THE TAXONOMIC AND AREAL-GEOGRAPHIC DIVERSITY OF THE CORMOPHYTA FLORA FROM THE LATORIŢA HYDROGRAPHIC BASIN (VÂLCEA COUNTY, ROMANIA)

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Abstract. The work presents the results of the analysis of the cormophytic flora from the Latoriţa hydrographic basin. It is to be remarked the richness of species (765) and supraspecific taxa (530), distributed on 3 levels of vegetation (piedmont area, mountain and subalpine), as well as the diversity of the life forms and the floristic elements. This great floristic variety is due to various types of habitats, as historical and specific genetic factors in the Southern Carpathian Mountains of our country. Each of these aspects is presented and discussed in separate sections of this paper. This study is the first of its kind in the above mentioned territory.

Keywords: Latoriţa River, Carpathian Mountains, cormophyta, life forms, floristic elements.

Rezumat. Diversitatea taxonomică şi areal-geografică a florei cormofitice din bazinul hidrografic Latoriţa (judeţul Vâlcea, România). Lucrarea prezintă rezultatele analizelor florei cormofitice din bazinul râului Latoriţa. Se ramarcă bogăţia speciilor (765) şi a taxonilor supraspecifici (530), distribuţia acestora în 3 etaje de vegetaţie (piemontan, montan şi subalpin), diversitatea bioformelor şi a geoelementelor. Această mare diversitate floristică se datorează varietăţii tipurilor de habitate, ca şi factorilor istorici şi genetici specifici Carpaţilor Sudici de pe teritoriul ţării noastre. Fiecare dintre aceste aspecte este prezentat şi discutat în secţiuni distincte ale acestui articol. Subliniem faptul că, acest studiu este primul de acest gen în teritoriul.

Cuvinte cheie: Latoriţa, Munţii Carpaţi, cormofite, bioforme, geoelemente.

INTRODUCTION

From the documents related to the European Strategy for Plant Conservation (2008-2014) it clearly results that the study of biodiversity, in general, and especially of the vegetal world continues to preserve freshness, being of a great actuality with the real development opportunities into a new context, of a large nationally and internationally partnership, between different scientific communities integrated into Planta Europa Network and between the network and the Council of Europe (ANDERSON et al., 2008).

Romania, as a member of the European Community, has the moral duty to contribute, through its own forces, to the achievement of some major objectives of this strategy, namely, knowing and preserving of phytodiversity of local and/or national habitats (SÂRBU, 2001; DONIŢĂ et al., 2005, 2006). Our research came to meet these objectives, the surveyed territory being, previously, only sporadically and partly scoured by the botanists: SĂVULESCU, 1952-1976; ŞTEFUREAC et al., 1957, 1959, 1963; BUIA et al., 1962, 1963; PÓCS, 1961, 1962 and other researchers: BIELZ et al., 1874 (PLOAIE & MOŢOC, 1992), PLOAIE, 1987. Special attention has triggered the land of the three springs - Latoriţa de Jos (Urda), Muntinu and Latoriţa de Vest, which are an integral part of the Parâng Mountains. In the surrounding areas of the territory, botanical surveys were conducted by: ŞTEFUREAC et al. (1957, 1959, 1963), PĂUN & POPESCU (1971), ZAHARIA (1972), POPESCU (1974), ALEXIU (1998), RĂDUŢOIU (2008). So, in the last 5 decades, thorough botanical investigations in the territory of the Latoriţa basin, was practically missed. This state of facts justified the approach of such issues. The studies we carried out between 2006 and 2012 have been materialized so far by publishing six papers (ANGHEL 2010a, 2010b, 2011, 2012; ANGHEL & TOMA, 2011).

Presently, there is a unified opinion among the experts in the field to consider the study of biodiversity as a fundamental theme of biology, which is of major theoretical interest, but, at the same time, it emphasizes real social-economic resonances. It was postulated that only through a deep knowledge of local and global biodiversity we would be able to ensure a sustainable development of the contemporary and forthcoming society and forthcoming (CRISTEA et al., 2004). Given this deep correlation, dynamic and complementary between natural capital and the social-economic system, of all its aspects of the phytodiversity from hydrographic basin Latoriţa has been an important desideratum of our scientific approach; for the achievement of this desideratum, there were targeted four aspects, namely: species richness of supraspecific taxa as they are classified, diversity of biological and ecological form and geographical elements. Each of these issues is presented and discussed in separate sections of this paper.

PHYSICAL AND GEOGRAPHICAL CONSIDERATIONS

The Latoriţa River, tributary of the Lotru River, features a hydrographic basin of 195.40 km^2, bordered in the West by the Parâng Mountains, in the North by the Latoriţa and Lotru Mountains, in the South and East by the Căpăţânii Mountains, and the eastern ridge of the Parâng Mountains. The basin has a total length (as the crow flies) of about 29 km, oriented to the West-East direction. The altitude varies between 520 m, at Gura Latoriţei, and 2,185 m at Galbenu Peak (Fig. 1).

On the whole, the basin relief is highly fragmented due to the development of a rich hydrographic network, which led to a high energy of the relief. The geological substrate is various and includes granites, crystalline and ultrabasic rocks, and limestone (POPESCU, 2003).

The glacial landscape is well represented in the region of to the three sources of the Latoriţa River, where each of these drain in the glacial valley. On the northern slope of the Păpuşa-Micaia ridge there have also formed smaller glacial cirques (Dengheru, Cioara, Bălescu, Galbenu, Igoiu and Pritos). A glacial cirque can also be found on the eastern slope of Fratoşteanu Mare Peak, where it is found the glacial Lake Negru.

The climate and the soils of the researched territory are specific to the Southern Carpathians peaks. In the hydrographic basin Latoriţa there are well defined only two levels of vegetation: mountain (700-1,750 m alt.), which covers almost c. 55%, and subalpine (1,750-2,185 m alt.), which covers the rest of the territory (~ 45%). Within the confluence area between the Latoriţa and the Lotru rivers, there appears a fragmented piedmont area as well (570–700 m). The mountain level has a larger extension on the peaks which exceed the altitude of 2,000 m, namely: Galbenu (2185 m), Cioara (2,146 m), Urda (2,172 m), Nedeia (2,130 m), Negovanu (2,072 m), Muntinu Mic and Muntinu Mare (2,062 m), Bora (2,055 m), Frătoşteanu Mare (2,053 m) and Ştefanu (2,051 m).

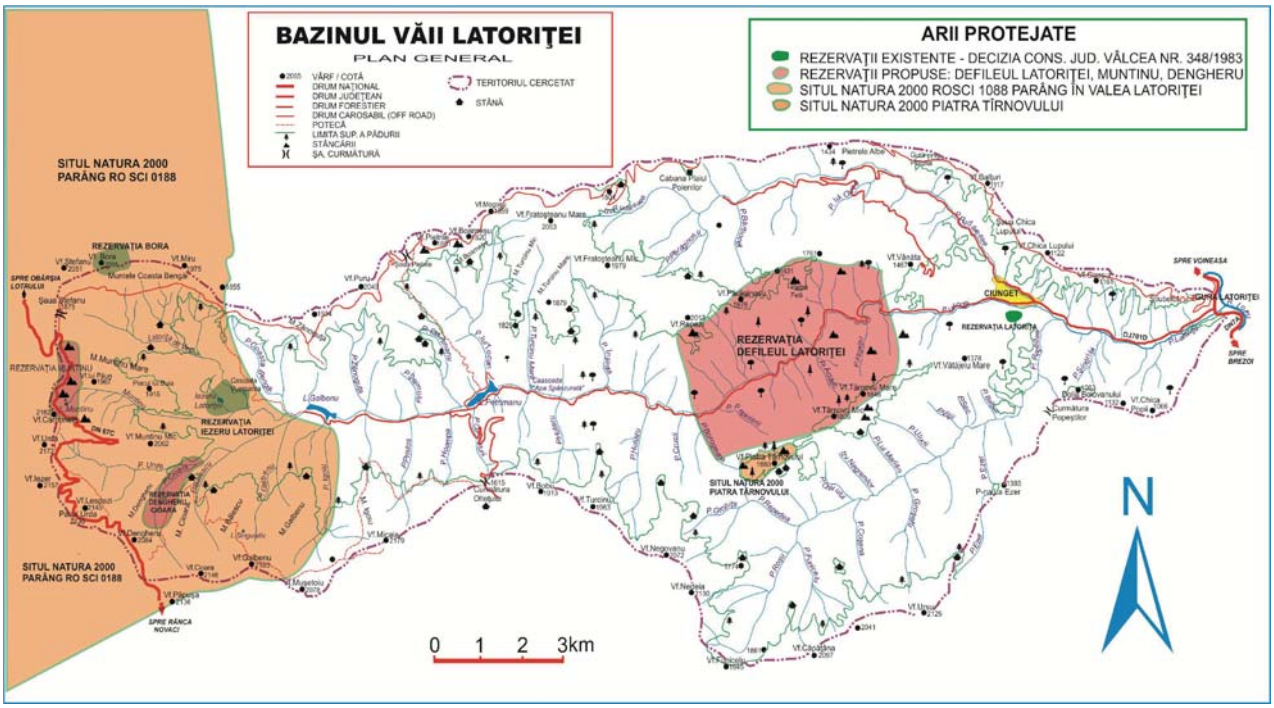

Figure 1. Map of the Latoriţa hydrographic basin, with the location of protected areas (from PLOAIE et al., 2009).

MATERIAL AND METHODS

The research on the taxonomic diversity of the cormophyta from the Latoriţa hydrographic basin was carried out using the methodology promoted by the specialty literature. For floristic diversity interpretation it was made a description of taxa pointing out to the following aspects: current scientific name, synonyms, life form, the main ecological characteristics, the characteristic coenotaxon, the floristic element, the presence and spread in the territory, the habitat, the altitude and the socio-economic importance.

The percentage of the life form and of the floristic element is represented by diagrams; the synthetic table completes the information.

The nomenclature and classification system used - from TUTIN et al., 1964-1980, 1993 and CIOCÂRLAN, 2009.

RESULTS AND DISCUSSIONS

1. The taxonomic analysis

The evaluation of the phytodiversity has been focused on taxonomic richness of the species and their relative abundance and on their distribution from supraspecific taxonomic units. The results of the statistical analysis have revealed a close positive correlation between the species diversity and stability of the system; so this is an indicator of environmental sustainability. The decline in species diversity reflects different degrees of stress the ecosystem is subject to.

The floristic list contains 765 taxa (species and subspecies) which belong to 380 genera, assigned to 90 families, 51 orders, 6 classes and 3 phylums (Pteridophyta, Pinophyta and Magnoliophyta). This great floristic variety is due to the geological substratum and of various types of soil, of the relief energy (1,165 m) and the climatic conditions, historical and specific genetic factors specific to the Southern Carpathians arch of our country.

Naturally, most specific and infraspecific taxa belong to the phylum Magnoliophyta (727) and less to the phylums Pinophyta (10), Pteridophyta, with those 28 taxa occupying an intermediate position. The number of orders and families is related to the species, so: the 727 species and subspecies from the phylum Manoliophyta are assigned in 44 orders (36 orders from Magnoliopsida, and 8 from Liliopsida), respectively 80 families (67 belong to the class Magnoliopsida, and 13 class Liliopsida); the 28 species of phylum the Pteridophyta are distributed in 5 orders, respectively 7 families, and the 10 species of the phylum Pinophyta are assigned in 2 orders, respectively 3 families). 30 of the 51 orders (= 58.8%) are monotypes (only one family), 7 orders (= 13.7%) are represented in the territory by two families, 10 orders (= 18.7%) by 3 families, 2 orders (= 3.5%) by 4 families and a single order (= 1.9 %) by 5 families (Table 1).

Table 1. The conspectus of supraspecific taxa from the basin of Latoriţa the River.

No.	Supraspecific taxa		No. sp.	No.	Supraspecific taxa		No. sp.
	Ph., cl., subcl.	Ord. and fam.			Ph., cl., subcl.	Ord. and fam.	
1	**PTERIDOPHYTA**			3	**MAGNOLIOPHYTA**		
		LYCOPODIALES		3.1	**MAGNOLIOPSIDA**		
		Lycopodiaceae	4			ROSALES	
1.1	**LYCOPODIOPSIDA**	SELAGINELLALES				Crassulaceae	11
		Selaginellaceae	2			Saxifragaceae	11
1.2	**EQUISETOPSIDA**	EQUISETALES				Rosaceae	36
		Equisetaceae	5			Fabaceae	37
1.3	**PTERIDOPSIDA**					MYRTALES	
1.3.1	**OPHIOGLOSSIDAE**	OPHIOGLOSSALES				Lythraceae	1
		Ophioglossaceae	2			Thymelaeaceae	2
		POLYPODIALES				Onagraceae	6
		Pteridiaceae	1			CORNALES	
1.3.2	**POLYPODIIDAE**	Dryopteridaceae	13			Cornaceae	2
		Polypodiaceae	1			SANTALALES	
2	**PINOPHYTA**					Santalaceae	1
2.1	**PINOPSIDA**	PINALES				Loranthaceae	1
		Pinaceae	6	3.1.5	**ROSIDAE**	CELASTRALES	
		Cupressaceae	3			Celastraceae	1
		TAXALES				EUPHORBIALES	
		Taxaceae	1			Euphorbiaceae	4
3	**MAGNOLIOPHYTA**					POLYGALALES	
3.1	**MAGNOLIOPSIDA**					Polygalaceae	2
		ARISTOLOCHIALES				SAPINDALES	
		Aristolochiaceae	2			Aceraceae	2
		RANUNCULALES				GERANIALES	
		Ranunculaceae	28			Oxalidaceae	1
3.1.1	**MAGNOLIIDAE**	PAPAVERALES				Geraniaceae	5
		Papaveraceae	1			Balsaminaceae	1
		Fumariaceae	2			LINALES	
		URTICALES				Linaceae	1
		Ulmaceae	1			APIALES	
		Cannabaceae	1			Araliaceae	1
		Urticaceae	3			Apiaceae	24
		JUGLANDALES				GENTIANALES	
3.1.2	**HAMAMELIDAE**	Juglandaceae	1			Gentianaceae	8
		FAGALES				SOLANALES	
		Fagaceae	2			Solanaceae	7
		Betulaceae	6			Convolvulaceae	1
		CARYOPHYLLALES				Cuscutaceae	1
		Caryophyllaceae	29			Menyanthaceae	1
		Amaranthaceae	1			LAMIALES	
		Chenopodiaceae	3			Verbenaceae	1
3.1.3	**CARYOPHYLLIDAE**	POLYGONALES				Lamiaceae	36
		Polygonaceae	14			Boraginaceae	12
		PLUMBAGINALES		3.1.6	**ASTERIDAE**	PLANTAGINALES	
		Plumbaginaceae	1			Plantaginaceae	5
		THEALES				SCROPHULARIALES	
		Clusiaceae	4			Scrophulariaceae	30
		MALVALES				Lentibulariaceae	1
		Tiliaceae	1			Oleaceae	2
		Malvaceae	4			CAMPANULALES	

3.1.4.	**DILLENIIDAE**	VIOLALES				Campanulaceae	16
		Violaceae	8			RUBIALES	
		Cistaceae	1			Rubiaceae	11
		TAMARICALES				DIPSACALES	
		Tamaricaceae	1			Caprifoliaceae	7
		SALICALES				Valerianaceae	6
		Salicaceae	8			Dipsacaceae	9
		CAPPARALES				Adoxaceae	1
		Brassicaceae	37			Asteraceae	100
		ERICALES		3.2	**LILIOPSIDA**		
		Ericaceae	7	3.2.1	**ALISMATIDAE**	ALISMATALES	
		Empetraceae	1			Alismataceae	1
		Pyrolaceae	4	3.2.2.	**ARECIDAE**	ARALES	
		Monotropaceae	1			Araceae	1
		PRIMULALES		3.2.3.	**COMMELINIDAE**	JUNCALES	
		Primulaceae	10			Juncaceae	15
						CYPERALES	
						Cyperaceae	23
						Poaceae	59
						TYPHALES	
						Typhaceae	1
				3.2.4.	**LILIIDAE**	ASPARAGALES	
						Trilliaceae	1
						Alliaceae	4
						Amaryllidaceae	2
						LILIALES	
						Liliaceae	15
						Iridaceae	2
						Dioscoreaceae	1
						ORCHIDALES	
						Orchidaceae	15

The families displaying the highest number of species are: Asteraceae (100 species), Poaceae (59 species), Brassicaceae (37 species), Fabaceae (37 species), Rosaceae (36 species), Lamiaceae (36 species), Scrophulariaceae (30 species), Cariophyllaceae (29 species), Ranunculaceae (28 species) (Table 1), and the genera with the most specific and infraspecific taxa are: *Carex* (18 species), *Campanula* (13 species), *Veronica* (12 species), *Ranunculus* (10 species), *Juncus*, *Trifolium*, *Saxifraga* (9 species each), *Viola*, *Poa*, *Sedum* (8 species each), *Polygonum*, *Hieracium*, *Salix*, *Potentilla*, *Galium*, *Senecio*, *Rumex*, *Festuca* (7 species each), *Luzula*, *Vicia* (6 species each), *Equisetum*, *Asplenium*, *Geranium*, *Gentiana*, *Plantago* and *Inula* (5 species each).

Of particular interest are the endemic, rare, and especially, the ones protected species, among which we mention: *Pinus cembra* L., *Taxus baccata* L., *Trolius europaeus* L., *Daphne blagayana* FREYER, *Gentiana lutea* L., *Leontopodium alpinum* CASS.

2. The spectrum of the life forms

The diversity of cormophyta from the Latoriţa hydrographic basin is also illustrated by the palette of 8 types of life forms in which they are assigned: hemicryptophytes (H), chamaephytes (Ch), terophytes (T), geophytes (G), phanerophytes (Ph), epiphytes (Ep), hemi-terophytes (HT) and hydro-helophytes (HH) (Table 2; Fig. 2).

The hemicryptophytes are the main components of the herbaceous layer in forests, grasslands and rocky vegetation; their dominance (54.38%) illustrates a moderate climate. These are followed by geophytes (12.29%) which reveal a short vegetation period, specific to sub-alpine level. The terophytes (11.50%) indicate a certain degree of aridity of the researched territory and anthropogenic effects on flora and vegetation. The share of the phanerophytes taxa is small they made a remarkable presence in the Latoritei forests by the large specimens number, the species abundance and dominance in the vegetal carpet, and by biomass. Chamaephytes hold a relatively low percentage (5.75%) and they mainly develop at altitudes exceeding 1,800 m. The low participation of hydro-helophytes (0.39%) indicates the lack of well-structured aquatic phytocenoses in the territory.

Overall, the life forms spectrum of cormophyta from the Latoriţa hydrographic basin greatly coincides with that reported in the specialty literature related to the flora of different sectors of the Southern Carpathians (POPESCU, 1974; RĂDOI, 1975; DRĂGULESCU, 1995; CRISTEA et al., 2004; CIOCÂRLAN, 2009; CIOCÂRLAN et al., 2004; RĂDUŢOIU, 2008; DIHORU & NEGREAN, 2009) suggesting that the geomorphologic and pedo-climatic features of the investigated area are circumscribed to the limits of their variability within the southern sector of the Romanian Carpathian chain.

3. The spectrum of floristic elements

The analysis of the floristic elements revealed the presence of 62 categories with different florogenetic origins in the vegetation structure from the Latoriţa basin. The large number of floristic elements, as well as the different percentage of participation for each one, can be explained by the areal-geographic interference of the investigated area.

The categories of floristic elements which include a large number of species proved to be the Eurasian (33.59%), Circumpolar (14.77%), European (12.42%) and European-Central (11.11%), and at the opposite pole there are the Arctic, Dacian and Romanian-Yugoslav, each with a rate of 0.13% (Table 3; Fig. 3).

Table 2. The types of life forms which are assigned to cormophyta species, their numerical and percentage share.

No.	Life form	No. taxa	Percentage	No.	Life form	No. taxa	Percentage
1	H	391		4	Ph.	64	
	H (Ch)	9			Ph (Ch)	4	
	H (HH)	7			**Total Ph**	**68**	**8.89**
	H (G)	6		5	HT	33	
	HG	1			HT- H	11	
	H (HT)	2			**Total HT**	**44**	**5.75**
	Total H.	**416**	**54.38**	6	Ch	48	
2	T	63			Ch (Ph)	2	
	T-HT	17			Ch (H)	1	
	T-H	6			**Total Ch**	**51**	**6.67**
	T, HT, H	2		7	HH	3	
	Total T	**88**	**11.50**		**Total HH**	**3**	**0.39**
3	G	91		8	Ep	1	
	G (HH)	2			**Total Ep**	**1**	**0.13**
	G (H)	1					
	Total G	**94**	**12.29**				

Table 3. The spectrum of floristic elements, the numerical and their percentage share.

No.	The general spread	No. taxa	Percentage	No.	The general spread	No. taxa	Percentage
1	Euras.	199		6	Cosm.	44	
	Euras. Cont.	18			**Total Cosm**.	**44**	**6.93**
	Euras. Submedit.	12		7	Carp. Balc.	34	
	Euras. Arct. Alp. Eur.	9			Carp. Rom.	3	
	Euras. Medit.	2			Carp. Balc. Anat.	2	
	Euras. Mont.	4			Carp. Balc. Cauc.	1	
	Euras. Arct. Alp.	4			Carp. Balc. Cauc. Anat.	2	
	Euras. Bor.	3			Carp. Balc. Pan.	1	
	Euras. Alp.	3			Carp. Balc. Sudet.	1	
	Euras. de S.	2			Carp. Balc. Alt.	1	
	Euras. Cosm.	1			Carp. Jug. Centr.	1	
	Total Euras.	**257**	**33.59**		End. Carp.	18	
2	Eur. Centr.	45			**Total Carp**.	**64**	**8.37**
	Centr. Eur. Medit.	6		8	Medit.	7	
	Centr. Eur. Submedit.	6			Submedit.	6	
	Centr. Eur. Mont.	20			Submedit. Medit.	1	
	Centr. Eur. Atl. Medit.	1			**Total Medit**.	**14**	**1.83**
	Centr. Eur. Balc.	1		9	Adv.	3	
	Centr. Eur. Balc. Cauc.	1			Am. de N.	7	
	Centr. Eur. Medit. Mont.	1			**Total Adv**.	**10**	**1.31**
	Centr. Eur. Submedit. Mont.	2		10	Alp. Eur.	29	
	Centr. Eur. Subatl. Submedit.	1			Alp. Carp.	10	
	Eur. Centr. Atl.	1			Alp. Carp. Balc.	12	
	Total Eur. **Centr**.	**85**	**11.11**		Alp.	1	
3	Eur	84			Alp.Euras. Arct.	1	
	Eur. Mont.	7			**Total Alp**.	**53**	**6.93**
	Eur. Cont.	3		11	Balc.	3	
	Eur. Submedit.	1			**Total Balc**.	**3**	**0.39**
	Total Eur.	**95**	**12.42**	12	Atl. Medit.	4	
4	Circ.	86			Atl. Centr. Eur. Medit.	3	
	Circ. Arct. Alp.	19			**Total Atl**.	**7**	**0.92**
	Circ. Arct. Alp. Euram.	5		13	Dac.	1	
	Circ. Alp.	1			**Total Dacic**.	**1**	**0.13**
	Circ. Bor.	2		14	Rom. Jug.	1	
	Total Circ.	**113**	**14.77**		**Total Rom**. **Jug**.	**1**	**0.13**
5	Pont. Medit.	8		15	Arct. Alp.	1	
	Pont. Pan. Balc.	4			**Total Arct**.	**1**	**0.13**
	Pont.	4					
	Pont. Pan.	1					
	Total Pont.	**17**	**2.22**				

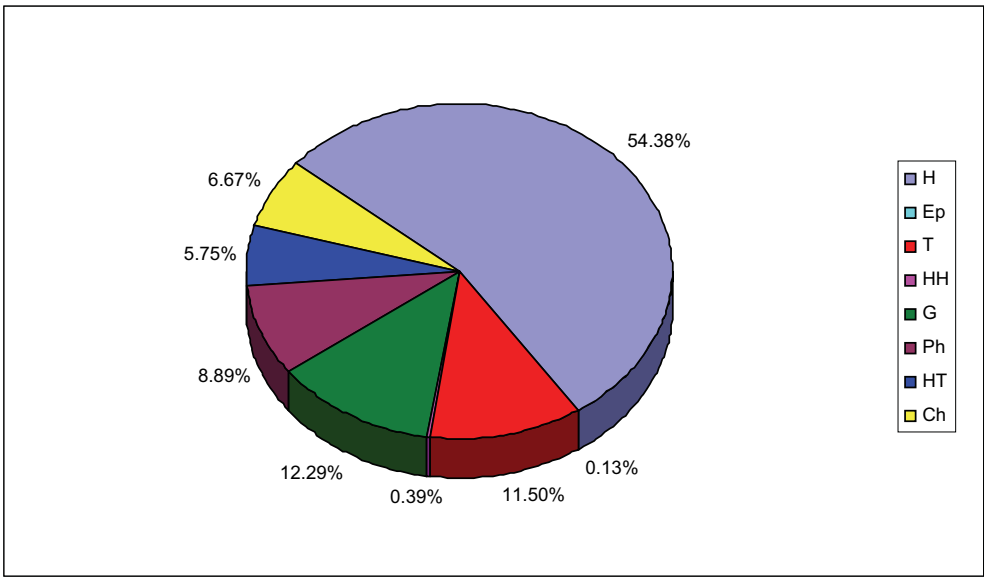

Figure 2. The life forms spectrum of cormophyta and their percentage share.

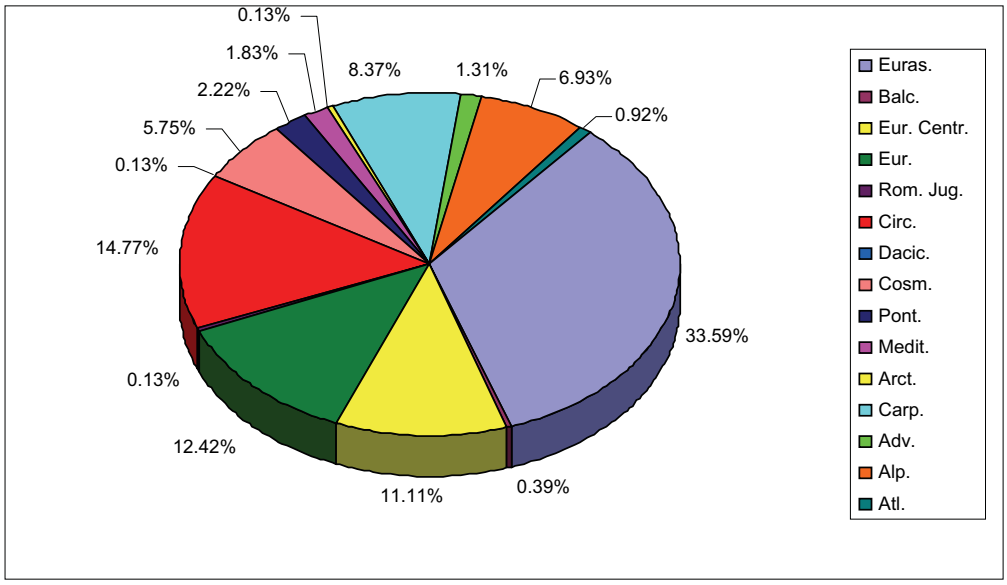

Figure 3. The spectrum of the floristic elements and their percentage share.

The large share of Eurasian, European and Central-European elements reveals the affiliation of the Latoriţa hydrographic basin flora at the Central-European region, and the high percentage of the Circumpolar elements emphasizes the mountain character of the vegetation (MIHĂILESCU, 2001).

The areal-geographical analysis revealed that, a considerable number of species, with the statute of endemic Carpathians species or with preponderant area in the Carpathian chain, recorded by the OLTEAN et al. (1994) and DIHORU & NEGREAN (2009) have been reported in the territory of the Latoriţa hydrographic basin, namely: *Ranunculus carpaticus* HERBICH., *Dianthus tenuifolius* SCHUR, *D. henteri* HEUFFEL, *Silene nutans* L. subsp. *dubia* (HERBICH) ZAPAL., *Dentaria glandulosa* WALDST. & KIT., *Thlaspi dacicum* HEUFFEL, *Genista tinctoria* L. subsp. *oligosperma* (ANDRAE) BORZA, *Athamanta turbith* (L.) BROT. subsp. *hungarica* (BORBÁS) TUTIN, *Heracleum palmatum* BAUMG., *Thymus comosus* HEUFFEL ex GRISEB., *T. pulcherrimus* SCHUR, *Campanula serrata* (KIT.) HENDRICH, *Festuca nitida* KIT.

CONCLUSIONS

The study of biodiversity, in general, and of the vegetal kingdom, in particular, conserves its freshness and is of great interest, with real perspectives of development in a new context, the broad partnership between various national and international scientific communities integrated into the Planta Europa Network and between the network and the Council of Europe.

The result of statistical analysis of the recorded data of taxonomic-chorological-ecological research reveals the remarkable diversity of the flora in the area, which demonstrates the existence of a wide variety of habitats and their relatively good preservation in the territory.

Taxonomic diversity is expressed by the presence in the territory of a considerable number of taxa (species and subspecies (765), many of which are floristic rarities, seculars trees and natural monuments [*Leontopodium alpinum* CASS., *Hedysarum hedysaroides* (L.) SCHINZ & THELL., *Potentilla haynaldiana* JANKA, *Pinus cembra* L., *Taxus baccata* L., *Larix decidua* subsp. *carpathica* (DOMIN) ŠIMAN, *Trollius europaeus* L., *Angelica archangelica* L., *Athamanta turbith* (L.) BROT. subsp. *hungarica* (BORBÁS)] for which multiplying and preserving is required.

The spectrum of life forms includes 8 types, dominated by hemicriptophytes, geophytes, terophytes and phanerophytes, while as floristic elements, there predominate the Eurasian, Circumpolar, European and Central-European floristic element.

REFERENCES

ALEXIU V. 1998. *Rezervaţii şi monumente ale naturii din judeţul Argeş*. Edit. Cultura. Piteşti. 80 pp.

ANDERSON S., RADFORD E., CHESTER V. 2008. *A sustainable future for Europe - The European Strategy for plant Conservation 2008-2014*. Acta Horti Botanici Bucurestiensis. **35**: 5-12.

ANGHEL ELENA DACIANA. 2010a. *Contribuţii la cunoaşterea diversităţii taxonomice a cormofitelor din regiunea celor trei izvoare ale Latoriţei*. Analele Grădinii Botanice Universitare „Pavel Covaci", Macea. Universitatea de Vest „Vasile Goldiş". Arad. **4**: 78-101.

ANGHEL ELENA DACIANA. 2010b. *Consideraţii privind protecţia fitodiversităţii din arcul carpatin românesc - Pământul*, *Miracolul vieţii*. Edit. April 22. Râmnicu Vâlcea. 80 pp.

ANGHEL ELENA DACIANA. 2011. *Contribuţii la cunoaşterea vegetaţiei arboricole şi arbustive din etajele piemontan şi montan din bazinul hidrografic Latoriţa (judeţul Vâlcea).* Analele Grădinii Botanice Universitare „Pavel Covaci" Macea. „Vasile Goldiş" University Press. Arad. **5**: 20-52.

ANGHEL ELENA DACIANA. 2012. *Contributions to knowledge of cormophytic vegetation from the subalpine level of Latoriţa hydrografic basin* (*Vâlcea Country*, *Romania*). Acta Horti Botanici Bucurestiensis. **39**: 53-68.

ANGHEL ELENA DACIANA & TOMA N. 2011. *Contribuţii la cunoaşterea vegetaţiei erbaceae din etajele piemontan şi montan al bazinului hidrografic Latoriţa* (*judeţul Vâlcea*). Analele Grădinii Botanice Universitare „Pavel Covaci" Macea. „Vasile Goldiş" University Press. Arad. **5**: 91-121.

BUIA A. & PĂUN M. 1962. *Consideraţiuni asupra florei şi vegetaţiei*. In: ANONYMUS, Pajiştile din Masivul Parâng şi îmbunătăţirea lor. Buletin Ştiinţific. Supliment. Institutul Agronomic Craiova: 587 pp. + 1 p. (erata).

BUIA A., PĂUN M., MALOŞ C., OLARU MARIANA 1963. *Materiale pentru flora masivului Parîng.* (*Matériaux pour la flore du massif Parîng*). Lucrări Grădina Botanică. Bucureşti. 1961-1962. **4**(1): 267-296.

CIOCÂRLAN V., BERCA M., CHIRIŢĂ C., COSTE I., POPESCU G. 2004. *Flora segetală a României*. Edit. Ceres. Bucureşti. 365 pp.

CIOCÂRLAN V. 2009. *Flora ilustrată a României*. *Pteridophyta et Spermatophyta*. Ediţia a treia. Edit. Ceres. Bucureşti. 1138 pp.

CRISTEA V., GAFTA D., PEDROTI F. 2004. *Fitocenologie*. Edit. Presa Universitară Clujeană. Cluj-Napoca. 394 pp.

DIHORU G. & NEGREAN G. 2009. *Cartea Roşie a plantelor vasculare din România.* Edit. Academiei Române. Bucureşti. 630 pp.

DONIŢĂ N., POPESCU A., PAUCĂ-CONSTANTINESCU MIHAELA, MIHĂILESCU SIMONA, BIRIŞ I. A. 2005. *Habitatele din România*. Edit. Tehnică Silvică. Bucureşti. 496 pp.

DONIŢĂ N., POPESCU A., PAUCĂ-CONSTANTINESCU MIHAELA, MIHĂILESCU SIMONA, BIRIŞ I. A. 2006. *Habitatele din România*. *Modificări conform amendamentelor propuse de România şi Bulgaria la Directiva habitate* (92/43/EEC). Edit. Tehnică Silvică. Bucureşti. 95 pp.

DRĂGULESCU C. 1995. *Bioformele vegetale indicatoare ale gradului de ariditate*. Studii şi Cercetări. Naturalia-Piteşti. **1**: 85-90.

MCNEILL J., BARRIE F. R., BUUCK W. R., DEMOULIN V., GREUTER W., HAWKSWORTH D. J., HERENDEEN P. S., KNAPP S., MARHOLD K., PRADO J., PRUD'HOMME VAN REINE W. F., SMITH G. F., WIERSEMA J. H., TURLAND N. J. 2012. *International Code of Nomenclature for algae*, *fungi*, *and plants.* (Melbourne Code): adopted by the Eighteenth International Botanical Congress Melbourne, Australia, July 2011. A.R.G. Gantner Verlag KG. ISBN 978-3-87429-425-6. (electronic ed.), Bratislava: International Association for Plant Taxonomy. Regnum Vegetabile. 154. (Accesed: December 20, 2012).

MIHĂILESCU SIMONA. 2001. *Flora şi vegetaţia Masivului Piatra Craiului*. Edit. Vergiliu. Bucureşti: 400 pp.

OLTEAN M.. NEGREAN G., POPESCU A., ROMAN N., DIHORU G., SANDA V., MIHĂILESCU SIMONA. 1994. *Lista roşie a plantelor superioare din România*. Institutul de Biologie - Studii, Sinteze documente de ecologie. Bucureşti. **1**: 1-52.

PĂUN M. & POPESCU G. 1971. *Flora superioară din cursul superior al Văii Olteţului*. Comunicări Botanice. Bucureşti. **12**: 163-172.

PLOAIE G. 1987. *Munţii Latoriţei*. Bucureşti: Edit. Sport-Turism. 112 pp.

PLOAIE G. & MOŢOC D. 1992. *Piatra Târnovului*, *un minunat monument al naturii*. Ecologia şi Protecţia Mediului. **9**: 125-126.

PLOAIE G., PLOAIE G. jr., IONESCU A. E. 2009. *Munţii Latoriţei*. *Economie şi ecoturism*. Edit. Almarom. 149 pp.

PÓCS T. 1961. *Flore du Massif du Parîng (Carpathes méridionaux en Roumanie)*. I. Fragmenta Botanica Musei Historico-Naturalis Hungarici. **1**(1-4): 49-128.

PÓCS T. 1962. *Flore du Massif du Parîng* (*Carpathes méridionaux en Roumanie*). II. Fragmenta Botanica Musei Historico-Naturalis Hungarici. **2**(1-4): 73-130.

POPESCU G. 1974. *Studiul floristic şi geobotanic al Bazinului Bistriţei Vâlcii*. Teză de doctorat. Facultatea de Biologie, Bucureşti: 303 pp.

POPESCU N. 2003. *Judeţul Vâlcea. Harta geografică - unităţi, tipuri şi forme de relief*. Edit. Offsetcolor. Râmnicu Vâlcea: 250 pp.

RĂDOI T. 1975. *Contribuţii privind flora bazinului Olăneşti*. Studii şi Cercetări. Ocrotirea Monumentelor Naturii. Drobeta Turnu Severin: 141-149.

RĂDUŢOIU D. 2008. *Flora şi vegetaţia bazinului Cernei de Olteţ*. Sitech Publishing House. Craiova: 407 pp.

SĂVULESCU T. (Ed.). 1952-1976. *Flora României*. Bucureşti. Edit. Academiei Române. **1**-**13** (**1**. 660 pp.; **2**. 702 pp.; **3**. 662 pp.; **4**. 958 pp.; **5**. 676 pp.; **6**. 676 pp.; **7**. 661 pp.; **8**. 706 pp.; **9**. 1000 pp.; **10**. 751 pp.; **11**. 876 pp.; **12**. 810 pp.; **13**. 301 pp.).

SÂRBU A. (Coord.). 2001. *Diversitatea plantelor în contextul strategiei europene de conservare a biodiversităţii*. Edit. Alo. Bucureşti. 320 pp.

ŞTEFUREAC T., POPESCU A., LUNGU L. 1957. *Aspecte din asociaţia cu Buxbaumia aphylla L. în formaţiunile de molid* (*Picea excelsa*) *din Munţii Lotru-Parâng* (*Carpaţii Meridionali*). Buletin Ştiinţific, Seria Botanică. **9**(1): 61-73.

ŞTEFUREAC T., LUNGU LUCIA, POPESCU ASPASIA. 1959. *Specii de Sphagnum din cîteva sfagnete de pe valea Lotrului*. Comunic. Acad. Române. **9**(1): 39-44.

ŞTEFUREAC T., LUNGU LUCIA, ŢECULESCU V., POPESCU ASPASIA. 1963. *Specii de Carex şi Salix din Sfagnetele de pe Valea Lotrului cu unele consideraţii geobotanice*. Analele Universităţii Bucureşti. Seria Ştiinţele Naturii. Biologie. anul XI, 1962. **33**: 81-95.

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*. Cambridge: Cambridge University Press. **1**-**5**. (**1**. 464 pp; **2**. 455 pp.; **3**. 370 pp.; **4**. 505 pp.; **5**. 452 pp.).

TUTIN T. G., BURGES N. A., CHATER A. O., EDMONDSON J. R., HEYWOOD V. H., MOORE D. M., VALENTINE D. H., WALTERS S. M., WEBB D. A. (Eds.). 1993 reprinted 1996. *Flora Europaea*. *Psilotaceae to Platanaceae.* Cambridge: Cambridge University Press. **1**. 581 pp.

ZAHARIA C. I. 1972. *Flora şi vegetaţia bazinului Gilort de la limita superioară a pădurii până la confluenţa cu Jiul*. Teză de doctorat. Universitatea din Bucureşti. Romania. 238 pp.

***. *Geografia României*. 1987. Editura Academiei R. S. R. Bucureşti. **3**. 655 pp.

***. *European Strategy for Plant Conservation* (2008-2014): A Sustainable Future for Europe Report prepared by the Planta Europa Network and the Directorate of Culture and Cultural and Natural Heritage. Strasbourg, 16 September 2008: http://bip.gdos.gov.pl/doc/2010/zampub/29-gdos-2010_plant_conservation-48s.PDF (Accessed: January 4, 2013).

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