

ASSOCIATIONS OF *MOLINIETALIA* KOCH 1926 (*MOLINIO-ARRHENATHERETEA* R. Tx. 1937) IDENTIFIED IN NEAGRA BROȘTENILOR BASIN (EASTERN CARPATHIANS)

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Abstract: The paper presents eight vegetal communities (*Junco-Molinietum coeruleae* Preising in R. Tx. et Preising ex Klapp 1954, *Calthetum laetae* Krajina 1933, *Scirpetum sylvatici* Ralski 1931, *Epilobio-Juncetum effusi* Oberd. 1957, *Cirsietum rivularis* Nowinski 1928, *Angelico-Cirsietum oleracei* R. Tx. 1937, *Filipendulo-Geranium palustris* W. Koch 1926, *Deschampsietum caespitosae* Hayek ex Horvatič 1930) from *Molinietalia* Koch 1926 (*Molinio-Arrhenatheretea* R. Tx. 1937) identified in Neagra Broștenilor hydrographic basin. These are analyzed from the chorology, floristic and phytosociological composition, bio-forms, floristic elements and ecological requests perspectives.

Key words: vegetal associations, *Molinietalia*, Neagra Broștenilor

Introduction

Hydrographic Basin of Neagra Broșteni River includes the central region of Bistrița Mountains, a part of the eastern slopes of Călimani Mountains and the Drăgoiasa-Glodu Depression (Eastern Carpathians). It is localized in Suceava county and has an area of approximate 350 km² [ATLASUL CADASTRULUI APELOR DIN R.S.R, 1972]. The river is about 42 km long, springs from Măgura Mountain (1300 m) and the confluence point with Bistrița river is at Broșteni (627 m).

Three geo-morphological units represent the relief. *Călimani Mountains*, by volcanic origin, present high altitudes: Căliman Cerbuc peak-2013 m and Căliman Izvor-2030 m, in our study area. *Drăgoiasa-Glodu Depression* (1000 m altitude) is reduced at river's valley. *Bistrița Mountains*, by tectonic origin, are divided in many massifs: Pietrosul Bistriței and Budacu with Grințieșul Mic-1734 m and Budacu-1859 m the highest peaks in our study area [MIHĂILESCU, 1963]. *Eruptive* (Călimani Mountains) and *crystalline* (Munții Bistriței) rocks represents geological substratum [MUTIHAC & IONESI, 1974]. The main soils types are *cambisoils* (corresponding to mixed deciduous and coniferous forests), *spodosoils* (corresponding to coniferous forests) and *litho-soils* (corresponding to sub-alpine meadows) [BARBU et al., 1984].

The climate is characterized by average precipitations oscillating between 600-1100 (1200) mm/year, yearly averages of temperatures varying between 0 and 4°C, western atmospheric circulation, increased nebulosity (6,8-7), increased relative humidity of the atmosphere (over 80%), frequent hydro-meteorological phenomena (dew, frost, hoar-frost, mist) [VELCEA & SAVU, 1982].

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Material and method

Molinetalia caeruleae Koch 1926 (syntax. syn. *Deschampsietalia* Horvatič 1958) order includes herbaceous phytocoenoses that grows on soils characterized by increased humidity (in excess even) and increased fertility, in riversides, valleys and mountainous depressions [CHIFU et al., 2006]. This order is subordinated to *Molinio-Arrhenatheretea* R. Tx. 1937 vegetation class that includes herbaceous, secondary, mesophilous and mesohygrophilous phytocoenoses, representing in fact the grasslands and hays of great economical importance from low hilly areas to high mountainous areas.

The method used for the study of vegetation from *Molietalia* has been elaborated by Central European Phytosociological School. Field data acquiring process has been realized by field trips (on itineraries or in stationeries) in 2006-2009 periods. Identification of vegetal association has been made based on characteristic, dominant and differential species [COLDEA, 1991; SANDA, 2002; CHIFU et al., 2006] and inclusion of the relevés presenting similar coenotic structures in one phytosociological table. For each vegetal association, chorology, floristic composition, phytosociological composition and proportions of bio-forms, floristic elements and ecological categories have been presented. In this study, the bioforms (life forms) and floristic elements are that presented by Ciocârlan [CIOCÂRLAN, 2000]. Species requirements for light, temperature, humidity, soil pH and soils content in nitrogen (quantified in ecological indices) have been used to analyze the ecological structure of phytocoenoses [ELLENBERG, 1974].

Results and discussion

According to prestigious papers [COLDEA, 1991; SANDA, 2002; CHIFU et al., 2006] on the phytosociological nomenclature and coenotaxa classification, these eight vegetal associations identified by us can be framed in the next coeno-system:

MOLINIO – ARRHENATHERETEA R. Tx. 1937

MOLINIETALIA CAERULEAE Koch 1926

Molinion caeruleae Koch 1926

Junco – Molinietum caeruleae Preising in R. Tx. et Preising ex Klapp 1954

Calthion palustris R. Tx. 1937

Calthetum laetae Krajina 1933

Scirpetum sylvatici Ralski 1931

Epilobio – Juncetum effusi Oberd. 1957

Cirsietum rivularis Nowinski 1928

Angelico – Cirsietum oleracei R. Tx. 1937

Filipendulion Segal 1966

Filipendulo – Geranietum palustris W. Koch 1926

Deschampsion Horvatič

Deschampsietum caespitosae Hayek ex Horvatič 1930

1. As. *Junco – Molinietum caeruleae* Preising in R. Tx. et Preising ex Klapp 1954

Chorology: phytocoenoses of *Junco-Molinietum caeruleae* have a sporadic distribution in Neagra Broștenilor hydrographic basin. They includes communities edified by *Molinia caerulea* (purple moor-grass) having *Juncus effusus* and *Juncus conglomeratus* as characteristic species. These communities are installed on plane or moderate inclined terrains, on humid, moderate acid to neutral and low in nutrients soils. This association has

been mentioned before from Criștișor [LUNGU, 1969] and Neagra Broșteni [POPOVICI et al., 1996]. We identified it in Drăgoiasa village and at the point of confluence of Criștișor rivulet with Neagra Broștenilor river.

Floristic composition and phytocenotic structure: herbaceous layer is homogeneous, presents a covering degree varying between 90% and 100% and includes, besides characteristic and edifying species, numerous other species: *Dactylorhiza maculata*, *Stachys officinalis*, *Lysimachia vulgaris*, *Trifolium spadiceum*, *Agrostis capillaris*, *Potentilla erecta* etc. Regarding phytocenological composition, increased constancy indices have been registered for species from: Molinion (*Linum catharticum*, *Lychnis flos-cuculi* etc.), Calthion (*Myosotis scorpioides*, *Caltha palustris*, *Polygonum bistorta* etc.), Filipendulion (*Filipendula ulmaria* etc.), Deschampsion (*Deschampsia caespitosa* etc.), Molinietales and Molinio-Arrhenatheretea (*Parnassia palustris*, *Stellaria graminea*, *Lathyrus pratensis*, *Trifolium repens* etc.). (Tab. 1).

Bioforms spectrum: H-75%, G-13%, Ht-4%, T-4%, Ch-2%, T-H-2%.

Floristic elements spectrum: Euras.-50%, Circ.-26%, Eur.-15%, Cosm.-7%, Eur. centr.-2%.

Ecological indices spectrum: preponderant light-species (L₇-53% and L₈-20%), eurythermic (T_x-61%) or preferring temperate sub-montane areas (T₅-24%), humid (U₇-23% and U₈-28%) or moderate humid soils (U₅-10% and U₆-12%). Most of the component species are euryionic (R_x-57%) and grows on solis poor in nitrogen (N₂-20%, N₃-20%).

2. As. *Scirpetum sylvatici* Ralski 1931

Chorology: vegetal communities edified by *Scirpus sylvaticus* (wood club-rush) can be frequently met in Neagra Broștenilor basin, both in this river and its affluents valleys. They are installed on plane or moderate inclined terrains, on humid, moderate acid and relative poor in nutrients soils. The association has been mentioned before from Criștișor [LUNGU, 1969] and Păltiniș [MITITELU et al., 1989]. We identified it in Drăgoiasa, Glodu, Neagra Broșteni and Păltiniș villages and Criștișor peat bog.

Floristic composition and phytocenotic structure: floristic composition is variate, herbaceous layer is homogeneous, presents a covering degree varying between 95% and 100% and includes, besides the characteristic and edifying species (*Scirpus sylvaticus*), numerous other species: *Caltha palustris*, *Lysimachia vulgaris*, *Juncus effusus*, *Lychnis flos-cuculi*, *Briza media*, *Juncus inflexus* etc. (Tab.2). Regarding phytocenological composition, increased constancy indices have been registered for species from: Calthion (*Angelica sylvestris*, *Cirsium oleraceum* etc.), Filipendulion (*Filipendula ulmaria*, *Lysimachia vulgaris* etc.), Deschampsion (*Deschampsia caespitosa* etc.), Molinietales (*Polygonum bistorta*, *Cirsium palustre* etc.), Arrhenatheretalia (*Holcus lanatus*, *Lysimachia nummularia* etc.), Molinio-Arrhenatheretea (*Trifolium repens*, *Trollius europaeus* etc.).

Bioforms spectrum: H-84%, G-10%, Ht-4%, Ch-2%.

Floristic elements spectrum: Euras.-47%, Circ.-27%, Cosm.-14%, Eur.-8%, Eur. centr.-2%, Carp.-balc.-cauc.-anat.-2%.

Ecological indices spectrum: preponderant light-species (L₇-51% and L₈-25%), eurythermic (T_x-47%) or preferring temperate sub-montane areas (T₅-35%), humid (U₇-24% and U₈-30%) and poor (to moderate) in nitrogen soils (N₁₋₆-57%). Most of the component species are euryionic (R_x-54%).

3. *As. Epilobio – Juncetum effusi* Oberd. 1957

Chorology: phytocoenoses of *Epilobio-Juncetum effusi* can be frequently met in Neagra Broștenilor basin. They includes vegetal communities edified by *Juncus effusus* (common rush) presenting *Epilobium palustre* (marsh willow herb) as characteristic species and are installed on plane or moderate inclined terrains, on humid and neutral soils, with variable contents of nutrients. This association has been identified before in Drăgoiasa [POP, 1960], Broșteni and Neagra Broșteni [MITITELU et al., 1989], Criștișor [LUNGU, 1969] and in Neagra Broștenilor valley [SEGHEDIN, 1986]. We identified it in Drăgoiasa, Neagra Broșteni, Păltiniș and Dârmoxa localities, on Budacu, Căliman Cerbuc and Criștișor.

Floristic composition and phytocenotic structure: herbaceous layer is very diversified, presents a covering degree varying between 90-95% and includes numerous species: *Caltha palustris*, *Filipendula ulmaria*, *Deschampsia caespitosa*, *Lychnis flos-cuculi*, *Ranunculus repens*, *Potentilla erecta*, *Juncus inflexus* etc. (Tab. 8). Regarding phytocenological composition, increased constancy indices have been registered for species from: Calthion (*Myosotis scorpioides*, *Scirpus sylvaticus*, *Cirsium oleraceum* etc.), Filipendulion (*Filipendula ulmaria*, *Lythrum salicaria* etc.), Deschampsion (*Deschampsia caespitosa*, *Juncus conglomeratus*, *Carex pallescens* etc.), Molinieta (*Lychnis flos-cuculi*, *Juncus articulatus*, *Cirsium palustre* etc.), Arrhenatheretalia (*Holcus lanatus*, *Briza media*, *Cynosurus cristatus* etc.), Molinio-Arrhenatheretea (*Trifolium repens*, *Alchemilla vulgaris*, *Agrostis capillaris*, *Trifolium pratense* etc.), Scheuchzerio-Caricetea nigrae (*Carex nigra*, *Carex echinata*), Phragmiti-Magnocaricetea (*Galium palustre*, *Lycopus europaeus* etc.).

Bioforms spectrum: H-84%, G-9%, Ht-3%, T-2%, Ch-2%.

Floristic elements spectrum: Euras.-46%, Circ.-33%, Eur.-9%, Eur. centr.-3%, Cosm.-9%.

Ecological indices spectrum: preponderant light-species (L₇-46% and L₈-26%), eurythermic (T_x-45%) or preferring temperate sub-montane areas (T₅-33%) and humid soils (U₇-26% and U₈-29%). Most of the component species are euryionic (R_x-51%) but a small part prefers neutral soils (R₇-15% and R₈-12%) characterized by variable contents in nitrogen (can variate from very poor to moderate and rich).

4. *As. Cirsietum rivularis* Nowinski 1928

Chorology: Association *Cirsietum rivularis* includes phytocoenoses edified by *Cirsium rivulare* distributed sporadically (nearby rivulets) in Neagra Broștenilor basin. It has been identified in the proximity of Neagra Broșteni and Dârmoxa villages where it occupies micro-depressions or plane (moderate inclined) terrains with wet and rich in nutrients soils. These vegetal communities were signaled before from Păltiniș [SEGHEDIN, 1986; MITITELU et al., 1989; POPOVICI et al., 1996].

Floristic composition and phytocenotic structure: herbaceous layer presents a covering degree varying between 85-95%. It includes, besides characteristic and edifying species, numerous other species: *Angelica sylvestris*, *Carex ovalis*, *Dactylis glomerata*, *Ranunculus repens*, *Geum rivale*, *Mentha longifolia*, *Lycopus europaeus* etc. (Tab. 3). From phytosociological point of view, increased constancy indices have been registered for species from: Calthion (*Scirpus sylvaticus*, *Myosotis scorpioides*, *Cirsium oleraceum* etc.), Deschampsion (*Juncus effusus*, *Deschampsia caespitosa* etc.), Filipendulion (*Filipendula ulmaria* etc.), Molinieta (*Galium palustre*, *Lychnis flos-cuculi* etc.), Arrhenatheretalia (*Briza media*, *Stellaria graminea* etc.), Molinio-Arrhenatheretea (*Lathyrus pratensis*, *Trifolium repens*, *Agrostis capillaris*, *Prunella vulgaris*, *Cynosurus cristatus* etc.).

Bioforms spectrum: H-87%, G-7%, Ht-H-2%, T-H-2%, Ch-2%.

Floristic elements spectrum: Euras.-54%, Circ.-28%, Eur.-9%, Eur. centr.-2%, Cosm.-7%.

Ecological indices spectrum: preponderant light-species (L₇-53% and L₈-20%), eurythermic (T_x-63%) or preferring temperate sub-montane areas (T₅-24%). Most of the component species are euryionic (R_x-60%) and grows on humid soils (U₇-22% and U₈-23%) characterized by variable contents in nitrogen (can variate from very poor to moderate and rich).

5. *As. Angelico – Cirsietum oleracei* R. Tx. 1937

Chorology: phytocoenoses of *Angelico-Cirsietum oleracei* are frequently met in Neagra Broștenilor basin (nearby rivulets), including the vegetal communities edified by *Cirsium oleraceum* having in *Angelica sylvestris* the characteristic species. We identified these phytocoenoses in the proximity of Glodu, Neagra Broșteni localities, along many affluents of Neagra Broștenilor (Cristișor rivulet, Arsurii rivulet), growing in places with an excess of humidity, on neutral and rich in nutrients soils. The association has been presented before [SEGHEDIN, 1986] from the valley of Neagra Broștenilor.

Floristic composition and phytocenotic structure: floristic composition is variate, herbaceous layer is homogeneous, presents a covering degree varying between 95-100%, and includes numerous species: *Myosotis scorpioides*, *Lythrum salicaria*, *Ranunculus acris*, *Mentha longifolia*, *Impatiens noli-tangere*, *Lycopus europaeus* etc. (Tab. 4). From phytosociological point of view, increased constancy indices have been registered for species from: Calthion (*Caltha palustris*, *Scirpus sylvaticus* etc.), Filipendulion (*Chaerophyllum hirsutum*, *Lysimachia vulgaris* etc.), Deschampsion (*Juncus effusus*, *Deschampsia caespitosa* etc.), Molinietales (*Cirsium palustre* etc.), Molinio-Arrhenatheretea (*Lathyrus pratensis*, *Prunella vulgaris*, *Briza media*, *Trifolium repens*, *Lysimachia nummularia*, *Stellaria graminea* etc.).

Bioforms spectrum: H-75%, G-5%, Ht-H-4%, Ch-4%, T-4%, T-Ht-4%, Ht-2%, Ph-2%.

Floristic elements spectrum: Euras-57%, Circ.-20%, Cosm.-13%, Eur.-4%, Eur. centr.-4%, Carp.-balc.-cauc.-anat.-2%.

Ecological indices spectrum: preponderant light-species (L₇-49% and L₈-18%), eurythermic (T_x-58%) or preferring temperate sub-montane areas (T₅-33%). Most of the component species are euryionic (R_x-53%) and grows on humid soils (U₇-20% and U₈-28%), rich in nitrogen (N₇-15%, N₈-18%). Reduced proportions have been registered for shade (L₆-22%), euryhygrous (U_x-15%) and for species preferring neutral soils (R₇-22%, R₈-11%).

6. *As. Calthetum laetae* Krajina 1933

Chorology: vegetal communities edified by *Caltha palustris* (marsh marigold) have a sporadic distribution both in Neagra Broștenilor and its affluents valleys. These phytocoenoses grows on plane or moderate inclined terrains, on humid, neutral and with variable contents in nutrients soils. The association has been presented before [SEGHEDIN, 1986] from the valley of Neagra Broștenilor and Broșteni [MITITELU et al., 1989].

Floristic composition and phytocenotic structure: herbaceous layer is very diversified, presents a covering degree varying between 90-95% including numerous species: *Myosotis scorpioides*, *Filipendula ulmaria*, *Juncus effusus*, *Ranunculus repens*, *Equisetum palustre*, *Agrostis stolonifera*, *Valeriana officinalis* etc. (Tab. 5). From

phytosociological point of view, increased constancy indices have been registered for species from: Calthion (*Scirpus sylvaticus*, *Cirsium oleraceum*, *Angelica sylvestris*, *Polygonum bistorta* etc.), Filipendulion (*Lythrum salicaria*, *Filipendula ulmaria* etc.), Deschampsion (*Deschampsia caespitosa*, *Juncus conglomeratus* etc.), Molinietales (*Lychnis flos-cuculi*, *Juncus effusus*, *Cirsium palustre* etc.), Molinio-Arrhenatheretea (*Lathyrus pratensis*, *Trifolium repens*), Phragmiti-Magnocaricetea (*Lycopus europaeus*, *Galium palustre*, *Epilobium palustre* etc.).

Bioforms spectrum: H-78%, G-11%, Ht-5%, T-3%, Ch-3%.

Floristic elements spectrum: Euras.-49%, Circ.-32%, Eur.-8%, Cosm.-5%, Eur. centr.-3%, Carp.-balc.-cauc.-anat.-3%.

Ecological indices spectrum: preponderant light-species (L₇-52% and L₈-24%), eurythermic (T_x-55%) or preferring temperate sub-montane areas (T₅-29%). Most of the component species are euryionic (R_x-55%) or prefers neutral soils (R₇-18%) and grows on humid soils (U₇-26% and U₈-37%) characterized by variable contents in nitrogen.

7. As. *Filipendulo – Geranietum palustris* W. Koch 1926

Chorology: phytocoenoses of *Filipendulo-Geranietum palustris* presents a sporadic distribution in Neagra Broștenilor basin, both in this river and its affluents valleys. They occupy plane terrains with humid, moderate acid and relative poor in nutrients soils. This association has not been presented before from this region. We identified it in Glodu, Drăgoiasa, Criștor and Neagra Broșteni.

Floristic composition and phytocenotic structure: herbaceous layer is very diversified, presents a covering degree up to 100% including numerous species: *Lysimachia vulgaris*, *Caltha palustris*, *Juncus effusus*, *Lychnis flos-cuculi*, *Briza media*, *Troilus europaeus*, *Geum rivale*, *Juncus inflexus*, *Impatiens noli-tangere* etc. (Tab. 6). From phytosociological point of view, increased constancy indices have been registered for species from: Filipendulion (*Chaerophyllum hirsutum*, *Polygonum bistorta*, *Lythrum salicaria* etc.), Calthion (*Caltha palustris*, *Scirpus sylvaticus*, *Myosotis scorpioides* etc.), Deschampsion (*Deschampsia caespitosa*, *Juncus conglomeratus* etc.), Alopecurion (*Agrostis stolonifera*, *Phleum pratense*), Molinietales (*Lychnis flos-cuculi*, *Cirsium palustre*, *Succisa pratensis* etc.), Arrhenatheretalia (*Prunella vulgaris*, *Dactylis glomerata*, *Briza media* etc.), Molinio-Arrhenatheretea (*Holcus lanatus*, *Lysimachia nummularia* etc.).

Bioforms spectrum: H-80%, G-10%, Ht-5%, T-2%, Ch-3 %.

Floristic elements spectrum: Euras.-51%, Circ.-27%, Cosm.-8%, Eur. centr.-7%, Eur.-5%, Carp.-balc.-cauc.-anat.-2%.

Ecological indices spectrum: preponderant light-species (L₇-60% and L₈-15%), eurythermic (T_x-47%) or preferring temperate sub-montane areas (T₅-36%). Most of the component species are euryionic (R_x-52%) and grows on humid soils (U₇-24% and U₈-37%), characterized by variable contents in nitrogen. Reduced proportions have been registered for species preferring wet soils (U₉-8%) and neutral soils (R₇-17%, R₈-10%).

8. As. *Deschampsietum caespitosae* Hayek ex Horvatič 1930

Chorology: vegetal communities edified by *Deschampsia caespitosa* can be frequently met in Neagra Broștenilor basin, on plane terrains, with humid, moderate acid-neutral, with variable contents in nutrients soils. In this area, the association was mentioned from Criștor [LUNGU, 1969] (as *Calliervo cuspidatae-Deschampsietum*

caespitosae) and Păltiniș [SEGHEDIN, 1986]. We identified it in Neagra Broșteni, Păltiniș, Budacu Mountain and Criștișor.

Floristic composition and phytocenotic structure: herbaceous layer is diversified, presents a covering degree varying between 90-100% including numerous species as: *Juncus effusus*, *Myosotis scorpioides*, *Briza media*, *Succisa pratensis*, *Ranunculus repens*, *Potentilla erecta* etc. From phytosociological point of view, increased constancy indices have been registered for species from: Deschampsion (*Juncus effusus*, *Juncus conglomeratus*, *Carex pallescens* etc.), Filipendulion (*Filipendula ulmaria*, *Phleum pratense*, *Agrostis stolonifera* etc.), Calthion (*Myosotis scorpioides*, *Caltha palustris*, *Scirpus sylvaticus* etc.), Molinietaia (*Lychnis flos-cuculi*, *Parnassia palustris*, *Dactylorhiza maculata* etc.), Arrhenatheretalia (*Holcus lanatus*, *Briza media* etc.), Molinio-Arrhenatheretea (*Lathyrus pratensis*, *Agrostis capillaris*, *Stellaria graminea*, *Festuca rubra*, *Cynosurus cristatus*, *Trifolium repens*, *Trifolium pratense* etc.). (Tab. 7).

Bioforms spectrum: H-87%, G-7%, Ht-3%, T-3%.

Floristic elements spectrum: Euras.-53%, Circ.-22%, Eur.-10%, Eur. centr.-3%, Cosm.-12%.

Ecological indices spectrum: preponderant light-species (L₇-49% and L₈-21%), eurythermic (T_x-60%) or preferring temperate sub-montane areas (T₅-24%). Most of the component species are euryionic (R_x-59%) or grows on neutral soils (R₇-12%) and prefers moderat humid (U₅-21%, U₆-16%) and humid (U₇-14%, U₈-16%) soils, characterized by variable contents in nitrogen. Significant proportion has been registered for euryhygrous species (U_x – 21%).

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Tab. 1. *As. Junco – Molinietum coeruleae* Preising in R. Tx. et Preising ex Klapp 1954

Floristic element	Bioform	No. of relevé	1	2	3	4	5	K
		Altitude (m.s.m. x 10)	1060	1060	1000	1000	820	
		Aspect	SE	-	-	-	-	
		Slope (°)	2-3	-	-	-	-	
		Vegetation covering (%)	95	90	95	95	100	
		Plot area (m ²)	25	25	25	25	25	
<i>Car. as.</i>								
Cosm.	H	<i>Juncus effusus</i>	1	-	+	+	1	IV
Circ.	H	<i>Juncus conglomeratus</i>	-	+	-	+	-	II
<i>Molinion et Molinieta caeruleae</i>								
Euras.	H	<i>Molinia caerulea</i>	4	4	4	4	4	V
Euras.	H	<i>Succisa pratensis</i>	+	-	+	+	+	IV
Eur.	T-H	<i>Linum catharticum</i>	+	+	-	+	+	IV
Circ.	G	<i>Equisetum palustre</i>	+	-	+	-	-	II
Euras.	Ht	<i>Cirsium palustre</i>	+	+	+	+	+	V
Euras.	H	<i>Lychnis flos-cuculi</i>	+	+	+	+	-	IV
Euras.	G	<i>Polygonum bistorta</i>	-	+	-	+	-	II
Eur. centr.	G	<i>Dactylorhiza maculata</i>	-	+	+	+	+	IV
<i>Calthion</i>								
Circ.	G	<i>Scirpus sylvaticus</i>	+	+	-	+	+	IV
Euras.	H	<i>Myosotis scorpioides</i>	+	+	+	+	+	V
Circ.	H	<i>Caltha palustris</i>	-	+	-	+	-	II
Euras.	H	<i>Cirsium oleraceum</i>	-	-	+	-	+	II
<i>Filipendulion</i>								
Euras.	H	<i>Filipendula ulmaria</i>	+	+	-	-	+	III
<i>Deschampsion</i>								
Cosm.	H	<i>Deschampsia caespitosa</i>	+	+	1	+	+	V
<i>Molinio – Arrhenatheretea</i>								
Circ.	H	<i>Parnassia palustris</i>	+	-	+	+	+	IV
Euras.	H	<i>Briza media</i>	+	+	+	+	+	V
Euras.	H	<i>Stellaria graminea</i>	+	-	-	+	+	III
Eur.	T	<i>Trifolium spadiceum</i>	+	-	-	+	-	II
Circ.	H (G)	<i>Agrostis capillaris</i>	1	+	1	1	+	V
Euras.	H	<i>Trifolium repens</i>	+	1	1	+	+	V
Euras.	H	<i>Lathyrus pratensis</i>	-	+	-	+	+	III
Eur.	H	<i>Cynosurus cristatus</i>	-	+	+	+	+	IV
Circ.	H	<i>Festuca rubra</i>	-	-	+	+	1	III
Euras.	H	<i>Phleum pratense</i>	-	-	-	+	+	II
Euras.	H	<i>Anthoxanthum odoratum</i>	-	-	-	+	+	II
Euras.	H	<i>Leucanthemum vulgare</i>	-	-	-	+	+	II
Euras.	H	<i>Trifolium pratense</i>	-	-	-	+	+	II
<i>Variae syntaxa</i>								
Euras.	H	<i>Ranunculus repens</i>	+	-	-	+	-	II
Euras.	H	<i>Potentilla erecta</i>	1	1	+	+	+	V
Eur.	H	<i>Alchemilla vulgaris</i>	-	-	+	1	-	II

Species in one relevé (K-I): *Stachys officinalis* (Euras., H, rel. 5); *Juncus articulatus* (Circ., H, rel. 5); *Angelica sylvestris* (Euras., Ht-H, rel. 4); *Lysimachia vulgaris* (Euras., H, rel. 5); *Lythrum salicaria* (Circ., H, rel. 5); *Trollius europaeus* (Eur., H, rel. 3); *Lysimachia nummularia* (Euras., Ch, rel. 3); *Carex pallescens* (Circ., H, rel. 4); *Euphrasia officinalis* ssp. *pratensis* (Eur., T, rel. 4); *Holcus lanatus* (Cosm., H, rel. 5); *Prunella vulgaris* (Cosm., H, rel. 5); *Dactylis glomerata* (Euras., H, rel. 5); *Taraxacum officinale* (Euras., H, rel. 5); *Gymnadenia conopsea* (Eur., G, rel. 5); *Carex nigra* (Circ., G, rel. 1); *Ligularia sibirica* (Euras., H, rel. 1); *Eriophorum angustifolium* (Circ., G, rel. 2); *Carex flava* (Eur., H, rel. 3); *Carex echinata* (Circ., H, rel. 2); *Geum rivale* (Circ., H, rel. 2); *Valeriana officinalis* (Euras., H, rel. 4); *Lychnis viscaria* (Euras., H, rel. 5).

Place and date of relevées: Drăgoiasa (rel. 1-4): 12.07.2008, Criștor (rel. 5): 3.07.2007.

Tab. 2. *As. Scirpetum sylvatici* Ralski 1931

Floristic element	Bioform	No. of relevé	1	2	3	4	5	6	K
		Altitude (m.s.m. x 10)	1000	950	700	700	800	950	
		Aspect	-	E	-	-	-	-	
		Slope (°)	-	2-3	-	-	-	-	
		Vegetation covering (%)	90	95	95	100	90	95	
		Plot area (m ²)	25	25	100	100	25	25	
Car. ass.									
Circ.	G	<i>Scirpus sylvaticus</i>	4	5	5	5	5	4	V
<i>Calthion</i>									
Euras.	Ht-H	<i>Angelica sylvestris</i>	+	-	-	+	+	-	III
Euras.	H	<i>Myosotis scorpioides</i>	1	+	+	-	+	+	V
Circ.	H	<i>Caltha palustris</i>	+	-	+	+	+	1	V
Euras.	H	<i>Cirsium oleraceum</i>	-	+	+	+	+	-	IV
<i>Filipendulion</i>									
Euras.	H	<i>Filipendula ulmaria</i>	+	+	+	-	-	+	IV
Circ.	H	<i>Lythrum salicaria</i>	-	-	+	-	+	-	II
<i>Alopecurion</i>									
Circ.	H	<i>Agrostis stolonifera</i>	-	+	-	+	-	-	II
<i>Deschampsion</i>									
Cosm.	H	<i>Juncus effusus</i>	+	-	+	+	-	+	IV
Cosm.	H	<i>Deschampsia caespitosa</i>	-	+	+	-	-	+	III
<i>Molinion et Molinieta</i>									
Circ.	H	<i>Parnassia palustris</i>	+	+	-	-	-	+	III
Euras.	H	<i>Lychnis flos-cuculi</i>	+	-	-	+	-	-	II
Euras.	G	<i>Polygonum bistorta</i>	+	-	+	+	-	-	III
Euras.	H	<i>Succisa pratensis</i>	+	-	-	-	+	-	II
Euras.	Ht	<i>Cirsium palustre</i>	-	+	+	+	-	-	III
<i>Arrhenatherion et Arrhenatheretalia</i>									
Cosm.	H	<i>Holcus lanatus</i>	-	+	-	-	+	-	II
Euras.	Ch	<i>Lysimachia nummularia</i>	-	+	-	+	+	-	III
Euras.	H	<i>Briza media</i>	-	-	+	+	-	-	II
Euras.	H	<i>Lathyrus pratensis</i>	-	-	+	-	+	-	II
<i>Molinio – Arrhenatheretea</i>									
Euras.	H	<i>Trifolium repens</i>	+	-	+	+	-	+	IV
Circ.	H (G)	<i>Agrostis capillaris</i>	-	-	-	+	+	-	II
<i>Phragmiti – Magnocaricetea</i>									
Circ.	G	<i>Equisetum palustre</i>	+	-	-	-	-	+	II
Circ.	H	<i>Epilobium palustre</i>	-	+	+	-	-	-	II
Euras.	H	<i>Lycopus europaeus</i>	-	-	+	+	-	-	II
<i>Scheuchzerio – Caricetea nigrae</i>									
Circ.	H	<i>Carex echinata</i>	+	-	-	-	+	-	II
Circ.	G	<i>Carex nigra</i>	+	+	-	-	-	-	II
<i>Variae syntaxa</i>									
Euras.	H	<i>Ranunculus repens</i>	+	-	+	-	-	+	III
Euras.	H	<i>Potentilla erecta</i>	+	+	-	-	+	-	III
Euras.	H	<i>Mentha longifolia</i>	-	-	+	+	-	+	III
Circ.	H	<i>Geum rivale</i>	-	-	+	-	+	-	II
Euras.	H	<i>Juncus inflexus</i>	-	-	-	+	-	+	II

Species in one relevé (K-I): *Chaerophyllum hirsutum* (Eur. centr., H, rel. 2); *Lysimachia vulgaris* (Euras., H, rel. 4); *Geranium palustre* (Euras., H, rel. 6); *Phleum pratense* (Euras., H, rel. 3); *Juncus conglomeratus* (Circ., H, rel. 3); *Carex pallescens* (Circ., H, rel. 4); *Symphytum officinale* (Euras., H, rel. 5); *Alchemilla vulgaris* (Euras., H, rel. 5); *Cynosurus cristatus* (Eur., H, rel. 5); *Trifolium pratense* (Euras., H, rel. 5); *Prunella vulgaris* (Cosm., H, rel. 5); *Poa pratensis* (Cosm., H, rel. 5); *Trollius europaeus* (Eur., H, rel. 6); *Glyceria plicata* (Circ., H, rel. 5); *Eleocharis palustris* (Cosm., G, rel. 6); *Potentilla anserina* (Cosm., H, rel. 4); *Telekia speciosa* (Carp.-balc.-cauc.-anat., H, rel. 5); *Rumex sanguineus* (Eur., H, rel. 4); *Cirsium heterophyllum* (Euras., H, rel. 5); *Rumex crispus* (Euras., H, rel. 6); Place and date of relevés: Drăgoiasa (rel. 1): 3.07.2007; Glodu (rel. 2): 3.07.2007; Neagra Broșteni (rel. 3-4): 29.07.2007; Criștoșor (rel. 5): 3.09.2007; Păltiniș (rel. 6): 1.08.2008.

Tab. 3. *As. Cirsietum rivularis* Nowinski 1928

Floristic element	Bioform	No. of relevé	1	2	3	4	5	K
		Altitude (m.s.m. x 10)	700	750	700	700	800	
		Aspect	E	SE	-	-	SV	
		Slope (°)	3	5	-	-	2-3	
		Vegetation covering (%)	95	95	85	90	95	
		Plot area (m ²)	10	15	10	20	15	
<i>Car. ass.</i>								
Eur. centr.	H	<i>Cirsium rivulare</i>	4	4	3	4	4	V
<i>Calthion palustris</i>								
Circ.	G	<i>Scirpus sylvaticus</i>	+	1	1	-	+	IV
Circ.	H	<i>Caltha palustris</i>	1	1	-	1	-	III
Euras.	H	<i>Myosotis scorpioides</i>	+	+	1	+	+	V
Euras.	H	<i>Cirsium oleraceum</i>	-	+	-	+	-	II
Euras.	Ht-H	<i>Angelica sylvestris</i>	-	-	+	-	+	II
<i>Deschampsion</i>								
Cosm.	H	<i>Juncus effusus</i>	+	-	+	+	-	III
Cosm.	H	<i>Deschampsia caespitosa</i>	1	+	1	1	+	V
Circ.	H	<i>Carex ovalis</i>	+	-	+	-	-	II
<i>Filipendulion</i>								
Circ.	H	<i>Lythrum salicaria</i>	+	-	+	-	-	II
Euras.	H	<i>Filipendula ulmaria</i>	+	+	+	+	+	V
<i>Molinion et Molinietales coeruleae</i>								
Circ.	H	<i>Galium palustre</i>	+	-	+	+	-	III
Circ.	H	<i>Parnassia palustris</i>	+	-	+	-	-	II
Euras.	H	<i>Lychnis flos-cuculi</i>	+	+	+	+	+	V
Circ.	H	<i>Juncus articulatus</i>	-	-	+	+	-	II
<i>Arrhenatheretalia</i>								
Euras.	H	<i>Briza media</i>	+	+	+	+	+	V
Euras.	H	<i>Dactylis glomerata</i>	+	-	-	+	+	III
Euras.	H	<i>Stellaria graminea</i>	+	+	+	+	+	V
<i>Molinio – Arrhenatheretea</i>								
Euras.	H	<i>Lathyrus pratensis</i>	+	1	+	+	+	V
Euras.	H	<i>Trifolium repens</i>	+	1	1	+	1	V
Circ.	H (G)	<i>Agrostis capillaris</i>	+	+	+	+	+	V
Circ.	H	<i>Festuca rubra</i>	+	+	-	+	-	III
Cosm.	H	<i>Prunella vulgaris</i>	+	-	+	-	+	III
Euras.	H	<i>Trifolium pratense</i>	+	-	+	+	+	IV
Euras.	H	<i>Ranunculus acris</i>	-	+	+	+	-	III
Eur.	H	<i>Cynosurus cristatus</i>	-	-	-	+	+	II
<i>Variae syntaxa</i>								
Euras.	H	<i>Ranunculus repens</i>	+	-	-	-	1	II
Circ.	H	<i>Geum rivale</i>	+	+	-	+	-	III
Euras.	H	<i>Cruciata glabra</i>	+	-	-	-	+	II
Euras.	H	<i>Mentha longifolia</i>	-	-	+	+	-	II

Species in one relevé (K-I): *Polygonum bistorta* (Euras., G, rel. 2); *Juncus conglomeratus* (Circ., H, rel. 5); *Lysimachia vulgaris* (Euras., H, rel. 3); *Succisa pratensis* (Euras., H, rel. 2); *Linum catharticum* (Eur., T-H, rel. 5); *Centaurea phrygia* (Eur., H, rel. 1); *Leucanthemum vulgare* (Euras., H, rel. 5); *Festuca pratensis* (Euras., H, rel. 2); *Trollius europaeus* (Eur., H, rel. 3); *Phleum pratense* (Euras., H, rel. 3); *Lysimachia nummularia* (Euras., Ch, rel. 4); *Anthoxanthum odoratum* (Euras., H, rel. 5); *Equisetum palustre* (Circ., G, rel. 2); *Epilobium palustre* (Circ., H, rel. 3); *Potentilla erecta* (Euras., H, rel. 3); *Lycopus europaeus* (Euras., H, rel. 5).

Place and date of relevés: Neagra Broșteni: 5.07.2008 (rel. 1-2); Criștișor: 5.07.2008 (rel. 3); Dârmoxa: 18.07.2009 (rel. 5).

Tab. 4. *As. Angelico – Cirsietum oleracei* R. Tx. 1937

Floristic elements	Bioform	No. of relevé	1	2	3	4	5	6	7	K
		Altitude (m.s.m. x 10)	900	900	800	810	750	800	680	
		Aspect	-	V	-	-	-	SE	E	
		Slope (°)	-	2-3	-	-	-	5	2-3	
		Vegetation covering (%)	100	100	95	100	95	100	100	
		Plot area (m ²)	20	25	20	20	25	25	25	
<i>Car. ass.</i>										
Euras.	Ht-H	<i>Angelica sylvestris</i>	+	+	-	-	+	-	+	III
<i>Calthion palustris</i>										
Euras.	H	<i>Cirsium oleraceum</i>	5	4	4	5	4	5	4	V
Euras.	H	<i>Myosotis scorpioides</i>	+	+	+	+	+	+	+	V
Circ.	H	<i>Caltha palustris</i>	+	1	+	-	1	+	+	V
Circ.	G	<i>Scirpus sylvaticus</i>	+	1	1	+	+	+	+	V
<i>Filipendulion</i>										
Euras.	H	<i>Filipendula ulmaria</i>	1	+	+	+	1	+	1	V
Eur. centr.	H	<i>Chaerophyllum hirsutum</i>	+	-	+	-	-	+	+	III
Euras.	H	<i>Lysimachia vulgaris</i>	+	-	+	-	-	+	+	III
Circ.	H	<i>Lythrum salicaria</i>	-	+	+	-	-	-	+	III
<i>Deschampsion</i>										
Cosm.	H	<i>Juncus effusus</i>	+	+	+	+	+	+	+	V
Cosm.	H.	<i>Deschampsia caespitosa</i>	+	+	-	-	+	-	-	III
<i>Molinion et Molinieta lia caeruleae</i>										
Euras.	Ht	<i>Cirsium palustre</i>	+	-	+	-	-	-	-	II
Circ.	H	<i>Parnassia palustris</i>	-	+	-	-	+	-	-	II
Euras.	H	<i>Lychnis flos-cuculi</i>	-	+	-	-	+	-	-	II
<i>Arrhenatheretalia et Molinio – Arrhenatheretea</i>										
Euras.	H	<i>Lathyrus pratensis</i>	+	+	+	-	-	+	-	III
Cosm.	H	<i>Prunella vulgaris</i>	+	+	-	+	+	+	+	V
Euras.	H	<i>Briza media</i>	+	+	+	-	+	-	-	III
Euras.	Ch	<i>Lysimachia nummularia</i>	+	+	-	+	+	+	+	V
Euras.	H	<i>Trifolium repens</i>	+	+	1	+	+	+	+	V
Euras.	H	<i>Dactylis glomerata</i>	+	-	+	-	-	-	+	III
Euras.	H	<i>Festuca pratensis</i>	-	+	-	-	-	-	+	II
Euras.	H	<i>Phleum pratense</i>	-	+	-	+	-	-	-	II
Cosm.	H	<i>Holcus lanatus</i>	-	-	-	+	+	-	-	II
Euras.	H	<i>Stellaria graminea</i>	-	-	-	+	+	-	+	III
Euras.	Ht-H	<i>Heracleum sphondylium</i>	-	-	-	+	-	+	-	II
<i>Variae syntaxa</i>										
Euras.	H	<i>Ranunculus repens</i>	+	-	+	+	+	-	+	IV
Euras.	G	<i>Petasites hybridus</i>	+	-	-	-	-	+	-	II
Circ.	H	<i>Epilobium palustre</i>	+	+	-	-	+	-	-	III
Euras.	H	<i>Potentilla erecta</i>	+	+	+	-	-	-	+	III
Euras.	H	<i>Mentha longifolia</i>	+	-	+	+	-	+	+	IV
Cosm.	T-Ht	<i>Stellaria media</i>	-	+	-	+	+	+	-	III
Carp.-balc.-cauc.-anat.	H	<i>Telekia speciosa</i>	-	+	+	+	-	+	-	III
Eur.	H	<i>Rumex sanguineus</i>	-	+	-	-	+	-	-	II
Euras.	Ch	<i>Solanum dulcamara</i>	-	-	+	+	+	-	-	III
Euras.	H (HH)	<i>Lycopus europaeus</i>	-	-	+	-	-	+	+	III
Euras.	T	<i>Impatiens noli-tangere</i>	-	-	+	-	-	+	+	III
Euras.	G	<i>Tussilago farfara</i>	-	-	-	+	-	-	+	II
Cosm.	H	<i>Urtica dioica</i>	-	-	-	-	+	+	-	II

Species in one relevé (K-I): *Geranium palustre* (Euras., H, rel. 2); *Ranunculus acris* (Euras., H, rel. 2); *Carex echinata* (Circ., H, rel. 3); *Trifolium pratense* (Euras., H, rel. 5); *Centaurea phrygia* (Eur., H, rel. 6); *Agrostis capillaris* (Circ., H, rel. 7); *Equisetum fluviatile* (Circ., HH, rel. 1); *Juncus articulatus* (Circ., H, rel. 2); *Valeriana*

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officinalis (Euras., H, rel. 3); *Stachys sylvatica* (Euras., H, rel. 3); *Cirsium erisithales* (Eur. centr., H, rel. 4); *Rubus idaeus* (Circ., Ph, rel. 5); *Eupatorium cannabinum* (Euras., H, rel. 5); *Glechoma hederacea* (Euras., H, rel. 7); *Poa pratensis* (Circ., H, rel. 7); *Geranium robertianum* (Cosm., T-Ht, rel. 7); *Torilis japonica* (Euras., T, rel. 7).

Place and date of relevées: Glodu: 18.07.2009 (rel. 1-2); Cristișor: 2.07.2007 (rel. 3-4); pârâul Arsurii: 19.09.2007 (rel. 5); Budacu: 14.07.2008 (rel. 6); Neagra Broșteni: 13.07.2008 (rel. 7).

Tab. 5. *As. Calthetum laetae* Krajina 1933

Floristic element	Bioform	No. of relevé	1	2	3	4	5	K
		Altitude (m.s.m. x 10)	750	820	820	1000	900	
		Aspect	-	-	-	-	-	
		Slope (°)	-	-	-	-	-	
		Vegetation covering (%)	90	90	95	95	90	
		Plot area (m ²)	15	15	10	10	20	
<i>Car. as.</i>								
Circ.	H	<i>Caltha palustris</i>	4	4	5	4	5	V
<i>Calthion</i>								
Euras.	H	<i>Myosotis scorpioides</i>	+	+	+	+	+	V
Circ.	G	<i>Scirpus sylvaticus</i>	1	+	+	+	-	IV
Euras.	H	<i>Cirsium oleraceum</i>	+	-	-	+	-	III
Euras.	Ht-H	<i>Angelica sylvestris</i>	+	-	+	-	+	III
Atl.-eur.	H	<i>Trifolium hybridum</i>	-	+	-	+	-	II
Euras.	G	<i>Polygonum bistorta</i>	-	-	+	+	-	II
<i>Filipendulion</i>								
Euras.	H	<i>Filipendula ulmaria</i>	+	-	-	+	+	III
<i>Deschampsion</i>								
Cosm.	H	<i>Deschampsia caespitosa</i>	+	+	+	-	+	IV
<i>Molinietalia</i>								
Euras.	H	<i>Lychnis flos-cuculi</i>	+	-	+	+	-	III
Cosm.	H	<i>Juncus effusus</i>	+	+	-	-	+	III
Euras.	Ht	<i>Cirsium palustre</i>	-	+	+	-	-	II
Circ.	H	<i>Cardamine pratensis</i>	-	+	+	-	-	II
Circ.	H	<i>Parnassia palustris</i>	-	-	+	-	+	II
Euras.	H	<i>Succisa pratensis</i>	-	-	+	+	-	II
<i>Molinio – Arrhenatheretea</i>								
Euras.	Ch	<i>Lysimachia nummularia</i>	+	-	+	+	+	IV
Euras.	H	<i>Ranunculus repens</i>	+	+	+	1	+	V
Euras.	H	<i>Lathyrus pratensis</i>	-	+	-	+	-	II
Euras.	H	<i>Trifolium repens</i>	-	-	-	+	+	II
<i>Phragmiti – Magnocaricetea</i>								
Euras.	H (HH)	<i>Lycopus europaeus</i>	+	-	-	+	-	II
Circ.	H	<i>Epilobium palustre</i>	+	+	-	-	-	II
Euras.	H (HH)	<i>Veronica beccabunga</i>	-	+	+	-	-	II
<i>Variae syntaxa</i>								
Circ.	G	<i>Equisetum palustre</i>	+	+	-	-	-	II
Circ.	H	<i>Agrostis stolonifera</i>	+	+	+	-	-	III
Euras.	H	<i>Potentilla erecta</i>	+	-	-	+	-	II
Circ.	H	<i>Geum rivale</i>	-	+	-	+	-	II
Euras.	T	<i>Bidens tripartita</i>	-	-	+	+	-	II
Circ.	H (HH)	<i>Glyceria notata</i>	-	-	-	+	+	II
Carp.- balc.- cauc.-anat.	H	<i>Telekia speciosa</i>	-	-	-	+	+	II

Species in one relevé (K-I): *Lythrum salicaria* (Circ., H, rel. 1); *Lysimachia vulgaris* (Euras., H, rel. 2); *Juncus conglomeratus* (Circ., H, rel. 2); *Dactylorhiza maculata* (Eur. centr., G, rel. 4); *Symphytum officinale* (Euras., H, rel. 5); *Galium palustre* (Circ., H, rel. 2); *Carex flava* (Eur., H, rel. 3); *Carex echinata* (Circ., H, rel. 4); *Valeriana officinalis* (Euras., H, rel. 5);

Place and date of relevées: Neagra Broșteni (rel. 1): 28.07.2006; Cristișor (rel. 2-3): 3.07.2007; Drăgoiasa (rel. 4): 12.07.2008; Glodu (rel. 5): 13.08.2008.

Tab. 6. *As. Filipendulo – Geranietum palustris* W. Koch 1926

Floristic element	Bioform	No. of relevé	1	2	3	4	5	K
		Altitude (m.s.m. x 10)	850	1000	800	700	680	
		Aspect	-	SE	E	V	-	
		Slope (°)	-	4-5	3-4	5	-	
		Vegetation covering (%)	95	100	95	100	100	
		Plot area (m ²)	100	100	100	100	100	
<i>Car. as.</i>								
Euras.	H	Filipendula ulmaria	4	4	4	5	5	V
Euras.	H	Geranium palustre	+	1	+	+	+	V
<i>Filipendulion</i>								
Eur. centr.	H	Chaerophyllum hirsutum	+	+	-	+	-	III
Circ.	H	Lythrum salicaria	+	-	-	+	+	III
Euras.	H	Lysimachia vulgaris	+	-	+	-	-	II
Euras.	G	Polygonum bistorta	-	+	+	+	-	III
<i>Calthion</i>								
Circ.	H	Caltha palustris	+	1	1	+	-	IV
Euras.	H	Myosotis scorpioides	+	+	+	+	+	V
Euras.	H	Cirsium oleraceum	1	-	-	+	+	III
Circ.	G	Scirpus sylvaticus	+	+	-	-	-	II
Euras.	Ht-H	Angelica sylvestris	-	-	+	-	+	II
<i>Deschampsion</i>								
Cosm.	H	Deschampsia caespitosa	+	+	+	+	+	V
Cosm.	H	Juncus effusus	+	+	+	-	-	III
<i>Alopecurion</i>								
Circ.	H	Agrostis stolonifera	-	-	-	+	+	II
<i>Molinion et Molinieta</i>								
Euras.	H	Lychnis flos-cuculi	+	-	+	-	-	II
Circ.	H	Galium palustre	+	+	-	-	-	II
Euras.	Ht	Cirsium palustre	+	-	+	-	+	III
Euras.	H	Symphytum officinale	-	-	+	+	-	II
<i>Arrhenatherion et Arrhenatheretalia</i>								
Cosm.	H	Prunella vulgaris	+	-	-	-	+	II
Euras.	H	Dactylis glomerata	-	-	+	-	+	II
Euras.	H	Briza media	-	-	+	-	+	II
<i>Molinio – Arrhenatheretea</i>								
Euras.	H	Lathyrus pratensis	-	+	-	-	+	II
Cosm.	H	Holcus lanatus	-	-	+	-	+	II
Euras.	Ch	Lysimachia nummularia	-	-	+	+	-	II
Euras.	H	Trifolium repens	-	-	-	+	+	II
<i>Phragmiti – Magnocaricetea</i>								
Circ.	G	Equisetum palustre	+	-	+	-	-	II
Euras.	H	Lycopus europaeus	+	-	+	-	-	II
Circ.	H	Epilobium palustre	+	+	-	-	-	II
<i>Scheuchzerio – Caricetea nigrae</i>								
Eur. centr.	G	Dactylorhiza maculata	-	-	+	-	+	II

ASSOCIATIONS OF *MOLINIETALIA* KOCH 1926 (*MOLINIO-ARRHENATHERETEA* R. Tx. 1937) ...

<i>Variae syntaxa</i>								
Circ.	H	Geum rivale	+	+	-	-	+	III
Euras.	H	Mentha longifolia	+	-	+	+	-	III
Euras.	H	Ranunculus repens	+	+	-	-	+	III
Euras.	H	Potentilla erecta	-	+	+	-	-	II
Euras.	T	Impatiens noli-tangere	-	+	-	+	-	II
Eur.	H	Rumex sanguineus	-	-	+	-	+	II
Euras.	H	Eupatorium cannabinum	-	-	-	+	+	II
Euras.	Ch	Solanum dulcamara	-	-	-	+	+	II
Euras.	G	Petasites hybridus	-	-	-	+	+	II
Euras.	H		-	-	-	-	+	I

Species in one relevé (K-1): *Epilobium hirsutum* (Euras., H, rel. 4); *Juncus conglomeratus* (Circ., H, rel. 1); *Phleum pratense* (Euras., H, rel. 5); *Parnassia palustris* (Circ., H, rel. 2); *Succisa pratensis* (Euras., H, rel. 2); *Molinia caerulea* (Euras., H, rel. 3); *Heracleum sphondylium* (Euras., Ht-H, rel. 5); *Trifolium pratense* (Euras., H, rel. 5); *Trollius europaeus* (Eur., H, rel. 1); *Agrostis capillaris* (Circ., H, rel. 3); *Alchemilla vulgaris* (Eur., H, rel. 5); *Festuca rubra* (Circ., H, rel. 5); *Carex nigra* (Circ., G, rel. 2); *Eriophorum vaginatum* (Circ., H, rel. 2); *Carex echinata* (Circ., H, rel. 2); *Cirsium rivulare* (Eur. centr., H, rel. 3); *Telekia speciosa* (Carp.-balc.-cauc.-anat., H, rel. 3); *Carex vesicaria* (Circ., H, rel. 3); *Potentilla anserina* (Cosm., H, rel. 4); *Carduus personatus* ((Eur. centr., H, rel. 4); *Valeriana officinalis* (Euras., H, rel. 5).

Place and date of relevés: Glodu (rel. 1): 13.07.2008; Drăgoiasa (rel. 2): 13.07.2008; Cristișor (rel. 3): 2.07.2007; Neagra Broșteni (rel. 4-5): 9.07.2007.

Tab. 7. *As. Deschampsietum caespitosae* Hayek ex Horvatič 1930

Floristic element	Bioform	No. of relevé	1	2	3	4	5	6	K
		Altitude (m.s.m. x 10)	700	750	800	750	800	700	
Aspect		SV	-	N	-	-	-		
Slope (°)		2-3	-	5	-	-	-		
Vegetation covering (%)		95	100	95	90	95	100		
Plot area (m ²)		100	100	100	50	50	100		
<i>Car. as.</i>									
Cosm.	H	<i>Deschampsia caespitosa</i>	4	5	4	4	4	5	V
<i>Deschampsion</i>									
Cosm.	H	<i>Juncus effusus</i>	+	-	1	-	+	-	III
Euras.	H	<i>Stachys officinalis</i>	+	+	-	-	-	+	III
Circ.	H	<i>Juncus conglomeratus</i>	-	+	+	-	-	-	II
<i>Filipendulion</i>									
Euras.	H	<i>Filipendula ulmaria</i>	1	-	+	+	+	-	IV
Euras.	H	<i>Phleum pratense</i>	+	-	-	-	+	-	II
Circ.	H	<i>Agrostis stolonifera</i>	-	+	+	-	-	+	III
<i>Calthion</i>									
Euras.	H	<i>Myosotis scorpioides</i>	+	-	+	+	-	+	IV
Circ.	G	<i>Scirpus sylvaticus</i>	-	+	+	-	1	-	III
Circ.	H	<i>Caltha palustris</i>	-	+	-	+	-	-	II
<i>Arrhenatherion et Arrhenatheretalia</i>									
Cosm.	H	<i>Holcus lanatus</i>	+	+	+	+	-	-	IV
Euras.	H	<i>Briza media</i>	+	+	-	+	+	+	V
Euras.	Ht-H	<i>Heracleum sphondylium</i>	+	-	-	-	+	-	II
Euras.	H	<i>Leucanthemum vulgare</i>	-	-	+	-	-	+	II

<i>Molinietalia</i>									
Euras.	H	Lychnis flos-cuculi	+	+	-	+	-	+	IV
Euras.	H	Succisa pratensis	+	+	-	-	+	-	III
Circ.	H	Lythrum salicaria	-	+	-	+	-	-	II
Circ.	H	Parnassia palustris	-	-	+	-	-	+	II
Eur.	T-H	Linum catharticum	-	-	-	+	+	-	II
Eur.	G	Dactylorhiza maculata	-	-	+	-	+	-	II
<i>Molinio – Arrhenatheretea</i>									
Euras.	H	Lathyrus pratensis	+	+	-	+	+	+	V
Cosm.	H	Prunella vulgaris	+	-	-	-	+	+	III
Circ.	H (G)	Agrostis capillaris	+	-	+	+	+	-	IV
Euras.	H	Stellaria graminea	+	-	+	-	-	+	III
Circ.	H	Festuca rubra	+	+	-	+	+	+	V
Euras.	H	Trifolium repens	+	+	+	+	+	+	V
Euras.	H	Anthoxanthum odoratum	+	+	-	-	-	+	III
Euras.	H	Ranunculus acris	+	-	-	+	-	-	II
Eur.	H	Cynosurus cristatus	+	-	-	-	+	+	III
Euras.	H	Trifolium pratense	-	+	-	+	-	+	III
Eur.	H	Alchemilla vulgaris	-	+	+	-	+	-	III
Cosm.	H	Poa pratensis	-	+	+	-	-	-	II
Eur.	H (Ch)	Polygala vulgaris	-	+	-	+	-	-	II
Euras.	Ch	Lysimachia nummularia	-	-	+	-	-	+	II
<i>Variae syntaxa</i>									
Euras.	H	Ranunculus repens	+	-	+	-	-	+	III
Euras.	H	Potentilla erecta	+	+	-	-	+	-	III
Euras.	H	Mentha longifolia	-	+	-	+	-	+	III
Circ.	H	Cirsium oleraceum	-	+	+	-	-	-	II
Euras.	H	Rumex crispus	-	-	+	+	-	-	II

Species in one relevé (K-I): Juncus articulatus (Circ., H, rel. 4); Carex pallescens (Circ., H, rel. 5); Leontodon autumnalis (Euras., H, rel. 1); Campanula glomerata (Euras., H, rel. 3); Taraxacum officinale (Euras., H, rel. 3); Molinia caerulea (Euras., H, rel. 4); Carum carvi (Euras., H, Ht-H); Trollius europaeus (Eur., H, rel. 4); Cerastium fontanum (Euras., Ch, rel. 4); Centaurea phrygia (Eur., H, rel. 4); Cruciata glabra (Euras., H, rel. 1); Carex nigra (Circ., G, rel. 5); Geum rivale (Circ., H, rel. 4); Luzula luzuloides (Eur. centr, H, rel. 5); Pteridium aquilinum (Cosm., G, rel. 6).

Place and date of relevés: Neagra Broșteni: 8.07.2007 (rel. 1-2); Păltiniș: 2.08.2008 (rel. 3); Budacu: 28.06.2006 (rel. 4-5); Criștișor (rel. 6): 29.07.2007.

Tab. 8. As. *Epilobio – Juncetum effusi* Oberd. 1957

Floristic element	Bioform	No. of relevé	1	2	3	4	5	6	7	8	9	10	K
		Altitude (m.s.m. x 10)	1000	980	700	750	1000	900	800	850	800	820	
		Aspect	-	-	SE	-	E	-	V	NV	-	-	
		Slope (°)	-	-	1-2	-	5	-	3-4	5	-	-	
		Vegetation covering (%)	90	95	90	95	90	95	90	95	95	95	
		Plot area (m ²)	25	20	25	25	25	20	10	10	20	25	
<i>Car. as.</i>													
Cosm.	H	<i>Juncus effusus</i>	4	4	4	5	4	5	4	4	5	4	V
Circ.	H	<i>Epilobium palustre</i>	-	-	+	+	-	-	+	-	-	+	II
<i>Calthion</i>													
Circ.	H	<i>Caltha palustris</i>	1	1	+	-	+	+	-	+	+	+	IV
Euras.	H	<i>Myosotis scorpioides</i>	+	+	+	+	+	+	+	+	+	+	V
Circ.	G	<i>Scirpus sylvaticus</i>	+	+	+	+	+	-	+	+	+	1	V
Circ.	H	<i>Cirsium oleraceum</i>	+	-	+	+	-	-	-	+	-	+	III
Euras.	Ht-H	<i>Angelica sylvestris</i>	-	-	+	+	-	-	+	-	-	+	II
<i>Molinietalia</i>													
Euras.	H	<i>Filipendula ulmaria</i>	+	-	+	+	-	-	-	+	+	+	III
Circ.	H	<i>Lythrum salicaria</i>	-	-	+	+	-	+	-	-	+	+	III
Cosm.	H	<i>Deschampsia caespitosa</i>	+	+	-	-	+	+	+	1	+	+	V
Circ.	H	<i>Juncus conglomeratus</i>	+	-	+	-	+	-	+	-	-	-	II
Euras.	H	<i>Lychnis flos-cuculi</i>	+	+	-	-	+	+	+	-	+	+	IV
Circ.	H	<i>Parnassia palustris</i>	+	-	-	+	+	-	-	-	-	+	II
Euras.	H	<i>Succisa pratensis</i>	-	-	+	-	-	-	+	-	+	+	II
Cosm.	H	<i>Holcus lanatus</i>	+	-	+	+	-	-	+	+	-	-	II
Euras.	H	<i>Briza media</i>	-	-	+	-	+	+	+	+	+	-	III
Euras.	H	<i>Phleum pratense</i>	-	-	+	+	+	-	-	-	+	-	II
Eur.	H	<i>Cynosurus cristatus</i>	-	-	-	-	+	+	-	+	-	+	II
<i>Molinio – Arrhenatheretea</i>													
Euras.	Ch	<i>Lysimachia nummularia</i>	+	-	-	+	-	-	+	+	-	-	II
Euras.	H	<i>Trifolium repens</i>	+	+	+	+	-	+	-	+	+	-	III
Eur.	H	<i>Alchemilla vulgaris</i>	+	1	+	-	+	+	-	+	+	-	III
Circ.	H	<i>Festuca rubra</i>	+	-	+	+	-	+	+	-	+	+	III

Circ.	H (G)	Agrostis capillaris	-	+	+	-	-	-	-	-	+	-	II
Euras.	H	Lathyrus pratensis	-	-	-	+	+	+	+	+	+	+	III
<i>Variae syntaxa</i>													
Euras.	H	Ranunculus repens	+	+	+	-	-	+	+	-	+	-	III
Euras.	H	Potentilla erecta	+	+	-	-	+	-	-	+	-	+	III
Circ.	H	Geum rivale	-	-	+	+	-	-	+	-	-	-	II

Species in one-two relevées (K-L): Lysimachia vulgaris (Euras., H, rel. 4); Geranium palustre (Euras., H, rel. 5); Carex ovalis (Circ., H, rel. 10); Molinia caerulea (Euras., H, rel. 2); Trollius europaeus (Eur., H, rel. 5); Equisetum palustre (Circ., G, rel. 2); Rumex sanguineus (Eur., H, rel. 1); Juncus inflexus (Euras., H, rel. 4); Eupatorium cannabinum (Euras., H, rel. 6); Equisetum telmateia (Circ., G, rel. 7); Carex flava (Eur., H, rel. 10); Carex pallescens (Circ., H, rel. 5,9); Juncus articulatus (Circ., H, rel. 4,10); Cirsium palustre (Euras., Ht, rel. 4,9); Stachys officinalis (Euras., H, rel. 4,8); Anthoxanthum odoratum (Euras., H, rel. 5,9); Agrostis stolonifera (Circ., H, rel. 4,10); Ranunculus acris (Euras., H, rel. 6,7); Mentha longifolia (Euras., H, rel. 1,5); Potentilla anserina (Cosm., H, rel. 4,6); Veratrum album (Euras., H, rel. 5,8); Impatiens noli-tangere (Euras., T, rel. 6,10); Chaerophyllum hirsutum (Eur. centr., H, rel. 5,7); Dactylorhiza maculata (Eur. centr., G, rel. 6,8); Stellaria graminea (Euras., H, rel. 3,4); Carex nigra (Circ., G, rel. 1,2); Carex echinata (Circ., H, rel. 2,5); Galium palustre (Circ., H, rel. 1,2); Lycopodium europaeus (Euras., H, rel. 3,9).

Place and date of relevées: Drăgoiasa (rel. 1-2): 2.08.2007; Neagra Broșteni: 9.07.2007 (rel. 3-4); Păltiniș: 2.08.2008 (rel. 5); Dârmoxa (rel. 6): 11.07.2007; Budacu: 28.06.2006 (rel. 7-8); Căliman Cerbuc: 20.08.2008 (rel. 9); Criștișor (rel. 10): 4.07.2008.