TISCIA monograph series (2002), 6, 39–44

PHYTODIVERSITY OF TRANSYLVANIAN HYDROGRAPHIC BASINS

Constantin Drăgulescu

Abstract

Based on field researches accomplished between 1991 and 1999 but also on all references, the present paper establishes a synthesis on the aquatic and paludal flora from the main rivers' basins from whole Transylvania. The status of species encountered in the red lists and the main natural protected areas are also concerned. Between 23% and 32,8% of the flora is considered endangered in the specified area.

Keywords: Flora, vegetation, wetlands, Red List.

Introduction

This paper offers succint information about the aquatic and paludal flora of the Transylvanian hydrographic basins (Someş, Criş, Mureş and Olt), about the plant species included in the Romanian red list, the main wetlands where they grow and the protected areas of these basins.

The data are the result of field research performed, in the 1991-1999 period, and of bibliography and herbariums consultation. These were published extensively in 1995 (Mureş), 1997 (Criş), 1999 (Someş, Olt). In the mentioned papers, only the species which grow near the ***main rivers course*** (including the sectors belonging to Hungary) were enumerated, but in this paper the numbers render the ***whole basins*** phytodiversity (excluding the sectors belonging to Hungary). The hybrids are not presented in the paper. Concerning the red list of Romanian flora, only extinct (Ex), endangered (E), vulnerable (V) and rare (R) plants were selected (excluding species with an uncertain status of integration in one or another category).

The Someş Basin

Phytodiversity and red list. In the Someş Basin there were identified 2050 species (cormophytes), of which 455 are aquatic and paludal species. The flora is rich in

species as a result of the river's course length, which runs through several different forms of relief with different geological substrates and varied soils, as well as distinct climates. One important factor is also that the Someş River has two components: the Someşul Mic with the springs in the Western Carpathians, and the Someşul Mare that springs from the Eastern Carpathians. 86 plants of these 455 aquatic and paludal species are on the red list. We illustrate this with the following examples: *Achillea impatiens, Achillea ptarmica, Andromeda polifolia, Angelica archangelica, Aster bellidiastrum, Blackstonia perfoliata, Calla palustris, Carex atrofusca, Carex bicolor, Carex loliacea, Cladium mariscus, Cnidium dubium, Cochlearia borzaeana, Comarum palustre, Drosera intermedia, Elatine alsinastrum, Eleocharis quinquefolia, Elisma natans, Empetrum nigrum, Euphorbia carpatica, Glaux maritima, Hippuris vulgaris, Isoetes lacustris, Ledum palustre, Liparis loeselii, Ludwigia palustris, Montia fontana, Najas minor, Narcissus angustifolius, Pedicularis limnogena, Pedicularis sceptrum-carolinum, Potamogeton coloratus, Ranunculus ophioglossifolius, Ranunculus polyphyllus, Rhynchospora alba, Ruppia rostellata, Salix aurita, Salix bicolor, Salix rosmarinifolia, Scheuchzeria palustris, Sparganium minimum, Stellaria palustris, Swertia perennis, Tofieldia calyculata, Trapa natans, Trichophorum alpinum, Utricularia bremii, Valeriana simplicifolia, Veronica scardica, Viola epipsila, Viola uliginosa, Zannichellia palustris.*

Wetlands: in the *Someşul Cald Basin*: Barsa, Calciş, Padiş, Sâvla, Cuciulata, Onceasa, Piatra Grăitoare, Izbuc, Ic, Călineasa, Pietrele Onachii, Între Şimone, Doda, Gura Firii, Tău Negru, Pârâul Cărbunilor, Şilica, Râşca, Ciurtuci; in the *Someşul Rece Basin*: Măguri, Dameş, Muntişoru, Cotul Someşului, Sub Zăpode, Ciunget, Balomireasa, Tăul Zânelor, Mocirle, Tăul Căpăţânii, Blăjoaia; in the *Someşul Mic Basin*: Sălicea, Valea Morii-Feleacu; in *Someşul Mare Basin*: Tinovul Câmpeilor-Ilva Mare, Zagra, Nimigea de Jos, Budacul de Jos, Şintireag, Mogoşeni; in the *United Someş Basin*: Hida, Mireşu Mare, Satulung, Homoroade, Ardusat; in *Lăpuş Basin*: Tău Negru, Recea-Lăpuşel, Groşi; in the *Crasna Basin*: Ecedea (disappeared).

***Protected wet areas*:** Valea Izbucelor, Padiş, Valea Morilor, Lacul Ştiucilor, Sic, Budacul de Jos, Mogoşeni, Zagra, Baia Mare, Rodna National Park, Apuseni National Park.

The Criş Basin

Phytodiversity and red list. The Transylvanian Criş Basin flora is estimated at 1850 species, 361 species being aquatic and paludal plants. The diversity is lower than that of Someş Basin, due to its smaller area and its limited localisation between the Western Carpathians and Pannonic Plain. 60 aquatic and paludal plants are included in the red list. Ex.: *Acorus calamus, Alisma gramineum, Angelica archangelica, Carex lasiocarpa, Elatine alsinastrum, Elatine hexandra, Elatine hungarica, Elatine triandra, Fritillaria meleagris, Gladiolus palustris, Iris sibirica, Lindernia procumbens, Ludwigia palustris, Marilea quadrifolia, Montia montana, Najas minor, Narcissus angustifolius, Nuphar lutea, Nymphaea lotus ssp. thermalis, Pedicularis limnogena, Potamogeton trichoides, Ranunculus circinatus, Rhynchospora alba,*

Sagittaria subulata, Salix aurita, Scheuchzeria palustris, Scirpus radicans, Sparganium minimum Stellaria palustris, Stratiotes aloides, Succisella inflexa, Swertia perennis, Trapa natans, Trollius europaeus, Utricularia australis, Vallisneria spiralis, Veronica catenata, Wolffia arrhiza.

Wetlands: in the *Crişul Repede Basin*: Călăţele, Dâmbul Negru, Tăul Runcului, Negruşul Finciului, Murgaş, Stâna de Vale, Remeţi, Morlaca-Huedin, Peţea-Oradea; in the *Crişul Negru Basin*: Cefa, Rădvani, Martihaz, Mădăraş, Salonta, Avram Iancu, Tulca; in the *Crişul Alb Basin*: Ineu, Bocsig, Beliu, Gurahonţ, Sebiş, Pâncota, Chişinău-Criş, Vărşand.

Protected wet areas: Băltile Gurahonţ, Peţea-Oradea, Apuseni National Park.

The Mureş Basin

Phytodiversity and red list. Due to the fact that the Mureş Basin is the largest hydrographic basin of Transylvania, and the Mureş River has tributaries in all Eastern, Southern and Western Carpathians, the phytodiversity is high. This basin's flora is estimated at 2120 species of which 458 are aquatic and paludal plants, 86 of them being included in the red list. Ex.: *Achillea impatiens, Andromeda polifolia, Angelica archangelica, Angelica palustris, Apium nodiflolium, Apium repens, Barbaraea lepuznica, Betula humilis, Calla palustris, Carex brunescens, Carex chordorrhiza, Carex heleonastes, Carex limosa, Cnidium dubium, Elatine alsinastrum, Epilobium alsinifolium, Epilobium nutans, Evonymus nana, Fritillaria meleagris, Gladiolus palustris, Glaux maritima, Groenlandia densa, Hammarbia paludosa, Hottonia palustris, Lindernia procumbens, Lysimachia thyrsiflora, Marselia quadrifolia, Narcissus angustifolius, Orchis laxiflora, Osmunda regalis, Pedicularis sceptrum-carolinum, Peucedanum rochelianum, Potamogeton alpinus, Potamogeton compressus, Ranunculus polyphyllus, Rhyncospora alba, Salix rosmarinifolia, Saxifraga hirculus, Scirpus radicans, Schoenus ferrugineus, Senecio paluster Spiraea salicifolia, Stellaris longifolia, Succisella inflexa, Taraxacum fontanum, Trichophorum alpinum, Utricularia australis, Utricularia minor, Viola epipsila.*

Wetlands: Voşlobeni, Joseni, Borzont, Remetea, Târgu Mureş, Ideciu, Ocna Mureş, Pecica-Bezdin, Nădlag; in the *Târnava Mare Basin*: Vârşag, Dealu, Şaeş; in the *Târnava Mică Basin*: Praid, Pasul Corundului; in *Arieş Basin*: Ierişoara, Dumitreasa, Izvorul Şoimului, La Potcoavă, Muntele Mare, Mluha-Ponor, Valea Cepilor, Valea Rătăcită-Săgacea; in the *Sebeş Basin*: Tărtărău, Sălane, Oaşa, Prigoana; in the *Strei Basin*: Pui, Nucşoara

Protected wet areas: Voşlobeni, Pădurea Mociar, Pui, Nucşoara, Bezdin, Retezat National Park.

The Olt Basin

Phytodiversity and red list. Although we are referring only to the upper and middle Olt River Basin, due to the fact that only these sectors are located in Transylvania, the

flora is the richest (2130 species) as compared with all the hydrographic basins of Transylvania. This is because the Olt River has tens of tributaries from Eastern and Southern Carpathians and, in the same time is the southest basin of Transylvania. Of all these cormophythes 445 species are aquatic and paludal plants and 77 of them are included in the red list. From this list I am quoting: *Achillea ptarmica, Acorellus pannonicus, Acorus calamus, Angelica palustris, Apium repens, Armeria barcensis, Betula humilis, Betula nana, Calla palustris, Calamagrostis neglecta, Carex contigua, Cladium mariscus, Cnidium dubium, Comarum palustre, Drosera anglica, Drosera intermedia, Elatine hexandra, Eleocharis uniglumis, Euonymus nana, Fritillaria meleagris, Groenlandia densa, Hippuris vulgaris, Hotonia palustris, Iris sibirica, Isolepis setacea, Isolepis supina, Juncus bulbosus, Ligularia sibirica, Lysimachia thyrsiflora, Menyanthes trifoliata, Narcissus angustifolius, Nuphar luteum, Nymphaea alba, Pedicularis sceprum-carolinum, Peucedanum rochelianum, Plantago maxima, Polemonium coeruleum, Primula farinosa, Ranunculus rionii, Rhynchospora alba, Salix aurita, Salix rosmarinifolia, Saxifraga hirculus, Saxifraga mutata, Schoenus ferrugineus, Scheuchzeria palustris, Scirpus radicans, Serratula wolffii, Sesleria uliginosa, Sparganium minimum, Spiraea salicifolia, Stellaria longifolia, Stratiotes aloides, Trapa natans, Trollius europaeus, Typha shuttleworthii, Utricularia bremii, Valeriana simplicifolia, Veronica catenata, Viola epipsila, Zannichellia palustris.*

Wetlands: Mădăraş, Racu, Între Olturi, Miercurea-Ciuc, Jigodin, Borsáros and Lucs-Sâncrăieni, Misentea, Büdös-Sântimbru, Sânsimion, Vrabia, Tuşnadul Nou, Mohoş-Tuşnad, Prejmer, Hărman, Stupini, Sânpetru, Bod, Feldioara, Sântion-Luncă, Arini, Aita Mare, Micloşoara, Apaţa, Ormeniş, Augustin, Comana de Jos, Şinca Nouă, Dumbrava Vadului, Şercăiţa, Todericţa, Bărcul Hurezului, Râuşor, Mândra, Arpaşul de Jos, Avrig, Bradu, Sebeş-Olt, Turnu Roşu.; in the *Râul Negru Basin*: Estelnic, Mereni, Lunga-Ojdula, Bálványos-Turia, Catalina-Ghelinţa, Borşneul Mare-Zagon, Mestecăniş-Reci, Malnaş-Băi; in the *Baraolt-Vârghiş Basin*: Vârghiş, Băile Ozunca, Băile Harghita; in the *Homorod Basin*: Căpâlniţa, Vlăhiţa-Lueta, Ocland; in the *Hârtibaci Basin*: Movile, Coveş, Bârghiş; in the *Cibin Basin*: Sibiu (disappeared), Şuvară-Tălmaciu, Cristian, Mag, Frumoasa, Iujbea Cacovei,

Protected wet areas: Borsaros-Sâncrăieni, Tinovul Lucs, Dumbrava Harghitei-Vlăhiţa, Reci, Hărman, Stupini, Mohoş-Tuşnad, Büdös-Sântimbru, Prejmer, Dumbrava Vadului, Bâlea, Arpăşel, Şuvară-Tălmaciu, Cheile Bicazului-Hăşmaş National Park, Bucegi National Park, Piatra Craiului National Park.

Conclusions

Observing the data included in Tab. 1, we ascertain that in the investigated hydrographic basins, as well as in all Transylvania and Romania, 16,6%-18,9% of the wet ecotops' flora is threatened, while 23,0%-32,8% of the integral flora is endangered.

This means that there are in suffering more xerophylous and mesoxerophylous species than hydro-, hygro- and hygromesophylous plants. Indeed, over 35% of the Romanian steppe and sylvosteppe species are included in the red list. Comparing the

flora of Transylvanian hydrographic basins, the data guide to the conclusion that the richest phytodiversity is in the Olt Basin, followed by the Mureş, Someş and Criş basins, and this phytodiversity is the mostly threatened in the Mureş and Someş Basins. For a more exact estimation also the extent of the basins must be taken into account, because at a certain surface the number of species does not increase proportionally with the analyzed area extension.

Tab. 1. Comparative data concerning each hydrographic basin, Transylvanian and Romanian flora

Basins	*Surfaces in Transylvania*	*Number of species*	*Species in the red list*	*Threat degree of flora*	*Hydro-, hygro- and mezohygrophyle species*	*Species in the red list*	*Threat degree of aquatic and paludal flora*
Someş	15.015 km²	2050	520	25,4%	455	86	18,9%
Criş	14.120 km²	1850	460	24,9%	361	60	16,6%
Mureş	27.830 km²	2120	570	26,9%	458	86	18.8%
Olt	13.340 km²	2130	490	23,0%	445	77	17,3%
Total	70.405 km²	2830	780	27,6%	560	102	18.2%
Romania	237.500 km²	3630	1190	32,8%	680	126	18,6%

References

Drăgulescu, C.,1995, The flora and vegetation of the Mureş (Maros) Valley, The Maros/Mureş River Valley. A study of the geography, hydrobiology and ecology of the river and its environment, Tiscia monograph series, Szolnok-Szeged-Târgu Mureş, 47-111

Drăgulescu, C., Macalik Kunigunda, 1997, The aquatic and paludal flora and vegetation from the Criş/Körös Valleys. The Criş/Körös Rivers' Valleys. A study of the geography, hydrobiology and ecology of the river system and its environment, Tiscia monograph series, Szolnok-Szeged-Târgu Mureş, 47-80

Drăgulescu, C., Macalik, Kunigunda, 1999, The aquatic and paludal flora and vegetation from the River Someş (Szamos) Valleys. A study of the geography, hydrobiology and ecology of the river system and its environment, Tiscia monograph series, Szolnok-Szeged-Târgu Mureş, 77-104

Drăgulescu, C., 1999, The hydrophilous and hygrophilous flora and vegetation from the upper and middle Olt River Valley, Transylvanian Review of Systematical and Ecological Research, Sibiu, 1, The Upper and Middle Olt River Basin, "Lucian Blaga" Univ. Press, 13-30

Oltean, M. and colab., 1994, Lista rosie a plantelor superioare din România, (Red list of higher plants from Romania), Studii, sinteze şi documentaţii de ecologie, I, Acad. Rom.-Inst. Biol.,Bucuresti.

Pop,E., 1960, Mlaştinile de turbă din R.P.Română (Swamps from R.P. Română), Edit. Acad. Bucureşti

Săvulescu, Tr. (red.), Flora R. P. Română and Flora R.S. România, I-XIII, Edit. Acad. Bucuresti, 1952-1976.

Toniuc, N. and colab., 1992, Lista ariilor protejate din România (The list of protected area from Romania), Ocrot. nat. Bucureşti, 36, 1, 23-33

DRĂGULESCU C.
Lucian Blaga University, Sibiu, Romania
31 Oituz St.
2400 Sibiu, RO