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CONTRIBUTIONS TO THE STUDY OF THE CLASS *MOLINIO-ARRHENATHERETEA* R. TX. 1937 IN THE UPPER BASIN OF THE RIVER DORNA (DISTRICT OF SUCEAVA) (II)

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Abstract: The paper presents two hygrophilic associations in the upper basin of the river Dorna (district of Suceava): *Epilobio-Juncetum effusi* Oberd 1957 and *Scirpetum sylvatici* Ralski 1931, associations classified from the coenotaxonomic point of view in the class *Molinio-Arrhenatheretea* R. Tx. 1937.

Key words: phytocoenology, hygrophilic vegetation.

Introduction

The upper basin of the river Dorna is located in the north of Romania, in the south-west part of the district of Suceava, being integrated in the central-northern part of the Oriental Carpathians.

The association *Epilobio-Juncetum effusi* Oberd 1957 was also noticed on the territory of the upper basin of Dorna (in the village Poiana Stampei) by Guşuleac M. in 1930 [5] under the name of *Juncetum effusae*, but it was mentioned without phytocoenological relevés. The association was also noticed without phytocoenological relevés by Mititelu D., Chifu T. and Pascal P. in 1989 [6] at Poiana Stampei. The second association was not mentioned so far in the territory of the upper basin of the river Dorna.

Material and method

The names of the species were chosen according to *Flora Europaea* [10] and *Flora ilustrată a României – Pteridophyta et Spermatophyta* [3], and for the study of the vegetation it was used the phytosociological method of Braun-Blanquet.

On taking into consideration several papers in the specialty literature [1, 2, 7, 8, 9], the two vegetal associations were classified in the following coenosystem:

MOLINIO-ARRHENATHERETEA R. Tx. 1937
MOLINIETALIA CAERULEAE Koch 1926
CALTHION PALUSTRIS R. Tx. 1937

Epilobio-Juncetum effusi Oberd 1957
Scirpetum sylvatici Ralski 1931

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Results and discussions

Ass. *Epilobio-Juncetum effusi* Oberd 1957

Corology. The association has an insular spread, being identified lengthways of axial path Dorna, between Dornișoara and forest path Bărăcii and lengthways of forest paths Borcut Muncelu, Muncelu Mare, Podu Vărăriei and Rizu-Dosu Arșiței, near Tinovul Mare, between Dorna river and the axial path Dorna.

Ecology. The hygrophilic phytocoenoses of *Juncus effusus* are usually developed in the valleys of the rivers, on alluvial soils, pseudogleic or gleic, with reduced content in nutritive substances. In the upper basin of Dorna, the phytocoenoses of this association are developed on surfaces generally plane, with a surplus of soil humidity.

The floristic and phytocoenological characterisation. The floristic composition of the association is rich (43 species) and varied. The dominant species *Juncus effusus* realizes a covering of vegetation with values between 50 and 75%, while the characteristic species *Epilobium palustre* has a high constancy in the frame of the association. These two species, besides the species in the alliance *Calthion* and in the order *Molinietalia* underlines the high humidity in the soil where these phytocoenoses develop. The species characteristic to the class *Molinio-Arrhenatheretea*, as well as the species in the inferior coenotaxons of this class give a mesophilic touch to this association (**Tab. 1**).

As for the **bioforms**, the hemicryptophytes are clearly dominant (H-76.74%), being followed at big distance by geophytes (G-13.95%). Equal percentages realize the terrophytes (T), hemiterrophytes (Ht), camephytes (Ch) and fanerophytes (Ph): 2.33% each (**Fig. 1 a**).

The element of flora dominant is the Euro-Asian one (Euras.-46.51%), followed by the circumpolar one (Circ.-23.26%) and cosmopolite (Cosm.-13.95%) (**Fig. 1 b**).

The hygrophilic touch of this association is reflected also in the high percentage of species with high index of humidity (almost 55% of the species). Over 90% of the total number of species are plants that prefer the light. As for the temperature, 60% are species tolerant to water, and almost 31% are plants preferring a climate with moderate values. The **spectre of ecological indices** shows also the high percentage (61.9%) of the amphitolerant species to the pH of the soil, and the preference for the low content in mineral nitrogen is reflected by the percentage of 35.2%.

Ass. *Scirpetum sylvatici* Ralski 1931

Corology. The association was identified between Dornișoara and the forest path Bărăcii, axial path Dorna (near Dornișoara), forest path Zgârciu, forest path Rizu-Dosu Arșiței, forest path Mâței, forest path Podu Vărăriei.

Ecology. The phytocoenoses identified by *Scirpus sylvaticus* are met on alluvial soils, gleic and pseudogleic, having a large distribution in altitude. The association was identified on plane surfaces, with soils with excessive humidity almost throughout the year.

The floristic and phytocoenological characterisation. The floristic composition is rich (42 species). The dominant species and characteristic to the association, *Scirpus sylvaticus*, realizes coverings between 80 and 100%. Besides it, numerous mesophilic and meso-hygrophilic species develop, characteristic for the alliance *Calthion* and the class *Molinio-Arrhenatheretea*. The excess of humidity favours also the appearance of species in the classes *Phragmiti-Magnocaricetea*, *Scheuchzeri-Caricetea fuscae* etc (**Tab. 2**).

Hemicryptophytes (H) dominate the **spectre of bioforms** (76.19%), being followed at big distance by geophytes (G-16.67%). Reduced percentages realize the camephytes (Ch-2.38%) and the terrophytes (T-4.76%) (**Fig. 2 a**).

The Euro-Asian element represents the biggest percentage (Euras.-54.76%) in the **spectre of floristic elements**; the circumpolar element (Circ.) comes next (23.81%), being followed by the European element (Eur.) with 9.52% (**Fig. 2 b**).

The spectre of ecological indices confirms the data in the specialty literature, reflecting the high percentage of hygrophilic species (over 50%). As for the temperature, over 70% of the species are amphotolerant. Almost 62% of the species in these phytocoenoses are amphotolerant to the reaction of the soil, and over 55% prefer the soils with low to moderate content of nitrogen.

Conclusions

- The installation and development of this kind of hygrophilic phytocoenoses is favoured by the stational conditions on plane surfaces, with a surplus of soil humidity almost throughout the year (alluvial soils, gleic and pseudogleic);
- The floristic and phytocoenological composition of these two associations is rich and varied;
- The analysis results of the 12 relevées realised for the two associations, in that concerning the bioforms, floristic elements and ecological indices, shows that our results are according with specialty literature.

Table 1
Ass. *Epilobio-Juncetum effusi* Oberd 1957

Number of relevées	1	2	3	4	5	6	
Altitude (m)	1095	1020	915	902	975	1096	
Covering of vegetation (%)	90	85	90	95	95	80	
Surface of relevée (m ²)	10	25	100	50	50	50	
Number of species	16	15	16	15	20	18	K
Association's characteristics							
<i>Epilobium palustre</i>	+	+	-	+	+	-	IV
<i>Calthion palustris</i>							
<i>Carex ovalis</i>	-	-	+	-	-	-	I
<i>Epilobium parviflorum</i>	-	-	+	-	-	+	II
<i>Geum rivale</i>	-	+	-	-	+	+	III
<i>Juncus articulatus</i>	-	-	+	-	+	+	III
<i>Myosotis scorpioides</i>	-	+	+	+	+	+	V
<i>Scirpus sylvaticus</i>	1	-	1	+	-	1	IV
<i>Trifolium hybridum ssp. hybridum</i>	-	-	-	+	-	-	I
<i>Molinietalia caeruleae</i>							
<i>Deschampsia caespitosa ssp. caespitosa</i>	-	+	-	-	-	-	I
<i>Equisetum palustre</i>	-	-	-	-	+	+	II
<i>Filipendula ulmaria</i>	-	1	+	+	-	-	III
<i>Galium palustre ssp. palustre</i>	+	-	-	-	+	+	III
<i>Juncus effusus</i>	4	4	4	4	4	4	V
<i>Lychnis flos-cuculi</i>	-	-	-	-	-	+	I
<i>Vicia sepium</i>	-	-	-	-	-	+	I
<i>Cynosurion</i>							
<i>Cynosurus cristatus</i>	-	-	+	-	-	-	I
<i>Trifolium repens ssp. repens</i>	+	-	-	1	+	-	III
<i>Arrhenatherion et Arrhenatheretalia</i>							

<i>Achillea millefolium</i> ssp. <i>millefolium</i>	-	-	-	+	-	-	I
<i>Bellis perennis</i>	-	-	-	+	+	-	II
<i>Campanula patula</i>	-	-	+	-	-	-	I
<i>Taraxacum officinale</i>	+	-	-	+	-	-	II
<i>Poo alpinae-Trisetetalia</i>							
<i>Phleum alpinum</i> ssp. <i>alpinum</i>	-	-	-	-	+	-	I
<i>Potentillion anserinae et Potentillo-Polygonetalia</i>							
<i>Agrostis stolonifera</i>	-	-	-	-	-	+	I
<i>Carex hirta</i>	-	+	-	-	-	-	I
<i>Potentilla anserina</i>	-	+	-	+	+	-	III
<i>Ranunculus repens</i>	-	+	+	1	+	+	V
<i>Molinio-Arrhenatheretea</i>							
<i>Alchemilla vulgaris</i>	+	-	+	-	1	+	IV
<i>Cerastium holosteoides</i>	-	-	-	-	+	-	I
<i>Lotus corniculatus</i>	-	-	+	+	+	-	III
<i>Prunella vulgaris</i>	+	+	+	+	+	+	V
<i>Ranunculus acris</i> ssp. <i>acris</i>	+	+	1	+	-	-	IV
<i>Trifolium pratense</i> ssp. <i>pratense</i>	+	+	-	-	+	+	IV
<i>Variae syntaxa</i>							
<i>Cirsium arvense</i>	+	+	+	-	+	+	V
<i>Cruciata glabra</i>	-	+	-	-	-	+	II
<i>Eleocharis austriaca</i>	+	-	-	-	-	-	I
<i>Epilobium montanum</i>	-	-	-	-	1	-	I
<i>Juncus buffonius</i>	+	-	-	-	-	-	I
<i>Mentha arvensis</i> ssp. <i>arvensis</i>	+	-	-	-	-	-	I
<i>Potentilla erecta</i>	-	-	-	-	+	-	I
<i>Salix caprea</i> (juv.)	-	+	-	-	-	-	I
<i>Senecio ovatus</i>	-	-	+	-	-	-	I
<i>Tussilago farfara</i>	1	-	-	-	-	+	II
<i>Veronica officinalis</i>	+	-	-	-	-	-	I

Place and date of relevées:

1 – axial path Dorna, between Dornișoara and forest path Bărâcii (27.07.2006); 2 – forest path Borcut Muncelu (22.08.2006); 3 – forest path Muncelu Mare (24.08.2006); 4 – near Tinovul Mare, between Dorna and the axial path Dorna (24.08.2006); 5 – forest path Podu Vărăriei (2.09.2006); 6 – forest path Rizu-Dosu Arșiței (3.09.2006).

Table 2
Ass. *Scirpetum sylvatici* Ralski 1931

Number of relevées	1	2	3	4	5	6	
Altitude (m)	1095	1050	1150	1096	1012	970	
Covering of vegetation (%)	95	80	90	95	100	90	
Surface of relevée (m ²)	25	10	100	100	20	50	
Number of species	21	21	19	16	13	15	K
<i>Association's characteristics</i>							
<i>Scirpus sylvaticus</i>	4	5	5	5	5	5	V
<i>Calthion palustris</i>							
<i>Caltha palustris</i>	-	+	+	-	+	-	III
<i>Epilobium parviflorum</i>	+	-	+	-	-	-	II
<i>Geum rivale</i>	-	-	+	+	+	-	III
<i>Juncus articulatus</i>	-	-	+	+	-	+	III
<i>Myosotis scorpioides</i>	+	+	+	+	+	-	V
<i>Poa palustris</i>	-	+	-	-	-	-	I
<i>Alopecurion pratensis</i>							
<i>Festuca pratensis</i> ssp. <i>pratensis</i>	+	-	-	-	-	+	II
<i>Phleum pratense</i>	+	-	+	-	-	-	II

<i>Deschampsion caespitosae</i>							
Carex ovalis	+	-	-	-	-	-	I
Deschampsia caespitosa ssp. caespitosa	-	+	-	-	-	-	I
<i>Arrhenatherion</i>							
Equisetum arvense	+	-	-	-	+	+	III
Taraxacum officinale	-	-	-	+	-	-	I
<i>Cynosurion</i>							
Cynosurus cristatus	+	-	-	+	-	-	II
Trifolium repens ssp. repens	+	-	+	-	-	+	III
<i>Arrhenatheretalia</i>							
Achillea millefolium ssp. millefolium	-	+	-	-	-	-	I
Leucanthemum vulgare ssp. vulgare	-	+	-	+	-	-	II
<i>Molinietalia caeruleae</i>							
Filipendula ulmaria	-	+	+	-	+	+	IV
Galium palustre ssp. palustre	-	+	-	+	+	+	IV
Juncus effusus	1	+	+	+	+	+	V
Lychnis flos-cuculi	+	-	+	-	+	-	III
<i>Molinio-Arrhenatheretea</i>							
Alchemilla vulgaris	+	+	+	+	+	-	V
Anthoxanthum odoratum	+	-	-	+	-	-	II
Cerastium holosteoides	-	+	-	-	-	+	II
Euphrasia officinalis ssp. pratensis	+	-	+	+	-	-	III
Lotus corniculatus	+	-	-	-	-	-	I
Plantago lanceolata ssp. lanceolata	-	+	-	-	+	-	II
Prunella vulgaris	+	+	+	-	-	+	IV
Trifolium pratense ssp. pratense	+	+	+	-	-	-	III
<i>Phragmiti-Magnocaricetea</i>							
Carex acutiformis	+	+	-	-	-	+	III
Eleocharis palustris	-	+	-	-	-	-	I
<i>Scheuchzerio-Caricetea fuscae</i>							
Triglochin palustre	+	-	-	-	-	-	I
<i>Juncetea trifidi</i>							
Hieracium aurantiacum	-	-	+	-	-	-	I
Potentilla erecta	-	+	+	-	+	-	III
<i>Epilobietea angustifolii</i>							
Rumex acetosella ssp. acetosella	-	+	-	+	-	-	II
<i>Stellarietea mediae</i>							
Mentha arvensis ssp. arvensis	+	-	-	+	-	+	III
<i>Artemisietea vulgaris</i>							
Cirsium arvense	-	+	+	-	-	+	III
Tussilago farfara	-	-	-	+	-	+	II
<i>Querco-Fagetea</i>							
Epilobium montanum	+	-	-	+	-	-	II
Equisetum sylvaticum	-	-	+	-	-	-	I
Impatiens noli-tangere	-	-	-	-	-	+	I
<i>Vaccinio-Piceetea</i>							
Veronica officinalis	-	+	-	-	+	-	II

Place and date of relevées:

1 – between Dornișoara and the forest path Bărăcii (27.07.2006); 2 – axial path Dorna (near Dornișoara) (21.08.2006); 3 – forest path Zgârciu (02.09.2006); 4 – forest path Rizu – Dosu Arșiței (03.09.2006); 5 – forest path Mâței (20.08.2006); 6 – forest path Podu Vărăriei (03.09.2006).

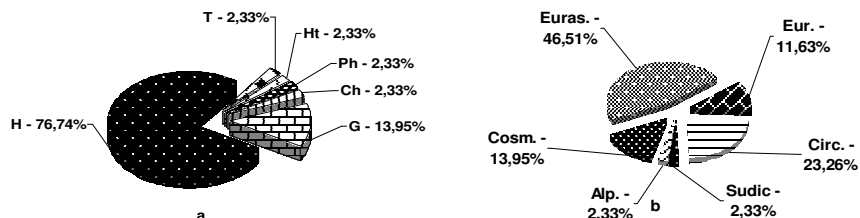


Fig. 1. a) The bioforms spectrum; b) The floristic elements spectrum – ass. *Epilobio-Juncetum effusi* Oberd 1957

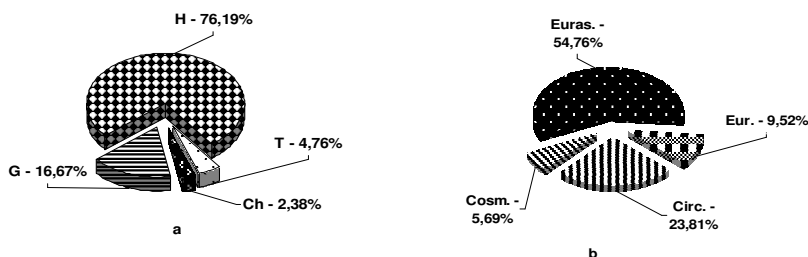


Fig. 2. a) The bioforms spectrum; b) The floristic elements spectrum – ass. *Scirpetum sylvatici* Ralski 1931

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