CONTRIBUTIONS REGARDING THE STUDY OF THE *RUMICION ALPINII* RÜBEL 1933 ALLIANCE IN THE LOTRU MOUNTAINS

CONTRIBUȚII PRIVIND STUDIUL CLASEI ALIANȚEI *RUMICION ALPINII* RÜBEL 1933 ÎN MUNȚII LOTRULUI

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Abstract: *The territory under research is located in the Lotru Mountains, part of the Meridional Carpathians. Lotru Mountains are dominated by the platform between Şteflesti Peak (2212m), and Cristeşti Peak (2233m). This platform spreads a branch to the south-western part, and is made up by Piatra Albă height (2179m) – Preajba - Tâmpa (1190m). The height descends to Lotrului Valley, and this is it when it curves to the east (Obârşia Lotrului). The biggest drainage tank of these mountains, with an important flow and energy is Lotrului tank. Its springs flow from Parângul Mare Mountains, from a glacial river. In the beginning, it flows from south to the north, and then suddenly turns to the right, in the pace called Obârşia Lotrului. In this paper, we present 3 plant associations, within* ***Rumicion alpinii*** Rubel 1933 *alliance because the human impact in this type of habitat are very increased and their generally conservation value is important:* ***Rumicetum alpini*** Szaf., Kulcz. et Pawl. 1923, 1927, ***Rumici obtusifolii - Urticetum dioicae*** Kornaš 1968 (Syn. *Urtica dioica - Rumex obtusifolius* Anghel et al. 1965) and ***Veratretum albi*** Puşc. et al.1956.

Rezumat: *Teritoriul cercetat aparţine M-ţilor Lotrului, situaţi în partea centrală a Carpaţilor Meridionali. Munţii Lotrului sunt dominaţi de platforma dintre Vf. Şteflesti (2212 m) si Vf. Cristeşti (2233 m). Această platformă trimite o ramură spre sud-vest, formată din culmea Piatra Albă (2 179 m) - Preajba - Tâmpa (1190 m). Din culmea principală a M-ţilor Lotru, cuprinsă între Obârşia Lotrului şi platforma Ştefleşti - Cristeşti, coboară spre nord-vest, în valea Frumoasei, Muntele Larg, Prejba, Tura, Turişoara. Cel mai mare bazin hidrografic al acestor munţi, cu un debit de apă foarte mare îl constituie bazinul Lotrului. Izvoarele Lotrului le găsim în Muntele Parângul Mare, dintr-un lac de origine glaciară.*
În urma cercetărilor geobotanice efectuate între anii 1997-2007, în M-ţii Lotrului au fost identificate un număr de 3 de asociaţii vegetale ce aparţin alianţei ***Rumicion alpinii*** Rubel 1933: ***Rumicetum alpini*** Szaf., Kulcz. et Pawl. 1923, 1927, ***Rumici obtusifolii - Urticetum dioicae*** Kornaš 1968 (Syn. *Urtica dioica - Rumex obtusifolius* Anghel et al. 1965) *and* ***Veratretum albi*** Puşc. et al.1956.

Key words: *phtosociological relevées, plant association, alliance, ecology, chorology, floristic composition, Lotru Mountains*
Cuvinte cheie*: releveu fitosociologic, asociaţie vegetală, alianţă, ecologie, corologie, fizionomia şi compoziţia floristică, Munţii Lotrului*

INTRODUCTION

Starting from our wish to contribute to the study of the flora and the vegetation in the region of Oltenia, and also to the prevention of its reduction because of irrational exploitation, we began, in 2005, the botanical research in the Lotru Mountains. These Lotru Mountains are characterized by a complex petrographic structure. The flora and fauna in this region of the Carpathians are very rich and interesting. The diversity of the species of plants and animals, some of them being rare and endemic, involves the necessity of their protection and reduction of the anthropic factors which represent a real danger to the ecosystem integrity and of the biodiversity preservation.

We consider that studying and knowing the flora and the vegetation of this area, whose vegetal carpet undergoes profound transformations caused by some anthropo-zoogenic factors, meet a present necessity.

The present paper aims at presenting the plant associations of the ***Rumicion alpinii*** Rübel 1933 alliance, met in the Lotru Mountains. In the territory under research, there were identified 3 vegetal associations as being part of this alliance: ***Rumicetum alpini*** Szaf., Kulcz. et Pawl. 1923, 1927, ***Rumici obtusifolii - Urticetum dioicae*** Kornaš 1968 (Syn. *Urtica dioica - Rumex obtusifolius* Anghel et al. 1965) and ***Veratretum albi*** Puşc. et al.1956.

We have presented, for each described association: chorology, ecology, physiognomy, floristic composition, as well as its economic importance.

MATERIALS AND METHODS

The research in the field was done between 2000 - 2005, in all seasons and on planned itineraries. The studies on the field involved a good bibliographic documentation regarding the physical-geographical frame: the relief, the geology-lithology, the types of rocks, the hydrographic network, the soils and the general and local climate. The main materials which were necessary for the recognition were the topographic, geologic, and the soil types maps. On the topographic map the followed itinerary was marked. For the study or the vegetal carpet we have used methods of phyto-sociologic research characteristic to the Central European phyto-sociologic School, which was based on the principles and methods elaborated by J. Braun-Blanquet (1926). We gave a special attention to the calculation of the quantitative index *Bray-Curtis* and to performing the dendrograms, by using the Group-Average method (UPGMA) in the program SYN-TAX 2000.

RESULTS AND DISSCUSSION

The present paper aims presenting 3 plant associations of the ***Rumicion alpinii*** Rübel alliance, met in the Lotrului Mountains.

For each vegetal association we have presented: the chorology, ecology, physiognomy and the floristic composition as well as its importance.

1. Ass. *Rumicetum alpini* Szaf., Kulcz. et Pawl. 1923, 1927 (Table 1)

Chorology. This plant communities is largely spread in the Lotru Mountains and can be seen in: Balindru Mare Mountain, Steaja Mountain, Goaţele Mountain, Goaţa de Jos, Săracinul Valley, Haneşu Valley, Balindru Valley, Groapei Mountain, Poiana Arsă Peak, Coasta Mioarelor Mountain, Tâmpa Valley, Stânii Valley, Voineşiţa Valley, Poiana Dobrunului, Bradului Sheepfold, Muntenilor Valley, Păscoaia Valley, Priboioasa Valley, at altitudes between 1200 and 1700 m.

Physiognomy and flower structure. There are frequent phytocoenoses in the area. Within the flower structure of these phytocenoses, there are 26 species. The floristic composition, apart from *Rumex alpinus*, also includes species like the following: *Deschampsia caespitosa*, *Trifolium repens*, *Urtica dioica*, *Poa supina*, *Phleum alpinum*, *Festuca nigrescens*, *Agrostis capillaris*, *Festuca pratensis*. Această asociaţie poate evolua spre pajişti de *Poa supina* şi *Festuca nigrescens*.

Importance. This association is not an important one, because the noxious character that it has.

2. Ass. *Rumici obtusifolii - Urticetum diocae* Kornãs 1968

(Syn. *Urtica dioica - Rumex obtusifolius* Anghel et al. 1965) (Table 2)

Chorology. The phytocoenoses of this association vegetate along valleys, near forest ranges, sheepfolds, huts, on fertile areas. In the survey area, this nitrophile association can be seen at Mânâileasa Valley, Lotru Valley, La Ţarcu, Obârşia Lotrului, Mânâileasa Mountain, Rea Valley, Chica lui Haneş, Pietrii Valley, Voineşiţa Valley, Cireşul Valley, Brădişor, Valley Furnica Mountain, Goaţele Valley, Măceşului Valley, at altitudes between 800 and 1350 m.

Table 1

Ass. *Rumicetum alpini* Szaf., Kulcz. et Pawl. 1923, 1927

No. of relevée	1	2	3	4	5	6	7	8	9	10
Altitude m.o.s. (x 10 m)	120	120	120	125	130	140	145	155	160	170
Exposure	SE	S	SE	SE	SV	E	S	SE	V	SV
Inclination (in grades)	5	5	5	10	2	7	5	5	5	10
Coverage (%)	95	90	100	95	100	100	90	90	95	90
Area (m^2)	100	50	50	100	50	100	100	50	50	50
Char. ass.										
Rumex alpinus	4	4	5	5	4	4	4	4	4	4-5
Rumicion alpini										
Senecio subalpinus	+	+	-	+	+	+	-	+	+	+
Veratrum album	+	+	+	-	+	-	+	+		-
Poa supina	+	+	-	+	1	+	+	+	+	+
Senecio squalidus	-	+	-	-	+	+	-	+	-	-
Chenopodietalia										
Plantago major	+	+	+	-	-	-	+	+	-	-
Stellaria media	1-2	+	-	+	1	1	1	+	+	+
Artemisietea										
Urtica dioica	+	1-2	+	+	1-2	1	+-1	1-2	2	+
Adenostyletalia s.l.										
Senecio germanicus	+	+	-	+	-	+	-	+	+	+
Aconitum firmum	+	+	-	-	+	+	1	+	-	-
Stellaria nemorum	1	+	+	-	+	+	+	+	-	+
Betulo-Adenostyletea										
Myosotis sylvatica	-	+	-	-	-	+	-	-	+	-
Molinio-Arrenatheretea										
Ranunculus repens	1	1	+	+	+	1	+	+	+	+
Poa pratensis	-	+	-	+	-	+	+	-	1	1
Trifolium pratense	+	+	+	-	+	+	+	+	+	-
Festuca pratensis	+	+	+-1	+	-	+	+	-	-	+
Trifolium repens	+	+	+	-	+	+	+	+	+	+
Prunella vulgaris	+	+	+	-	-	+	-	-	+	-
Rumex acetosella	+	-	-	+	+	-	-	+	-	-
Festuca nigrescens	+	+	+	+	1	+	1	+	+	+
Phleum alpinum	+	-	+	+	-	-	+	+	+	+
Deschampsia caespitosa	+	-	-	+	+	1	+	+	-	+
Variae Syntaxa										
Alchemilla conivens	+	+	1	+	-	+	-	+	+	+
Epilobium montanum	-	+	-	-	+	-	+	-	-	-
Campanula patula ssp. abietina	+	+	+	+	+	-	+	-	+	+
Luzula luzuloides	+	-	+	-	-	+	+	+	+	+

Place and data of the relevés : 1, 2, 3, 4 – Steaja Mountain, 19.VIII.2005; 5, 6 – Balindru Mare Mountain, 08.VII.2007; 7, 8 – Goaţele Mountain, 09.VII.2007; 9, 10 – Târnpa Peak, 10.VII. 2007

Physiognomy and flower structure. These are well structured phytocoenoses spread over the whole area (100%). With the edifying *Rumex obtusifolius* species, there are also present species that belong to the order *Molinio - Arrhenatheretea*: *Trifolium repens, Dactylis glomerata, Ranunculus repens, Poa pratensis, Trifolium pretense, Holcus lanatus, Mentha*

longifolia, Poa trivialis. There are also well represented the species that belong to the *Querco - Fagetea* order, and this points out that a large amount of the analyzed phytocoenoses interact with the mountain fir woods or beech forests in the survey area.

Table 2

Ass. *Rumici obtusifolii - Urticetum dioicae* Kornaš 1968

No. of relevée	1	2	3	4	5	6	7	8	9	10	11	12
Altitude m.o.s. (x 10 m)	80	80	80	90	90	100	100	110	111	120	135	135
Exposure	SE	E	SE	-	E	-	SV	-	-	NV	-	-
Inclination (in grades)	3	3	5	-	5	-	3	-	-	7	-	-
Coverage (%)	100	100	100	100	100	100	100	100	100	100	100	100
Area (m^2)	10	100	100	50	50	50	50	100	100	50	100	100
Char. ass.												
Rumex obtusifolius	4	4-5	4	4	4	4	2	4	4	4	5	5
Chenopodietea												
Artemisia vulgaris	-	-	-	-	+	-	+	+	+	-	-	-
Elymus repens	-	+	+	+	+	-	+	+	-	+	+	+
Artimisietea												
Urtica dioica	2	1	2-3	1	1	2	4	1	2	2	1	1
Alliaria petiolata	+	+	-	+	+	+	+	-	+	+	-	-
Tussilago farfara	+	+	+	1	1	1	+	+	+	+	-	-
Molinio-Arrhenatheeretea												
Ranunculus repens	1	+	1	1	1	1	1	+	+	1	+	+
Rumex acetosella	-	-	-	+	+	-	+	+	+	-	+	+
Taraxacum officinale	+	-	-	+	-	-	+	+	-	+	+	-
Stellaria graminea	+	+	-	-	+	+	+	+	-	+	+	+
Trifolium pratense	+	+	-	+	+	+	+	+	+	+	+	+
Poa pratensis	1	+	+	+	+	-	+	+	+	+	+	+
Rumex acetosa	-	-	-	+	-	-	-	+	-	-	+	+
Dactylis glomerata	-	+	-	+	-	+	+	+	+	+	+	+
Mentha longifolia	+	-	+	+	+	+	+	1	+	+	-	-
Prunella vulgaris	-	+	+	+	+	+	+	+	+	+	+	+
Trifolium repens	+	-	+	+	+	+	+	+	+	+	+	+
Holcus lanatus	-	+	+	+	+	+	-	+	+	+	+	+
Centaurea phrygia	+	-	-	+	-	+	+	+	+	-	-	-
Lolium perenne	-	+	-	+	+	+	+	+	-	+	+	+
Poa trivialis	+	-	+	+	+	+	+	+	+	+	-	-
Chaerophyllum hirsutum	+	-	-	+	+	+	-	+	+	+	-	-
Cirsium oleraceum	-	-	+	+	1	+	+	+	+	-	-	-
Adenostyletalia												
Stellaria nemorum	+	+	+	+	+	+	+	+	+	+	-	-
Carduus personata	-	+	-	+	-	+	+	+	+	-	-	-
Cirsium waldsteinii	+	-	-	+	+	-	+	+	+	-	-	-
Achillea distans	-	+	+	+	-	-	+	-	+	+	+	+
Leucanthemum waldsteinii	+	-	-	+	-	-	+	+	+	-	+	+
Epilobietalia angustifolii												
Chamaenerion angustifolium	-	-	-	-	+	-	+	+	1	-	-	-
Senecio ovatus	-	-	-	-	-	-	+	+	+	-	+	+
Rubus idaeus	-	-	-	+	-	+	+	+	+	+	-	-
Fragaria vesca	+	+	+	+	+	+	+	1	+	+	+	-
Querco-Fagetea												
Athyrum filix-femina	-	+	-	+	-	-	+	+	-	+	-	+
Festuca gigantea	-	+	-	+	+	-	+	+	+	+	-	-
Salvia glutinosa	+	-	-	+	+	+	-	+	-	+	-	-
Brachypodium sylvaticum	-	+	-	-	+	+	+	+	-	+	-	-
Myosotis sylvatica	+	+	-	+	+	+	+	+	+	+	-	-
Poa nemoralis	+	-	-	+	+	+	+	+	+	+	-	-
Epilobium montanum	+	-	-	+	-	+	+	+	+	-	+	+
Geum urbanum	+	-	+	+	+	+	+	+	-	+	+	-
Solidago virgaurea	+	-	-	+	+	-	-	+	+	-	-	-
Luzula luzuloides	+	+	+	+	+	+	+	+	+	+	+	+
Variae Syntaxa												
Galium aparine	+	+	-	+	-	+	+	+	+	+	-	-
Aegopodium podagraria	+	+	+	+	-	+	+	+	-	+	+	-
Impatiens noli-tangere	+	-	+	-	-	+	-	+	-	+	-	-
Geranium robertianum	-	-	-	+	+	-	+	+	+	-	+	-
Petasites hybridus	-	+	-	-	+	+	-	+	-	+	-	-

Place and data of the relevés : 1, 2, 3 - Mânâileasa Valley, 10.VIII.2005; 4, 5, 6 – Lotru Valley, 18.VI.2007; 7, 8, 9 – Obârşia Lotrului, 11.VII.2007; 10,11, 12 – Chica lui Haneş, 12.VII.2007.

By analyzing the dendrology diagram of the association (fig. 1), there was noticed the grouping ground surveys in two clusters. The former groups ground surveys 1, 6, 10, 4, 8, 9, 5, 2 and 3. The latter groups ground surveys 11 and 12. From this respect, the value of the *Bray-Curtis* quantitative index changes, and it, thus indicates the heterogeneity of phytocenoses, from the point of view of the abundance-dominance of the *Urtica dioica* (AD=4) and *Rumex obtusifolius* (AD=2) species, in comparison with the other ground surveys. There was also noticed the separation of ground survey 5, for the high abundance-dominance value of the *Cirsium oleraceum* species (AD=1). Also, ground survey 9 separates from the other ones, due to the higher abundance-dominance value of the *Chamaenerion angustifolium* species (AD=1). Grouping ground surveys 1, 6 and 10 from the former cluster can be explained by the absence of the *Elymus repens* species, which is present in the other ground surveys. Ground surveys 11 and 12, which make up the latter cluster are grouped due to the highest abundance-dominance value of the *Rumex obtusifolius* species (AD=5), and also because the absence of the *Tussilago farfara* species, present in the other ground surveys.

Importance. This association is important from the economic respect; the flower structure has a medicinal, honey bearing, foodstuff and fodder value.

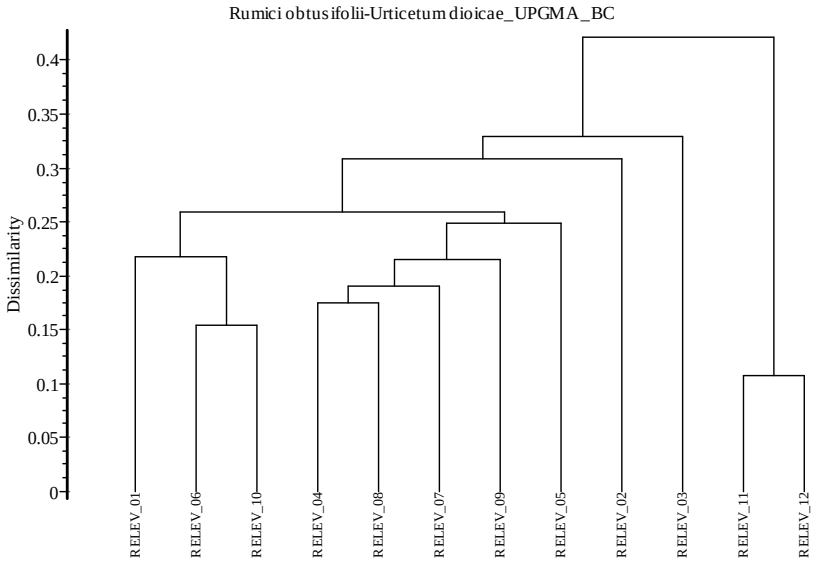

Fig. 1. Dendrogram for the ass. *Rumici obtusifolii-Uricetum diocae* Kornãs 1968

3. Ass. *Veratretum albi* Pusc. et al. 1956

Chorology. Edifying swamp hellebore phytocoenoses are largely spread in the sub-alpine layer in the survey area, on sheep fold areas. In the Lotru Mountain, there were analyzed

phytocoenoses at Balindru Valley, Coasta Mioarelor, Haneşu Mountain and Galbena Mountain.

Physiognomy and flower structure. In the flower structure of this association, together with the edifying species, there are also the following: *Festuca nigrescens*, *Nardus stricta*, *Potentilla aurea* ssp. *chrysocraspeda*, *Viola declinata*, *Gnaphalium supinum*, *Antenaria dioica*, *Campanula rotundifolia* ssp. *polymorpha*, *Aconitum toxicum*, and *Poa media*.

Swamp hellebore phytocenoses can develop into *Festuca nigrescens* or *Nardus stricta* grazes, under the condition that sheep fold areas are removed.

Veratrum album is an important medicinal plant, which is used in veterinary medicine, in order to control ectoparasites. Rhizome roots are used, such as Veratri rhizome cum radicibus. They are cropped in the autumn and summer.

CONCLUSIONS

The studied area is situated in the Lotru Mountains, part of Meridional Carpathians.

Following the botanical research, carried out in the this area between 2000 - 2005, there were identified three plants associations: ***Rumicetum alpini*** Szaf., Kulcz. et Pawl. 1923, 1927, ***Rumici obtusifolii - Urticetum dioicae*** Kornaš 1968 (Syn. *Urtica dioica - Rumex obtusifolius* Anghel et al. 1965) and ***Veratretum albi*** Puşc. et al.1956.

Ecology, chorology, floristic composition (species richness, life forms, phyto-geographical elements) as well as the economic importance for all these associations (characterised by 22 original phytosociological relevées) are analysed. We paid much attention to the determination of the *Bray-Curtis* qualitative index and the achievement of dendrograms, using the *Group-Average method (UPGMA)* from the program SYN-TAX 2000 (for the associations with minimum 10 surveys).

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