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

Potentilla argentea **L. -** (n. 24.840) – ref.: Sp. pl. 1:497. 1753; - Romania, Bihor, Şimian, Jungher grassland 1 (natural reserve on sands), 24.05.2002, leg. T. Tofan, det. V. M. Danciu

Potentilla argentea **L.** – (n. 24.860 /1.; 24.860 /2.) - ref.: Sp. pl. 1:497. 1753; - Romania, Bihor, Şimian, Jungher grassland 2, pigs'fountain, 24.05.2002, leg. T. Tofan, det. V. M. Danciu

Potentilla ternata **C. Koch. –** (n. 24.649) – ref.: *Oesterreichische Botanische Zeitschrift* 52(2): 62. 1902; - Romania, Sibiu, Făgăraş Mountains, Lake Bâlea, 06.07.1998, leg. T. Tofan

Trib ***Pruneae***

Gen ***Prunus*** L.,1753

Prunus padus **L.** – (n. 24.846) – ref. : Sp. pl. 1:473. 1753 ; - Romania, Bihor,

Şimian , Jungher grassland 1 (natural reserve on sands), 24.05.2002, leg. T. Tofan, det. V. M. Danciu

Trib ***Rubeae***

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

Rubus caesius **L.** – (n. 24.787) – ref.:Sp. Pl. ed. 1 493 (1753); - Romania, Bihor, Paleu, Săldăbagiu de Munte (association with Ruscus), 05.10.2001, leg. T. Tofan, det. V. M. Danciu.

Rubus procerus **auct.** – (n. 24.738 /1; 24.738 /2.) – ref.: Name verified on 09-May-2005 by ARS Systematic Botanists. Last updated: 12-Oct-2005; - Romania, Bihor, Sânmartin, Băile 1 Mai, the Stellar forest – the project of an eco-museum, 31.07.2001, leg. T. Tofan

"malvids"
Ord. ***Brassicales*** Bromhead, 1838
Fam. ***Cruciferae*** A.L. de Jussieu, 1789, nom.cons.

Gen ***Cardaminopsis*** (C. A. Mey) Hayek

Cardaminopsis arenosa (L.) Hayek. – (n. 24.896) – ref.: Fl. Steierm. 1: 478 (1908)*;* - Romania, Suceava, Vatra Dornei, Zugreni Gorge, 24.05.1996, leg. T. Burac (T. Tofan); det. V. M. Danciu.

Cardaminopsis arenosa **(L.) Hayek –** (n. 24.663) – ref.: Fl. Steierm. 1: 478 (1908); - Romania, Sibiu, Făgăraş Mountains, Lake Bâlea, 06.07.1998, leg. T. Tofan.

Gen. ***Hornungia*** Bernhardi, 1840

Hornungia procumbens **(L.) Hayek. –** (n. 24.176) – ref.: Repert. Spec. Nov. Regni Veg. Beih. 30(1): 480. 1925; - Romania, Tulcea, Murighiol, the Danube Delta (Dobrogea), 04.05.1996, leg.: T. Tofan

Trib ***Alysseae***

Gen ***Alyssum*** L.,1753

***Alyssum alyssoides* (L.) L.** – (n. 24.876) - ref.: Syst. Nat. Ed. 10. 2 : 1130 (1759); - Romania, Bihor, Şimian, Jungher grassland 2, pigs'fountain**,** 24.05.2002, leg. T. Tofan, det. V. M. Danciu

Trib ***Arabideae***

Gen ***Draba*** L., 1753

***Draba nemorosa* L. -** (n. 24.177) – ref.: *Species Plantarum* 2: 643. 1753; - Romania, Tulcea, Murighiol, Danube Delta, salty soils, 04.05.1996, leg. T. Burac (T.Tofan)

Trib ***Brassiceae***

Gen ***Crambe*** L., 1753

***Crambe maritima* L. –** (n. 24.175 / a.; 24.175 / b) – ref.: Sp. pl. 2:671. 1753; syn.: *Cambre pontica* Steven; - Romania, Tulcea, Portiţa, the Danube Delta, 03.05.1995, leg. T. Tofan

***Crambe tataria* Sebeók –** (n. 24.192) – ref.: Tataria hung. 7. 1779; Medico-Bot. Tatar. 7 (1779); - Romania, Mureş, Zau de Câmpie, the natural reserve, 10.05.1996, leg. T. Burac (T. Tofan).

Trib ***Camelineae***

Gen ***Arabidopsis*** (DC.) Heynh.

***Arabidopsis thaliana* (L.) Heynh.** – (n. 24.894) – ref.: C. F. Holl & G. Heynhold, Fl. Sachsen 2:538. 1842; - Romania, Suceava, Vatra Dornei, Zugreni Gorge, 24.05.1996, leg. T. Burac (T. Tofan); det. V. M. Danciu.

Trib ***Cardamineae***

Gen ***Barbarea*** R. Brown

***Barbarea vulgaris R*. Brown** – (24.765) – ref.: Hort. Kew. ed. 2 4: 109 (1812); - Romania, Bihor, Paleu, the lake shore, 23.05.2002, leg. T. Tofan, det. V. M. Danciu

Gen ***Cardamine*** L., 1753

***Cardamine amara* L.** – (n. 24.908) – ref.: Sp. Pl. ed. 1. 656 (1753); - Romania, Suceava, Vatra Dornei, Zugreni Gorge, 24.05.1996, leg. T. Burac (T. Tofan); det. V. M. Danciu.

***Cardamine pratensis* L.** – (n. 24.880 /1.; 24.880 /2.) – ref.: *Species Plantarum* 2: 656. 1753; - Romania, Suceava, Vatra Dornei, Zugreni Gorge, 24.05.1996, leg. T. Burac (T. Tofan); det. V. M. Danciu.

Gen ***Rorippa*** Scopoli, 1760

***Rorippa sylvestris* (L.) Besser .** – (24.769) – ref.: Enum. Pl. Volhyn. 27 (1822); - Romania, Bihor, Paleu, the lake shore, 23.05.2002, leg. T. Tofan, det. V. M. Danciu

Trib ***Isatideae***

Gen ***Isatis*** L., 1753

***Isatis tinctoria* L.** - (n. 24.688.) – ref.: Sp. Pl. ed. 1 670 (1753); - Romania, Argeş, Piatra Craiului Mountains, 08.07.1998, leg. T. Tofan.

Trib ***Lepidieae***

Gen. ***Lepidium*** L.,1753

***Lepidium latifolium* L.** – (n. 24.910) – ref.: Sp. pl. 2:644. 1753; - Romania, Suceava, Vatra Dornei, Zugreni Gorge, 24.05.1996, leg. T. Burac (T. Tofan); det. V. M. Danciu.

Trib. ***Thlaspideae***
Gen ***Alliaria*** Heister ex Fabricius, 1759

***Alliaria petiolata* (Bieb.) Cavara & Grande –** (n. 24.180) – ref: Boll. Orto Bot. Napoli 3: 418 (1913); - Romania, Tulcea, Crişan, Caraorman (Danube Delta), Caraorman sand, sandy banks, 02.05.1996, leg. T. Burac (T.Tofan)

Ord. ***Malvales*** Dumortier, 1829
Fam. ***Cistaceae*** A.L. de Jussieu, 1789, nom. cons.

Trib. ***Cisteae*** (A.L. de Jussieu, 1789) Rchb., 1832

Gen ***Helianthemum*** P. Miller, 1754

***Helianthemum nummularium* (L.) Mill.** - (n. 24.685) – ref.: Gard. Dict. ed. 8 no. 12 (1768); - Romania, Argeş, Piatra Craiului Mountains, 08.07.1998, leg. T. Tofan.

Subclas. ***Asteridae*** Takhtajan, 1967
Ord. ***Ericales*** Dumortier, 1829
Fam. ***Ericaceae*** A.L. de Jussieu, 1789, nom. cons.
Subfam. ***Ericoideae***
Trib ***Empetreae***

Gen ***Empetrum*** L., 1753

***Empetrum nigrum* L. –** (n. 24.727) – ref.: Sp. Pl. ed. 1 1022 (1753); - Romania, Harghita, Voşlăbeni, the „După Luncă" swamp, 25.06.2000, leg. T. Tofan.; det. M. Venczel.

Trib. ***Rhodoreae*** (Vent., 1799) DC. ex Duby, 1828

Gen ***Rhododendron*** L., 1753

***Rhododendron myrtifolium* Schott & Kotschy –** (n. 24.665) – ref.: Bot. Zeit. 9: 17 (1851); - Romania, Sibiu, Făgăraş Mountains, Lake Bâlea, 06.07.1998, leg. T. Tofan.

Subfam. ***Monotropoideae***
Trib. ***Pyroleae***

Gen ***Moneses*** R.A. Salisbury ex S.F. Gray, 1821

***Moneses uniflora* (L.) Gray –** (n. 24.699) – ref.: Man. Bot. ed. 1 273 (1848); - Romania, Argeş, Făgăraş Mountains, Mt. Capra, 06.07.1998, leg. T. Tofan.

Subfam. ***Vaccinoideae***
Trib ***Andromedeae***

Gen ***Andromeda*** l., 1753

Andromeda polifolia **L. –** (n. 24.724) – ref.: Sp. pl. 1:393. 1753; - Romania, Harghita, Voşlăbeni, the „După Luncă" swamp, 25.06.2000, leg. T. Tofan; det. M. Venczel

Trib ***Vaccinieae***

Gen: ***Vaccinium*** L., 1753

Vaccinium myrtillus L. – (n. 24.712) – ref.: Sp. pl. 1:349. 1753; - Romania, Southern Carpathians, Piatra Craiului Mountains, 08.09.1998, leg. T. Tofan

Vaccinium myrtillus L. **–** (n. 24.721) – ref.: Sp. 1: 349. 1753 [1 May 1753]; - Romania, Harghita, Voşlăbeni, the „După Luncă" swamp, 25.06.2000, leg. T. Tofan

Vaccinium vitis-idaea **L.** – (n. 24.711) – ref.: Species Plantarum 1: 351. 1753; - Romania, the Southern Carpathians, Piatra Craiului Mountains, 08.09.1998, leg. T. Tofan

Fam. ***Primulaceae*** Batsch ex Borkh., 1797, nom.cons.
Subfam. ***Myrsinoideae***
Trib ***Lysimachieae***

Gen ***Lysimachia*** L.,1753

Lysimachia nummularia **L.** – (n. 24.819) – ref.: Sp. pl. 1:148. 1753; - Romania, Bihor, Şuncuiuş, Mişid Valley, sunny limestone rocks, 08.10.2001, leg. T. Tofan, det. V. M. Danciu

Fam. ***Primulaceae*** Batsch ex Borkh., 1797, nom.cons.
Subfam. ***Primuloideae*** (Batsch ex Borkh., 1797) Kostel., 1834
Trib ***Primuleae***

Gen ***Cortusa*** L., 1753

Cortusa matthioli L. - (n. 24.680) – ref.: Sp. pl. 1:144. 1753; - Romania, Argeş, Piatra Craiului Mountains, 08.07.1998, leg. T. Tofan.

Gen ***Primula*** L., 1753

***Primula minima* L. –** (n. 24.662) – ref.: Sp. Pl. ed. 1 143 (1753); - Romania, Sibiu, Făgăraş Mountains, Lake Bâlea, 06.07.1998, leg. T. Tofan.

Gen ***Soldanella*** L., 1753

***Soldanella pusilla* Baumg. –** (n. 24.653) – ref.: Enum. Stirp. Transsilv. 1: 138. 1816; - Romania, Sibiu, Făgăraş Mountains, Lake Bâlea, 06.07.1998, leg. T. Tofan.

"lamiids"

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. 795) – ref.:. Sp. Pl. ed. 1 135 (1753); - Romania, Bihor, Sânmartin, Băile 1 Mai, the Stellar forest – projected eco-museum, 04.10.2001, leg. T. Tofan; det. V. M. Danciu

***Pulmonaria filarszkyana* Jáv.** – (n. 24.909) – ref.: Bot. Közl. 15: 51 (1916); - Romania, Suceava, Vatra Dornei, Zugreni Gorge, 24.05.1996, leg. T. Burac (T. Tofan); det. V. M. Danciu.

Gen ***Symphytum*** L., 1753

***Symphytum cordatum* W. & K.** – (n. 24.906) – ref.:Pl. Rar. Hung. i. 6. t. 7; - Romania, Suceava, Vatra Dornei, Zugreni Gorge, 24.05.1996, leg. T. Burac (T. Tofan); det. V. M. Danciu.

Trib ***Lithospermeae***

Gen ***Buglossoides*** Moench. 1794

***Buglossoides arvensis* (L.) I.M. Johnston - –** (n. 24.185) – ref.: J. Arnold Arbor. 35:42. 1952; - Romania, Iaşi, the Botanical Garden, 27.04.1996, leg. T. Burac (T. Tofan).

Gen ***Myosotis*** L., 1753

***Myosotis scorpioides* L. –** (n. 24.667) – ref.: Sp. pl. 1:258. 1753; - Romania, Argeş, Făgăraş Mountains, Mt. Capra, 06.07.1998, leg. T. Tofan.

***Myosotis sparsiflora* Mikan** – (n. 24.739) – ref.: *Botanisches Taschenbuch* 74. 1807. - Romania, Bihor, Sânmartin, Băile 1 Mai, the "Peţea Rivulet" Natural Reserve, left shore of Ochiul Mare, 18.04.2002, leg. T.Tofan

***Myosotis stenophylla* Knaf** – (n. 24.904) – ref.:Bercht. & Opiz, Okon.- techn. Fl. Bohm. Ii. II. 126 (1839); cf. Domin in Carpatica, i. 254 (1939); - Romania, Suceava, Vatra Dornei, Zugreni Gorge, 24.05.1996, leg. T. Burac (T. Tofan); det. V. M. Danciu.

***Myosotis sylvatica* Hoffm.** – (n. 24.903) – ref.: Deutschl. Fl. 1:61. 1791; - Romania, Suceava, Vatra Dornei, Zugreni Gorge, 24.05.1996, leg. T. Burac (T. Tofan); det. V. M. Danciu.

***Myosotis sylvatica* Hoffm. –** (n. 24. 710) – ref. : Deutschl. Fl. ed. 1 61 (1791); -Romania, Sibiu, Tălmaciu, Tălmăcel, Iezer-Păpuşa Mountains (at the mouth of the Olt canyon), 08.07.1998, leg. T. Tofan

Ord. ***Gentianales*** Lindley, 1833

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

Gen ***Centaurium*** J. Hill, 1756

***Centaurium erythraea* Rafn . -** (n. 24.832.) – ref. Danm. Holst. Fl. 2: 75 (1800): - Romania, Bihor, Şuncuiuş, Mişid Valley, 08.10.2001, leg. T. Tofan, det. V. M. Danciu

Trib. ***Gentianeae***
Subtrib. ***Gentianinae*** (A.L. de Jussieu, 1789) G. Don, 1838

Gen ***Gentiana*** L., 1753

***Gentiana pneumonanthe* L.** – (n. 24.824) – ref.: Sp. Pl. ed. 1 228 (1753); - Romania, Bihor, Şuncuiuş, Mişid Valley, 08.10.2001, leg. T. Tofan, det. V. M. Danciu

***Gentiana pneumonanthe* L. –** (n. 24.725) – ref.: Sp. Pl. ed. 1 228 (1753); - Romania, Harghita, Voşlăbeni, the „După Luncă" swamp, 25.06.2000, leg. T. Tofan; det. M. Venczel

Subtrib. ***Swertiineae*** (Griseb.) Rchb., 1837

Gen ***Gentianopsis*** Ma, 1951

***Gentianopsis ciliata* (L.) Ma** – (n. 24.737) – ref.: *Acta Phytotaxonomica Sinica* 1: 15. 1951; - Romania, Bihor, Suncuius, Criş Valley, 08.10.2001, leg. T. Tofan

***Gentianopsis ciliata* (L.) Ma** – (n. 24.823) – ref.: *Acta Phytotaxonomica Sinica* 1: 15. 1951; - Romania, Bihor, Şuncuiuş, Mişid Valley, 08.10.2001, leg. T. Tofan, det. V. M. Danciu

Fam. ***Rubiaceae*** A.L. de Juisseu, 1789, nom cons.
Subfam. ***Rubioideae***
Trib ***Rubieae***

Gen ***Asperula*** L., 1753

***Asperula capitata* Kit. ex Schult.** - (n. 24.682) – ref.: Österreichs Fl. ed. 2 1: 312 (1814); - Romania, Argeş, Piatra Craiului Mountains, 08.07.1998, leg. T. Tofan.

Gen ***Cruciata*** P. Miller, 1754

***Cruciata glabra* (L.) Ehrend** – (24.764) – ref.: Notes. Roy. Bot. Gard. Edinburgh 22:393. 1958; - Romania, Bihor, Paleu, lake shore, 23.05.2002, leg. T. Tofan, det. V. M. Danciu

***Cruciata laevipes* Opiz –** (n. 24.196) – ref.:Seznam 34 (1852); - Romania, Mureş, Zau de Câmpie, the natural reserve, 10.05.1996, leg. T. Burac (T. Tofan).

Gen ***Galium*** L.,1753

***Galium mollugo* L. .** – (24.767 /1.; 24.767 /2.)) – ref.: Sp. Pl. ed. 1 107 (1753); - Romania, Bihor, Paleu, the lake shore , 23.05.2002, leg. T. Tofan, det. V. M. Danciu

***Galium palustre* L. .** – (24.768) – ref.: *Species Plantarum* 1: 105. 1753; - Romania, Bihor, Paleu, the lake shore, 23.05.2002, leg. T. Tofan, det. V. M. Danciu

Gen ***Sherardia*** L., 1753

***Sherardia arvensis* L.** – (n. 24.815) – ref.: Sp. Pl. ed. 1 102 (1753); - Romania, Bihor, Şuncuiuş, Criş Valley, 08.10.2001, leg. T. Tofan, det. V. M. Danciu

***Sherardia arvensis* L. -** (n. 24.833.) – ref.: Sp. Pl. ed. 1 102 (1753); - Romania, Bihor, Şuncuiuş, Mişid Valley, on limestone rocks; 08.10.2001, leg. T. Tofan, det. V. M. Danciu

***Sherardia arvensis* L.** – (n. 24.720) – ref.: Sp. pl. 1:102. 1753; - Romania, Southern Carpathians, Piatra Craiului Mountains, 08.07.1998, leg. T. Tofan; det. V. M. Danciu

Ord. ***Lamiales*** Bromhead, 1838
Fam. ***Labiatae*** A.L. de jussieu, 1789, nom. cons.
Subfam. ***Lamioideae***
Trib. ***Lamieae***

Gen ***Lamium*** L., 1753

***Lamium galeobdolon* (L.) Crantz** – (n. 24.796) – ref.: Stirp. austr. fasc. ed. 2, 2:262. 1769 (Linnaeus, Amoen. acad. 4:485. 1759, nom. inval.) ; - Romania, Bihor, Sânmartin, Băile 1 Mai, the "Peţea Rivulet" Natural Reserve, the shore of Ochiul Mare, 04.10.2001, leg. T. Tofan; det. V. M. Danciu

Subfam. ***Nepetoideae***
Trib ***Mentheae***
Subtrib ***Menthinae***

Gen: ***Acinos*** P. Mill., 1754

***Acinos alpinus* (L.) Moench subsp. *alpinus* –** (n. 24.709) – ref.: Meth. 407 (1794); - Romania, Sibiu, Tălmaciu city, Tălmăcel, Tămăcel (plai), Iezer-Păpuşa Mountains (at the mouth of the Olt canyon), 08.07.1998, leg. T. Tofan.

Gen ***Clinopodium*** L.; 1753

***Clinopodium menthifolium* (Host) Stace. –** (n. 24.708) – ref.: Watsonia 17:443. 1989; - România, Sibiu, Tălmaciu city, Tălmăcel, Tămăcel (plai), Iezer-Păpuşa Mountains (at the mouth of the Olt canyon), 08.07.1998, leg. T. Tofan.

Gen ***Prunella*** L., 1753

***Prunella vulgaris* L. -** (n. 24.831 / 1.; 24.831 /2.) – ref. : Sp. Pl. ed. 1 600 (1753); - Romania, Bihor, Şuncuiuş, Mişid Valley, 08.10.2001, leg. T. Tofan, det. V. M. Danciu

Gen ***Thymus*** L.; 1753

***Thymus comosus* Heuff., ex Griseb. & Schenk** - (n. 24.668; 24.668 /a.) – ref.: Wiegm. Archiv xviii. I. (1852) 328.; - Romania, Argeş, Făgăraş Mountains, Mt. Capra, 06.07.1998, leg. T. Tofan.

***Thymus serpyllum* L. -** (n. 24.838.) – ref.: Sp. pl. 2:590. 1753; - Romania, Bihor, Şimian, Jungher grassland 1 (natural reserve on sands), 24.05.2002, leg. T. Tofan, det. V. M. Danciu

***Thymus serpyllum* L.** – (n. 24.861 /1.; 24.861 /2.) - ref.: Sp. pl. 2:590. 1753; - Romania, Bihor, Şimian, Jungher grassland 2, pigs'fountain, 24.05.2002, leg. T. Tofan, det. V. M. Danciu

Subtrib ***Nepetinae***

Gen ***Glechoma*** L.,1753

***Glechoma hederacea* L.** – (n. 24.893) – ref.: Sp. pl. 2:578. 1753; - Romania, Suceava, Vatra Dornei, Zugreni Gorge, 24.05.1996, leg. T. Burac (T. Tofan); det. V. M. Danciu.

Fam. ***Plantaginaceae*** A.L. de Juisseu, 1789, nom cons.
Subfam. ***Antirrhinoideae***
Trib ***Antirrhineae***

Gen ***Linaria*** P. Miller

***Linaria alpina* (L.) Mill.** – (n. 24.716) – ref.: Gard. Dict. ed 8 no 4 (1768); - Romania, Southern Carpathians, Piatra Craiului Mountains, 08.07.1998, leg. T. Tofan

Subfam. ***Digitalidoideae*** (Augier, 1801 ex Martinov, 1820) Leurss., 1882
Trib ***Digitalideae*** (Augier, 1801 ex Martinov, 1820) Dumort., 1829

Gen ***Digitalis*** L., 1753

***Digitalis grandiflora* Mill. -** (n. 24.674) – ref.: Gard. Dict. ed. 8 no. 4, Corr. (1768); - Romania, Argeş, Rucăr, Dâmboviţa Valley, Great Gorge of Dâmboviţa, 07.07.1998, leg. T. Tofan.

Trib ***Veroniceae***

Gen ***Veronica*** L.,1753

***Veronica alpina* L. –** (n. 24.655) – ref.: Sp. Pl. ed. 1 11 (1753); - Romania, Sibiu, Făgăraş Mountains, Lake Bâlea, 06.07.1998, leg. T. Tofan.

***Veronica arvensis* L.** – (n. 24.898) – ref.: Sp. pl. 1:13. 1753; - Romania, Suceava, Vatra Dornei, Zugreni Gorge, 24.05.1996, leg. T. Burac (T. Tofan); det. V. M. Danciu.

***Veronica officinalis* –** (n. 24.203) – ref.: Sp. pl. 1:11. 1753; - Romania, Mureş, Zau de Câmpie, the natural reserve, 10.05.1996, leg. T. Burac (T. Tofan).

***Veronica prostrata* L.** – (n. 24.899) – ref.: Sp. pl. ed. 2, 1:17. 1762; - Romania, Suceava, Vatra Dornei, Zugreni Gorge, 24.05.1996, leg. T. Burac (T. Tofan); det. V. M. Danciu.

***Veronica urticifolia* Jacq. –** (n. 24.701) – ref.: Fl. Austr. 1: 37 (1773); - Romania, Argeş, Făgăraş Mountains, Mt. Capra, 06.07.1998, leg. T. Tofan.

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

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

***Plantago gentianoides* Sibth. & Sm. –** (n. 24.659) – ref.: Fl. Graec. Prodr. 1: 101 (1806); - Romania, Sibiu, Făgăraş Mountains, Lake Bâlea, 06.07.1998, leg. T. Tofan.

Fam. ***Orobanchaceae*** Ventenat, 1799
Trib ***Rhinantheae***

Gen ***Euphrasia*** L., 1753

***Euphrasia rostkoviana* Hayne –** (n. 24.726) – ref.: Getreue Darstell. Gew. 9: t.

7. 1825; - Romania, Harghita, Voşlăbeni, „După Luncă" swamp, 25.06.2000, leg. T. Tofan.

Gen ***Pedicularis*** L., 1753

***Pedicularis verticillata* L.** - (n. 24.684) – ref.: Sp. Pl. ed. 1 608 (1753); - Romania, Argeş, Piatra Craiului Mountains, 08.07.1998, leg. T. Tofan.

Gen ***Rhinanthus*** L., 1753

***Rhinanthus alectorolophus* (Scop.) Pollich.** – (24.771) – ref.: Hist. Pl. Palat. 2: 177 (1777); - Romania, Bihor, Paleu, the lake shore, 23.05.2002, leg. T. Tofan, det. V. M. Danciu

***Rhinanthus minor* L. .** – (24.770) – ref.: Amoen. acad. 3:54. 1756; - Romania, Bihor, Paleu, the lake shore, 23.05.2002, leg. T. Tofan, det. V. M. Danciu

Fam. ***Plantaginaceae*** A.L. de Juisseu, 1789, nom cons.
Subfam. ***Digitalidoideae***
Trib ***Veroniceae***

Gen ***Veronica*** L.,1753

***Veronica serpyllifolia* L.** – (n. 24.733) – ref.: *Species Plantarum* 1: 12. 1753; - Romania, Bihor, Oradea (the Baroque Palace –Ţării Crişurilor Museum), 22.04. 2002, leg. T. Tofan

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

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

***Plantago lanceolata* L.** – (n. 24.867) - ref.: Sp. Pl. ed. 1 113 (1753); - Romania, Bihor, Şimian, Jungher grassland 2, pigs'fountain, 24.05.2002, leg. T. Tofan, det. V. M. Danciu

Ord. ***Solanales*** Dumortier, 1829
Fam. ***Convolvulaceae*** A.L. de Jussieu, 1789
Trib ***Convolvuleae***

Gen ***Convolvulus*** L.; 1753

***Convolvulus arvensis* L. -** (n. 24.837.) – ref.: Sp. Pl. ed. 1 153 (1753); - Romania, Bihor, Şimian, Jungher grassland 1 (natural reserve on sands), 24.05.2002, leg. T. Tofan, det. V. M. Danciu

"campanulids"
Ord. ***Apiales*** Nakai, 1930
Fam. ***Umbelliferae*** A.L. de Jussieu, 1789, nom cons.
Subfam. ***Apioideae***
Trib ***Apieae***

Gen ***Carum*** L., 1753

***Carum carvi* L.** – (n. 24.881) – ref.: Sp. pl. 1:263. 1753; - Romania, Suceava, Vatra Dornei, Zugreni Gorge, 24.05.1996, leg. T. Burac (T. Tofan); det. V. M. Danciu.

Gen ***Ligusticum*** L., 1753

***Ligusticum mutellina* (L.) Crantz –** (n. 24.661) – ref.: Stirp. Austr. ed. 1 3: 81 (1767); - Romania, Sibiu, Făgăraş Mountains, Lake Bâlea, 06.07.1998, leg. T. Tofan.

***Ligusticum mutellina* (L.) Crantz –** (n. 24.706) – ref.: Stirp. Austr. ed. 1 3: 81 (1767); - Romania, Argeş, Făgăraş Mountains, Mt. Capra, 06.07.1998, leg. T. Tofan

Trib ***Scandiceae***

Gen ***Anthriscus*** L., 1753

***Anthriscus sylvestris* (L.) Hoffm.** – (n. 24.799 /1.; 24.799 /2.) – ref.: Gen. pl. umbell. 40. 1814; - Romania, Bihor, Paleu, the lake shore, 23.05.2002, leg. T. Tofan, det. V. M. Danciu

Gen ***Chaerophyllum*** L.,1753

***Chaerophyllum hirsutum* L. –** (n. 24.666) – ref.: Sp. pl. 1:258. 1753; - Romania, Argeş, Făgăraş Mountains, Mt. Capra, 06.07.1998, leg. T. Tofan.

Trib **Smyrnieae**

Gen ***Smyrnium*** L., 1753

***Smyrnium perfoliatum* L.** – (n. 24.734 /a.; 24.734 /b) – ref.: Species Plantarum 1:262. 1753; - Romania, Bihor, Oradea (Baroque Palace courtyard), 24.04. 2002, leg. T. Tofan

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

Gen ***Campanula*** L., 1753

***Campanula carpatica* Jacq. -** (n. 24.672) – ref.: Hort. Vindob. 1: 22 (1770); - Romania, Argeş, Rucăr, the Dâmboviţa Valley, Great Gorge of Dâmboviţa, 07.07.1998, leg. T. Tofan.

***Campanula cochleariifolia* Lam.** - (n. 24.690.) – ref.: Encycl. 1:578. 1785; - Romania, Argeş, Piatra Craiului Mountains, 08.07.1998, leg. T. Tofan.

***Campanula patula* L. subsp. *abietina* (Griseb.) Simonkai –** (n. 24.700) – ref.: Enum. Fl. Transs. 383 (1887); - Romania, Argeş, Făgăraş Mountains, Mt. Capra, 06.07.1998, leg. T. Tofan.

***Campanula glomerata* L.** – (n. 24.778) – ref.: **:** Sp. pl. 1:166. 1753; - Romania, Bihor, Paleu, the lake shore, 23.05.2002, leg. T. Tofan, det. V. M. Danciu

***Campanula patula* L.** – (n. 24.807 /1; 24.807 /2.) – ref.: Sp. Pl. ed. 1 163 (1753); - Romania, Bihor, Paleu, the lake shore, 23.05.2002, leg. T. Tofan, det. V. M. Danciu

***Campanula rapunculoides* L.** – (n. 24.822) – ref.:. Sp. Pl. ed. 1 165 (1753); - Romania, Bihor, Şuncuiuş, Mişid Valley, on limestone rocks, 08.10.2001, leg. T. Tofan, det. V. M. Danciu

Trib. ***Jasioneae***

Gen ***Jasione*** L., 1753

***Jasione montana* L.** – (n. 24.814) – ref.: Sp. Pl. ed. 1 928 (1753); *Flora von*

Deutschland, Österreich und der Schweiz 1885, Gera, Germany; - Romania, Bihor, Şuncuiuş, Criş Valley, 08.10.2001, leg. T. Tofan, det. V. M. Danciu

Trib ***Phyteumateae***

Gen ***Phyteuma*** L., 1753

***Phyteuma confusum* A. Kern. –** (n. 24.652) – ref.: Zeitschr. Ferdinand. Tirol (Innsbruck) ser. 3 15: 247 (1870); - Romania, Sibiu, Făgăraş Mountains, Lake Bâlea, 06.07.1998, leg. T. Tofan.

***Phyteuma orbiculare* –** (n. 24.654) – ref.: Sp. Pl. Ed. 1 170 (1753); - Romania, Sibiu, Făgăraş Mountains, Lake Bâlea, 06.07.1998, leg. T. Tofan.

***Phyteuma orbiculare* L.** - (n. 24.687; 24.687 /a) – ref.: Sp. Pl. ed. 1 170 (1753); Romania, Argeş, Piatra Craiului Mountains, 08.07.1998, leg. T. Tofan.

Fam. ***Compositae*** Giseke, 1792, nom.cons.
Subfam. ***Asteroideae***
Trib ***Anthemideae***
Subtrib ***Anthemidinae***

Gen ***Anthemis*** L., 1753

***Anthemis arvensis* L.** – (n. 24.800) – ref.: Sp. Pl. ed. 1 894 (1753); - Romania, Bihor, Paleu, the lake shore, 23.05.2002, leg. T. Tofan, det. V. M. Danciu

***Anthemis carpatica* Willd.** – (n. 24.718) – ref.: Sp. pl. 3(3):2179. 1803; *syn*.: *Anthemis cretica* L. subsp. *carpatica* (Waldst. & Kit. ex Willd.) Grierson**;** - Romania, the Southern Carpathians, Piatra Craiului Mountains, 08.07.1998, leg. T. Tofan; det.; V. M. Danciu

Subtrib ***Achilleinae***
Gen ***Achillea*** L.; 1753

***Achillea oxyloba* (DC.. –** (n. 24.651) – ref.: Oesterr. Bot. Wochenbl. 6: 300. 1856; - Romania, Sibiu, Făgăraş Mountains, Lake Bâlea, 06.07.1998, leg. T. Tofan.

Subtrib ***Leucantheminae***

Gen ***Leucanthemum*** P. Miller,1754

***Leucanthemum vulgare* Lam.** – (24.766) – ref.: *Flore Françoise* 2: 137. 1778; - Romania, Bihor, Paleu, the lake shore , 23.05.2002, leg. T. Tofan, det. V. M. Danciu

***Leucanthemum vulgare* Lam.** – (n. 24.845) – ref.: Fl. Fr. ed. 1 2: 137 (1779); - Romania, Bihor, Şimian, Jungher grassland 1 (natural reserve on sands), 24.05.2002, leg. T. Tofan, det. V. M. Danciu

***Leucanthemum vulgare* Lam.** – (n. 24.868) - ref.: Fl. franç. 2:137. 1779 («1778»); - Romania, Bihor, Şimian, Jungher grassland 2, pigs' fountain**,** 24.05.2002, leg. T. Tofan, det. V. M. Danciu

Trib ***Astereae***
Subtrib ***Asterinae***

Gen ***Aster*** L., 1753

***Aster alpinus* L.** - (n. 24.679) – ref.: *Species Plantarum* 2: 872. 1753; - Romania, Argeş, Piatra Craiului Mountains, 08.07.1998, leg. T. Tofan.

***Aster oleifolius* (Lam.) Wagenitz –** (n. 24.194) – ref.: Bot. Jahrb. 83: 329 (1964); - România, Mureş, Zau de Câmpie, the natural reserve, 10.05.1996, leg. T. Burac (T. Tofan).

Trib. ***Astereae***
Subtrib. ***Conyzinae*** Schultz-Bip., in Webb & Berthel., 1844

Gen ***Erigeron*** L., 1753

***Erigeron acris* L.** – (n. 24.844) – ref. : Sp. pl. 2:813. 1753 «*acre*"; - Romania, Bihor, Şimian, Jungher grassland 1 (natural reserve on sands), 24.05.2002, leg. T. Tofan, det. V. M. Danciu

Trib ***Gnaphalieae***
Subtrib ***Gnaphaliinae***

Gen: ***Leontopodium*** R. Brown ex Cassini, 1819

***Leontopodium alpinum* Cassini** – (n. 24.715) – ref.: Dict. Sci. Nat. 25: 474 (1822); - Romania, Southern Carpathians, Piatra Craiului Mountains, 08.07.1998, leg. T. Tofan

Trib ***Senecioneae***
Subtrib ***Tussilagininae***

Gen ***Doronicum*** L., 1753

***Doronicum austriacum* Jacq.** - (n. 24.683) – ref.: Flora Austriaca. Viennae 2:18, t. 130. 1774; - Romania, Argeş, Piatra Craiului Mountains, 08.07.1998, leg. T. Tofan.

Gen ***Homogyne*** Cass., 1816

***Homogyne alpina* Cass. –** (n. 24.656) – ref.: Dict. Sci. Nat. , ed.2. [F.Cuvier] 21: 412. 1821; - Romania, Sibiu, Făgăraş Mountains, the Bâlea Lake, 06.07.1998, leg. T. Tofan.

Gen ***Tussilago*** L., 1753

***Tussilago farfara* L. –** (n. 24.187) – ref.: Sp. Pl. 2: 865 1753; - Romania, Iaşi, Moldova Plain, 20.04.1996, leg. T. Burac (T. Tofan).

Subfam. ***Carduoideae***
Trib ***Cardueae***
Subtrib ***Centaureinae***

Gen ***Centaurea*** L.,1753

***Centaurea triumfettii* All. -** (n. 24.675; 24.675 /a.) – ref.: Fl. Pedem. i. 158. 1785; - Romania, Argeş, Rucăr, Dâmboviţa Valley, the Great Gorge of Dâmboviţa, 07.07.1998, leg. T. Tofan.

Subfam. ***Cichorioideae***
Trib ***Lactuceae***

Subtrib ***Hieraciinae***

Gen ***Hieracium*** L.,1753
Hieracium *subg.* ***Pilosella***

Hieracium (Pilosella) pilosella **L. -** (n. 24.841 /1.; 24.841 /2; 24.841 /3) – ref. Sp. Pl. ed. 1 800 (1753); - Romania, Bihor, Şimian, Jungher grassland 1 (natural reserve on sands), 24.05.2002, leg. T. Tofan, det. V. M. Danciu

Hieracium (Pilosella) pilosella **L.** – (n. 24.859) - ref.: Sp. Pl. ed. 1 800 (1753); - Romania, Bihor, Şimian, Jungher grassland 2, pigs' fountain, 24.05.2002, leg. T. Tofan, det. V. M. Danciu

Hieracium piloselloides **Vill. subsp.** ***piloselloides*** – (n. 24.858 /1; 24.858 /2.)– ref.: Prosp. Hist. pl. Dauphiné 34. 1779; - Romania, Bihor, Şimian, Jungher grassland 2, pigs'fountain, 24.05.2002, leg. T. Tofan, det. V. M. Danciu

Hieracium villosum **Jacq.** - (n. 24.689.) – ref.: Enum. Stirp. Vindob. 142, 271. 1762; Linn. Sp. Pl. ed. II. 1130; - Romania, Argeş, Piatra Craiului Mountains, 08.07.1998, leg. T. Tofan.

Subtrib ***Hypochaeridinae***

Gen ***Hypochaeris*** L., 1753

Hypochaeris radicata **L.** - (n. 24.813) – ref.: Species Plantarum 2:811. 1753; - Romania, Bihor, Aleşd, Peştiş, Valea Morilor, on the water flow, in beech forest, 02.08.2001, leg. T. Tofan; det. V. M. Danciu

Hypochaeris radicata **L.** - (n. 24.820) – ref.: Species Plantarum 2:811. 1753; - Romania, Bihor, Şuncuiuş, the Ungurul Mare Cave, 08.10.2001, leg. T. Tofan; det. V. M. Danciu

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

Leontodon autumnalis **L.** – (n. 24.816) – ref.: Species Plantarum 2:798. 1753; - Romania, Bihor, Şuncuiuş, Criş Valley, the Ungurul Mare Cave, 08.10.2001, leg. T. Tofan, det. V. M. Danciu

***Leontodon autumnalis* L.** – (n. 24.825) – ref. : Sp. pl. 2:798. 1753; - Romania, Bihor, Şuncuiuş, Mişid Valley, 08.10.2001, leg. T. Tofan, det. V. M. Danciu

Leontodon crispus* Vill. subsp. *crispus – (n. 24.843 /1; 24.843 /2; 24.843 /3) – ref.: Prosp. Pl. Dauph. 34 (1779); - Romania, Bihor, Şimian , Jungher grassland 1. (natural reserve on sands), 24.05.2002, leg. T. Tofan, det. V. M. Danciu.

***Leontodon crispus* Vill. subsp. *crispus*.** – (n. 24.869 /1; 24.869 /2.) - ref.: Prosp. Pl. Dauph. 34 (1779); - Romania, Bihor, Şimian, Jungher grassland 2, pigs' fountain, 24.05.2002, leg. T. Tofan, det. V. M. Danciu

***Leontodon hispidus* L.** – (n. 24.826) – ref. : Sp. Pl. ed. 1 799 (1753); - Romania, Bihor, Şuncuiuş, Mişid Valley, 08.10.2001, leg. T. Tofan, det. V. M. Danciu.

Ord. ***Dipsacales*** Dumortier, 1829
Fam. ***Caprifoliaceae*** A.L. de Jussieu, 1789, nom. cons.
Trib ***Lonicereae***

Gen ***Lonicera*** L., 1753

***Lonicera tatarica* L.** – (n.24.744) – ref.: Sp. Pl. ed. 1 173 (1753); - Romania, Bihor, Sânmartin, Băile 1 Mai, the "Peţea Rivulet" Natural Reserve, near "Venus" public swimming pool, 24.04.2002, leg. T. Tofan.

Concluding remarks

The specimens in the herbarium presented in this article were mostly collected in Bihor County, but also in other parts of Romania. In Bihor they were collected in 2001-2002, mainly in the area surrounding the city of Oradea (the city and its neighboring villages Sânmartin and Paleu), the sands in the proximity of Valea lui Mihai, in the north-western part of the county (the area corresponding to the town of Şimian), and the Peştiş region surrounding the town of Aleşd (in the eastern part of the county).

The eco-geographical particularities of the area represent three different situations and were presented in Part I of the paper (Danciu & Golban, 2010). But collections were done in the area of Şuncuiuş, an area falling into a larger location, the Bratca–Şuncuiuş–Vadu Crişului–Crişul Repede Gorge area, a karst complex in the limestone mountains Pădurea Craiului. Of great importance here

is the gorge with its many slopes and caves, including the Wind Cave of Şuncuiuş and the Ungurul Mare Cave. It is worth mentioning that the Crişul Repede Gorge, on a distance of 3 km. between Şuncuiuş and Vadu Crişului, has been declared a nature reserve by the Romanian Academy in 1955.

The village of Şuncuiuş is situated in the eastern part of the Bihor County at the foot of Pădurea Craiului mountains, midstream the Crişul Repede river. Landforms vary in altitude between 300 and 850 m. and consist of hills, of which the most important are Cărmăzan (855 m.), Recea (750 m.), Popii (683 m.), Rujetului (845 m.) and Hăpătag (730 m). In addition to those low hills, there is also a mountaineous area of Pădurea Craiului mountains (the Runcului top), as well as a depression strip in the centre of the villages Şuncuiuş and Bălnaca, belonging to the Vad–Borod depression area which separates the Pădurea Craiului Mountains from the Şes Mountain. Both the hill and the mountain regions have a clay and limestone subsoil in which waters have shaped various karst forms (dolines, slopes, springs, karst valleys, caves). The village of Şuncuiuş is crossed by Crişul Repede river and its tributaries, some of them permanent (Izbândişului and Mişidului Valleys), and others seasonal (Făgetului, Groşi, Măguranului, Ţarinii Valleys). The weather in this region is temperate continental with slight Mediterranean influences.

It is worth mentioning the floristic inventory of the Crişul Repede Gorge, consisting of more than 1500 species (out of which more than 750 are vascular plants), since the botanical importance of the reserve lies in the cohabitation of European species with several Euro-Asian (such as *Aconitum anthora, Lilium martagon, Gentiana cruciata, Neottia nidus avis, Daphne mezereum, Amygdalus nana*), Mediterranean- Euroasian (*Asperula odorata, Primula officinalis*), Atlantic-Mediterranean (*Ruscus aculeatus*) and Carpathian-Balkan ones (*Crocus heuffelianus, Colchicum autumnale*). Within the perimeter of the reserve, there are several species that are considered vulnerable (*Sesleria coerulans, Allium rotundum, Saxifraga aizoon*).

As previous researches and studies related to the flora and the vegetation of these areas, we can mention the works of Simonkai (1890) and Borza (1940, 1947) for Oradea and its surroundings, Hodişan & Pop. (1972, 1973), Tofan & Venczel (2003), as well as Lukacs et al. (2006). The sandy area in northwestern Romania, where the Natura 2000 ROSCI0020 Carei plain site is to be found today, included in two counties (62% in Satu Mare County and 38% in Bihor County), was investigated by Resmeriţă et al. (1971), Doltu et al. (1983) and Karacsony C (1995). The Peştiş area was described in the studies of Coldea (1972, 1973, 1978, 1979, 1981), mostly related to the flora and vegetation of the Plopiş Mountains.

The Şuncuiuş and the Crişul Repede Gorges were studied by Boşcaiu et al. (1966 a., b.), Raţiu et al. (1966), as well as Groza (1986, 1999), Cristea & Groza (1983).

The present material contains specimens collected in other counties than Bihor, respectively from other geographical regions of Romania, where a certain botanical interest could be identified; the material might have been collected during a study tour because of the existence of a local protected area of some kind or of a locally specific natural reserve, of a botanical garden or just due to interest for a certain species. The eco-geographical and climatic data where these habitats are to be found are the following:

There is on one hand a steppe vegetation, while on the coastal area, on lacustrine deposits, the vegetation is predominantly hydrophilic. The Black Sea vegetation consists of associations of plants, algae of different sizes and colours, and sea grass (the only flowering plant in the Romanian sea waters). The flora of Dobrogea was mentioned in publications since the 19th century (Brândză, 1898), and later by Prodan (1935-1939), but botanical researches begun in 1915, when Traian Săvulescu, Ion Borcea and Constantin Petrescu discovered separately plant species on the dunes at Agigea (such as *Convolvulus persicus* and *Ephedra distachya)*; they were continued by Zaharia Panţu (who collected the species *Calystegia soldanella* and found the endemic species *Silene pontica*) and Alexandru Borza (who mentioned the species *Medicago marina*). Further interest was manifested by Ştefan Peterfi (who, together with onescu, made a classical algological treaty, published 1976-1986) and Nyarady (discoverer of the species *Alyssum borzeanum* while mentioning other rare species in the Romanian flora). There were also other researches on the Black Sea coastal vegetation carried out by Morariu (1957, 1959), Burduja (1968), Şerbănescu (1970), Mititelu et al. (1994), Mihăilesc et al. (2005). The eco-protection is due to the presence of some rare or vulnerable species on the Black Sea coast (Oltean et al., 1994). Since 2007, the marine reserve of dunes in Agigea has been designated as a Site of Community Importance ROSCI0073, and since 2008 the protected natural area has been confirmed as part of Natura 2000 network for the Black Sea biogeographical region.

Tulcea County is represented here by three locations related to the Danube Delta, namely, Caraorman, Portiţa and Murighiol. The Danube Delta is situated in the southeast of the country, where the river flows into the Black Sea. Caraorman village is located in the north-east of the county, on top of the Caraorman bank ridge, and is part of Crişan village. Caraorman is a sand bank of river-sea origin, 18 km. long, with a maximum width of 8 km. and heights up to 7-9 m. Caraorman forest is a forest reserve on the sands of Caraorman (similar to the Letea forest)

which in 1940 was declared a natural monument and a strictly protected area. Gura Portiţei is a wild place inhabited by Lipovans, located between Lake Goloviţa and the Black Sea. Murighiol is situated in the eastern part of Tulcea County, a territory falling within the type of continental climate, with warm summers and rather cold winters, the annual average temperature being of 11 centigrades. In general, the eastern extremity of the Danube Delta grants it a drier continental climate, of Pontic type, where the average annual temperature is above 10 centigrades, and is therefore a dry region, the lack of rainfalls being compensated by the moisture of water surfaces. The vegetation of the Danube Delta is specific, consisting largely of marshes (78%), and then of forests of willow, ash, alder and poplar trees growing out of fluvial sands (6%), but in the fields of Letea and Caraorman there is also vegetation consisting of oak, elm and aspen trees and climbing plants. The pools of water are covered by aquatic floating vegetations, representing about 2% of the delta. This area was and still is thoroughly researched, especially after 1991, when it entered the UNESCO World Heritage, classified as a biosphere reserve at national level, and as a national park in the international taxonomy of IUCN. The flora of the Delta was studied by Sanda & Şerbănescu (1969), Dihoru and Negrean (1976), Popescu, Oroian & Nedelcu (1991, 1997), Ciocârlan (1994), Vicol (2009).

The city of Iaşi, the administrative centre of the Iaşi County, is mentioned here for its Botanical Garden, where several collections were done (e.g. *Thesium dollineri* Murb.), and also due to the local flower market, both being locations where there was a special botanical interest for several species (*Leucojum vernum* L. bought from Galaţi; *Crocus flavus* Weston, brought form near Bucharest, *Crocus vernus* (L.) Hill subsp. *vernus*). However, there are also aboriginal species specific to the Moldavian plain, such as: *Tussilago farfara* L., *Ranunculus ficaria* L., *Viola odorata* L.**,** *Viola riviniana* Rchb. The city is located in eastern Moldova, on the river Bahlui, having a continental climate, influenced by air masses of eastern origin. The flora and the vegetation of Iaşi were researched by Mititelu et. al. (1989).

In Suceava County, about 20 km downstream the town of Vatra Dornei, on the river Bistriţa, at an altitude of 740 m, is the area of Zugreni Gorges, declared a geological and floral reserve in 1973. It represents the most impressive segment of the Bistriţa river course. In Vatra Dornei the annual average temperature is 5.2 centigrades and the cumulative annual rainfall is 800 mm. The flora of the reserve is typical of rocks; here the edelweiss, *Leontopodium alpinum*, is to be found in the lowest natural resort of Moldova, as well as the endemic species *Andryala levitomentosa* or *petrosia*, a glacial relict with unique characteristics. The woody vegetation consists of spruce, mountain maple, mountain elm, linden, aspen, mountain ash, birch. The flora of Bucovina was published beginning from the 19th

century (Herbich, 1859), and its natural reserves were also studied (Seghedin, 1983, Ştefureac, 1967, 1969, 1970). More recently, researches on the vegetation of the area were carried out by Resmeriţă (1981), Mititelu et al. (1988, 1989) and Lucescu (1987, 1995).

The natural reserve of Zau de Câmpie, a village situated in the western part of Mureş County, is a botanical reserve established in 1932 by prof. Alex. Borza for the protection of the steppe peony (*Paeonia tenuifolia*), since that was the northernmost point in Romania where the species is living. Mureş County lies between the peaks of Călimanului and Gurghiului mountains, down to the Târnavelor plateau and the Transylvanian Plain. In the western part of the county, where the natural reserve of Zau de Câmpie is located, the climate is rather arid, with dry and hot summers. In the eastern parts of the county, the annual average temperature is between 2-4 centigrades, while in the western parts of the county it reaches 8-9 centigrades. The hydrography of the village is poor, reduced to a stream that runs through the main valley (Luduşelul) and collects several brooks that may dry up in summer. The vegetation includes species from the Western Transylvanian Plain, of which we mention as ligneous species the oak and the alder, whereas for pastures and hay fields the following species are common: *Festuca pratensis, Poa pratensis, Dactilis glomerata, Bromus molis, Poa trivalis, Medicago lupulina.* Yet the floristic characteristic phenomenon of the village is the steppe peony (*Peonia tenuifolia*), and for its protection a botanical reserve of 2.5 ha was created close to the village, in the Bota valley bottom. This plant was declared a natural monument in 1932. The steppe peony of the village of Zau de Câmpie was first publicly mentioned in 1846 in Vienna by Sternheim C., a physician who wrote on the flora of Transylvania. In the 20th century researches were carried out on the vegetation of the Trasnylvanian Plain by experts of the botanical school in Cluj, such as professors Prodan (1931), Borza (1939-1942, 1947), Pop (1965), Ghişa (1961, 1962), and later Mititelu (1990), the specfic aspects of the vegetation also marking the memory of the place (Floca & Pop, 2002).

The ‚După luncă' swamp in Voşlobeni (or Voşlăbeni), situated 2 km south of the village, at the left of river Mureş, is a protected area of Harghita county, covering an area of about 60 ha. Voşlobeni village is located in the south of Giurgeului Depression situated within the Eastern Carpathians, at an altitude of 780 m. The climate of the village is typical to mountain areas, with long, cold winters and short, cool summers. Rainfalls are fairly abundant throughout the year. The flora of the land is typical to alpine and sub-alpine areas. The specific vegetation of this area is the peat swamp. In the swamps there are a number of glacial relicts (e.g. *Viola epipsila*), and the spontaneous flora includes: *Fritillaria meleagris, Betula*

humilis, Spiraea ulmifolia, Prunus padus, Spirea salicifolia, Vaccinium myrtillus, Vaccinium vitis idaea, Rhododendron kotschyi and samples of *Drosera*. The peat swamps were described by Pop (1954, 1955, 1960), and studies on the vegetation in the marshes of Giurgeului Depression and on the one from near the village of Voşlobeni, in Harghita County, were published by Raţiu (1968, 1971, 1972).

The Făgăraş Mountains form a mountain range in the Southern Carpathians that stretches for about 70 km. north and 45 km south, being delimited by the Olt Valley in the west and by the Dâmboviţa river in the east. The climate here is rough, with sub-polar features, the air temperature dropping with the increasing altitude. In the Făgăraş Mountains (Sibiu County) there is Lake Bâlea, a glacial lake situated at an altitude of 2040 m. In 1932, the lake and 180 ha of land located around it were declared a scientific reserve. The Capra mountain peak (2,494 m.) is also located here an dat its foot another glaciar lake is to be found, Lake Capra (accessible from Lake Bâlea via the Capra). Studies on the ecology and the vegetation of the Făgăraş Mountains were carried out by Bălăceanu et al. (1981), Alexiu & Stancu (2003), Alexiu (2005, 2006, 2008).

Piatra Craiului Mountains became a nature reserve in 1938 due to their unique landscapes, a place where rare species are to be found, such as *Dianthus callizonus, Hesperis nivea, Minuartia transilvanica, Leontopodium alpinum*. In 1990 the area was declared a national park in order to ensure its biodiversity and conservation management. The Piatra Craiului National Park is situated in the perimeters of Braşov and Argeş counties, respectively the localities Zărneşti, Moeciu, Rucăr and Dâmbovicioara, including Piatra Craiului and an area encompassing Dâmboviţei and Ghimbavului Gorges. Dâmbovicioarei Gorge and Cave are the most characteristic karst phenomena in Piatra Craiului. They are near the village Dâmbovicioara, 5 km. from Podul Dâmboviţei, on the route Rucăr-Bran, the gorges being 2 km. long. The botanical researches on the flora and vegetation of Piatra Craiului date back to the 17th century, when J. Lerchenfeld and Peter Sigerus, a pharmacist from Sibiu, showed interest in the local flora, making herbarium sheets, some of them to deposited in the Brukenthal Museum of Sibiu. In 1816 Baumgarten's study was published ("Enumeratio stirpium Magno Transilvaniae Principatui"), being one of the first works on the flora of the Piatra Craiului; in 1851 the first descriptions and citations of plants of the area are published. After describing the endemic species *Dianthus callizonus* (the pink of Piatra Craiului) by the botanists Schott and Kotschy (published in „Botanische Zeitung", 1851), many other botanists have focused their interests on the study of local flora, among them being Schur (1866, see also Doltu & Schneider-Binder, 1970.), Fuss (1866), Simonkai (1886), Römer (1898, 1904), D. Brândză (1883,

1898). They were followed by Beldie, (1952, 1967), Beldie & Dihoru (1967), Boşcaiu & Täuber (1977), Morariu (1978, 1980), Cristian-Comes & Tauber (1977), Drăghici (1979,1980), Sanda & Popescu (1976, 1977). Among the most recent botanists we can mention Sanda, Alexiu (2002, 2005) and Mihăilescu (1994, 1995, 1996, 2001), who continue to enrich the knowledge on the flora here. Alexiu (1998) studied the flora of the Iezer-Păpuşa Mountains, as well as of the Făgăraş and Bucegi Mountains (1999, 2005), as well as Beldie did (1956, 1967).

The village of Rucăr, a settlement on the Dâmboviţa valley, in the northeastern part of Argeş county, is situated at an altitude of 750 m, on the southern slope of Piatra Craiului Mountains and the southern foot of the Făgăraş Mountains, on their lower portions, made up of the Iezer-Păpuşa range. It is crossed by two streams: Dâmboviţa and its branch, Râuşor. Aspects related to the vegetation of this place are to be found in the studies of Anghel & Turcu (1985) and Alexiu (1995).

Iezer-Păpuşa Mountains are part of the Southern Carpathians and are separated on three sides: by the waters of Doamnei and Dâmboviţa rivers, in the south the mountain peaks the Câmpulung depression. The average temperatures here are between 2 degrees Celsius in the higher areas and 7-8 centigrades in the mid-areas, rainfalls being abundant totalling an average annual value of 1200-1300 mm./mp. There are several researchers who studied the vegetation of these mountains such as Bărbulescu (1961), Bărbulescu et al. (1960, 1985), Alexiu (1996a, b), Schneider-Binder (1970).

The Botanical reserve „Arinişul" in Sinaia (Prahova county) represents one of the smallest forest reserves in the Curvature Carpathians and is situated on the left bank of the Prahova rivulet, in the Cumpătul district (at an altitude of 830-900 m.). It has an area of 1,037 ha. and is under the patronage of the Romanian Academy and the Institute of Biology in Bucharest. Several species are under protection, such as the white alder (*Alnus incana*). Besides the alder, there are also maples (*Acer pseudoplatanus*), hornbeams (*Carpinus betulus*), and also shrubs such as *Crataegus intermedia* and *Crataegus monogyna.* The "Arinişul" botanical reserve has been declared a „nature monument" since 1940 by a decision of the Council of Ministers. Beldie (1967) carried out researches on the flora and vegetation of the region.

All these locations across the country, where these plants were collected from, from the Black Sea coast to the high Carpathians, fall in the category of habitats with specific interests in protection and conservation. The existence of protected areas, specifically created for species declared monuments of nature, some of them since the beginning of the 20th century, shows the real interest

to protect, conserve, and monitor biodiversity (Doniţă et al., 2005a, b, Stefureac 1953, Pop 1965, Olteanu et al., 1994).

The material we examined was taxonomically updated according to Systema Naturae 2000 and contains, for the specimens collected in Bihor County, 117 taxa belonging to 76 genera and 35 families, while the specimens collected in other parts of the country are included in 145 taxa belonging to 101 genera and 49 families.

Bibliography

Alexiu V., 1995. Aspecte de vegetaţie din Cheile mari ale Dâmboviţei. Rucăr, jud. Argeş, Marisia, 23-24: 73-83, Tg. Mureş.

Alexiu V., 1996.a. Studiu fitocenologic al vegetaţiei din Masivul Iezer-Păpuşa şi Cheile Bazinului Superior al Dâmboviţei, Universitatea "Babeş-Bolyai", Cluj-Napoca.

Alexiu V., 1996.b. Cenotaxonomia grupărilor vegetale din Masivul Iezer-Păuşa şi Complexul de chei al Dâmboviţei, *Naturalia, Stud. şi cerc.* 2-3: 179-192, Piteşti.

Alexiu V., 1998. Flora and vegetation of the upper basin of Dîmboviţa. Comparative survey. *Sargetia (Se.Sci.Nat.),* 28: 59-75, Deva

Alexiu V., 1998. Vegetaţia Masivului Iezer-Păpuşa, Edit. Cultura, Piteşti, 362 pg.

Alexiu V., 2000. Rezervaţiile naturale ale judeţului Argeş, *Ecos,* 12: 60-70. Soc. Şt. Biol. Filiala Piteşti.

Alexiu V., 2003. Characterization of the flora and vegetation of the upper stream of Dâmboviţa. *Reserches in Piatra Craiului National Park*. Braşov, Editura Phoenix, 1: 100-118.

Alexiu V., 2005. Flora endemică din Munţii Argeşului. *Muzeul Olteniei Craiova. Studii şi Comunicări Ştiinţele Naturii.* Vol. XXI, pp.19-22 .

Alexiu V., 2006. Completări la flora judeţului Argeş. *Argesis. Studii şi Comunicări. Ştiinţele Naturii*, Piteşti, 14: 53-66.

Alexiu V., 2008**.** *Cormoflora judeţului Argeş*. Bucureşti, Editura Ceres, 323 p.

Alexiu V., 2009**.** Comori floristice argeşene, *Ecos*, 21: 21- 29., Piteşti.

Alexiu V., Stancu D.I., 2003. Consideraţii privind vegetaţia judeţului Argeş, *Argesis*, *Studii şi Comunicări* 11: 63-84.

Anghel Gh., Turcu Gh., 1985. Pajiştile din culoarul Bran-Rucăr, *Lucrări Ştiinţifice ale Institutului de Cercetare şi producţie pentru Cultura pajiştilor, Măgurele-Braşov,* 10: 215-234.

Ardelean G., Karacsonyi C., 2005. Flora, vegetaţia, fauna şi ecologia nisipurilor din nord-vestul României, Edit. Daya, Satu Mare.

Baumgarten I.C.G., 1816. *Enumeratio stirpium Magno Transsilvaniae Principatui præprimis indigenarum in usum nostratum botanophilorum conscripta, inque ordinem sexuali-naturalem concinnata,* Vindobonae, 2.

Baumgarten I.C.G., 1846. *Enumerationis stirpium Transsilvaniæ indigenarum* Mantissa I., Sibiu, 8, 112 p.

Bălăceanu V., Marian Elisabeta, Spirescu M., 1981, Ecosistemele spaţiului alpin şi subalpin al Munţilor Făgăraş, Lucr. Conf. Naţ. S.N.R.S.S., Publ. S.N.R.S.S., nr. 19 E, Bucureşti

Bărbulescu C., Bîrsan A., Bărbulescu V., 1960. Contribuţii la studiul păşunilor alpine din Masivul Iezer-Păpuşa, Edit. Agro-silvică, Bucureşti.

Bărbulescu C. 1961. Păşunile alpine din Munţii Iezer-Păpuşa. *Natura* 13(3): 16-22.

Bărbulescu C., Burcea P., Marinica D., 1985. Pajiştile din Masivul Iezer-Păpuşa, *Lucrări Ştiinţifice ale Institutului de Cercetare şi producţie pentru Cultura pajiştilor, Măgurele-Braşov,* 10: 235-246.

Beldie Al.,1952. Vegetaţia masivului Piatra Craiului, *Bul. şt. biol., agron., geol., geogr., Secţ. biol.* 4(4): 999-1029, Ed. Acad. Române, Bucureşti.

Beldie, Al.,1967. Flora şi vegetaţia Munţilor Bucegi, Ed. Acad. R.S.R., Bucureşti.

Beldie, Al.,1967. Endemismele şi elementele dacice din flora Carpaţilor României, *Com. Bot.,* Bucureşti.

Beldie Al., Dihoru Gh., 1967, Asociaţiile vegetale din Carpaţii României, *Comunicări botanice, Soc. Sti. Nat. Geogr.,* Bucuresti, 6: 133-238.

Borza, Al., 1929, Vegetaţia şi flora Ardealului (Schiţă geobotanică), *Transilvania, Banatul, Crişana, Maramureşul*, **1**: 251-270.

Borza Al., 1940. Les monumentts de la Nature de Transylvanie et du Banat, - Transylvania, V., 4.

Borza, Al., 1942, Monumentele naturii din Ardealul Central şi Apusean, *Bul. Muz. Reg. Alba-Iulia*, 1: 3-14.

Borza Al., 1947. Conspectus Florae Romaniae region unique affinum, Ed. Inst. Bot. Univ. Clusiensis, fasc. 1. p. 93

Borza Al., 1949. Conspectus Florae Romaniae, f. II. Cluj.

Boşcaiu N., Gergely I., Codreanu V., Raţiu O., Micle F., 1966.a. Flora şi vegetaţia rezervaţiei naturale Defileul Crişului Repede. Flora Spermafitică. *Contribuţii Botanice*, Cluj, pp. 112-150.

Boşcaiu N., Gergely I., Codreanu V., Raţiu O., Micle F., 1966.b. Flora şi vegetaţia Defileului Crişului Repede. Descrierea asociaţiilor. *Contribuţii Botanice*, Cluj, pp. 167-258.

Boşcaiu N., 1975. Aspecte de vegetaţie din rezervaţia Dunelor maritime de la Agigea, *Studii şi Comunic. Şti. Nat. Muz. Bruckenthal*, Sibiu, 18: 81-93.

Boşcaiu, N., 1989, Importanţa turbăriilor pentru conservarea unor relicte vegetale şi protecţia lor în România, *Ocrot. Nat. Med. Înconj.*, XXXIII, (2): 139-141.

Boşcaiu, N., & Tauber F., 1977. Asociaţii vegetale petrofile şi rupicole din Munţii Piatra Craiului,(I), *Stud. Com. Ocrot. Nat.,* 265-271, Suceava.

Boşcaiu, N., Coldea, Gh., Horeanu, C., 1994, Lista roşie a plantelor vasculare dispărute, periclitate, vulnerabile şi rare din flora României, *Ocrot. Nat. şi a mediului înconjurător*, Bucureşti, 1: 45-56.

Brands, S.J. (comp.) 1989-present. - Systema Naturae 2000. The Taxonomicon. Universal Taxonomic Services, Amsterdam, the Netherlands. [http://sn2000. taxonomy .nl/]. (Last updated: 17 Oct. 2009).

Brândză D., 1879-1883. Prodomul Florei României sau Enumeraţiunea plantelor până azi cunoscute în Moldova şi Valachia., Tipografia Academiei Române, 568 pg.

Brândză D., 1898. Contribuţiuni noue la Flora României, *Analele Acad. Române*, seria 2, 11 : 1-34, Bucureşti.

Brândză D., 1898. Flora Dobrogei, Ediţiunea Academiei Române, îngrijită de Sabba Ştefănescu, Institutul de Arte Grafice Carol Gobl., Bucureşti, 498 pg.

Burduja C., 1968. Observation sur l'association a *Convulvulus persicus* et sur celle a *Alyssum borzaeanum* de le reserve du dunes d'Agigea et du Delta du Danube., *Lucr. Ses. Şti. a Staţ. De Cerc. Marine « Prof. I. Borcea », Agigea (1969),* pp. 151-157.

Ciocârlan V. 1994. *Flora Deltei Dunării*. Editura Ceres, Bucureşti. Pg. 3-115

Ciocârlan V. 2000. Flora ilustrată a României – Pteridophyta et Spermatophyta, ediţia II-a, Editura Ceres, Bucureşti.

Coldea G., 1972. Flora şi vegetaţia Munţilor Plopiş, Teză de doctorat, Universitatea « Babeş-Bolyai », Cluj-Napoca.

Coldea G., 1973. Pajiştile mezo-xerofile din Munţii Plopiş. *Studii şi Cercetări de Biologie, Seria Botanică,* Bucureşti, **25**(6): 487-496.

Coldea G., 1978. Vegetaţia fontinală şi palustră din Munţii Plopiş, *St. şi Cercet. Biolog., seria Bot.,* Bucureşti, 30, 2, 125-134.

Coldea G., 1979. Pajiştile de luncă din zona munţilor Plopiş. *Contribuţii Botanice*, Cluj-Napoca, pp. 163-174.

Coldea G., 1981. Pajiştile mezofile din munţii Plopiş, *Stud. şi cercet. de biolog*., *Seria Biolog. Veget.,* Bucureşti, 33(1): 45-54.

Cristea V., Groza G., 1983. Contribuţii la cunoaşterea pajiştilor de pe dealul « Bătrânu » - comuna Vadu Crişului (jud. Bihor), *Contrib. Bot.,* Cluj-napoca, 137-143.

Cristian-Comes I., Tauber F., 1977. Ceno-corologia tisei (*Taxus baccata* L.) in Piatra Craiului, *Ocrot. Nat. Şi med. înconj.*, t. 21, nr.1: 27-32, Bucureşti.

Danciu V.M., Golban D., 2010. The Botanical Collection of the Ţării Crişurilor Museum Tatiana Tofan's Herbarium (part.I.), *Nymphaea*, XXXVII, 53-102.

Dihoru Gh., Negrean G. 1976. Sintaxoni specifici Deltei Dunării. *Muzeul Deltei Dunării, Peuce, Tulcea*. Vol. 5. Pg. 101-118

Doltu M.I., Schneider-Binder E., 1970. Plante colectate şi prelucrate de Ferdinand Schur, aflate în colecţiile de herbarii ale Muzeului Brukenthal, *Studii şi Comunicări Ştiinţe Naturale, Muzeul Brukenthal*, Sibiu.

Doltu M.I., Sanda V., Popescu A., 1983. Caracterizarea ecologică şi fitocenologică a florei terenurilor nisipoase din România, *Stud. Şi Comunic. Şti. Nat. Muz. Brukenthal*, Sibiu, 25: 87-151.

Doniţă, N., Popescu, A., Paucă-Comănescu, M., Mihăilescu, S., Biriş, I. -A., 2005.a. „Habitatele din România", Ed. Tehnică Silvică, Bucureşti

Doniţă, N., Popescu, A., Paucă-Comănescu, M., Mihăilescu, S., Biriş, I. -A., 2005. b: „Habitatele din România - Modificări conform amendamentelor propuse de România şi Bulgaria la Directiva Habitate (92/43/EEC) - 2006" -, Ed. Tehnică Silvică, Bucureşti

Drăghici B., 1979. Flora şi vegetaţia văii Dâmbovicioarei şi a versantului estic al Pietrei Craiului, Teza de doctorat, Bucuresti.

Drăghici B., 1980. Analiza florei vasculare din Valea Dambovicioarei şi a versantului estic al Pietrei Craiului, *Bul.şt.al Facultăţii de Învăţământ Pedagogic*, 467-474, Piteşti.

Floca I., Pop E. – 2002, - Satul cu bujori de-a lungul veacurilor, Mediaş.

Fuss M., 1866**.** Flora Transsilvaniæ excursoria; munificencia Societatis pro illustranda Transilvaniæ cognitione et Excellentissimi D. Archiepiscopi Dr. L. Haynald. *Societas Naturæ -Curiosum Transsilvanica*, Sibiu, 8, 864 p.

Ghişa E., 1961. Rezervaţia botanică de la Zaul de Câmpie, *Ocrotirea naturii şi a mediului înconjurător*, 5., pp.11-26.

Ghişa E., 1962. Rezervaţia botanică de la Zăul de Câmpie. *Ocrotirea Naturii*, Bucureşti, 6: 11-30.

Groza Gh., 1986. Analiza cormoflorei din Valea Mişid (Munţii Pădurea Craiului, jud. Bihor). *Contribuţii Botanice*, Cluj-Napoca, pp. 115-121.

Groza Gh., 1999. Vegetaţia munţilor Pădurea Craiului, Studiu fitocenologic, ecologic şi bioeconomic, Univ. « Babeş Bolyai », Cluj-Napoca.

Herbich Fr., 1859. Flora der Bucovina, Verlag Von F. Volckmar, Leipzig, 460 p.

Hodişan, I. & Pop. I., 1973. - Aspecte de vegetaţie din împrejurimile Băilor Felix Oradea (jud. Bihor) , - *Contrib. Botan.,* Cluj, 173-181.

Karacsony C., 1995. Flora şi vegetaţia judeţului Satu Mare, Edit. Muzeului Sătmărean, Satu Mare.

Lucescu T., 1987. Plante noi sau rare din flora Bucovinei, *Culegere de Studii şi Art. de Biol., Univ. "A.I. Cuza" Iaşi,* Grăd. Bot., 3: 260-261.

Lucescu T., 1995. Plante noi sau rare din flora Bucovinei, *Bucovina forestieră*, An III. Nr. 2, 54-56

Lukacs B. A., Sramko G., Molnar V.A., 2006. A *Nymphaea lotus* L. var. *thermalis* (DC.) Tuzson taxonomiai helyzetenek vizsgalata nrITS szekvenciak alapjan, *Kitaibelia*, 11(1): 63, Debrecen.

Mihăilescu S. 2001. Flora şi vegetaţia Masivului Piatra Craiului., Ed. Vergiliu, Bucureşti.

Mihăilescu S., Făgăraş M., Popescu A., 2005. "Characterization of some natural habitats of the Romanian Black Sea coast", *Proceedings of the Institute of Biology*, Bucharest, vol. VII, pp. 69-75.

Mihăilescu, S., 1994, Dynamic of vegetation of calcareous screes on the Piatra Craiului Mică Mountains, *Ocrot. nat.*, 38(2,): 135-141, Bucuresti.

Mihăilescu, S., 1995, Indicii de diversitate ai unor asociaţii vegetale din Munţii Piatra Craiului, *Ocrot. nat*, 39 (1-2): 71-77, Bucureşti.

Mihăilescu, S., 1996, Structura unui profil transversal de vegetaţie in Masivul Piatra Craiului, *Asociaţia Muzeografilor Naturalişti din România Naturalia, Studii şi cercetări,* t. I-II.

Mititelu D., 1990. Flora şi vegetaţia rezervaţiei ,,Zau de Câmpie" Mureş. *Contribuţii Botanice*, Cluj-Napoca, pp. 17-23.

Mititelu D., Haja S., Odochianu V., Paţa M., Venţel M., 1988. La flore et la vegetation des environ de la Vatra Dornei, *Analele Ştiinţifice ale Universităţii « A.I. Cuza » Iaşi, ser. II-a, Biologie,* 34 (supl.- 26-30).

Mititelu D., Chifu T., Pascal P., 1989. Flora şi vegetaţia judeţului Suceava, *Anuarul Muzeului Judeţean Suceava, Ştiinţe Naturale*, Suceava, 10: 93-120.

Mititelu D., Costica M., Parincu M., 1994. Flore et vegetation de la reserve botanique d'Agigea (depart. Constanta), *Analele Sti. Univ. « Al.I.Cuza » Iasi, Serie noua, Sectia II.a Biol.,* Iasi, 35-40.

Mititelu D., Chifu T., Scarlat A., Aniţei L., 1995. Flora şi vegetaţia judeţului Iaşi, *Buletinul Grădinii Botanice Iaşi,* 5 : 99-132.

Morariu I., 1943. Contribuţii la studiul florei litoralului Mării Negre şi a Dobrogei, *Lucrări ştiinţifice, Facultatea de Silvicultură Braşov*, 6:55-88.

Morariu I., 1957. Contributii la cunoasterea vegetatiei litoralului Marii Negre, *Bul. Sti. Sect. de Biol. Si Sti. Agricole, Seria Bot,* 9(4) : 361-378.

Morariu I., 1959. Contributii la studiul vegetatiei litoralului Marii Negre. II.,. *Stud. si Cerc. de Biol., Seria Biol. Veget.,* Bucuresti, 11(4) : 355-378.

Morariu, I., 1978: *Primula baumgarteniana* nu a dispărut din flora Carpaţilor Româneşti, *Ocrot. nat,* 22(1): 78, Ed. Academiei Române, Bucureşti.

Morariu, I. & Drăghici, B., 1980, Contributii la flora Masivului Piatra Craiului, *St. şi cerc. biol*, seria biol. veget., 32 (1): 3-8, Bucuresti.

Olteanu M., Negrean G., Popescu A., Roman N., Dihoru G., Sanda V., Mihăilescu S., 1994. Lista Roşie a plantelor superioare din România., *Inst. De Biologie – Studii, Sinteze, documentaţii de ecologie*, 1: 1-52, Bucureşti

Peterfi Şt., Ionescu Al., 1976-1986. Tratat de algologie, I.-IV., Ed, Academiei R.S.R., Bucureşti

Pop E., 1954. Studii botanice in mlastinile noastre de turba, *Buletin Stiintific – sectiunea de stiinte biologice, agronomice, geologice si geografice*, 6. I. Bucuresti, 349, 383-386.

Pop E., 1955. Mlastinile noastre de turba si problema ocrotirii lor, *Ocrotirea Naturii*, 1., Edit. Academiei R.P.R., Bucuresti, 57-105.

Pop E., 1960. Mlaştinile de turbă din R.P. România, Ed. Acad. Române, Bucureşti, 519 p.

Pop E., 1965. Monumente ale naturii în România, Ed. Academiei, Bucureşti

Pop I., Hodişan I. 1972. - Vegetaţia dealurilor Şomleu-Oradea , *Contrib. Bot.,* Cluj, 247-258.

Popescu A., Sanda V., Oroian Silvia, 1997. Vegetaţia Deltei Dunării. *Muzeul judeţean Mureş, Marisia*. Vol. 25. Pg. 126 .

Prodan I., 1931. Flora Câmpiei Ardelene. Studiu floristic-ecologic şi agricol, *Buletinul Academiei de Agricultură,* 2, Cluj, pp. 3-171.

Prodan I., 1935, 1936, 1939. Conspectul florei Dobrogei, *Bul. Acad. Agron*. 3, 6, 7, Cluj.

Raţiu F., 1968. Vegetaţia lemnoasă din complexul mlăştinos Voşlobeni (jud. Harghita). *Contrib. Bot.,* Cluj-Napoca., 327-335.

Raţiu F., 1971. Asociaţii de rogozuri înalte din mlaştinile eutrofe ale Depresiunii Giurgeului., *Contrib. Bot.,* Cluj-Napoca, 263-293.

Raţiu F., 1972. Asociaţii de rogozuri scunde din mlaştinile eutrofe ale Depresiunii Giurgeului., *Contrib. Bot.,* Cluj-Napoca, 161-186.

Raţiu O., Gergely I., Boşcaiu N., Codoreanu V., Bechet M., Silaghi G., Raţiu F., Turcu L., Lorinczi F., Peterfi L. Şt., Micle F., Plega C., Nicolau M., 1966. Flora şi vegetaţia rezervaţiei naturale „Defileul Crişului Repede". *Contribuţii Botanice,* Cluj, pp. 7-272.

Resmeriţă I., Spârchez Z., Csuros Şt., 1967. Vegetaţia nisipurilor din nord-vestul României. *Contribuţii Botanice*, Cluj-Napoca, pp. 349-371.

Resmeriţă I., Spârchez Z., Csuros Şt., Moldovan I., 1971 – Flora şi vegetaţia nisipurilor din Nord-Vestul României (Flora and vegetation from sands of northeastern Romania), Comunicări de Botanică, a VII-a Consfătuire Naţională de Geobotanică (Satu Mare, Maramureş), 17-26 VII 1969, 39-75.

Resmeriţă I., 1981. Aspecte de floră şi vegetaţie din împrejurimile staţiunii balneare Vatra Dornei (Suceava), *Stud. şi Comunic. de Ocrot. Nat., Suceava,* 5 : 420-423.

Romer, J., 1898. Aus der Pflanzenvelt der Burzenlander Berge in Siebenburgen, Verlag von Carl Graser, Viena.

Romer, J., 1904: Durch der Krepatura auf den Kleinen Konigstein, *Jahrb. Der Siebenburgen Karp. Ver.,* 4: 86-95.

Sanda V., Popescu A., 1973. Cercetări privind flora şi vegetaţia din Delta Dunării, *Stud. şi Cercet. Biol., seria Bot.,* Bucureşti, 25(5) : 399-424.

Sanda V., Popescu A., 1976. Contribuţii la cunoaşterea vegetaţiei de stâncării din Masivul Piatra Craiului, *Contrib. Bot*., Cluj-Napoca, 149-160.

Sanda V., Popescu A., Doltu M.I., 1977. Vegetaţia masivului Piatra Craiului, *Stud. şi Comunic. Şti. Nat. Muz. Brukenthal, Sibiu*, 21: 115-212.

Sanda V., Popescu A., 1983. Contribuţii la cunoaşterea vegetaţiei din Delta Dunării, *Hidrobiologia*, 18 : 61-69.

Sanda V., Popescu A., 1979. Noi contribuţii la cunoaşterea vegetaţiei de buruieni a litoralului românesc al Mării Negre. *Culegere de Studii şi Articole de Biologie*, Iaşi, **1**: 149-158.

Sanda V., Popescu A., 1990. L'etude des phztocenoses specifiques des mauvaises herbes des plages, des soils salines maritimes et des dunes littorales de la Roumanie, *Reveue Roum. De Biol. Veget.,* Bucureşti 35(1) : 7-15.

Sanda V., Popescu A., Nedelcu A., 1991. Caracterizarea vegetatiei din Delta Dunării. *Acta Botanica Horti Bucurestiensis*, Bucureşti, 1990-1991, pp. 97-109.

Sanda V., Popescu A., 1992. Contribuţii la cunoaşterea fitocenozelor de pe grindurile din Delta Dunării, *Ocrot. Nat. Med. Înconj.,* Bucureşti, 36(2) : 129-135.

Sanda V., Alexiu V., Vicol I. 2009. Structuri cenotice reprezentative pentru vegetaţia Deltei Dunării , ECOS, 21, pp. 7-11.

Schott H. W., 1851. *Dianthus callizonus* n. Sp. Und *Hepatica angulosa* D.C., *Bot. Ztg..* 9(10): 192-194, Berlin.

Schur J.F., 1866. Enumeratio Plantarum Transsilvaniae, Wien, pp. 984.

Scneider-Binder E., 1970. Aspecte din flora şi vegetaţia conglomeratelor Tălmaci – Podul Olt (jud. Sibiu), *Studii şi Comunicări Ştiinţe Naturale, Muzeul Brukenthal,* Sibiu, 161-186.

Seghedin T.G., 1983. Rezervaţiile naturale din Bucovina, Edit. Sport-Turism, Bucureşti.

Simonkai L. 1886. Enumeratio Florae Transsilvanicae vesculosae critica, Magyar Termeszettudomanyi Tarsulat, Budapest.

Simonkai L., 1890. "Nagyvarad es kornyekenek geologiai leirasa" – in Bunyitay V.: Nagyvarad termeszetrajza , Budapest, pp. 19-45.

Stefureac Tr. 1953. - Ocrotirea unor plante rare pe cale de dispariţie în Flora R.P.R. – monumente ale naturii", - *Natura*, V., 46., Bucureşti.

Ştefureac T., 1967. Importanţa rezervaţiilor naturale din regiunea Suceava, Comunicări de botanică – a V-a consfătuire de geobotanică, Edit. Academiei Române, Bucureşti, 93-111.

Ştefureac T., 1970. Relicte şi endemisme în flora rezervaţiilor naturale din Bucovina, *Studii şi comunicări de protecţia naturii*, Suceava, 21-39.

Ştefureac T., Raclaru P., 1969. Cartări de floră şi vegetaţie din Bucovina, *Comunicări de botanică*, 11, Bucureşti, 111-117.

Tofan T. 2003. - Conspectul sistematic al florei vasculare din rezervaţia naturală Pârâul Peţea – Băile 1 Mai (Jud. Bihor), *Nymphaea,* 30: 85–100.

Tofan T. & Venczel M. 2003. - A new station for *Ruscus hypoglossum* L. in Romania, *Nymphaea,* 30: 101–105.

xxx – Royal Botanic Garden Edinburgh – Flora Europaea (PANDORA taxonomic data base system)

xxx - Global Biodiversity Information Facility. (http;//www.gbif.org),

xxx - uBio Portal (www.ubio.org/portal/-5k),

xxx – Species 2000 & ITIS Catalogue of Life: 2007 Annual Checklist.

xxx – International Information System on Crop Wild Relatives (www.genres.de/CF/ipgri_cwr/.../authors.cfm...).

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The Botanical Collection of the Ţării Crişurilor Museum Tatiana Tofan's Herbarium (part III)

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Abstract. The present paper continues the publication of the botanical collection deposited in the Ţării Crişurilor Museum by describing the samples in the herbarium collected by Tatiana Tofan, a former botanist of the museum. The material presented here originated from the Republic of Moldova and were collected on the left bank of river Prut during 1994-1997. The material was arranged in an updated taxonomical classification, with the indication of accepted names and main synonyms, location, date and author of collecting. It includes 131 taxa, belonging to 92 genera and 39 families, according to the taxonomical classification employed (*Systema Naturae 2000*).

Introduction

The present paper continues the publication of the botanical collection deposited in the Ţării Crişurilor Museum by describing the samples in the herbarium completed by Tatiana Tofan, a former botanist of the museum. The material was collected in the Republic of Moldova, on the left bank of the river Prut (the districts of Briceni, Ocniţa, Edineţ, Rîşcani, Glodeni, Făleşti and Cahul – see Fig. 1), between 1994 and 1997.

Material and methods

The examined material is deposited in the collection of the Ţării Crişurilor Museum in Oradea, as indicated by the inventory numbers following the scientific names. When rendering the accepted species names, we mentioned the reference source of its first description and its synonyms. We employed the database of the Royal Botanic Garden Edinburgh *Flora Europaea*, *Global Biodiversity Information Facility.* (http;//www.gbif.org), and *uBio Portal* (www.ubio.org/portal/-5k). In order to update the taxonomic classification, we consulted also the study of V. Ciocârlan (2000) which follows the rules and recommendations of the International Code for Botanic Cataloguing, and the site *Systema Naturae 2000* (http://taxonomicom.taxonomy.nl) (the variant entered after October 17, 2009). We also mentioned the present names of the collecting sites, the locality, the date and the name of the collector. Where determination was missing, the name of the determinator was mentioned.

Abbreviations: n. = number of inventory; ref. = reference index for the first description of the species; leg. = the author who collected and determined the plant; Ord. = order; Fam. = 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 ramosissimum Desf. (n. 24.590) – ref.: Fl. Atl. 2: 398 (1799); Republic of Moldova, Rîşcani district, (com.) Branişte, village Branişte, the ponds between mounds, 07.06.1996, leg. T. Burac (T. Tofan).

Infraphylum "*Radiatopses"* Kenrick & Crane, 1997
Clas. *Magnoliopsida* Brogniart, 1843

"monocotyledons"
Ord. *Asparagales* Bromhead, 1838
Fam. *Asparagaceae* A. de Jussieu, 1789, nom. cons.
Subfam. *Convallarioideae* (Dumort., 1827) Herb., 1837
Trib *Polygonateae*

Gen *Polygonatum*

Polygonatum latifolium (Jacq.) Desf. (n. 24.524) – ref.: Ann. Mus. Hist. Nat. (Paris) 9: 50 (1807); Republic of Moldova, Glodeni district, (com.) Viişoara, village Moara Domnească, 06.06.1996, leg. T. Burac (T. Tofan)

Polygonatum latifolium (Jacq.) Desf. (n. 24.538) – ref.: Ann. Mus. Hist. Nat. (Paris) 9: 50 (1807); Republic of Moldova, Glodeni district, (com.) Viişoara, village Viişoara, forest, on the meadow, 05.06.1996, leg. T. Burac (T. Tofan).

Polygonatum latifolium (Jacq.) Desf. (n. 24.636) – ref.: Ann. Mus. Hist. Nat. (Paris) 9: 50 (1807); - Republic of Moldova, Glodeni district, (com.) Cuhneşti, village Cuhneşti, 06.06.1996, leg. T. Burac (T. Tofan).

Polygonatum latifolium (Jacq.) Desf. (n. 24.641) – ref.: Ann. Mus. Hist. Nat. (Paris) 9: 50 (1807); Republic of Moldova, district Făleşti, (com.) Chetriş, village Chetriş, 04.06.1996, leg. T. Burac (T. Tofan).

Potamogeton pectinatus L. (n. 24.544) – ref.: Sp. Pl. ed. 1 127 (1753); Republic of Moldova, Glodeni district, (com.) Viişoara, village Viişoara, irrigation canal, aquatic ecosystem, 05.06.1996, leg. T. Burac (T. Tofan).

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

Gen *Coeloglossum* C.J. Hartman , 1820

Coeloglossum viride (L.) Hartm. (n. 24.926) – ref.: *Handbok i Skandinaviens Flora* 329 (1820); Republic of Moldova, Ocniţa district, village Bîrnova, meadow, 25.06.1997, leg. T. Burac (T. Tofan).

Fam. *Iridaceae* A.L. de Jussieu, 1789, nom. cons.
Subfam. *Iridoideae*

Trib *Irideae*

Gen *Iris* L., 1753

Iris graminea L. (n. 24.592) – ref.: Sp. Pl. ed. 1 39 (1753); Republic of Moldova, Glodeni district, (com.) Viişoara, village Viişoara, steppe, 05.06.1996, leg. T. Burac (T. Tofan).

Iris spuria L. subsp. *halophila* (Pall.) D. A. Webb & Chater (n. 24.525; 24.526) – ref.:. Bot. Jour. Linn. Soc. 76: 315 (1978); Republic of Moldova, Glodeni district, (com.) Viişoara, village Moara Domnească, 06.06.1996, leg. T. Burac (T. Tofan)

Iris spuria L. subsp. *halophila* (Pall.) D. A. Webb & Chater (n. 24.529) – ref.: Bot. Jour. Linn. Soc. 76: 315 (1978); Republic of Moldova, Glodeni district, (com.) Balatina, the village Balatina, 06.06.1996, leg. T. Burac (T. Tofan)

Iris spuria L. subsp. *halophila* (Pall.) D. A. Webb & Chater (n. 24.614) – ref.: Bot. Jour. Linn. Soc. 76: 315 (1978); Republic of Moldova, Glodeni district, (com.) Balatina, village Balatina, edge of the forest, 06.06.1996, leg. T. Burac (T. Tofan)

Iris spuria L. subsp. *halophila* (Pall.) D. A. Webb & Chater (n. 24.615) – ref.: Bot. Jour. Linn. Soc. 76: 315 (1978); Republic of Moldova, Glodeni district, (com.) Balatina, village Balatina, 04.06.1996, leg. T. Burac (T. Tofan)

Ord. *Liliales* Perleb, 1826
Fam. *Liliaceae* A.L. de Jussieu, 1789, nom. cons.
Subfam. *Lilioideae*
Trib *Lilieae*

Gen *Fritillaria* L., 1753

Fritillaria orientalis Adams (n. 24.536.) – ref.: Beitr. Naturk. 1: 50 (1805); Republic of Moldova, Glodeni district, (com.) Viişoara, village Viişoara, forest, on the meadow, 05.06.1996, leg. T. Burac (T. Tofan).

"commelinids"
Ord. *Poales* Small, 1903
Fam. *Cyperaceae* A.J. de Jussieu, 1789, nom.cons.
Subfam. *Cyperoideae*

Trib *Eleocharideae*

Gen *Eleocharis* R. Brown, 1810

Eleocharis palustris (L.) Roem. & Schult. (n. 24.589) – ref.: Syst. Veg. ed. nov. (15) 2: 151 (1817); Republic of Moldova, Glodeni district, (com.) Comanca, village Buteşti, 08.06.1996, leg. T. Burac (T. Tofan).

Trib *Scirpeae*

Gen *Scirpus* L., 1753

Scirpus maritimus L. (n. 24.587) – ref.: Sp. Pl. ed. 1 51 (1753); Republic of Moldova, Glodeni district, (com.) Comanca, the village Buteşti, Comencuţa gorge, 08.06.1996, leg. T. Burac (T. Tofan).

Subfam. *Caricoideae*

Gen *Carex* L.,1753

Carex caryophyllea Latourr. (n. 24.584) – ref.: Chlor. Lugd. 27 (1785); Republic of Moldova, Glodeni district, (com.) Viişoara, village Viişoara, floodplain forest, 05.06.1996, leg. T. Burac (T. Tofan).

Carex distans L. (n. 24.583) – ref.: Syst. Nat. ed. 10 2: 1263 (1759); Republic of Moldova, Glodeni district, (com.) Viişoara, village Viişoara, meadow pastures, 05.06.1996, leg. T. Burac (T. Tofan).

Carex hirta L. (n. 24.588) – ref.: Sp. Pl. ed. 1 975 (1753); Republic of Moldova, Glodeni district, (com.) Viişoara, village Viişoara, meadow, 05.06.1996, leg. T. Burac (T. Tofan).

Carex riparia M. A. Curtis (n. 24. 582; 24.582 /a.) – ref.: Fl. Londin. 2 (4): t. 60 (1783); Republic of Moldova, Glodeni district, (com.) Viişoara, village Viişoara, 07.06.1996, leg. T. Burac (T. Tofan).

Carex riparia M. A. Curtis (n. 24.586.) – ref.: Fl. Londin. 2 (4): t. 60 (1783); Republic of Moldova, Glodeni district, (com.) Comanca, village Buteşti, Comencuţa river, 08.06.1996, leg. T. Burac (T. Tofan).

Carex secalina Willd. ex Wallenb (n. 24.585) – ref.: Kungl. Svenska Vet. Akad. Handl. nov. ser. 24: 151 (1803); Republic of Moldova, Rîşcani district, (com.) Branişte, village Branişte, the hillocks, 07.06.1996, leg. T. Burac (T. Tofan).

Carex spicata Huds. (n. 24.638) – ref.: Fl. Angl. ed. 1 349 (1762); Republic of Moldova, Glodeni district, (com.) Balatina, village Balatina, edge of forest, 06.06.1996, leg. T. Burac (T. Tofan)

Carex vulpina L. (n. 24.639) – ref.: Sp. Pl. ed. 1 973 (1753); Republic of Moldova, Glodeni district, (com.) Viişoara, village Viişoara, old riverbed, 05.06.1996, leg. T. Burac (T. Tofan).

Fam. *Gramineae* A.J. de Jussieu, 1789, nom. cons.
Subfam. *Pooideae*
Trib *Aveneae*
Subtrib *Alopecuridinae*

Gen *Agrostis* L., 1753

Agrostis stolonifera L. (n. 24.546) – ref.: Sp. pl. 1: 62 (1753); Republic of Moldova, Rîşcani district, (com.) Branişte, village Branişte, ponds between mounds, 08.06.1996, leg. T. Burac (T. Tofan).

Gen *Phleum* L., 1753

Phleum phleoides (L.) H. Karst. – (n. 24.611) – ref.: Deutsche Fl. ed. 1 374 (1881); Republic of Moldova, Cahul district, (com.) Slobozia Mare, village Slobozia Mare, coastal steppe, 05.07.1996, leg. T. Burac (T. Tofan).

Subtrib. *Aveninae*

Gen *Koeleria* Persoon, 1805

Koeleria macrantha (Ledeb.) Schult. (n. 24.551; 24.551/a.) – ref.: Mantissa 2: 345 (1824); Republic of Moldova, Glodeni district, (com.) Cobani, village Cobani, the hillocks, 07.06.1996, leg. T. Burac (T. Tofan)

Subtrib *Phalaridinae*
Gen *Phalaris* L., 1753

Phalaris arundinacea L. (n. 24.635) – ref.: *Species Plantarum* 1: 55 (1753); Republic of Moldova, Glodeni district, (com.) Viişoara, village Viişoara, forest, 05.06.1996, leg. T. Burac (T. Tofan).

Trib *Bromeae*

Gen *Bromus* L., 1753

Bromus hordeaceus L. subsp. *hordeaceus* (n. 24.631; 24.631/a) – ref.: Sp. pl. 1: 77 (1753); Republic of Moldova, Glodeni district, (com.) Viişoara, village Viişoara, road side, 05.06.1996, leg. T. Burac (T. Tofan).

Bromus inermis var. *inermis* Leyss. (n. 24.545) – ref.: Folia Geobot. Phytotax. 8:167 (1973); Republic of Moldova, Rîşcani district, (com.) Branişte, village Branişte, hillocks, 07.06.1996, leg. T. Burac (T. Tofan).

Bromus tectorum L. (n. 24.632) – ref.: Sp. pl. 1:77 (1753); Republic of Moldova, Glodeni district, (com.) Viişoara, village Viişoara, 05.06.1996, leg. T. Burac (T. Tofan).

Bromus tectorum L. (n. 24.644) – ref.: Sp. pl. 1:77 (1753); Republic of Moldova, Glodeni district, (com.) Viişoara, village Viişoara, road side, 05.06.1996, leg. T. Burac (T. Tofan).

Trib *Meliceae*

Gen *Melica* L., 1753

Melica ciliata L. (n. 24. 576) – ref.: Sp. pl. 1:66 (1753); Republic of Moldova, district Glodeni, (com.) Comanca, village Buteşti, steppe, 06.06.1996, leg. T. Burac (T. Tofan).

Trib *Poeae*

Gen *Festuca* L, 1753

Festuca valesiaca Schleich. ex Gaudin (n. 24.573; 24.573/a) – ref.: Agrost. Helv. 1: 242 (1811); Republic of Moldova, Glodeni district, (com.) Cobani, village Cobani, the hillocks, 07.06.1996, leg. T. Burac (T. Tofan)

Gen *Milium* L., 1753

Milium effusum L. (n. 24.627) – ref.: Sp. Pl. Ed. 1 61 (1753); Republic of Moldova, Glodeni district, (com.) Viişoara, village Moara Domnească, 06.06.1996, leg. T. Burac (T. Tofan).

Gen *Poa* L., 1753

Poa compressa L. (n. 24.630; 24.630/a) – ref.: Sp. Pl. 1 :69 (1753); Republic of Moldova, Glodeni district, (com.) Viişoara, village Viişoara, pasture, meadow, 05.06.1996, leg. T. Burac (T. Tofan).

Poa nemoralis L. (n. 24.574) – ref.: Sp. Pl. Ed. 1 69 (1753); Republic of Moldova, Glodeni district, (com.) Cobani, village Cobani, the hillocks, 06.06.1996, leg. T. Burac (T. Tofan)

Gen *Puccinellia* Parlatore, 1848, nom. cons.

Puccinellia distans subsp. *limosa* (Schur) Soo & Jav. (n. 24.609; 24.643; 24.643/a) – ref.: Magyar Növ. Kéz. 2: 928 (1951); Republic of Moldova, Glodeni district, (com.) Viişoara, village Viişoara, salt meadow, 05.06.1996, leg. T. Burac (T. Tofan).

Gen *Sclerochloa* P. Beuv

Sclerochloa dura (L.) P.Beauv. (n. 24.602) – ref.: Agrost. 98 & 177 (1812); Republic of Moldova, district Făleşti, (com.) Chetriş, village Chetriş, forest in the Prut meadow, 07.06.1996, leg. T. Burac (T. Tofan)

Trib *Stipeae*

Gen *Stipa* L., 1753

Stipa pulcherrima K.Koch (n. 24.550) – ref.: Linnaea 21: 440 (1848); Republic of Moldova, Glodeni district, (com.) Cobani, village Cobani, the hillocks, 07.06.1996, leg. T. Burac (T. Tofan)

Trib *Triticeae*

Gen *Elymus* L., 1753

Elymus hispidus (Opiz) Melderis (n. 24.549) – ref.: Bot. Jour. Linn. Soc. 76: 380 (1978); Republic of Moldova, Glodeni district, (com.) Cobani, village Cobani, hillocks, 07.06.1996, leg. T. Burac (T. Tofan)

Elymus repens (L.) Gould subsp. *repens* (n. 24.543) – ref.: Madroño 9: 127 (1947); Republic of Moldova, Glodeni district, (com.) Viişoara, village Viişoara, abandoned riverbed, meadow, 05.06.1996, leg. T. Burac (T. Tofan).

Subfam. *Chloridoideae*
Trib *Cynodonteae*

Gen *Tragus* A. Haller, 1768, nom. cons.

Tragus racemosus (L.) All. (n. 24.608) – ref.: Fl. Pedem. 2: 241 (1785); Republic of Moldova, Cahul district, (com.) Slobozia Mare, village Slobozia Mare, eroded seashore, 04.07.1996, leg. T. Burac (T. Tofan).

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

Gen *Juncus* L., 1753

Juncus gerardi Loisel. (n. 24.581; 24.581/a) – ref.: Jour. Bot. Rédigé 2: 284 (1809); Republic of Moldova, Glodeni district, (com.) Comanca, village Buteşti, 07.06.1996, leg. T. Burac (T. Tofan)

" eudicots"
Ord. *Ranunculales* Dumontier, 1829
Fam. *Ranunculaceae* Adans., 1763, nom. cons.
Subfam. *Ranunculoideae*
Trib *Ranunculeae*

Gen *Ranunculus* L., 1753

Ranunculus auricomus L. (n. 24.542) – ref.: Sp. Pl. ed. 1 551 (1753); Republic of Moldova, Glodeni district, (com.) Viişoara, village Viişoara, steppe, 05.06.1996, leg. T. Burac (T. Tofan).

Ranunculus sceleratus L. (n. 24.558) – ref.: Sp. Pl. ed. 1 551 (1753); Republic of Moldova, Rîşcani district, (com.) Branişte, village Branişte, the hillocks, 07.06.1996, leg. T. Burac (T. Tofan)

Ranunculus trichophyllus var. *trichophyllus* Chaix (n. 24. 616) – ref.: Hist. Pl. Dauph. 1: 335 (1786); Republic of Moldova, Glodeni district, (com.) Viişoara, village Viişoara, irrigation canal, 05.06.1996, leg. T. Burac (T. Tofan).

"core eudicots"
Ord. *Caryophyllales* Perleb. 1826
Fam. *Amaranthaceae* Adans., 1763 ex A.L. de Jussieu, 1789, nom.cons.
Subfam. *Chenopodioideae*
Trib *Camphorosmeae*

Gen *Bassia* Allioni, 1766

Bassia prostata (L.) A.J.Scott (n. 24.570; 24.570/a) – ref.: Feddes Repert. 89: 108 (1978); Republic of Moldova, Rîşcani district, (com.) Branişte, village Branişte, the hillocks, 06.06.1996, leg. T. Burac (T. Tofan)

Fam. *Caryophyllaceae* Durande, 1872, ex A. L. de Jussieu, 1789, nom. cons.
Subfam. *Caryophylloideae*
Trib *Caryophylleae*

Gen *Dianthus* L., 1753

Dianthus membranaceus Borbás (n. 24.520) – ref.: Österr. Bot. Zeitschr. 26: 125 (1876); Republic of Moldova, Glodeni district, (com.) Comanca, village Buteşti, 06.06.1996, leg. T. Burac (T. Tofan)

Trib *Sileneae*

Gen *Silene* L.,1753

Silene densiflora d'Urv. (n. 24.548; 24.548/a; 24.548/b) – ref.: Mém. Soc. Linn. Paris 1: 303 (1822); Republic of Moldova, Rîşcani district, (com.) Branişte, village Branişte, the hillocks, 07.06.1996, leg. T. Burac (T. Tofan).

Silene latifolia Poir. subsp. *alba* (Mill.) Greuter & Burdet (n. 24.553) – ref.: Willdenowia 12: 189 (1982); Republic of Moldova, Glodeni district, (com.) Cobani, village Cobani, steppe, 06.06.1996, leg. T. Burac (T. Tofan)

Fam. *Polygonaceae* A. L. de Jussieu, 1789, nom. cons.
Subfam. *Polygonoideae*
Trib *Polygoneae*

Gen *Polygonum* L., 1753

Polygonum amphibium L. f. *aquaticum* Leyss (n. 24.535.) – ref.: Sp. Pl. ed. 1 361 (1753); Republic of Moldova, Glodeni district, com. Camenca, village Camenca (Reefs of Cobani, Buteşti, Balatina); Stânca Mare reefs, 08.06.1996, leg. T. Burac (T. Tofan).

Trib *Rumiceae*

Gen *Rumex* L.,1755

Rumex aquaticus L. (n. 24.519) – ref.: Sp. Pl. ed. 1 336 (1753); Republic of Moldova, district Fălesti, (com.) Călineşti, village Călineşti, the old riverbed, 06.06.1996, leg. T. Burac (T. Tofan).

Ord. *Santalales* Dumortier, 1829
Fam. *Santalaceae* R. Brown, 1810
Trib *Thesieae*

Gen *Thesium* L., 1753

Thesium dollineri Murb. subsp. *simplex* (Velen.) Stoj. & Stef. (n. 24.036) – ref.: Fl. Balg. ed. 2 312 (1933); Republic of Moldova, Glodeni district, (com.) Comanca, village Buteşti, on limestone reefs, 08.06.1996, leg. T. Burac

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'Herit. (n. 24.547) – ref.: W. Aiton, Hort. Kew 2: 414 (1789); Republic of Moldova, Rîşcani district, (com.) Branişte, village Branişte, the hillocks, 06.06.1996, leg. T. Burac (T. Tofan).

Ord. *Myrtales* Reichenbach,1828
Fam. *Onagraceae* A.L. de Juisseu, 1789, nom cons.
Subfam. *Onagroideae*
Trib *Epilobieae*

Gen *Epilobium* L.,1753

Epilobium collinum C. C. Gmel. (n. 24.922; 24.923) – ref.: Fl. Bad. 4: 265 (1826); Republic of Moldova, Ocniţa district, village Bîrnova, the meadow, 25.06.1997, leg. T. Burac (T. Tofan).

Epilobium montanum L. (n. 24.046) – ref.: Sp. Pl. 1: 348 (1753); Republic of Moldova, Glodeni district, (com.) Comanca, village Buteşti, meadow, 17.07.1994, leg. T. Burac.

Trib *Onagreae*

Gen *Oenothera* L., 1753

Oenothera parviflora L. (n. 24.034) – ref.: Syst. nat. ed. 10, 2: 998 (1759); Republic of Moldova, Briceni district, the village Drepcăuţi, forest in the Prut meadow, 24.06.1995, leg. T. Burac (T. Tofan).

"fabids"
Ord. *Celastrales* Baskerville, 1839
Fam. *Celastraceae* R. Brown, 1814
Subfam. *Celastroideae*
Trib *Euonymeae*

Gen *Euonymus* L.,1753

Euonymus europaeus L. (n. 24.619) – ref.: Sp. Pl. ed. 1 197 (1753); Republic of Moldova, district Fălesti, (com.) Chetriş, village Chetriş, 04.06.1996, leg. T. Burac (T. Tofan)

Ord. *Fabales* Bromhead, 1838
Fam. *Leguminossae* A. L. de Jussieu, 1789, nom. cons.
Subfam. *Papilionoideae* (Giseke, 1792) DC., 1825
Trib *Fabeae* Rchb., 1832

Gen *Lathyrus* L., 1753

Lathyrus hirsutus L. (n. 24.577) – ref.: Sp. Pl. ed. 1 732 (1753); Republic of Moldova, district Fălesti, (com.) Chetriş, village Chetriş, 04.06.1996, leg. T. Burac (T. Tofan)

Lathyrus niger (L.) Bernh. (n. 24.523) – ref.: Syst. Verz. Erfurt 248 (1800); Republic of Moldova, district Făleşti, (com.) Chetriş, village Chetriş, 04.06.1996, leg. T. Burac (T. Tofan)

Lathyrus vernus (L.)Bernh. (n. 24.629) – ref.: Syst. Verz. 247 (1800); Republic of Moldova, Glodeni district, (com.) Viişoara, village Viişoara, forest, 05.06.1996, leg. T. Burac (T. Tofan).

Gen *Vicia* L.,1753

Vicia hirsuta (L.) Gray (n. 24.645) – ref.: Nat. Arr. Brit. Pl. 2: 614 (1821); Republic of Moldova, Glodeni district, (com.) Viişoara, village Viişoara, pasture, meadow, 05.06.1996, leg. T. Burac (T. Tofan).

Vicia sepium L. (n. 24.617) – ref.: Sp. Pl. ed. 1 737 (1753); Republic of Moldova, district Fălesti, (com.) Chetriş, village Chetriş, 04.06.1996, leg. T. Burac (T. Tofan).

Trib *Galegeae*

Gen *Astragalus* L.,1753

Astragalus cicer L. (n. 24.575; 24.575/a) – ref.: Sp. Pl. ed. 1 757 (1753); Republic

of Moldova, Glodeni district, (com.) Cobani, village Cobani, forest, 06.06.1996, leg. T. Burac (T. Tofan).

Trib *Trifolieae*

Gen *Medicago* L., 1753

Medicago minima (L.) Bartal. (n. 24. 578) – ref.: Cat. Piante Siena 61 (1776); Republic of Moldova, Glodeni district, (com.) Cobani, village Cobani, Stînca Mare reefs, 08.06.1996, leg. T. Burac (T. Tofan)

Gen *Trigonella* L., 1753

Trigonella procumbens (Besser) Rchb. (n. 24. 579) – ref.: Pl. Crit. 4: 35 (1826); Republic of Moldova, Glodeni district, (com.) Viişoara, village Viişoara, steppe, 05.06.1996, leg. T. Burac (T. Tofan).

Ord. *Fagales* Engler, 1892
Fam. *Fagaceae* Dumortier, 1829
Subfam. *Quercoideae*

Gen *Quercus* L., 1753

Quercus dalechampii Ten. (n. 24.620; 24.620/a) – ref.: Ind. Sem. Horti Neap. 15 (1830); Republic of Moldova, Glodeni district, (com.) Cuhneşti, village Cuhneşti, steppe, 06.06.1996, leg. T. Burac (T. Tofan).

Quercus petraea (Matt.) Liebl. (n. 24.640) – ref.: Fl. Fuld. 403 (1784); Republic of Moldova, district Făleşti, (com.) Chetriş, village Chetriş, 04.06.1996, leg. T. Burac (T. Tofan).

Fam. *Juglandaceae* DC. ex Perleb, 1818, nom. cons.
Subfam. *Juglandoideae*
Trib *Juglandeae*

Gen *Juglans* L., 1753

Juglans nigra L. (n. 24.541) – ref.: Sp. Pl. ed. 1 997 (1753); Republic of Moldova,

Glodeni district, (com.) Viişoara, village Viişoara, steppe, 05.06.1996, leg. T. Burac (T. Tofan).

Ord. *Malpighiales* C. Martius, 1835
Fam. *Euphorbiaceae* A.L. de Jussieu, 1789, nom. cons.
Subfam. *Acalyphoideae*
Trib *Acalypheae*

Gen *Mercurialis* L., 1753

Mercurialis perennis L. (n. 24.625) – ref.: Sp. Pl. ed. 1 1035 (1753); Republic of Moldova, Glodeni district, (com.) Viişoara, village Viişoara, forest, meadow, 05.06.1996, leg. T. Burac (T. Tofan).

Mercurialis perennis L. (n. 24.625 /a) – ref.: Sp. Pl. ed. 1 1035 (1753); Republic of Moldova, Glodeni district, (com.) Viişoara, village Viişoara, 06.06.1996, leg. T. Burac (T. Tofan).

Subfam. *Euphorbioideae*
Trib *Euphorbieae*

Gen *Euphorbia* L., 1753

Euphorbia cyparissias L. (n. 24.554; 24.554 /a) – ref.: Sp. Pl. ed. 1 461 (1753); Republic of Moldova, Glodeni district, (com.) Cobani, village Cobani, forest, 06.06.1996, leg. T. Burac (T. Tofan).

Euphorbia esula L. (n. 24. 539) – ref.: Sp. Pl. ed. 1 461 (1753); Republic of Moldova, Glodeni district, (com.) Viişoara, village Viişoara, steppe, 05.06.1996, leg. T. Burac (T. Tofan).

Euphorbia lingulata Heuff. (n. 24.618) – ref.: *Verhandlungen der Zoologisch-botanischen Gesellschaft in Wien* 8: 192 (1858); Republic of Moldova, district Fălesti, (com.) Chetriş, village Chetriş, 04.06.1996, leg. T. Burac (T. Tofan).

Fam. *Salicaceae* Mirbel, 1815
Trib *Saliceae*

Gen *Populus* L., 1753

Populus alba L. (n. 24. 564) – ref.: Sp. pl. 2: 1034 (1753); Republic of Moldova, Glodeni district, (com.) Cobani, village Cobani, hillocks, 07.06.1996, leg. T. Burac (T. Tofan).

Gen *Salix* L.,1753

Salix alba L. (n. 24.561) – ref.: Sp. Pl. ed. 1 1021 (1753); Republic of Moldova, district Falesti, (com.) Chetriş, village Chetriş, steppe, 04.06.1996, leg. T. Burac (T. Tofan).

Salix cinerea L. (n. 24.527) – ref. : Sp. pl. 2: 1021 (1753); Republic of Moldova, Glodeni district, (com.) Balatina, village Balatina, 06.06.1996, leg. T. Burac (T. Tofan).

Salix elaeagnos Scop. (n. 24.562; 24.562 /a) – ref.: Fl. Carn. ed. 2 2: 257 (1772); Republic of Moldova, Glodeni district, (com.) Viişoara, village Moara Domnească, steppe, 06.06.1996, leg. T. Burac (T. Tofan).

Salix triandra L. (n. 24.559) – ref.: Sp. Pl. ed.1 1016 (1753); Republic of Moldova, Glodeni district, (com.) Viişoara, village Moara Domnească, steppe, 26.06.1996, leg. T. Burac (T. Tofan).

Salix purpurea L. (n. 24.560; 24.560/a; 24.560/b; 24.560/c) – ref.: Sp. Pl. ed. 1 1017 (1753); Republic of Moldova, Glodeni district, (com.) Cobani, village Cobani, the hillocks, 07.06.1996, leg. T. Burac (T. Tofan).

Salix viminalis L. (n. 24.563; 24.563/a; 24.563/b) – ref.: Sp. Pl. ed.1 1021 (1753); Republic of Moldova, Glodeni district, (com.) Viişoara, village Viişoara, steppe, 05.06.1996, leg. T. Burac (T. Tofan).

Ord. *Rosales* Perleb, 1826
Fam. *Rosaceae* A.I. de Jussieu, 1789, nom.cons.
Trib *Potentilleae*

Gen *Potentilla* L.,1753

Potentilla argentea L. (n. 24.530) – ref.: Sp. Pl. ed. 1 497 (1753); Republic of Moldova, Glodeni district, (com.) Cobani, 08.06.1996, leg. T. Burac (T. Tofan).

Trib *Pruneae*

Gen *Prunus* L., 1753

Prunus mahaleb L. (n. 24.528) – ref.: Sp. Pl. Ed. 1 474 (1753); Republic of Moldova, Glodeni district, (com.) Balatina, village Balatina, 06.06.1996, leg. T. Burac (T. Tofan).

Prunus spinosa L. (n. 24.623.) – ref.: Sp. Pl. ed. 1 475 (1753); Republic of Moldova, Glodeni district, (com.) Balatina, village Balatina, 06.06.1996, leg. T. Burac (T. Tofan).

Trib *Pyreae*

Gen *Aronia* Medikus, 1789, n0m. cons.

Aronia melanocarpa (Michx.) Elliott (n. 24.594) – ref.: Sketch bot. S. Carolina 1: 556 (1821); Republic of Moldova, district Fălesti, (com.) Chetriş, village Chetriş, 04.06.1996, leg. T. Burac (T. Tofan).

Fam. *Ulmaceae* Mirbel, 1815

Gen *Ulmus* L., 1753

Ulmus laevis Pall. (n. 24.593; 24.593/a) – ref.: Fl. Ross. 1 (1): 75 (1784); Republic of Moldova, Glodeni district, (com.) Viişoara, village Viişoara, steppe, 05.06.1996, leg. T. Burac (T. Tofan).

Ulmus minor Mill. (n. 24.591; 24.591/a) – ref.: Gard. Dict. ed. 8 no. 6 (1768); Republic of Moldova, Glodeni district, (com.) Cobani, village Cobani, 06.06.1996, leg. T. Burac (T. Tofan).

"malvids"
Ord. *Brassicales* Bromhead, 1838
Fam. *Cruciferae* A.L. de Jussieu, 1789, nom. cons.

Trib *Alysseae*

Gen *Alyssum* L.,1753

Alyssum alyssoides (L.) (n. 24.531) – ref.: Syst. Nat. ed. 10 2: 1130 (1759); Republic of Moldova, Glodeni district, (com.) Cobani (Reefs of Cobani, Buteşti, Balatina); Stânca Mare reefs, 08.06.1996, leg. T. Burac (T. Tofan).

Trib *Brassiceae*

Gen *Brassica* L.,1753

Brassica nigra (L.) W. D. J. Koch (n. 24.637) – ref.: Deutschl. Fl. ed. 3 4: 713 (1833); Republic of Moldova, Glodeni district, (com.) Viişoara, village Viişoara, 05.06.1996, leg. T. Burac (T. Tofan).

Trib *Camelineae*

Gen *Erysimum* L., 1753

Erysimum repandum L. (n. 24.521) – ref.: *Demonstrationes Plantarum* 17 (1753); Republic of Moldova, Glodeni district, (com.) Comanca, village Buteşti, on the rocks, 06.06.1996, leg. T. Burac (T. Tofan).

Trib. *Euclidieae*

Gen *Euclidium* R. Brown, in W.& W.T. Aiton, 1812, nom.cons.

Euclidium syriacum (L.) Ait. f. (n. 24.633) – ref.: *Hort. Kew (ed. 2)* 4: 74 (1812); Republic of Moldova, district Fălesti, (com.) Chetriş, village Chetriş, “La Canton”, 05.06.1996, leg. T. Burac (T. Tofan).

Fam. *Reseda*ceae Augier, 1801, ex Martinov, 1820, nom. cons.
Trib. *Resedeae*

Gen *Reseda* L., 1753

Reseda inodora Rchb. (n. 24.555) – ref.: Icon. Fl. Germ. 2: 22 (1838); Republic of

Moldova, Glodeni district, (com.) Cobani, village Cobani, the hillocks, 07.06.1996, leg. T. Burac (T. Tofan)

Reseda inodora Rchb. (n. 24.556) – ref.: Icon. Fl. Germ. 2: 22 (1838); Republic of Moldova, district Rîşcani, (com.) Branişte, village Branişte, the hillocks, 07.06.1996, leg. T. Burac (T. Tofan)

Reseda lutea L. (n. 24.557) – ref.: Sp. Pl. ed. 1 449 (1753); Republic of Moldova, district Rîşcani, (com.) Branişte, village Branişte, hillocks, 07.06.1996, leg. T. Burac (T. Tofan)

Ord. *Malvales* Dumortier, 1829
Fam. *Malvaceae* A. L. de Jussieu, 1789, nom.cons.
Subfam. *Tilioideae*

Gen *Tilia* L.,1753

Tilia cordata Mill. (n. 24. 598) – ref.: Gard. Dict. ed. 8 no. 1 (1768); Republic of Moldova, Glodeni district, (com.) Viişoara, village Moara Domnească, steppe, 06.06.1996, leg. T. Burac (T. Tofan).

Tilia platyphyllos Scop. (n. 24.597) – ref.: Fl. Carn. ed. 2 1: 373 (1772); Republic of Moldova, Glodeni district, (com.) Cuhneşti, village Cuhneşti, 06.06.1996, leg. T. Burac (T. Tofan).

Tilia tomentosa Moench (n. 24.599) – ref.: Gard. Dict. ed. 8 no. 1 (1768); Republic of Moldova, Glodeni district, (com.) Viişoara, village Moara Domnească, steppe, 06.06.1996, leg. T. Burac (T. Tofan).

Ord. *Sapindales* Dumortier, 1829
Fam. *Sapindaceae* A.L. de Jussieu, 1789, nom. cons.
Subfam. *Hippocastanoideae*

Gen *Acer* L., 1753

Acer negundo L. (n. 24.540) – ref.: Sp. Pl. ed. 1 1056 (1753); Republic of Moldova, Glodeni district, (com.) Viişoara, village Viişoara, steppe, 05.06.1996, leg. T. Burac (T. Tofan).

Subclas. *Asteridae* Takhtajan, 1967
Ord. *Cornales* Dumortier, 1829
Fam. *Cornaceae* Bercht.& J. Persl, 1825, nom. cons.

Gen *Cornus* L., 1753

Cornus sanguinea L. (n. 24.622; 24.622/a) – ref.: Sp. Pl. ed. 1 117 (1753); Republic of Moldova, Glodeni district, (com.) Balatina, village Balatina, 06.06.1996, leg. T. Burac (T. Tofan)

Ord. *Ericales* Dumortier, 1829
Fam. *Balsaminaceae* A. Richard, 1822

Gen *Impatiens* L., 1753

Impatiens parviflora DC. (n. 24.045) – ref.: Prodr. 1: 687 (1824); Republic of Moldova, Briceni district, (com.) Drepcăuţi, village Drepcăuţi, forest in the Prut meadow, 25..06.1995, leg. T. Burac

Fam. *Primulaceae* Batsch ex Borkh., 1797, nom. cons.
Subfam. *Myrsinoideae*
Trib *Anagallideae*

Gen *Anagallis* L., 1753

Anagallis arvensis subsp. *foemina* (P. Mill.) Schinz & Thellung (n. 24.613) – ref.: *Bulletin de l'Herbier Boissier, sér. 2,* 7 (6): 497 (1907); Republic of Moldova, Cahul district, (com.) Văleni, village Văleni, road side, 26.06.1995, leg. T. Burac (T. Tofan).

Trib *Lysimachieae*

Gen *Lysimachia* L., 1753

Lysimachia nummularia L. (n. 24.612) – ref.: Sp. Pl. 1: 148 (1753); Republic of Moldova, Briceni district, village Drepcăuţi, forest in the Prut meadow, 24.06.1995, leg. T. Burac (T. Tofan).

Subfam. *Primuloideae* (Batsch ex Borkh., 1787) Kostel., 1834
Trib. *Primuleae*

Gen *Primula* L., 1753

Primula veris L. (n. 24.610) – ref.: Sp. Pl. ed. 1 142 (1753); Republic of Moldova, Glodeni district, com. Viişoara, village Viişoara, Pădurea Domnească natural reserve, 20.04.1995, leg. T. Burac (T. Tofan).

"lamiids"
Fam. *Boraginaceae* A. L. de Jussieu, 1789, nom. cons.
Subfam. *Boraginoideae* (A. L. de Jussieu, 1789) Am., 1832

Trib *Cynoglosseae*

Gen *Cynoglossum* L., 1753

Cynoglossum officinale L. (n. 24.044/a) – ref.: Sp. Pl. ed. 1 134 (1753); Republic of Moldova, Cahul district, village Câşliţa Prut, 06.07.1996, leg. T. Burac

Trib. *Lithospermeae*

Gen *Myosotis* L., 1753

Myosotis sylvatica Hoffm. (n. 24.041) – ref.: Deutschl. Fl. ed. 1 61 (1791); Republic of Moldova, Glodeni district, com. Viişoara, village Moara Domnească, steppe, Pădurea Domnească natural reserve, 25.06.1995, leg. T. Burac

Myosotis sylvatica Ehrh. ex Hoffmann (n. 24.564; 24.564/a) – ref.: Sp. Pl. ed.1 1021 (1753); Republic of Moldova, Glodeni district, (com.) Viişoara, village Moara Domnească, 06.06.1996, leg. T. Burac (T. Tofan).

Ord. *Gentianales* Lindley, 1833
Fam. *Rubiaceae* A. L. de Juisseu, 1789, nom cons.
Subfam. *Rubioideae*
Trib *Rubieae*

Gen *Asperula* L., 1753

Asperula cynanchica L. (n. 24. 533.) – ref.: Sp.Pl. 1: 104 (1753); Republic of

Moldova, Glodeni district, (com.) Cobani, village Cobani (the Reefs of Cobani, Buteşti, Balatina); Stânca Mare reefs, 08.06.1996, leg. T. Burac (T. Tofan).

Asperula tenella Heuff. ex Degen (n. 24.039) – ref.: Fl. Exsicc. Austr-Hung. viii, 43 (1899) 1897; Republic of Moldova, Cahul district, (com.) Slobozia Mare, village Slobozia Mare, coastal steppe, 07.07.1996, leg. T. Burac (T. Tofan).

Gen *Galium* L.,1753

Galium mollugo L. (n. 24.518) – ref.: Sp. Pl. ed. 1 107 (1753); Republic of Moldova, district Edinet, (com.) Bădragii Noi, village Bădragii Noi, "at the tall tree", 28.06.1996, leg. T. Burac (T. Tofan)

Galium rubioides L. (n. 24. 646) – ref.: Sp. Pl. ed. 1 105 (1753); Republic of Moldova, Glodeni district, (com.) Viişoara, village Viişoara, forest, meadow, 05.06.1996, leg. T. Burac (T. Tofan).

Ord. *Lamiales* Bromhead, 1838
Fam. *Labiatae* A.L. de Jussieu, 1789, nom.cons.
Subfam. *Ajugoideae*
Trib. *Ajugeae*

Gen *Ajuga* L., 1753

Ajuga chamaepitys subsp. *chia* (Schreb.) Murb (n. 24.532; 532/a) – ref.: *Plantarum Verticillatarum Unilabiatarum Genera et Species* 24 (1774); Republic of Moldova, Glodeni district, (com.) Cobani (the Reefs of Cobani, Buteşti, Balatina); Stânca Mare reefs, 08.06.1996, leg. T. Burac (T. Tofan).

Trib. *Teucrieae*

Gen *Teucrium* L., 1753

Teucrium chamaedrys L. (n. 24.600) – ref.: Sp. Pl. ed. 1 565 (1753); Republic of Moldova, Rîşcani district, (com.) Branişte, village Branişte, "Suta de movile" reserve, 17.07.1994, leg. T. Burac (T. Tofan).

Subfam. *Lamioideae*
Trib *Lamieae*

Gen *Lamium* L.,1753

Lamium purpureum L. (n. 24.605) – ref.: Sp. Pl. ed. 1 579 (1753); Republic of Moldova, Glodeni district, (com.) Cobani, village Cobani, forest in the Prut meadow, 18.04.1996, leg. T. Burac (T. Tofan).

Trib. *Marrubieae*

Gen *Marrubium* L., 1753

Marrubium peregrinum L. (n. 24.604) – ref.: Sp. Pl. ed. 1 582 (1753); Republic of Moldova, Glodeni district, (com.) Buteşti, village Buteşti, „*toltru*" rock, 17.07.1994, leg. T. Burac (T. Tofan).

Subfam. *Nepetoideae*
Trib *Mentheae*
Subtrib *Nepetinae*

Gen *Glechoma* L., 1753

Glechoma hederacea L. (n. 24.606) – ref.: Sp. Pl. ed. 1 578 (1753); Republic of Moldova, district Fălesti, com. Chetriş, village Chetriş, forest in the Prut meadow, 15.05.1996, leg. T. Burac (T. Tofan)

Subtrib *Menthinae*

Gen *Acinos* Mill.

Acinos arvensis (Lam.) Dandy (n. 24. 534.) – ref.: Jour. Ecol. 33: 326 (1946); Republic of Moldova, Glodeni district, (com.) Camenca (the Reefs of Cobani, Buteşti, Balatina); Stânca Mare reefs, 08.06.1996, leg. T. Burac (T. Tofan).

Acinos arvensis (Lam.) Dandy (n. 24.607) – ref.: Jour. Ecol. 33: 326 (1946); Republic of Moldova, Glodeni district, (com.) Camenca, village Camenca, „*toltru*" rocks, 17.07.1994, leg. T. Burac (T. Tofan).

Gen *Clinopodium* L. 1753

Clinopodium vulgare L. (n. 24.927; 24.928) – ref.: *Species Plantarum* 2: 587 (1753); Republic of Moldova, Ocniţa district, village Bîrnova, meadow, 25.06.1997, leg. T. Burac (T. Tofan), det. V. M. Danciu.

Subtrib *Salviinae*

Gen *Salvia* L.,1753

Salvia moldavica Klokov (n. 24.603) – ref.: Fl. URSR ix 658 (1960); Republic of Moldova, Glodeni district, (com.) Comanca, village Brînzeni, "*toltru*" rocks 16.07.1994, leg. T. Burac (T. Tofan)

Subfam. *Scutellarioideae*

Gen *Scutellaria* L., 1753

Scutellaria hastifolia L. (n. 24.601.) – ref. Sp. Pl. ed. 1 599 (1753); Republic of Moldova, Glodeni district, (com.) Balatina, village Balatina; forest in the Prut meadow, 05.06.1996, leg. T. Burac (T. Tofan).

Fam. *Oleaceae* Hoffmannsegg & Link, 1813-1820
Trib *Oleeae*
Subtrib. *Fraxininae*

Gen *Fraxinus* L., 1753

Fraxinus excelsior L. (n. 24.628) – ref.: Sp. Pl. ed. 2 1057 (1753); Republic of Moldova, Glodeni district, (com.) Viişoara, village Moara Domnească, 06.06.1996, leg. T. Burac (T. Tofan).

Subtrib *Ligustrinae*

Gen *Ligustrum* L., 1753

Ligustrum vulgare L. (n. 24.522) – ref.: Sp. Pl. ed. 1 7 (1753); Republic of Moldova, district Făleşti, (com.) Chetriş, village Chetriş, 04.06.1996, leg. T. Burac (T. Tofan.

Fam. *Plantaginaceae* A.L. de Juisseu, 1789, nom cons.
Subfam. *Plantaginoideae* (A.L. de Jussieu,1789) Eaton, 1836

Gen *Plantago* L.,1753

Plantago altissima L. (n. 24.040) – ref.: Sp. Pl. ed. 2 164 (1762); Republic of Moldova, Briceni district, (com.) Drepcăuţi, village Drepcăuţi, forest, 23.06.1995, leg. T. Burac

Plantago media L. (n. 24.552; 24.552/a) – ref.: Sp. Pl. ed. 1 113 (1753); Republic of Moldova, Glodeni district, (com.) Cobani, village Cobani, the hillocks, 07.06.1996, leg. T. Burac (T. Tofan)

Fam. *Scrophulariaceae* A.L. de Juisseu, 1789, nom. cons.
Trib *Scrophularieae*

Gen *Scrophularia* L., 1753

Scrophularia nodosa L. (n. 24.537.) – ref.: Sp. pl. 2: 619 (1753); Republic of Moldova, Glodeni district, (com.) Viişoara, village Viişoara, forest, meadow, 05.06.1996, leg. T. Burac (T. Tofan).

Gen *Verbascum* L.,1753

Verbascum thapsus L. (n. 24.037) – ref.: Sp. Pl. 1: 177 (1753); Republic of Moldova, Glodeni district, village Glodeni, Pădurea Domnească natural reserve, the hillocks, 25.06.1995, leg. T. Burac.

"campanulids"
Ord. *Apiales* Nakai, 1930
Fam. *Umbelliferae* A.L. de Jussieu, 1789, nom cons.
Subfam. *Apioideae*
Trib *Apieae*

Gen *Aegopodium* L.,1753

Aegopodium podagraria L. (n. 24.626) – ref.: Sp. Pl. ed. 1 265 (1753); Republic of Moldova, Glodeni district, (com.) Viişoara, village Viişoara, 06.06.1996, leg. T. Burac (T. Tofan).

Gen *Falcaria* Fabricius, 1759, nom. cons.

Falcaria vulgaris Bernh. (n. 24.580) – ref. Syst. Verz. Erfurt 176 (1800); Republic of Moldova, Glodeni district, (com.) Comanca, village Buteşti, 07.06.1996, leg. T. Burac (T. Tofan).

Gen *Oenanthe* L., 1753

Oenanthe peucedanifolia Pollich. (n. 24.921) – ref.: Hist. Pl. Palat. 1 : 289 (1776); Republic of Moldova, Glodeni district, village Viişoara, Pădurea Doamnească natural reserve, the Prut meadow, 05.06.1996, leg. T. Burac (T. Tofan).

Gen *Seseli* L., 1753

Seseli elatum L. subsp. *osseum* (Crantz) P.W.Ball (n. 24.043) – ref.: Feddes Repert. 79: 64 (1968); Republic of Moldova, district Edineţ, (com.) Bădrojii Vechi, village Bădrojii Vechi, coastal steppe, 26.06.1996, leg. T. Burac

Gen *Trinia* G.F. Hoffman, 1814, nom.cons.

Trinia glauca (L.) Dumort. (n. 24.037) – ref.: Fl. Belg. 78 (1827); Republic of Moldova, Glodeni district, (com.) Comanca, village Buteşti, steppe, "*toltru*" reefs, 08.06.1996, leg. T. Burac

Trib *Scandiceae*

Gen *Anthriscus* Persoon, 1805, nom. cons.

Anthriscus cerefolium (L.) Hoffm. (n. 24.634; 24.634/a) – ref.: Gen. Umb. ed. 1 41 (1814); Republic of Moldova, Glodeni district, (com.) Viişoara, village Viişoara, forest, 05.06.1996, leg. T. Burac (T. Tofan).

Trib *Peucedaneae*

Gen *Peucedanum* L., 1753

Peucedanum palustre (L.) Moench (n. 24.042) – ref.: Meth. 82 (1794); Republic of Moldova, Glodeni district, (com.) Viişoara, village Moara Domneasca, steppe, Pădurea Domnească natural reserve, 25.06.1995, leg. T. Burac

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

Gen *Campanula* L., 1753

Campanula rapunculoides L. (n. 24.596) – ref.: Sp. Pl. ed. 1 165 (1753); Republic of Moldova, Glodeni district, (com.) Cobani, village Cobani, Pădurea Domnească natural reserve, 06.06.1996, leg. T. Burac (T. Tofan)

Fam. *Compositae* Giseke, 1792, nom.cons.
Subfam. *Asteroideae*
Trib *Anthemideae*
Subtrib *Achilleinae*

Gen *Achillea* L.; 1753

Achillea setacea Waldst. & Kit. (n. 24.565; 24.565/a) – ref.: Pl. Rar. Hung. 1: 82 (1801- 1802); Republic of Moldova, Glodeni district, (com.) Cobani, village Cobani, the hillocks, 07.06.1996, leg. T. Burac (T. Tofan)

Subtrib. *Artemisiinae*

Gen *Artemisia* L.,1753

Artemisia maritima L. (n. 24.621) – ref.: Sp. Pl. ed. 1 846 (1753); Republic of Moldova, Glodeni district, (com.) Balatina, village Balatina, road side, 06.06.1996, leg. T. Burac (T. Tofan)

Trib *Inulae*

Gen *Inula* L.,1753

Inula oculus-christi L. (n. 24. 917) – ref.: Sp. Pl. ed. 1 881 (1753); Republic of Moldova, Rîşcani district, village Branişte, „Suta de movile" natural reserve, the Prut meadow, 07.06.1996, leg. T. Burac (T. Tofan).

Subfam. *Carduoideae*
Trib *Cardueae*
Subtrib *Carduinae*

Gen *Jurinea* Cassini, 1821

Jurinea mollissima Klok. (n. 24.918) – ref.: J. Bot. Acad. Sci. Ukraine vii, No.4, 49 (1951); Republic of Moldova, Rîşcani district, village Branişte, „Suta de movile" natural reserve, the Prut meadow, 07.06.1996, leg. T. Burac (T. Tofan).

Subtrib *Centaureinae*

Gen *Centaurea* L.,1753

Centaurea scabiosa L. (n. 24.566) – ref.: Sp. Pl. ed. 1 913 (1753); Republic of Moldova, Rîşcani district, (com.) Branişte, village Branişte, the hillocks, 07.06.1996, leg. T. Burac (T. Tofan).

Centaurea solstitialis L. (n. 24.567) – ref.: Sp. Pl. ed. 1 917 (1753); Republic of Moldova, Glodeni district, (com.) Viişoara, village Moara Domnească, 06.06.1995, leg. T. Burac (T. Tofan)

Centaurea stoebe L. (n. 24. 924) – ref.: Sp. pl. 2: 914 (1753); Republic of Moldova, Glodeni district, (com.) Comanca, village Buteşti, the Prut meadow, 11.06.1997, leg. T. Burac (T. Tofan); det. V. M. Danciu

Subtrib. *Echinopsidinae*

Gen *Echinops* L.,1753

Echinops exaltatus Schrad. (n. 24.035) – ref.: Hort. Gotting. 1809-1811 15 (1809); Republic of Moldova, Glodeni district, (com.) Viişoara, village Moara Domnească, "Pădurea Domnească" natural reserve, 25.06.1995, leg. T. Burac

Echinops ritro L. subsp. *ruthenicus* (M. Bieb.) Nyman (n. 24.569) – ref.: Consp. fl. eur. 2: 399 (1879); Republic of Moldova, Glodeni district, (com.) Comanca, village Buteşti, 06.06.1996, leg. T. Burac (T. Tofan)

Subfam. *Cichorioideae*
Trib *Lactuceae*
Subtrib *Crepidinae*

Gen *Chondrilla* L., 1753

Chondrilla juncea L. (n. 24.920) – ref.: Sp. Pl. ed. 1 796 (1753); Republic of Moldova, Glodeni district, village Cobani, „Suta de movile" natural reserve, the Prut meadow, 07.06.1996, leg. T. Burac (T. Tofan).

Chondrilla juncea L. (n. 24.568; 24.568/a; 24.568/b) – ref.: Sp. Pl. ed. 2. 796 (1753); Republic of Moldova, Glodeni district, (com.) Comanca, village Buteşti, 06.06.1996, leg. T. Burac (T. Tofan)

Subtrib *Hieraciinae*

Gen *Hieracium* L., 1753

Hieracium cymosum L. (n. 24.919) – ref.: Sp. Pl. , ed. 2. 2: 1126 (1763); Republic of Moldova, Glodeni district, village Cobani, the „Suta de movile" reefs, the Prut meadow, 07.06.1996, leg. T. Burac (T. Tofan)

Hieracium cymosum L. (n. 24.572) – ref. Sp. Pl. ed. 2 1126 (1763); Republic of Moldova, Rîşcani district, (com.) Branişte, village Branişte, the hillocks, 06.06.1996, leg. T. Burac (T. Tofan)

Hieracium sabaudum L. (n. 24.044) – ref.: Sp. pl. 2: 804 (1753); Republic of Moldova, Cahul district, (com.) Cîşliţa-Prut, village Cîşliţa-Prut, coastal steppe, 06.07.1996, leg. T. Burac

Subtrib *Scorzonerinae*

Gen *Scorzonera* L., 1753

Scorzonera cana (C. A. Mey.) O. Hoffm. (n. 24. 642) – ref.: Natürl. Pflanzenfam. ed. 1 4(5): 365 (1893); Republic of Moldova, Glodeni district, (com.) Viişoara, village Viişoara, irrigation canal, 05.06.1996, leg. T. Burac (T. Tofan).

Gen *Tragopogon* L.,1753

Tragopogon dubius Scop. (n. 24.571) – ref.: Fl. Carn. ed. 2 2: 95 (1772); Republic of Moldova, district Rîşcani, (com.) Branişte, village Branişte, the hillocks, 06.06.1996, leg. T. Burac (T. Tofan)

Ord. *Dipsacales* Dumortier, 1829
Fam. *Adoxaceae* (Dumort., 1827) E. Meyer, 1839, nom. cons.

Gen *Sambucus* L., 1753

Sambucus nigra L. (n. 24.595) – ref.: Sp. Pl. ed. 1 269 (1753); Republic of Moldova, Glodeni district, (com.) Cobani, the village Cobani, 07.06.1996, leg. T. Burac (T. Tofan)

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

Gen *Knautia* L.,1753

Knautia arvensis (L.) Coult. (n. 24.925) – ref.: Mem. Dipsac. 29 (1823); Republic of Moldova, Glodeni district, (com.) Comanca, village Buteşti, the Prut meadow, 11.06.1997, leg. T. Burac (T. Tofan); det. V. M. Danciu

Conclusions

The material presented here includes species collected between 1994 and 1997 on the left bank of the river Prut, within the territory of the Republic of Moldova (the districts Briceni and Ocniţa at the northernmost, Edineţ, Rîşcani, Glodeni and Făleşti, partially representing the mid-Prut area, and also Cahul as the southernmost district, representing the lower Prut). The river Prut has a total length of 976 km, it springs from the Outer Eastern Carpathians (Ukraine) and flows eastward, then much of its course takes a south-east direction and ultimately flows into the Danube river, near Reni. It forms the border between Romania and the Republic of Moldova.

The Republic of Moldova is a country situated in eastern Europe, between Romania to the west and Ukraine to the east. Its relief consists of a hilly plain sloping from northeast to southeast, with an average altitude of 147 m. The regular

landforms are plains, plateaus, hills, and valleys, the general character of the landscape being slightly contrasted due to a relatively uniform erosion and a poor rain gauge. The climate is temperate continental, the average annual temperature increasing from 8-9 ºC in the north to 10-11 ºC in the south and southeast. The average annual rainfall varies from 600-650 mm in the north and centre to 500-550 mm in the south and southeast. The hydrographic network includes more than 3000 rivers and rivulets, of which 10 are more than 10 km long. The main rivers are the Dniester (1352 km long, 657 km across the country), and the Prut (976 km, 695 km across the country). There are also 60 natural lakes.

Regarding the Prut river, we should also mention here the fact that along the mid-Prut there is a chain of 'reef-type' limestone formations of called the Rocks of Prut (the "*Toltre*" of the Prut*),* scattered over a distance of about 200 km, from the north of the country (next to Criva) down to Cobani. These „*toltre*" (a word of Polish borrowing) are not right on the Prut river banks but in the riverbed of its tributaries, several kilometers off the left bank of the Prut. These chains of limestone reefs are composed of coral skeletons, molluscs, shellfish, algae, marine animals and organisms that lived in the Tortonian and Sarmatian tropical seas, 10-20 million years ago. They are declared monuments of nature and are protected by law. Such an example is the reserve "Suta de Movile" (1072 ha), unique in its way, situated east of the villages Branişte and Cobani, parallel to the Prut meadow. Here the natural landscape is characterized by a lot of hillocks (more than 3500), oval or elongated, sizing from 1-3 up to 30 m high. The most impressive is the so-called "*Movila Ţiganului*". East of the "Suta de Movile" reserve and south to the village Buteşti, the Camenca river hollowed out a picturesque gorge in the strings of reefs. Here we find the famous Buteşti reef*,* surrounded on three sides by the rivulet Camenca and by its tributary, Camencuţa. At about 5 km far from the Buteşti reef, south to the village Cobani, there is "*Stînca Mare*", the southernmost geological monument in the reef belt of the Middle Prut. This reef, which remained as an exotic island in the middle of farmlands, is a limestone block with a well developed karst system, of geological, paleontological, floristical, zoological, and archaeological interest.

On the right side of the Prut, on Romanian territory, there are three zones of vegetation (forest area, forest-steppe area and steppe area), following approximately the same order from northwest to southeast, while on the left side of the Prut the landscapes have particular features from north to south, resembling in some way those on the right side of the Prut, yet differing in extent and the more representative development of the steppe itself. Thus the northern area of the republic is characterized by steppe and forest-steppe, with mesophilic species

predominating; the centre is characterized by the presence of mixed forests of common oak, beech and oak; the south distinguishes itself by the predominance of downy oak forests and oak and blackthorn forests.

In the region of the Middle Prut we mention the existence of the "Pădurea Domnească" reserve, a law-protected area for conservation of biodiversity, as the main feature of this natural complex given by the river valley itself, which crosses some coral reefs with a unique value in Europe. From here and around this place many specimens presented in this paper were collected (Annex 2).

The scientific reserve „Pădurea Domnească" is located in the meadow of Prut river and is unique in its biodiversity, soil and vegetation types, and landscape. It lies within the district of Glodeni and was founded in 1993. It is situated in the neighbourhood of Cobani, Balatina, Bisericani, Cuhneşti, Moara-Domnească, the district of Glodeni and Chetriş, Călineşti, Hânceşti, Drujineni and Pruteni in the district of Făleşti. Orographycally, the reserve is situated in the floodplain of Prut river, between Prut and Camenca. The area of the reserve is of 6032 ha (of which 3054 are forests). The forest in the Prut meadow is one of the most valuable old forests in Europe. The main purpose of the scientific reserve „Pădurea Domnească" is to preserve the most representative floodplain forests, to conserve some rare plant species and animal communities, and to restore the biodiversity of the most characteristic phytocenoses.

Historically, researches on the flora and vegetation of Bessarabia, also including territories on the left side of the Prut river, appeared in the early 20th century when Tr. Săvulescu and T. Rayss (1924-1934) referred to places in the region of the rivers Delia, Tigheci and Sărata in their studies on the flora in Bessarabia, describing some species from the meadows of these rivers. Important contributions were made by Al. Borza (1935) and Em. Ţopa (1934), who carried out researches on the flora in Bessarabia, describing species from the Prut river region. More recently, researches were done by Gh. Postolache (1995), Postolache et al. (2006), V. Covali (2009), A. Miron (2008 a.), A. Miron (2008 b.), A. Miron (2009), Tatiana Tofan-Burac (1997, 1998, 1999, 2002, 2004.a, 2004.b), Tofan-Burac T. & Mititelu, D., (1996), Tofan-Burac T. & Chifu T. (1998, 2002). We also mention some researches on the right bank of the Prut river, especially on endangered species (Sârbu I. & Chifu T., 2003), and some materials related to plant diversity in the context of the European strategy for biodiversity conservation [Sârbu Anca (coord.) et al., 2001].

The material was processed by arranging it in systematic order, the taxonomical classification was updated by indicating the accepted names, the location, the date and the author of its collecting. According to the taxonomical classification

employed here (Systema Naturae 2000), the 131 taxa presented belong to 92 genera and 39 families.

Bibliography

Borza A., 1935. - Contribuţii la flora Basarabiei. In: Bul. Grăd. Bot., Cluj, 1935, vol. XV, 1-4. p.233-236.

Ciocârlan V., 2000. - Flora ilustrată a României – Pteridophyta et Spermatophyta, ediţia II-a, Editura Ceres, Bucureşti.

Covali V., 2009. - Biodiversitatea fitocenotică a ariilor protejate forestiere din valea Prutului de Mijloc., Autoreferat al tezei de doctor, Chişinău, 27 p.

Miron A., 2008. - Diversitatea taxonomică a halofitelor din luncile râurilor mici din stînga Prutului de Mijloc. Internaţional Conference of Young Researchers, 6-7noiembrie, Chişinău, 2008, p. 90.

Miron A., 2008. - Contribuţii la cunoaşterea vegetaţiei halofile din luncile râurilor micidin stînga Prutului de Mijloc. Internaţional Conference of Young Researchers,6 - 7 noiembrie, Chişinău, 2008, p. 92.

Miron A., 2009. - Vegetaţia luncilor râurilor mici din stânga Prutului de Mijloc, Autoreferat al tezei de doctor, Chişinău, 27 p.

Postolache Gh., 1995. - Vegetaţia Republicii Moldova, Edit. Ştiinţa, Chişinău, 340 p.

Postolache Gh., Teleuţă Al., Miron A., Covali V., 2006. - Conservarea diversităţii vegetaţiei din lunca Prutului. *Mediul Ambiant*, Nr. 5(29), Chişinău, 2006, p. 26-30.

Săvulescu Tr., Rayss T., 1924-1926. - Materiale pentru flora Basarabiei. Bucureşti (Supliment la "Buletinul agriculturii"), vol. 2, 1924, p. 1-80; vol. 3. 1926, p. 81-250.

Sârbu Anca (coord.) et al., 2001. - Diversitatea plantelor în contextul strategiei europene de conservare a biodiversităţii (sinteze), Bucureşti, Edit. alo, Bucureşti, 320 pp.

Sârbu I., Chifu T., 2003. - Lista roşie a plantelor vasculare din Moldova, Bucureşti, Edit. Acad. Rom., Mem. Secţ. Şt. Acad. Rom., XXIV-2001, 131-151.

Tofan-Burac, T., 1997. - Flora si vegetatia din lunca Prutului (Republica Moldova), Teza de doctorat, Univ. „Al.I. Cuza", Iaşi.

Tofan-Burac, T., 1998. - Consideraţii privind conservarea şi protecţia naturii în bazinul Prutului Mijlociu, Mediul şi cooperarea transfrontieră "Transeco", Suceava, 136-139.

Tofan-Burac, T., 1999. - ABC-ul Naturii, Mişcarea Ecologistă din Moldova, Colecţia *Natura*, Chişinău, 1999, 79 p.

Tofan-Burac, T., 2004. - Asociaţii de buruieni din lunca Prutului (Republica Moldova), Bul. Şt., Muzeul Naţional de Etnografie şi Istorie Naturală, vol. 1(14), p. 219-223.

Tofan-Burac, T., 2004. - Lista roşie a plantelor superioare din valea Prutului (Republica Moldova), Bul. Şt., Muzeul Naţional de Etnografie şi Istorie Naturală, vol. 1(14), p. 213-217.

Tofan, T., 2002. - Consideratii asupra florei medicinale din lunca Prutului, *Nymphaea*, XXIX, 69-99, Muzeul Ţării Crişurilor, Oradea.

Tofan-Burac, T. & Mititelu, D., 1996. - Flora vasculara din lunca Prutului (Republica Moldova), Bulet. Grad., Botan. Iasi, 5, 231-239.

Tofan-Burac, T. & Chjfu T., 1998. - The red list of vascular plants from the Prut Valley – Republic of Moldova, Biodiversitatea vegetala a Republicii Moldova, Chisinau, 181-191.

Tofan-Burac Tatiana, Chifu T., 2002. - Flora şi vegetaţia din Valea Prutului, Edit. Corson, Iaşi, 437 pp.

Ţopa, E., 1934. - Contribuţii la flora Basarabiei de Nord. In: Bul. fac. de şt. din Cernăuţi, 1934, vol. 7, p. 321-328.

xxx – Royal Botanic Garden Edinburgh – Flora Europaea (PANDORA taxonomic data base system).

xxx - Global Biodiversity Information Facility. (http;//www.gbif.org).

xxx - uBio Portal (www.ubio.org/portal/-5k).

xxx – Species 2000 & ITIS Catalogue of Life: 2007 Annual Checklist.

xxx – International Information System on Crop Wild Relatives (www.genres.de/CF/ipgri_cwr/.../authors.cfm...)

xxx - Republica Moldova, - Harta administrativă - (http://www.primaria.md/imagini/harta-moldova.gif)

Fig.1. Collecting sites from Republic of Moldova.

Fig. 2. Map of Domneasca Forest Natural Reserve.

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Floristic survey of dendrological parks in Săcuieni and Cadea (Bihor County, Transylvania, Romania)

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Abstract. The paper is dealing with the floristic inventory of two dendrological parks in Bihor County: Dendrological Park of Săcuieni (= Székelyhíd) and Dendrological Park of Cadea (= Nagykágya). Field surveys were carried out in 2009-2010. In Dendrological Park of Săcuieni 61 woody taxa have been identified: 44 trees, 12 shrubs and 5 lianas. In Dendrological Park of Cadea 43 woody taxa have been identified: 24 trees, 14 shrubs and 5 lianas. In this arboretum herbaceous layer have been also studied, 42 herbaceous plant species being inventoried.

Key Words. dendrological park, woody flora, secular trees, herbaceous species

Introduction

In Transylvania there are many dendrological parks (arboreta), most secular, established near castles, noble houses in the 18-20th centuries. Although they preserved woody taxa (species, subspecies and varieties) with pronounced biogeographic and/or ornamental importance, and served recreation, relaxation and aesthetic purposes, due to historical shifts, majority of them have reached a state of abandonment and are invaded by lianas, adventive herbaceous species and nitrophilous weeds, while most secular trees have been removed. There are

some dendrological parks that have been declared protected by local or regional authorities. However, many of these arboreta are also abandoned.

In the last two decades, some of these dendrological parks have been returned to their respective owners, and they have been partially or completely restored. Given the existing possibilities of restoration and conservation of arboreta even those still in public ownership, with financing from European funds, it is necessary to reintroduce theme in the recreational and educational circuit even, by setting up thematic (didactic) paths. Therefore, we consider important the floristic survey of these dendrological parks, especially woody taxa inventory, but also the herbaceous layer study where this is well developed and valuable. The results of these surveys basically serve as a database on the flora of the park, which can be the basis for its restoration. Also, these studies can lead to the design of thematic paths, serving an important educational role, and also contributing to the information and awareness on the need for conservation these dendrological parks.

The purpose of this study was to identify and inventory the flora of two dendrological parks in Bihor County: Dendrological Park of Săcuieni and Dendrological Park of Cadea.

Material and Methods

The surveys were conducted in 2009-2010. In Dendrological Park of Cadea the survey was made both for woody taxa (trees and shrubs) and for the herbaceous layer, while in Dendrological Park of Săcuieni only woody taxa have been inventoried. The plants were identified in the field, using Simon (2002) and Ciocârlan (2009); in cases when field identification was difficult (for polymorphic taxa, ornamental varieties and hybrids), the plant material was collected and determined using monographic works (Săvulescu, 1956-1976; Zanoschi *et al*., 1996-2004). Plant taxa nomenclature follows Flora Europaea (Tutin *et al.* 1964-1980). The biogeographic area/statute in the Romanian flora for each woody taxon is given according to Popescu *et* Sanda (1998) and Ciocârlan (2009).

Study site

A. Dendrological Park of Săcuieni is very close to the center of Săcuieni town, located 40 km north of Oradea (in the north-west of Bihor County), on Ier River terraces at an altitude of 100-160 m a.s.l (GPS coordinates: N 47°21'; E 22°05'). Access is on the road E671 Oradea - Carei - Satu Mare, which crosses the locality.

The park was set up nearby an 18th century castle, known today as the Stubenberg Castle after its former owner, count Stubenberg József, who extended the building in 1906 in neoclassical architectural style (Nánási, 2003). The arboretum covers an area of 4 ha and it is included on the list of protected natural areas of Bihor County (Bihor County Council Decision no. 19/1995).

B. Dendrological Park of Cadea is located in Cadea village which is situated in the vicinity of Săcuieni town, on the left side of Ier River, in a contact area of plains and hills at an altitude of 100-160 m a.s.l (GPS coordinates: N 47°18'53.28"; E 22°03'51.84"). Access is on road E671 Oradea - Carei - Satu Mare, also. From administrative point of view, Cadea village belongs to Săcuieni town.

The arboretum was founded in the 19th century in the style of an English garden-park, nearby the Pongrácz family castle. This is a very old Hungarian noble family, rooted in 12-13th centuries (Erdei, 2006). The castle was built in 1820, then modified and extended in 1895. During the same period (1820-1900) it was arranged the garden-park of the castle, being used native woody taxa, but also ornamental plants originating from other continents (Kiss, 1983; Erdei, 2006). Currently, the arboretum covers an area of 6 ha and it is listed on the list of protected natural areas of Bihor County (Bihor County Council Decision no. 19/1995).

Results and Discussion

A. Woody flora of Dendrological Park Săcuieni

There have been identified 61 taxa, including 44 trees, 12 shrubs and 5 lianas (Table 1). From all of these taxa, 26 are spontaneous (indigenous, native taxa, which are found in the Romanian flora), European or Eurasian biogeographical elements, 31 are cultivated (originating in North America or Asia). Among the cultivated there are sub-spontaneous taxa, which penetrated into the spontaneous flora, managing to reproduce naturally. Also, there are invasive species (*Ailanthus altissima, Robinia pseudacacia*), which has a strong vegetative growth and spread rapidly to the detriment of native species. The lianas *Parthenocissus tricuspidata* and *Parthenocissus quinquefolia* are also considered invasive species. Of all identified plants, red pine (*Pinus sylvestris*) and yew (*Taxus baccata*) are included on the national red lists being considered rare species (Boşcaiu *et al*., 1994; Oltean *et al*., 1994).

Secular trees (age estimated at approx. 100-150 years) are: *Aesculus hippocastanum*, *Fraxinus excelsior*, *Gymnocladus dioica*, *Liriodendron tulipifera*, *Populus alba, Quercus robur*, *Quercus rubra*, *Sophora japonica*.

Table 1. Woody taxa identified in Dendrological Park Săcuieni

No.	Taxon	Biological form*	Biogeographic area/statute in the Romanian flora
1	*Abies alba*	T	Central-European/spontaneous
2	*Abies nordmanniana*	T	Southeastern Asia/cultivated
3	*Acer campestre*	T, sh	European/spontaneous
4	*Acer platanoides*	T	European/spontaneous
5	*Acer pseudoplatanus*	T	Central-European/spontaneous
6	*Aesculus hippocastanum*	T	Balkanic/cultivated
7	*Ailanthus altissima*	T	China/cultivated/sub-spontaneous/invasive
8	*Berberis vulgaris*	T	European-Mediterranean/spontaneous
9	*Betula pendula*	T	Eusiberian/spontaneous
10	*Buxus sempervirens*	T, sh	Mediterranean/cultivated
11	*Campsis radicans*	l	North America/cultivated
12	*Carpinus betulus*	T	Central-European/spontaneous
13	*Castanea sativa*	T	Submediterranean/cultivated/sub-spontaneous
14	*Catalpa bignonioides*	T	North America/cultivated
15	*Celtis occidentalis*	T	North America/cultivated/sub-spontaneous
16	*Cerasus vulgaris*	T	Eurasian-Submediterranean/cultivated
17	*Cercis siliquastrum*	T	Mediterranean/cultivated
18	*Clematis vitalba*	l	Central-European/spontaneous
19	*Cornus sanguinea*	sh	Central-European/spontaneous
20	*Crataegus monogyna*	sh	Eurasian/spontaneous
21	*Deutzia scabra*	sh	China, Japan/cultivated/sub-spontaneous
22	*Euonymus europaeus*	sh	European/spontaneous
23	*Ficus carica*	sh	Mediterranean/cultivated
24	*Fraxinus excelsior*	T	European/spontaneous
25	*Fraxinus excelsior* var. *pendula*	T	European/cultivated
26	*Gymnocladus dioica*	T	North America/cultivated
27	*Hedera helix*	l	Atlantic-Mediterranean/spontaneous
28	*Juglans nigra*	T	North-America/cultivated
29	*Juglans regia*	T	European-Balkanic-Caucasian/cultivated/sub-spontaneous
30	*Juniperus virginiana*	T	North America/cultivated
31	*Laburnum anagyroides*	T	Central-European-Balkanic/cultivated
32	*Liriodendron tulipifera*	T	North America/cultivated
33	*Magnolia obovata*	T	Eastern Asia/cultivated
34	*Malus* sp.	T	European/spontaneous
35	*Morus alba*	T	China/cultivated
36	*Morus nigra*	T	Mediterranean/cultivated
37	*Parthenocissus tricuspidata*	l	China and Japan/sub-spontaneous/invasive

38	*Parthenocissus quinquefolia*	l	North America/sub-spontaneous/invasive
39	*Picea abies*	T	European/spontaneous
40	*Pinus nigra*	T	Central-European/cultivated
41	*Pinus sylvestris*	T	Eurasian/spontaneous/cultivated
42	*Populus alba*	T	Eurasian/cultivated/sub-spontaneous
43	*Prunus cerasifera*	T	Ponto-Balkanic/cultivated/sub-spontaneous
44	*Prunus cerasifera* var. *pissardi*	T	Ponto-Balkanic/cultivated
45	*Prunus spinosa*	sh	European-Mediterranean/spontaneous
46	*Quercus robur*	T	European-Mediterranean/spontaneous
47	*Quercus rubra*	T	North America/cultivated
48	*Robinia pseudacacia*	T, sh	North America/cultivated/sub-spontaneous/ invasive
49	*Rosa canina*	sh	European-Mediterranean/spontaneous
50	*Rosa spinosissima*	sh	Eurasian/spontaneous
51	*Sambucus nigra*	sh	European-Mediterranean/spontaneous
52	*Sophora japonica*	T	Eastern Asia/cultivated
53	*Spiraea x vanhouttei*	sh	cultivated hybrid
54	*Staphylea pinnata*	sh	Central-European-Mediterranean/ spontaneous
55	*Syringa vulgaris*	sh	European-Mediterranean-Balkanic/ cultivated/sub-spontaneous
56	*Taxus baccata*	T	Central-European-Mediterranean/ spontaneous
57	*Thuja orientalis*	T	China/cultivated
58	*Tilia cordata*	T	European/spontaneous
59	*Tilia platyphyllos*	T	Central-European-Mediterranean/ spontaneous
60	*Tilia tomentosa*	T	Balkan-Pannonic/spontaneous
61	*Ulmus minor*	T	Central-European-Mediterranean/ spontaneous

*****T- tree, sh- shrub, l- liana

B. Woody flora of Dendrological Park Cadea

There have been identified 43 taxa, including 24 trees, 14 shrubs and 5 lianas (Table 2). Of the total woody taxa, 25 are spontaneous, European or Eurasian biogeographical elements, and 15 are cultivated (originating in North America or Asia). Among the cultivated, there are also sub-spontaneous taxa. The invasive species are *Ailanthus altissima, Amorpha fruticosa, Robinia pseudacacia*, *Parthenocissus tricuspidata, Parthenocissus quinquefolia*. Of all identified plants only *Larix decidua* is included on the national red lists being considered rare (Boşcaiu *et al.*, 1994; Oltean *et al.*, 1994).

Table 2. Woody taxa identified in Dendrologic Park Cadea

No.	Taxon	Biological form*	Biogeographic area/statute in the Romanian flora
1	*Acer campestre*	T, sh	European/spontaneous
2	*Acer negundo*	T	North America/sub-spontaneous/cultivated
3	*Acer platanoides*	T	European/spontaneous
4	*Aesculus hippocastanum*	T	Balkanic/cultivated
5	*Ailanthus altissima*	T	China, cultivated/sub-spontaneous/invasive
6	*Amorpha fruticosa*	sh	North America/sub-spontaneous/invasive
7	*Berberis vulgaris*	sh	European-Mediterranean/spontaneous
8	*Celtis occidentalis*	T	North America/cultivated/sub-spontaneous
9	*Clematis vitalba*	l	Central-European/spontaneous
10	*Cornus sanguinea*	sh	Central-European/spontaneous
11	*Corylus avellana*	sh	European/spontaneous
12	*Crataegus monogyna*	sh	Eurasian/spontaneous
13	*Euonymus europaeus*	sh	European/spontaneous
14	*Frangula alnus*	sh	Eurasian/spontaneous
15	*Fraxinus excelsior*	T	European/spontaneous
16	*Gymnocladus dioica*	T	North America/cultivated
17	*Hedera helix*	l	Atlantic-Mediterranean/spontaneous
18	*Juglans regia*	T	European-Balkanic-Caucasian/cultivated/sub-spontaneous
19	*Larix decidua*	T	Central-European/spontaneous
20	*Morus alba*	T	China/cultivated
21	*Parthenocissus quinquefolia*	l	North America/sub-spontaneous/invasive
22	*Parthenocissus tricuspidata*	l	China and Japan/sub-spontaneous/invasive
23	*Pinus nigra*	T	Mediterranean/cultivated
24	*Platanus x acerifolia*	T	Controversal hybride origin/cultivated
25	*Populus alba*	T	Eurasian/cultivated/sub-spontaneous
26	*Populus nigra* ssp. *pyramidalis*	T	Eurasian/cultivated
27	*Prunus padus*	T	Eurasian/cultivated/sub-spontaneous
28	*Prunus spinosa*	sh	European-Mediterranean/spontaneous
29	*Quercus petraea*	T	European/spontaneous
30	*Quercus robur*	T	European-Mediterranean/spontaneous
31	*Quercus rubra*	T	North America/cultivated
32	*Robinia pseudacacia*	T, sh	North America/cultivated/sub-spontaneous/ invasive
33	*Rosa canina*	sh	European-Mediterranean/spontaneous
34	*Salix fragilis*	T, sh	Eurasian/spontaneous
35	*Sambucus nigra*	sh	European-Mediterranean/spontaneous
36	*Sorbus torminalis*	sh	Central-European/spontaneous

37	*Syringa vulgaris*	sh	European-Mediterranean-Balkanic/cultivated/ sub-spontaneous
38	*Tilia cordata*	T	European/spontaneous
39	*Tilia plathyphyllos*	T	Central-European-Mediterranean/spontaneous
40	*Tilia tomentosa*	T	Balkanic-Pannonic/spontaneous
41	*Viburnum lantana*	sh	Central-European/spontaneous
42	*Viburnum opulus*	sh	Circumpolar/spontaneous
43	*Vitis sylvestris*	l	Ponto-Mediterranean/spontaneous

*T- tree, sh- shrub, l- liana

Secular trees (age estimated at approx. 100-150 years) are: *Aesculus hippocastanum*, *Fraxinus excelsior*, *Larix decidua, Pinus nigra, Platanus x acerifolia*, *Populus alba, Populus nigra* ssp. *pyramidalis, Quercus robur*, *Quercus rubra*, *Tilia tomentosa*.

C. Herbaceous flora of Dendrological Park Cadea

Because of its location close to semi-natural habitats (grasslands, forests), into the structure of this arboretum herbaceous species have been installed from the above mentioned habitats, forming a well-developed and rich herbaceous layer. Due to washing the soil rich in organic material by meteoric waters on slopes (also cultivated by crops) and their accumulation in the arboretum area, into the herbaceous layer nitrophilous weeds have been also installed. The development of weeds was favored by the long-term abandonment of the park. On the lower areas in the arboretum, meteoric water accumulation and persistence of soil moisture favored the growth of a few hygrophilous and meso-hygrophilous species. Thus, this dendrological park structure has become very close to a semi-natural forest under anthropogenic influence.

There have been identified 42 herbaceous plant species**:** *Allium ursinum, Anthriscus sylvestris, Arum maculatum, Athyrium filix-femina, Ballota nigra, Calystegia sepium, Carex brizoides, Chelidonium majus, Cirsium arvense, Clematis vitalba, Conium maculatum, Dactylis polygama, Conyza canadensis, Eupatorium cannabinum, Euphorbia amygdaloides, Fragaria vesca, Fumaria schleicheri, Galium mollugo, Glyceria nemoralis, Hedera helix, Heracleum sphondylium, Isopyrum thalictroides, Lactuca serriola, Lysimachia nummularia, Onopordon acanthium, Phragmites australis, Polygonatum latifolium, Polygonatum multiflorum, Polygonum aviculare, Pulmonaria officinalis, Ranunculus repens, Reynoutria japonica, Rubus caesius, Sambucus ebulus, Sanicula europaea,*

Stachys sylvestris, Symphytum officinale, Telekia speciosa, Thypha latifolia, Urtica dioica, Vinca herbacea, Vinca minor.

There are characteristic forest species like *Allium ursinum, Arum maculatum, Athyrium filix-femina, Dactylis polygama, Euphorbia amygdaloides, Fragaria vesca, Isopyrum thalictroides, Polygonatum latifolium, Polygonatum multiflorum, Sanicula europaea, Stachys sylvestris,* etc. The hygrophilous and meso-hygrophilous species are represented by *Glyceria nemoralis, Phragmites australis, Thypha latifolia.* One invasive species have been identified (*Reynoutria japonica*), having a luxuriant growth on the eastern, south-eastern and southern edges of the arboretum. Must be noticed the interesting presence of *Telekia speciosa*; we consider this carpathian-balkanic species, which growth along mountain rivers, that was introduced in the arboretum with ornamental purposes.

Recommendations

Cleaning and sanitation works (Negruţiu, 1980; Mateescu, 2002) are recommended to be done within the studied arboreta, followed by restoration of these parks. Trees, especially secular ones, should be allowed to develop freely and naturally, in order to fulfill their decorative function. The restoration plans of the parks should be developed in accordance with the owners' strategic objectives and the future functions which are going to fulfill these dendrological parks. The cleaning and sanitation works must take into consideration the restoration plans of the parks. For Dendrological Park of Cadea, were the herbaceous layer is dominated by native forest species, it is recommended to keep this semi-natural structure of the arboretum, by eliminating only the weeds and invasive species.

Also, we recommend a thematic path for both arboreta with informative and educational value, in order to attract visitors and raise the attention on conservation of these arboreta and on nature conservation in general.

References

Boşcaiu, N., Coldea, Gh., Horeanu, C. 1994. - Lista roşie a plantelor vasculare dispărute, periclitate, vulnerabile şi rare din Flora României. *Ocrotirea Naturii şi a Mediului Înconjurător* **38** (1): 45-56.

Ciocârlan, V. 2009. - *Flora ilustrată a României. Pteridophyta et Spermatophyta*. Ceres, Bucureşti, 1141 p.

Erdei, F. 2006. - *Nagykágya történeti monográfiája*.

Kiss, A. 1983. - *Monografia localităţii Cadea, Judeţul Bihor*. Manuscript.

Mateescu, R. 2002. - *Arbori şi arbuşti ornamentali.* M.A.S.T., Bucureşti, 222 p.

Nánási, Z. 2003. - *Székelyhíd történeti monografiája.* Érmellék Egyesület, Székelyhíd.

Negruţiu, F. 1980. - *Spaţii verzi.* Didactică şi Pedagogică, Bucureşti, 414 p.

Oltean, M., Negrean, G., Popescu, A., Roman, N., Dihoru, G., Sanda, V., Mihăilescu, S. 1994. - Lista roşie a plantelor superioare din România. *Studii, Sinteze, Documentaţii de Ecologie* **1**: 5-51.

Popescu, A. & Sanda, V. 1998. - Conspectul florei cormofitelor spontane din România. *Acta Botanica Horti Bucurestiensis:* 5-310

Săvulescu, T. (Red.). 1952-1976. - *Flora R.P.R. (R.S.R.)* **1-13**. Academiei R. P. R. S. România, Bucureşti

Simon, T. 2002. - *A magyarországi edényes flóra határozója. Harasztok - virágos növények*. Nemzeti Tankönyvkiadó, Budapest, 892 p.

Tutin, T. G., Heywood, V.H., Burges, N. A., Moore, D. M., Valentine, D.H., Walters, S. M., Webb, D. A. (Eds.). 1964-1980. - *Flora Europaea* 1-5. Cambridge University Press, Cambridge.

Zanoschi, V., Sârbu, I., Toniuc, A. 1996-2004. - *Flora lemnoasă spontană şi cultivată din România* I-IV. Universităţii A. I. Cuza, Iaşi.

*** Decizia Nr. 19/1995 a Consiliului Judeţean Bihor privind măsurile de organizare, administrare, gestionare şi ocrotirea rezervaţiilor (zonelor, ariilor) protejate şi monumentelor naturii din Judeţul Bihor.

*** http://rbg-web2.rbge.org.uk/FE/fe.html – *Flora Europaea,* online database.

NYMPHAEA Folia naturae Bihariae	XXXVIII	129 - 136	Oradea, 2011

An isolated occurrence of *Alopia bielzii tenuis* (E.A. Bielz) (Mollusca, Gastropoda, Clausiliidae) in the Bihor-Vlădeasa Mountains (Romania)

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Abstract. A population of *Alopia bielzii tenuis* (E. A. Bielz, 1861) is reported from the western side of the Bihor-Vlădeasa Mts., near Pietroasa (jud. Bihor). The zoologeographical significance of this isolated occurrence is discussed.

Keywords. Clausiliidae, *Alopia bielzii*, zoogeography, Bihor-Vlădeasa Mountains.

Introduction

The genus *Alopia* H. & A. Adams 1855 is endemic to the Carpathians. Except one isolated occurrence in south-eastern Slovakia, all other *Alopia* forms inhabit Romania's Southern and Eastern Carpathians, as well as the interlocked Apuseni Mountains. These strongly calcophilic clausiliids are quite ubiquitous in the limestone ranges toward the south-eastern part of their area, but become sporadic toward the western, north-western and northern limits of their distribution.

The widest distributed species of the genus is the *A. bielzii* (L. Pfeiffer, 1849). The nominate subspecies of this dextral *Alopia* (*A. b. bielzii*) occurs in the

Poiana Ruscă Mts., near Hunedoara. Two further subspecies, *A. b. madensis* (Fuss, 1855) and *A. b. tenuis* (E. A. Bielz, 1861) are native to the Apuseni Mts., whereas *A. b. clathrata* (E. A. Bielz, 1856) is found in the Zádiel Valley of the Slovak Karst (Figure 1). In contrast to most other species of the genus, the subspecies of *A. bielzii* forms are quite thermophilic, showing strong preference for sunlit limestone cliffs at low altitudes (below 1000 m).

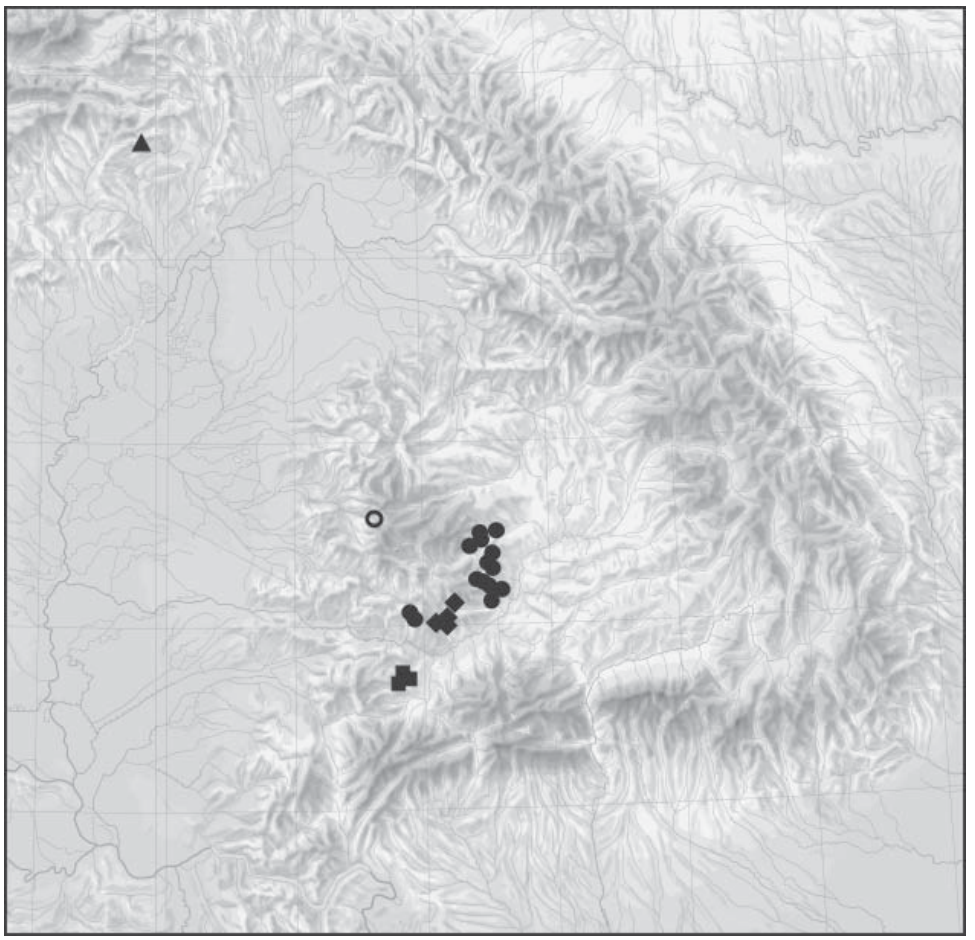

Figure 1. Distribution map of *A. b. bielzii* (square), *A. b. madensisi* (diamond), *A. b. tenuis* (circle), and *A. b. clathrata* (triangle). The new locality of *A. b. tenuis* is highlighted by empty circle.

The subspecies *A. b. tenuis* is widely distributed along the eastern and southern boundaries of the Apuseni mountain complex, in the Gilău-Muntele Mare, Trascău and Metaliferi Mts. It was not known, however, from other limestone regions of the Apuseni Mts., where only sporadic populations of *A. livida julii* A. J. Wagner, 1913 were found. Here we report finding an isolated occurrence of *A. b. tenuis* at the foothills of the Bihor-Vlădeasa Mts. This zoogeographically very interesting locality has not yet been published, though there are two samples of *A. b. tenuis* that originate from here. One of these at the Naturhistorisches Museum (Vienna) was collected in 1926 by Franz Käufel with the record "Padis bei der V. Bulsa" (NHMW 10021), whereas the other at the Mátra Múzeum (Gyöngyös) was collected by the amateur naturalist Tibor Wirth (Miskolc) in 1977 with the indication of Pieroasa, at the upper flow of Crişu Pietros (MMG 31208; see: Varga, 1983). The locality data are not precise, but it seems likely that these two forgotten samples were collected at, or very near, the site which was now re-discovered.

Results

On December 1, 2010, the authors of this paper conducted a brief malacological survey in the Boga Valley. During this field trip 56 fallen shells of *A. b. tenuis* were collected from a leaf litter-covered scree at the SSW cliffs of Piatra Bulzului (46°36'4'' N 22°38'29'' E), situated on the right side of the Bulzu Stream along the highway, at an elevation of 560 m (Figs 2 and 3).

Over the steep, shaded slope beneath the cliffs the following accompanying snail taxa were collected:

Acanthinula aculeata (O. F. Müller, 1774)
Bulgarica vetusta (Rossmässler, 1836)
Carychium tridentatum (Risso, 1826)
Chondrina arcadica clienta (Westerlund, 1883)
Drobacia banatica (Rossmässler, 1842)
Faustina faustina (Rossmässler, 1835)
Granaria frumentum (Draparnaud, 1801)
Helix pomatia Linné, 1758
Kovacsia kovacsi (Varga & Pintér, 1972)
Morlina glabra striaria (Westerlund, 1881)
Oxychilus montivagus (Kimakowicz, 1890)
Platyla banatica (Rossmässler, 1842)
Platyla microspira (Pini, 1885)
Platyla polita (Hartmann, 1840)

Punctum pygmaeum (Draparnaud, 1801)
Pupilla muscorum (f. bigranata) (Linné, 1758)
Pyramidula pusilla (Vallot, 1801)
Ruthenica filograna (Rossmässler, 1836)
Truncatellina cylindrica (Férussac, 1807)
Vallonia costata (O. F. Müller, 1774)
Vitrea subrimata (f. maritae) (Reinhardt, 1871)
Vitrea sp.
Vitrina pellucida (O. F. Müller, 1774)

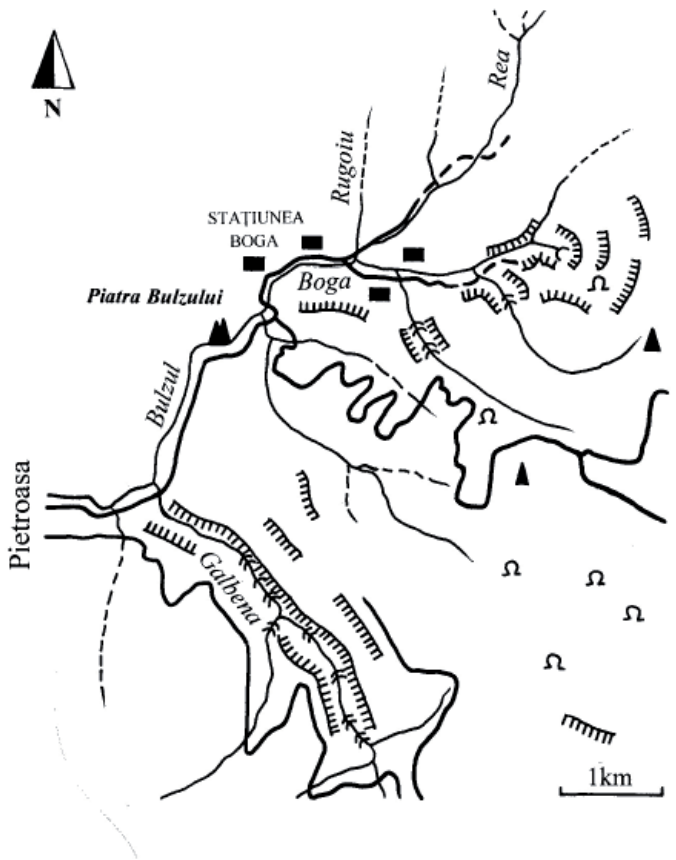

Figure 2. Map of the Bihor-Vlădeasa Mountains at the northern headwaters of the Crişu Pietros. Piatra Bulzului is situated on the right side of the Bulzu stream.

Among the shells found, there was a clear dominance of *Bulgarica vetusta*, with nearly 25% of the specimens. Farther upstream in the valley, toward Amfiteatrul Boghii, the following further species were recorded:
Aegopinella cf. epipedostoma (Fagot, 1879)
Aegopinella pura (Alder, 1830)
Balea stabilis (L. Pfeiffer, 1847)
Cochlodina laminata (Montagu, 1803)
Isognomostoma isognomostoma (Schröter, 1784)
Trichia bielzii (A. Schmidt, 1860)
Vertigo alpestris Alder, 1838
Vertigo pusilla O. F. Müller, 1774

Figure 3. Piatra Bulzului, the locality of *Alopia bielzii tenuis* (E. A. Bielz).

Discussion

Verification of the locality of *A. b. tenuis* near Pietroasa confirms the presence of this subspecies on the western side of the Bihor-Vlădeasa Mts., which could be expected on the basis of two earlier, unpublished collection data from the same valley. In major overviews of the genus these remained unmentioned (Grossu, 1981; Nordsieck, 2008), perhaps also due to reservations prompted by isolation of the Piatra Bulzului population from the other occurrences of this subspecies. The closest locality data of *A. b. tenuis* are from the Gilău-Muntele Mare and Metaliferi Mts. (near Poşaga de Sus and Crăciuneşti, respectively), both at a distance of 65-70 km.

Another, even more isolated occurrence of *A. bielzii* is that of the subspecies *A. b. clathrata* in the Zádiel Valley in south-eastern Slovakia. The large distance between this site and the known Romanian range of the species lead to considering possible human introduction at the Slovakian locality (Soós 1928). Later, however, thorough analyses of shell morphology (Soós, 1943), and especially the presence of *A. b. clathrata* in Holocene deposits of the Zádiel Valley (Ložek, 1964), provided strong support for the natural origin of the Slovakian population.

Current locality records and ecological preferences of *A. bielzii* seem to indicate fragmentation and contraction of a once larger distribution area, which could have been established at a warm period toward the end of the Pleistocene. The locally confined occurrence of *A. b. tenuis* in the Bihor-Vlădeasa Mts., an otherwise favourable and well studied environment, attests to the relict character of this subspecies. But this record is particularly important, because it considerably decreases the distance separating the Romanian and Slovakian localities of *A. bielzii* (Figure 1). It is worth noting that similar disjunct ranges, comprised of distribution areas in the Apuseni Mts. and foothills of the Northern Carpathians, are also known in the cases of other gastropods, such as *Vestia elata* (Rossmässler, 1836), *Lozekia transsilvanica* (Westerlund, 1876), *Kovacsia kovacsi* (Pintér & Varga, 1972), and species of the genus *Aspasita* Westerlund, 1889. These are indicative of expansion routes which once lead to the colonization of the Northern Carpathians by Transylvanian species via the Apuseni mountain complex.

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References

Grossu, A. 1981. - Gastropoda Romaniae, 3. Suprafamiliile Clausiliacea şi Achatinacea. Bucureşti, 269 p.

Ložek, V. 1964. - Quartärmollusken der Tschechoslowakei. *Rozpravy Ústředniho Ústavu Geologického* **31**: 1-374.

Nordsieck, H. 2008. - The system of the genus *Alopia* H. & A. Adams 1855 (Gastropoda: Stylommathophora Clausiliidae). *Mitteilungen der Deutschen Malakozoologicshen Gesellschaft*, **79/80**: 7-18.

Soós, L. 1928. - Az Alopia-nem. The Alopia genus. – *Annales Historico-Naturales Musei Nationalis Hungarici*, 25: 261-426.

Soós, L. 1943 - A Kárpát-medence Mollusca-faunája. Magyar Tudományos Akadémia, Budapest, 478 p.

Varga, A. 1983. - Wirth Tibor Mollusca-gyűjteménye. Tibor Wirth's mollusc collection. – *Soosiana*, **10/11**: 45-56. [in Hungarian, with English abstract]

NYMPHAEA Folia naturae Bihariae	XXXVIII	137 - 146	Oradea, 2011

The invasive harlequin ladybug *Harmonia axyridis* (Pallas 1773) (Coleoptera, Coccinellidae) in the Pârâul Peţea natural reserve, northwestern Romania

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Abstract. The Asian invasive ladybug *Harmonia axyridis* (Pallas 1773) was first observed and collected in the Pârâul Peţea natural reserve near Oradea, NW Romania, in May-June 2011, with several color forms. The presence of both imagos and larvae indicates that the ladybugs were reproducing within the reserve.

Introduction

The Asian harlequin ladybug *Harmonia axyridis* (Pallas 1773) (Coleoptera, Coccinellidae, Coccinellinae, Coccinellini) is native to temperate and subtropical Asia (China, Japan, Korea, Mongolia and Siberia), although its entire range has not been clearly recorded. It occupies many habitats, and in both its native and introduced ranges has been recorded in meadows, heathlands, riparian zones, reedbeds and crop systems. In recent times, there have been 155 attempts to control aphids and 613 to control coccids worldwide through the introduction of coccinellids, mainly unsuccessful regarding aphids, while *H. axyridis*, one of the introduced ladybugs, has become an invasive species in Europe, having far-reaching, unacceptable impact on biodiversity (Brown et al. 2008, Dixon 2000).

H. axyridis has been released as a biological control agent in North America in 1916 and in Europe in 1927 (in Georgia, then in western Europe in 1982 in France with a population from China, probably northeast, which provided also the individuals for the release in Greece in 1994), due to its polyphagous nature (it preys mainly upon various tree-dwelling homopterans) (Koch et al. 2006, Poutsma & al. 2008). While it feeds on aphids, coccids, adelgids, psyllids, it also attacks the eggs of many other insects, including coccinellids and lepidopterans (Roy & Migeon 2010). Although efficient in aphids control, its extremely polyphagous nature suggests also a negative impact on non-target species, mainly through its intra-guild predation potential (probably due to its larger size throughout its life cycle), which could disrupt the natural aphidophagous ladybug guilds in Europe (a guild is a community of specialist and generalist predator, parasitoid and pathogen species that share the same prey/host resource). Since the arrival of *H. axyridis* in the USA, it has replaced *Coccinella 7-punctata* as top aphidophagous predator, and there are already data indicating the decline of European coccinellids as well, with the only exception of the coniferous tree specialist *Anatis ocellata* (L. 1758), which might even act as a threat for *H. axyridis* (Pell et al. 2008, Ware & Majerus 2008), a fact wich could be at least partly useful for the biological control of the invasive ladybug. Still, sibling and non-sibling larval cannibalism may act to some extent as a limiting factor for the populations of *H. axyridis*, but also as a survival strategy (Joseph et al. 1999, Osawa 1989, 1992).

H. axyridis is large, aggressive, polyphagous, with a tendency for intraguild predation, rapid dispersal with more than 50 km per year (144.5 km per year westwards in Great Britain), higher developmental rate, continuous breeding, with evidence of bi-voltinism in Great Britain and Belgium, and a more plastic phenotype, thus it has a reproductive advantage over native ladybugs and it may cause a reduction in biodiversity and declines in native predators and parasitoids of aphids and coccids (Adriaens et al. 2008, Brown et al. 2008, Labrie et al. 2006, Majerus 2006, Roy & Migeon 2010). Furthermore, it feeds on plant materials, including pollen and fruits, when insect prey is scarce, thus becoming a pest for wine and fruit, and its overwintering aggregates in urban areas are a nuisance to humans (Berkvens & al. 2008, van Lenteren et al. 2008).

H. axyridis has spread rapidly from the countries where it was introduced as pest control to many others across Europe, particularly since 2002, so that it may become one of the most widely distributed coccinellids on the continent (Brown & al. 2008). It was first released in Europe in Georgia in 1927, then followed Ukraine (1964), Belarus (1968), France (1982), Portugal (1984), Greece (1994), Spain (1995), the Netherlands and Switzerland (1996), Germany and Belgium (1997),

and the Czech Republic (2003), as well as Italy (1990s) and Denmark (2000s). Its first European occurrence in the wild was reported in 1991 from France, then it was found in Greece (1998), Germany (1999), Belgium (2001), the Netherlands (2002), Spain (2003), Switzerland, Luxembourg and England (2004), Italy, the Czech Republic, Austria, Denmark, Wales, Poland, and Norway (2006), Liechtenstein, Sweden, Northern Ireland, and Scotland (2007), Serbia, Slovakia and Hungary (2008), Bulgaria and Romania (2009), and Bosnia and Herzegovina (2010) (Brown & al. 2008, Fekete & Merkl. 2010, Kulijer 2010, Merkl 2008, Poutsma & al. 2008, Przewoźny et al. 2007, Schneider & Loomans 2006).

It is now distributed in Europe in Albania, Austria, Belgium, Belarus, Bulgaria, the Czech Republic, Denmark, Germany, France (including Corsica), Great Britain, Greece (including Crete), Hungary, Israel, Italy (including Sicily), Lithuania, Luxembourg, the Netherlands, Norway, Portugal, Romania, Russia, Spain (including the Canaries), Slovakia, Sweden, Switzerland, and Ukraine. It was reported from various natural and urban or cultivated habitats, such as woodlands, parks, gardens, cultivated areas, and buildings, confirming the trend for alien coccinellids to occur in urban and cultivated habitats in Europe (Roy & Migeon 2010).

The aim of the present paper was to report the first occurrence of this invasive species in the Pârâul Peţea natural reserve, which is part of the ROSCI 0098 Natura 2000 site in northwestern Romania.

Material and methods

The Pârâul Peţea reserve is located in Băile 1 Mai spa, 9 km southeast from Oradea, Bihor County, in northwestern Romania, and was declared in 1932 around the hypothermal lake formed by some extensions of the brook (total length 1.5 km). The reserve has roughly two zones: first (A), a pond with thermal, underwater springs, having a depth of 0,1 – 3 m and an average temperature between 35 °C by the springs and 25 °C near the shore (Paina 1978). The second zone (B) is an elongated pond formed by another diverticulum of the rivulet.

Aquatic vegetation is abundant, consisting of species of *Potamogeton*, *Typha*, *Phragmites*, *Lemna*, *Butomus*, *Alisma*, *Spirodela*, *Cabomba*, *Elodea*, and the local endemic morph *Nymphaea lotus* L. var. *thermalis* (DC.) Tuzson 1908. Shore and terrestrial vegetation is also abundant, including species of *Carex*, *Equisetum*, *Cyperus*, *Alopecurus*, *Calamagrostis*, *Arrhenaterum*, *Anthoxanthum*, *Brachypodium*, *Bromus*, *Briza*, *Dactylis*, *Festuca*, *Holcus*, *Poa*, *Setaria*, *Juncus*, *Typha*, *Ranunculus*, *Corydalis*, *Chenopodium*, *Cerastium*, *Myosoton*, *Gypsophila*,

Saponaria, *Lychnis*, *Fallopia*, *Polygonum*, *Rumex*, *Erodium*, *Geranium*, *Lythrum*, *Epilobium*, *Vicia*, *Astragalus*, *Ononis*, *Euphorbia*, *Viola*, *Oxalis*, *Potentilla*, *Alyssum*, *Brassica*, *Camelina*, *Rorippa*, *Sisymbrium*, *Althaea*, *Lysimachia*, *Vinca*, *Gallium*, *Cuscuta*, *Lamium*, *Stachys*, *Glechoma*, *Mentha*, *Lycopus*, *Salvia*, *Veronica*, *Plantago*, *Verbascum*, *Angelica*, *Chaerophyllum*, *Pastinacum*, *Leucanthemum*, *Inula*, *Arctium*, *Crepis*, *Lactuca*, *Tragopogon*, *Sonchus*, *Knautia*, *Urtica*, *Sambucus*, *Robinia*, *Rosa*, *Alnus*, *Salix*, and *Tilia* (Danciu & Golban 2010). The fauna of the reserve includes characteristic elements such as the Cyprinid *Scardinius racovitzai* Müller 1958, endemic for the lake, the relict snail *Melanopsis parreyssii* Philippi 1847, and many other protected invertebrates and vertebrates. Odonata and Gerromorphans are abundant in many areas of the lake, the latter including the rare *Mesovelia thermalis* Horváth 1915.

On May 25, 2011, two *H. axyridis* individuals were observed while monitoring the fauna in the reserve: an imago (f. *succinea*) on *Rosa canina* flowers, close to the end of zone B, which took flight and could not be retrieved, and a larva on a shrub by the lake shore, in zone A. Then, on June 22, 2011, two imagos (f. *succinea* and f. *conspicua*) were collected manually on shrubs near the end limit of zone B. No other individuals were found, not even by beating the shrubs over a collecting panel. Another *f. succinea* imago was found on October 12, 2011, entering the museum building in Oradea in search for a shelter for overwintering.

Results

The observed imagos were shortened oval in shape, moderately convex, with straw yellow pronotum with characteristic M-shaped black marks (except for the f. *conspicua* individual, which had the black marks extended and fused in a roughly trapezoidal form), black ventral side, and brownish legs (except for f. *conspicua*, which had black legs). The elytra coloration was as follows: reddish with black spots (observed f. *succinea*), yellow with 18 black spots (collected f. *succinea*), and black with two reddish spots with a black dot each (f. *conspicua*) (Fig. 1).

The larva (third instar) was elongated, somewhat flattened, blackish, with elongated tubercles and spines, with a prominent, typical, bright yellow-orange patch extending over the dorso-lateral lobes of abdominal segments 1-5 on each side (Adriaens & al. 2003, Chapin & Brou 1991, Gordon & Vanderberg 1991, Koch 2003, Michie & al. 2010, Przewoźny & al. 2007, Ruicănescu & Alexandru 2009). The collected specimens are deposited in the entomological collection of Ţării Crişurilor Museum, Oradea.

Figure 1. Specimens of *Harmonia axyridis* (*f. succinea* and *conspicua*) collected in Pârâul Peţea reserve. Scalebar = 2 mm. (Photo Dr. Márton Venczel).

Discussion

Only one previous record of the presence of *H. axyridis* in Bihor county is available, mentioning two collectings from Oradea (10 April 2009, „one imago") and Gurani (2 Aug. 2009, „more individuals"), with no other details and erroneously considered as the first records from Romania (Markó & Pozsgai 2009). The real first record in the wild in Romania was in the summer of 2008 (four individuals in the „Calcarele din Dealul Măgura", a mountaineous area in Băiţa, Hunedoara county, central Romania), and afterwards the species was observed at the same spot in May 2009 and around Baia Mare (Maramureş county, northwestern Romania) in June 2009 (Ruicănescu & Alexandru 2009). In the fall of 2010, *H. axyridis* was already present, with many individuals, in southeast and central Romania: Dobrudja (Constanţa, Măcin Mountains National Park, Celic Dere), Jiu Gorge (at Meri), and Olteţ Gorge; then a huge population (thousands of individuals) was observed in October 2011 near Arad, west Romania (Skolka & Preda 2010, M. Skolka, pers. comm.). There is no information that *H. axyridis* was ever released for biological control purposes in Romania. As it invaded Hungary from western

and possibly northern directions and within one year (2009) it became one of the most common coccinellids (with f. *succinea* predominating, 91.3 %) (Markó & Pozsgai 2009), it could be more likely that the individuals in the Pârâul Peţea reserve originated from Hungary or the Baia Mare region, since no major natural barrier would prevent their spread along those directions.

It may not be possible to fully explain the mechanisms of spread of *H. axyridis* in Europe, because of the multiple introduction sites in at least twelve European countries over a period of approximately forty years, and time lags may occur between arrival, establishment and impact. The need for adaptation before increase in number and spread may explain the lack of a time lag between establishment and expansion in countries where *H. axyridis* was not introduced; individuals arriving in these countries from parts of the introduced range had already been through the adaptation phase. So after a period of adaptation of one or several populations in France, Netherlands, Belgium and/or Germany, a rapid spread of *H. axyridis* occurred in Europe (Brown et al. 2008).

Although winter temperatures below 12 °C. are needed for induction of diapause, too cold winters may prevent *H. axyridis* from establishing (Poutsma & al. 2008, Soares & al. 2008), but selection of human houses as overwintering sites may constitute a cold-free space, which could explain its great invasive success in northern regions (Labrie & al. 2008). The larvae favor temperatures of 18-30 ºC. and no development occurs in adults above 25 ºC., while larvae and pupae are capable of developing at temperatures between 0 and 35 °C., although very slowly below 15 °C., with an optimum for development in adults from 5 to 25 °C. and for larvae and pupae from 5 to 15 °C. (Acar & al. 2004). Ovipositing females showed strong preference for *Urtica dioica* infested with the aphid *Microlophium carnosum* (Alhmedi & al. 2008), an interesting fact to be correlated with the interactions between *H. axyridis* and the native aphidophagous guilds in crops and other habitats.

Being a colonizing species which frequently encounters new habitats, climates, resources and selection pressures, *H. axyridis* displays great phenotypic plasticity on a genetic basis, among the tested traits being the ability to enter into quiescence during periods of low resource availability and the ability to forage for a variety of different food sources, including through cannibalism (Grill & al. 1997, Lombaert & al. 2008); yet more comparative studies between colonizing and established populations are needed to clarify the role of plasticity in colonization and range expansion.

Three color forms of adult *H. axyridis* have been found in Europe: the non-melanic f. *succinea* (predominating), and the melanic f. *spectabilis* and f. *conspicua*,

while the typical form *axyridis*, which predominates in central Asia, has not been recorded in Europe yet. The broad consistency in the color form frequency data from Europe suggests a genetic similarity of populations, possibly the result of spread from very limited points of origin in Europe (Brown & al. 2008), a fact which is to be verified through genetic analyses of *H. axyridis* samples from different countries and regions. Another melanic form (*nigra*, completely black) had lower voracity, biomass, longevity and reproductive capacity than the *aulica* form (mainly red) in laboratory conditions (Soares et al. 2001), a fact which may change under different conditions in various habitats. Therefore, the polymorphism in *H. axyridis* may have an adaptative valuability if different genotypes were selectively favoured in different habitats or at different times, resulting in an increased tolerance of a wide range of environmental conditions. Melanic forms would be in advantage in colder climates, being able to attain higher body temperatures when exposed to sunlight, and therefore greater fitness, as melanization is a phenotypical response of the highly plastic f. *succinea* to colder temperatures (Michie & al. 2010, Poutsma & al. 2008). Indeed, the melanic f. *conspicua* predominates in southwestern Siberia and northern Japan (Chapin & Brou 1991), but an increase in non-melanic f. *succinea* from spring to summer and in melanic forms from summer to autumn was observed, caused by non-random mating based not only on elytral color (Osawa & Nishida 1992).

Various techniques and trapping methods to prevent ladybugs from entering and aggregating in buildings or on grapes in autumn or to remove aggregates inside buildings have been proposed, as well as several natural enemies, but the latter showed very limited potential as biological control agents (Kenis & al. 2008), thus it is unlikely that any highly specific predator or parasitoid would be effective against *H. axyridis* in the field in the colonized regions.

Further spreading in Europe is likely, particularly northwards and eastwards (Brown et al. 2008). The data about the presence of *H. axyridis* in Romania indicate a fast spreading and numerous populations in southern, central and western regions, this ladybug being probably already distributed in the whole country. The low number of individuals in the area of Oradea and the Pârâul Peţea reserve (compared to the abundance in central, southeastern and western regions of Romania), the presence of different color forms and the lack of reports of overwintering groups in that northwestern region suggest that, while certainly reproducing, *H. axyridis* may still be in the process of establishing itself in the Pârâul Peţea reserve and the surrounding zone, but its impact on native species in the protected area needs investigation.

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Bibliography

Acar, E. B., Mill, D. D., Smith, B. N., Hansen, L. D., Booth, G. M. 2004. – Calorespirometric determination of the effects of temperature on metabolism of *Harmonia axyridis* (Col.: Coccinellidae) from second instars to adults. *Environmental Entomology* **33** (4): 832-838.

Adriaens, T., Branquart, E., Maes, D. 2003 – The multicoloured Asian ladybird *Harmonia axyridis* Pallas (Coleoptera: Coccinellidae), a threat for native aphid predators in Belgium?. *Belgian Journal of Zoology* **133** (2): 201-202.

Adriaens, T., San Martin y Gomez, G., Maes, D. 2008. – Invasion history, habitat preferences and phenology of the invasive ladybird *Harmonia axyridis* in Belgium. In: Roy, H. E., Wajnberg, E. (eds.): From Biological Control to Invasion: the Ladybird Harmonia axyridis as a Model Species. (Springer), 287 pp.

Alhmedi, A., Haubruge, E., Francis, F. 2008. – Role of prey-host plant associations on *Harmonia axyridis* and *Episyrphus balteatus* reproduction and predatory efficiency. *Entomologia Experimentalis et Applicata* **128**: 49-56.

Berkvens, N., Bonte, J., Berkvens, D., Deforce, K., Tirry, L., De Clercq, P. 2008. - Pollen as an alternative food for *Harmonia axyridis*. In: Roy, H. E., Wajnberg, E. (eds.): From Biological Control to Invasion: the Ladybird Harmonia axyridis as a Model Species. (Springer), 287 pp.

Brown, P. M. J., Adriaens, T., Bathon, H., Cuppen, J., Goldarazena, A., Hagg, T., Kenis, M., Klausnitzer, B. E. M., Kovář, I., Loomans, A. J., Majerus, M. E. N., Nedved, O., Pedersen, J., Rabitsch, W., Roy, H. E., Ternois, V., Zakharov, I., Roy, D. B. 2008. - *Harmonia axyridis* in Europe: spread and distribution of a non-native coccinellid. *Biocontrol* **53**: 5–21.

Chapin, J. B., Brou, V. A. 1991. – *Harmonia axyridis* (Pallas), the third species of the genus to be found in the United States (Coleoptera: Coccinellidae). *Proceedings of the Entomological Society of Washington* **93** (3): 630-635.

Danciu, V. M., Golban, D. 2010. - The botanical collection of the Ţării Crişurilor Museum Tatiana Tofan's herbarium (part I). *Nymphaea, Folia Naturae Bihariae* **37**: 53-102.

Dixon, A. F. G. 2000. - Insect predator-prey dynamics: Ladybeetles and Biological Control. (Cambridge University Press) Cambridge, 257 pp.

Fekete, Z., Merkl, O. 2010. - Coccinellidae housed in the Mátra Museum, Hungary, with a national checklist of the family (Coleoptera). *Folia Historico-Naturalia Musei Matraensis* **34**: 119-130.

Gordon, R. D., Vanderberg, N. 1991. - Field guide to recently introduced species of coccinellidae Coleoptera) in North America, with a revised key to north American genera of coccinellini. *Proceedings of the Entomological Society of Washington* **93**: 845-864.

Grill, C. P., Moore, A. J., Brodie, E. D. 1997. – The genetics of phenotypic plasticity in a colonizing population of the ladybird beetle, *Harmonia axyridis*. *Heredity* **78**: 261-269.

Joseph, S. B., Snyder, W. E., Moore, A. J. 1999. – Cannibalizing *Harmonia axyridis* (Coleoptera: Coccinellidae) larvae use endogeneous cues to avoid eating relatives. *Journal of Evolutionary Biology* **12**: 792-797.

Kenis, M., Roy, H. E., Zindel, R., Majerus, M. E. N. 2008. - Current and potential management strategies against Harmonia axyridis. In: Roy, H. E., Wajnberg, E. (eds.): From Biological Control to Invasion: the Ladybird *Harmonia axyridis* as a Model Species. (Springer), 287 pp.

Koch, R. L. 2003. – The multicolored Asian lady beetle, *Harmonia axyridis*: a review of its biology, uses in biological control, and non-target impacts. *Journal of Insect Science* **3**: 32, 16 pp. Available online: insectscience.org/3.32.

Kulijer, D. 2010. – First record of invasive species *Harmonia axyridis* (Pallas, 1773) (Coleoptera: Coccinellidae) in Bosnia and Herzegovina. Acta entomologica serbica **15** (1): 141-143.

Labrie, G., Lucas, É., Coderre, D. 2006. – Can developmental and behavioral characteristics of the multicolored Asian lady beetle *Harmonia axyridis* explain its invasive success?. *Biological Invasions* **8**: 743-754.

Labrie, G., Coderre, D., Lucas, É. 2008. – Overwintering strategy of multicolored Asian lady beetle (Coleoptera: Coccinellidae): cold-free space as a factor of invasive success. *Annals of the Entomological Society of America* **101** (5): 860-866.

Lombaert, E., Malausa, T., Devred, R., Estoup, A. 2008. – Phenotypic variation in invasive and biocontrol populations of the harlequin ladybird, *Harmonia axyridis*. *BioControl* **53**: 89-102.

Majerus, M. E. N. 2006. - The impact of male-killing bacteria on the evolution of aphidophagous coccinellids. *European Journal of Entomology* **103**: 1–7.

Markó, V., Pozsgai, G. 2009. – A harlekinkatica (Harmonia axyridis Pallas, 1773) (Coleoptera, Coccinellidae) elterjedése Magyarországon és megjelenése Romániában, Ukrainában. *Növényvédelem* **45** (9): 481-492.

Merkl, O. 2008. - A harlekinkatica (*Harmonia axyridis* Pallas) Magyarországon (Coleoptera: Coccinellidae). (First record of the harlequin ladybird (*Harmonia axyridis* Pallas) in Hungary (Coleoptera: Coccinellidae).) *Növényvédelem* **44** (5): 239–242.

Michie, L. J., Mallard, F., Majerus, M. E. N., Jiggins, F. M. 2010. – Melanic through nature or nurture: genetic polymorphism and phenotypic plasticity in *Harmonia axyridis*. *Journal of Evolutionary Biology* **23**: 1699-1707.

Osawa, N. 1989. – Sibling and non-sibling cannibalism by larvae of a lady beetle *Harmonia axyridis* Pallas (Coleoptera: Coccinellidae) in the field. *Researches on Population Ecology* **31**: 153-160.

Osawa, N. 1992. – A life table of the ladybird beetle *Harmonia axyridis* Pallas (Coleoptera, Coccinellidae) in relation to aphid abundance. *Japanese Journal of Entomology* **60** (3): 575-579.

Osawa, N., Nishida, T. 1992. – Seasonal variation in elytral colour polymorphism in *Harmonia axyridis* (tha ladybird beetle): the role of non-random mating. *Heredity* **69**: 297-307.

Pell, J. K., Baverstock, J., Roy, H. E., Ware, R. E., Majerus, M. E. N. 2008. – Intraguild predation involving *Harmonia axyridis*: a review of current knowledge and future perspectives. In: Roy, H. E., Wajnberg, E. (eds.): From Biological Control to Invasion: the Ladybird *Harmonia axyridis* as a Model Species. (Springer), 287 pp.

Poutsma, J., Loomans, A. J. M., Aukema, B., Heijerman, T. 2008. - Predicting the potential geographical distribution of the harlequin ladybird, *Harmonia axyridis*, using the CLIMEX model. In: Roy, H. E., Wajnberg, E. (eds.): From Biological Control to Invasion: the Ladybird *Harmonia axyridis* as a Model Species. (Springer), 287 pp.

Przewoźny, M., Barłożek, T., Bunalski, M. 2007. – *Harmonia axyridis* (Pallas, 1773) (Coleoptera: Coccinellidae) new species of ladybird beetle for Polish fauna. *Polish Journal of Entomology* **76**: 177-182.

Roy, H., Migeon, A. 2010. - Ladybeetles (Coccinellidae), Chapter 8.4. In: Roques A. et al. (Eds.), Alien terrestrial arthropods of Europe. *BioRisk* **4** (1): 293–313.

Ruicănescu, A., Alexandru, C. 2009. – Buburuza asiatică, *Harmonia axyridis*, Pallas 1773 (Coleoptera: Coccinellidae) – specie invazivă în România. In: Rákosy, L., Momeu, L. (eds.): Neobiota din România (Presa Universitară Clujeană), Cluj-Napoca, 212 pp.

Schneider, N., Loomans, A. J. M. 2006. – Sur la présence au Luxembourg de la coccinelle arlequin *Harmonia axyridis* (Pallas, 1773) (Insecta, Coleoptera, Coccinellidae). *Bulletin de la Societé des Naturalistes luxembourgeois* **106**: 71-74.

Skolka, M., Preda, C. 2010. – Recent data regarding the Asian ladybug *Harmonia axyridis* Pallas, 1773 (Coleoptera – Coccinellidae) in Romania. In: Murariu, D., Adam, C., Chişamera, G., Iorgu, E., Popa, L. O., Popa, O. P. (eds.): Annual Zoological Congress of "Grigore Antipa" Museum, 17-19 November 2010, Bucharest, Romania, Book of abstracts, 132 pp.

Soares, A. O., Coderre, D., Schanderl, H. 2001. - Fitness of two phenotypes of *Harmonia axyridis* (Coleoptera: Coccinellidae). *European Journal of Entomology* **98**: 287-293.

Soares, A. O., Borges, I., Borges, P. A. V., Labrie, G., Lucas, É. 2008. - *Harmonia axyridis*: What will stop the invader? In: Roy, H. E., Wajnberg, E. (eds.): From Biological Control to Invasion: the Ladybird *Harmonia axyridis* as a Model Species. (Springer), 287 pp.

van Lenteren, J. C., Loomans, A. J. M., Babendreier, D., Bigler, F. 2008. - *Harmonia axyridis*: an environmental risk assessment for Northwest Europe. In: Roy, H. E., Wajnberg, E. (eds.): From Biological Control to Invasion: the Ladybird *Harmonia axyridis* as a Model Species. (Springer), 287 pp.

Ware, R. L., Majerus, M. E. N. 2008. - Intraguild predation of immature stages of British and Japanese coccinellids by the invasive ladybird *Harmonia axyridis*. In: Roy, H. E., Wajnberg, E. (eds.): From Biological Control to Invasion: the Ladybird *Harmonia axyridis* as a Model Species. (Springer), 287 pp.

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Moment aniversar: Csák Kálmán la 85 ani

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S-a născut la 26 februarie 1926, la Tinca, jud. Bihor. Tatăl, de la care şi-a moştenit şi prenumele deţinea o măcelărie la Tinca, iar mama, Medra Etelka era descendenta unei familii înstărite de morari. În afară de Kálmán, în casa părintească, aflată la câteva sute de metri distanţă de localitate, în lunca lată a Crişului Negru, au mai crescut patru copii. Printre arborii de luncă din apropiere se situau moara de apă (180 CP) şi clădirile anexe.

Pentru el, terenul de joacă din copilărie era reprezentat de un spaţiu construit, plin de zgomote, şi de natura aproape neatinsă, fără margini, fiind atras de la început de detaliile acesteia. Azi îşi povesteşte amintirile cu plăcere şi in extenso, fiindcă amnezia, cataracta sau pierderea auzului nu îl pot împiedica. (E interesant că nu prea vorbeşte de amintirile din măcelărie – poate pentru că e vegetarian!). Era preferatul bunicului Medra, care îl lua cu el de mic copil prin munţii din împrejurimi când căuta roci potrivite pentru piatra de moară. Acesta a fost de fapt pentru Kálmán Csák începutul vocaţiei sale.

După ce mama sa îl introduce în lumea literelor şi a scrisului, termină şapte clase primare la şcoala românească. De la sfârşitul anilor ’30, lucrează ca morar la moara bunicului şi îşi petrece timpul liber prin Munţii Apuseni, dar începând de la vârsta de 19 ani devine colecţionar pasionat. Citeşte nopţi întregi – ca un autodidact adevărat – cărţi de geologie în limbile maghiară şi germană, la lumina generatorului de la moară. Cumpără numeroase cărţi din stocul anticariatului din Oradea.

În anii războiului, se ocupă de explorări speologice pe baza hărţilor geologice primite de la Bucureşti. După naţionalizare (1948), moara este devastată şi meseria de morar nu mai putea fi continuată. Astfel, îşi petrece tot mai mult timp pe teren şi, ca o consecinţă, în satul învecinat organizează prima sa expoziţie, la Şcoala generală din Belfir. Prin donaţia acestei colecţii, realizează în anul 1956 în două săli ale fostei şcoli reformate (cam cu 15 ani înainte ca cea din Oradea) Muzeul de Ştiinţele Naturii din Tinca. (În urma reprivatizării, clădirea a fost retrocedată bisericii reformate în care actualmente mai funcţionează Centrul Cultural şi un cabinet parlamentar). Una dintre sălile expoziţiei este dedicată colecţiilor geologice şi paleontologice, iar cealaltă colecţiilor zoologice. Partea mai importantă a colecţiei zoologice constă din naturalizări de păsări şi mamifere şi din preparate umede de peşti, amfibieni şi reptile. În expoziţie sunt incluse aproximativ 30.000 de piese, iar în depozit se mai află încă 50.000 de piese diferite.

În anul 1952 se căsătoreşte cu doamna învăţătoare Bihari (Lazurán) Mária. Are doi copii: Kálmán şi Csaba.

Între anii 1950-1960, Csák Kálmán efectuează o serie de observaţii ornitologice, catalogând dispariţia din zonă a unor specii, cum ar fi: gaia neagră şi cea roşie, nagâţul, corcodelul mare şi cel mic, uliul încălţat şi şerparul, eretele sur, vânturelul de seară, dropia, etc., unele rămânând reprezentate doar prin naturalizările pe care le-a realizat. Tehnicile de taxidermie erau ”culese” din paginile revistei ”Élet és Tudomány”, al cărei abonat era. Mai târziu, tehnicile de preparare au fost dezvoltate la Muzeul „Grigore Antipa”. În anul 1962 vizitează Muzeul Naţional şi Universitatea „Ötvös Lóránd” de la Budapesta, în primul rând ca să achiziţioneze cărţi de specialitate şi ca să studieze colecţiile comparative de moluşte ale lui Strausz László.

În anii ‘70 publică în anuarul „Nymphaea” din Oradea articole ştiinţifice care abordează teme stratigrafice şi de paleontologie (despre miocenul, pliocenul şi pleistocenul din România). Menţine relaţii bune cu cercetători ai domeniului respectiv, cum ar Hamar Márton, Jurcsák Tibor şi Mircea Paucă (cel din urmă, de origine armeană şi cu doctoratul obţinut de la Viena, îl considera fiul lui adoptiv). Mai nou a colaborat, prin furnizare de informaţii, cu zoologul craiovean Aurelian Leonardo Ilie (Ilie 2008).

Vizitează sporadic Ungaria, de pildă în anul 1999 face o vizită la Békéscsaba la vernisajul expoziţiei Pro Natura.

Actualmente cu ce se ocupă şi ce-l frământă pe naturalistul Csák Kálmán: publicarea de cărţi. Tematica e legată de condiţiile ecologice la ciuperci, micogeografie şi micoterapie, fotografiile de teren fiind realizate cu un aparat Canon 300D.

Prin Tinca circulă o vorbă: că localitatea îşi datorează renumele apei termale şi muzeografului Csák Kálmán, care este cetăţean de onoare din anul 2002.

Stimate domnule Csák Kálmán, cu această ocazie deosebită vă dorim mulţi ani fericiţi. „Kedves Kálmán Bácsi! Isten éltessen e jeles születésnapodon." Şi aşteptăm cu nerăbdare apariţia acelei cărţi de micologie…

References

Fábián, J. (2003): - Tenkei magyarok. Editura Literator.Oradea, p. 114─116.

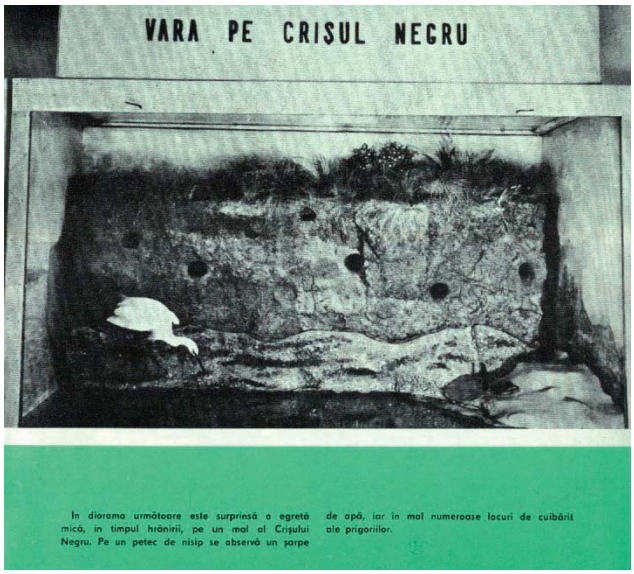
Ilie, A. L. (2008): - Monografie faunistică ─ Păsările din zona Tinca (Judeţul Bihor, România), Editura Sitech. Craiova.

„Aici m-am născut, în anul 1926". (2011)

În faţa muzeului inaugurat în 1956 (2011)

„ Aici sunt sedimentele litorale de la Dealul Burzău...” Sala de geologie (2011).

Afiş al Muzeului din Tinca



Diorama ”Vara pe Crişul Negru”

„Naţionalizarea din 1948 a pecetluit soarta morii de apă de la Tinca.”(2011)