

DIVERSITY OF MEADOWS IN VASLUI RIVER BASIN

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Keywords: *phytosociology, bioforms, floristic elements, ecological indices.*

Resumé: *Le travaux présente deux associations végétales appartenant à l'alliance Potentillion anserinae R. Tx. 1947: Agrostietum stoloniferae Burduja et al. 1956 et Poëtum pratensis Răv., Căzăc. et Turenschi 1956, décrites de point de vue de la corologie, la composition floristique et phytosociologique, les bioformes, les éléments floristiques et les indices écologiques.*

1. Introduction

The territory of the hydrographical basin of the river Vaslui is located in the central area of the Moldavian plateau, between the city of Iași in the north and Vaslui in the south. The river has a subsequent course and asymmetrical basin towards the centre of the upper plateau of Bârlad, to the right. It is characterised by a temperate continental climate, with dry and cold winters and hot or even very hot and dry summers.

The two vegetal associations belong to the following phytosystem:

MOLINIO – ARRHENATHERETEA R. Tx. 1937 Class

POTENTILLO – POLYGONETALIA R. Tx. 1947 Order

POTENTILLION ANSERINAE R. Tx. 1947 Alliance

1. *Agrostietum stoloniferae* Burduja et al. 1956 Association

2. *Poëtum pratensis* Răv., Căzăc. et Turenschi 1956 Association

2. Results and discussions

1. Ass. *Agrostietum stoloniferae* Burduja et al. 1956

(Syn.: ass. *Agrostis stolonifera* Burduja et al. 1956, *Rorippo-Agrostietum stoloniferae* (Moor 1958) Oberd. et T. Müller in T. Müller 1961, *Rumici crispi-Agrostietum stoloniferae* Moor 1958 p.p.

Chorology: Focșeasca, Moara Domnească, Rediu Galian, Solești (Dobrescu C.,1970), Miclești, Șerbotești, Vaslui (Mititelu D.,1975), Bârnova (Mititelu D. & collab.,1995), *Deleni, Dobrovăț, Dumitreștii Gălății, Coloneasa hill, between Vaslui and Moara Grecilor*

Ecology: This association is installed on flat, humid fields, with muddy clay soils. The ecological conditions give it a strong mesohydrophilic character, reflected in its floral structure. The fields occupied by these phytocoenoses are located especially near villages, and that is why they are used in some places also as surfaces for the animals' grazing.

The phytocoenological composition: The species characteristic to the association is *Agrostis stolonifera*, besides it there appear also species in the classes *Molinio-Arrhenatheretea* and *Festuco-Brometea*: *Rorippa sylvestris* ssp. *sylvestris*, *Medicago lupulina*, *Trifolium repens*, *Trifolium pratense* etc. (Table I).

Among the species with high constancy we mention: *Agrostis stolonifera*, *Lotus corniculatus*, *Rorippa sylvestris* ssp. *sylvestris*, *Ranunculus acris*, *Trifolium repens*, *Achillea setacea* etc.

The hydrophilic character is underlined by the presence of the species in the class *Phragmiti-Magnocaricetea*: *Phragmites australis*, *Carex vulpina* etc.

In the composition of the association there are also some related species in the classes *Stellarietea mediae* and *Artemisietea vulgaris*, which indicates a beginning of common elements between meadows.

Tab. I. Ass. *Agrostietum stoloniferae* Burduja et al. 1956

Number of survey	1	2	3	4	5	6	7	8	9	10	
Altitude (m.s.m.)	350	320	300	280	90	320	300	207	320	320	
Exposition	NE	NV	S	NE	NE	NE	NV	-	-	-	
Slope (°)	3	1-2	2	5	2	2	1-2	-	-	-	
Cover of the vegetation (%)	95	95	100	80	80	85	100	80	100	95	
Surface of survey (m ²)	100	100	100	100	50	100	100	100	100	100	
Number of species	23	26	28	18	24	25	17	23	17	12	K
Association's characteristics											
<i>Agrostis stolonifera</i>	4	3	3	4	3	3	4	3	3	3	V
Section 1.01 Potentillion anserinae											
<i>Rorippa sylvestris</i> ssp.											IV
<i>Sylvestris</i>	1	-	+	-	+	-	+	+	+	3	
<i>Inula Britannica</i>	-	-	+	-	+	-	+	-	-	-	II
<i>Carex hirta</i>	-	-	-	-	-	-	-	+	1	1	II
<i>Festuca arundinacea</i>	-	+	-	-	-	-	-	-	-	-	I
<i>Elymus repens</i>	-	-	-	-	-	1	-	+	-	-	I
<i>Mentha pulegium</i>	-	-	-	-	-	-	+	-	-	-	I
<i>Mentha longifolia</i>	-	-	-	-	-	-	-	1	-	-	I
<i>Festuca pratensis</i>	-	-	-	-	-	-	-	+	-	-	I
<i>Rorippa sylvestris</i> ssp. <i>kernerii</i>	-	-	-	-	-	-	-	-	+	+	I
<i>Juncus inflexus</i>	-	-	-	-	-	-	-	-	+	-	I
<i>Rumex crispus</i>	-	-	-	-	-	-	-	-	-	+	I
Section 1.02 Potentillo-Polygonetalia											
<i>Potentilla reptans</i>	1	-	+	+	+	+	-	+	-	-	III
<i>Lysimachia nummularia</i>	-	+	-	-	+	-	-	-	+	+	II
<i>Glechoma hederacea</i>	-	+	-	-	-	+	-	+	-	-	II
<i>Rumex obtusifolius</i>	-	+	-	-	-	-	-	-	-	-	I

<i>Verbena officinalis</i>	-	1	-	-	+	-	-	-	-	-	I
<i>Ranunculus sardous</i>	-	-	+	-	+	-	-	-	-	-	I
<i>Carex melanostachya</i>	-	-	-	-	+	-	-	-	-	-	I
<i>Trifolium fragiferum</i>	-	-	-	-	-	-	-	+	-	-	I
<i>Ranunculus repens</i>	-	-	-	-	-	-	-	-	1	+	I
Section 1.03 Plantagineta											
<i>Lolium perenne</i>	+	+	-	+	-	1	-	+	-	-	III
<i>Taraxacum officinale</i>	-	-	+	+	-	+	+	+	-	-	III
<i>Plantago major</i>	+	-	-	-	+	-	+	+	-	-	II
<i>Cichorium intybus</i>	+	-	-	-	-	+	-	-	-	-	I
<i>Poa annua</i>	-	+	+	-	-	-	-	-	-	-	I
<i>Digitaria sanguinalis</i> ssp.	-	-	-	-	-	-	-	-	-	-	I
<i>Sanguinalis</i>	-	+	-	-	-	-	-	-	-	-	I
<i>Polygonum aviculare</i>	-	-	-	+	-	-	-	-	-	-	I
Section 1.04 Cynosurion											
<i>Trifolium repens</i>	-	2	+	-	2	2	1	+	+	-	IV
<i>Bellis perennis</i>	+	+	-	+	-	-	-	-	-	-	II
<i>Leontodon autumnalis</i>	+	+	-	-	-	-	-	-	-	-	I
Section 1.05 Arrhenatheretalia											
<i>Phleum pratense</i>	+	-	-	-	-	+	-	-	-	-	I
<i>Achillea millefolium</i>	+	-	-	-	-	-	-	-	-	-	I
<i>Daucus carota</i>	-	-	+	-	-	-	-	-	-	-	I
<i>Heracleum sphondylium</i> ssp.	-	-	-	-	-	+	-	-	-	-	I
<i>Sphondylium</i>	-	-	-	-	-	-	-	-	-	-	I
<i>Equisetum arvense</i>	-	-	-	-	-	-	-	+	+	-	I
Section 1.06 Molinieta											
<i>Trifolium hybridum</i>	+	+	-	-	-	-	-	+	-	-	II
<i>Lythrum salicaria</i>	-	-	+	-	2	-	+	-	+	-	II
<i>Galium palustre</i>	-	-	-	-	-	-	-	-	+	+	I
Section 1.07 Molinio-Arrhenatheretea											
<i>Lotus corniculatus</i>	+	+	2	+	-	+	1	2	+	-	IV
<i>Ranunculus acris</i>	-	+	-	+	+	+	+	+	+	-	IV
<i>Trifolium pratense</i>	1	+	+	+	-	-	1	-	-	-	III
<i>Prunella vulgaris</i>	+	+	+	-	+	-	-	-	-	-	II
<i>Plantago lanceolata</i>	-	1	+	+	-	-	-	-	-	-	II
<i>Ajuga reptans</i>	-	+	-	+	+	-	-	-	-	-	II
<i>Centaurea jacea</i>	+	-	-	+	-	-	-	-	-	-	I
<i>Galium album</i>	-	+	-	-	-	+	-	-	-	-	I
<i>Vicia cracca</i>	-	-	2	-	+	-	-	-	-	-	I
<i>Medicago lupulina</i>	-	-	+	-	-	-	-	-	-	-	I
<i>Inula salicina</i>	-	-	-	-	-	+	-	-	-	-	I
<i>Poa pratensis</i>	-	-	-	-	-	-	-	+	-	-	I
Section 1.08 Festuco-Brometea											
<i>Achillea setacea</i>	+	2	+	+	-	+	+	-	-	-	III
<i>Eryngium campestre</i>	+	+	-	1	-	+	-	-	-	-	II
<i>Koeleria macrantha</i>	+	-	+	+	-	-	-	-	-	-	II
<i>Plantago media</i>	+	-	-	+	-	+	-	-	-	-	II
<i>Galium verum</i>	-	-	-	+	+	+	-	-	-	-	II
<i>Salvia nemorosa</i>	-	-	-	+	+	+	-	-	-	-	II
<i>Hieracium pilosella</i>	+	-	-	-	-	-	-	-	-	-	I
<i>Tragopogon dubius</i>	-	-	+	-	-	+	-	-	-	-	I
<i>Prunella grandiflora</i>	-	-	+	-	-	-	+	-	-	-	I
<i>Erigeron acris</i> ssp. <i>acris</i>	-	-	+	-	-	-	-	-	-	-	I
<i>Centaurea biebersteinii</i>	-	-	-	-	-	+	-	-	-	-	I

Echium vulgare	-	-	-	-	-	+	-	-	-	-	I
Asperula cynanchica	-	-	-	-	-	+	-	-	-	-	I
Section 1.09 Phragmiti-Magnocaricetea											
Equisetum palustre	-	+	+	-	-	-	+	1	-	-	II
Carex vulpine	-	+	-	-	-	-	1	-	1	+	II
Eleocharis palustris	-	-	-	-	+	-	-	-	+	1	II
Symphytum officinale	-	-	+	-	-	-	+	-	-	-	I
Phragmites australis	-	-	-	-	+	-	-	-	-	-	I
Lycopus europaeus	-	-	-	-	+	-	-	-	-	-	I
Alisma lanceolatum	-	-	-	-	+	-	-	-	-	-	I
Section 1.10 Artemisietea vulgaris											
Tanacetum vulgare	-	-	+	-	+	-	-	-	-	-	I
Arctium lappa	-	-	+	-	-	-	-	-	-	-	I
Echinops sphaerocephalus	-	-	-	-	-	+	-	-	-	-	I
Setaria viridis	-	-	-	-	-	-	+	-	-	-	I
Cirsium vulgare	-	-	-	-	-	-	-	+	-	-	I
Cirsium arvense	-	-	-	-	-	-	-	1	-	-	I
Artemisia absinthium	-	-	-	-	+	-	-	-	-	-	I
Xanthium strumarium	-	-	-	-	-	-	+	+	-	-	I
Section 1.11 Stellarietea mediae											
Carduus acanthoides	+	+	-	-	-	-	-	-	-	-	I
Stachys annua	+	-	-	-	-	-	-	-	-	-	I
Convolvulus arvensis	-	+	-	-	+	-	-	-	-	-	I
Lathyrus tuberosus	-	-	1	-	-	-	-	-	-	-	I
Linaria vulgaris	-	-	+	-	-	-	-	-	-	-	I
Anthemis cotula	-	-	+	-	-	-	-	-	-	-	I
Mentha arvensis	-	-	-	-	-	-	-	+	+	-	I
Section 1.12 Bidentetea											
Alopecurus aequalis	-	-	-	-	-	-	-	-	-	+	I
Section 1.13 Variae syntaxa											
Urtica dioica	+	-	-	-	-	-	-	-	-	-	I
Juncus gerardi	-	-	-	-	-	-	-	-	+	+	I

Place and date of the surveys:

1. Between Slobozia and Dobrovăț, 12.07.2003; 2, 6, 9, 10. Dobrovăț, 12.07.2003, 1.07.2004; 3, 7. Dumitreștii Gălății, 12.08.2001; 4. Deleni, 07.2001; 5. Vaslui-Moara Grecilor, 10.08.2002; 8. Codăești, 1.07.2004

After the analysis of the surveys undertaken we noticed the following:

- **the spectrum of bioforms** illustrates the predominance of hemicyptophytes (66.66%), followed by terophytes (11.12%), hemiterophytes (10%), geophytes (10%), camephytes (1.11%) and hydrohelophytes (1.11%) (fig. 1a);
- **the floristic elements spectrum** underlines the presence of Euro-Asian elements (48.88%), followed by circumpolar ones (14.45%) and cosmopolite ones (14.45%). Besides them, we can find European elements (10%), Pontic –Mediterranean elements (5.55%), central European elements (2.22%), continental Euro-Asian ones (3.33%) and Atlantic- European ones (1.12%) (fig. 1b);

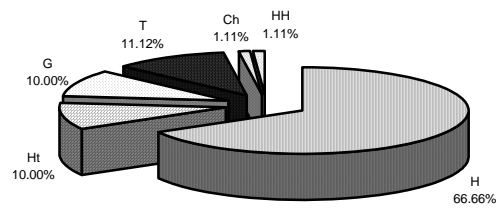


Fig.1a. The bioform spectrum of ass. *Agrostietum stoloniferae* Burduja et al. 1956

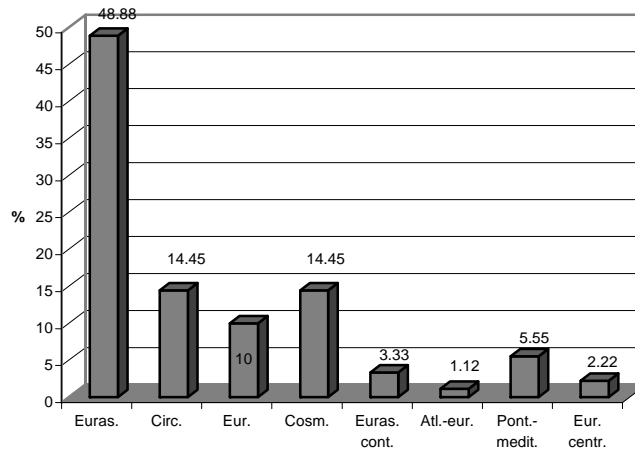


Fig.1b. The floristic elements spectrum of ass. *Agrostietum stoloniferae* Burduja et al. 1956

- from the spectrum of ecological indices it results the fact that predominant are the species that hardly bare shadow (45.78%), amphotolerant to the index of temperature (40.96%), with the area of spreading in central Europe (28.91%),

mesohydrophilic (19.28%), developing on soils with average content of mineral nitrogen (19.28%), amphotolerant in what concerns the pH (62.65%) (fig. 1c).

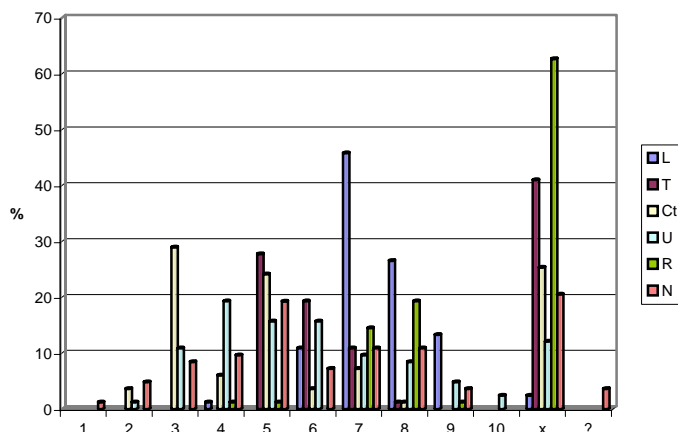


Fig. 1c. The ecological indices spectrum of ass. *Agrostietum stoloniferae* Burduja et al. 1956

2. Ass. *Poëtum pratensis* Räv., Căzăc. et Turenschi ex Räv. et Mititelu 1958 (Syn.: *Poëtum pratensis* Räv., Căzăc. et Turenschi 1956, as. *Poa pratensis* ssp. *angustifolia* Burduja et al. 1956)

Chorology: *Dobrovăț* (Mititelu și colab., 1995), *Codăești*

Ecology: The meadows of *Poa pratensis* are widely spread in the forest steppe in our country, occupying especially the sandy alluvia, sandy-clay humid ones, offering them a strong mesophilic character (V. Sanda, A. Popescu, D. Stancu, 2001).

In the area chosen to be studied, the association was met in only two locations (*Codăești* and *Dobrovăț*), occupying small enough surfaces in the watersides of the Vaslui river effluents, where the soil is moderately humid during the whole year, these fields being used especially for the animals' grazing.

Tab. II. Ass. *Poëtum pratensis* Räv., Căzăc. et Turenschi ex Räv. et Mititelu 1958

Number of survey	1	2	3	4	5	
Altitude (m.s.m.)	210	120	120	210	210	
Exposition	E	-	-	E	E	
Slope (°)	10	-	-	6	2	
Cover of the vegetation (%)	80	85	80	75	80	
Surface of survey (m ²)	100	100	100	100	100	
Number of species	41	14	21	23	30	K

<i>Association's characteristics</i>						
Poa pratensis	3	3	4	3	3	V
Article II. Potentillion anserinae						
Rorippa austriaca	+	-	-	+	+	III
Agrostis stolonifera	-	+	+	-	-	II
Carex hirta	-	+	-	-	-	I
Article III. Potentillo-Polygonetalia						
Elymus repens	+	-	-	+	+	III
Potentilla reptans	+	-	-	+	+	III
Glechoma hederacea	+	-	-	+	-	II
Article IV. Arrhenatherion et Arrhenatheretalia						
Lolium perenne	+	1	1	+	1	V
Bromus commutatus	+	1	+	+	-	IV
Cynosurus cristatus	1	-	-	+	1	III
Trifolium campestre	+	-	+	-	+	III
Dactylis glomerata	+	-	+	-	+	III
Taraxacum officinale	-	+	+	+	-	III
Cichorium intybus	-	+	+	-	-	II
Article V. Molinio-Arrhenatheretea						
Lotus corniculatus	1	1	+	1	1	V
Trifolium repens	+	+	+	+	+	V
Prunella vulgaris	+	+	+	+	+	V
Trifolium pratense	1	-	+	+	+	IV
Cerastium holosteoides	+	+	-	+	+	IV
Plantago lanceolata	+	-	+	+	+	IV
Agrostis capillaries	+	-	-	-	+	II
Bellis perennis	+	-	-	-	+	II
Rumex acetosa	-	-	+	-	-	I
Centaurea jacea	-	-	+	-	-	I
Inula Britannica	-	-	-	-	+	I
Article VI. Festuco-Brometea						
Achillea setacea	1	+	+	2	1	V
Plantago media	1	-	+	+	+	IV
Medicago falcate	+	-	+	+	+	IV
Potentilla argentea	+	-	+	+	-	III
Elymus hispidus	+	-	+	+	-	III
Poa angustifolia	+	-	-	-	+	II
Hieracium pilosella	+	-	-	-	+	II
Eryngium campestre	+	-	-	-	+	II
Echium vulgare	+	-	-	-	+	II
Crepis foetida ssp. Rhoeadifolia	+	-	-	-	+	II
Galium humifusum	+	-	-	-	+	II
Salvia pratensis	+	-	-	-	-	I
Ajuga laxmannii	+	-	-	-	-	I
Article VII. Artemisietea vulgaris						
Equisetum arvense	+	-	-	+	+	III
Cirsium arvense	-	+	+	-	-	II
Verbascum blattaria	+	-	-	-	-	I
Carduus crispus	+	-	-	-	-	I
Xanthium strumarium	+	-	-	-	-	I
Capsella bursa-pastoris	-	-	-	-	+	I
Article VIII. Stellarietea mediae						
Rumex acetosella	+	-	-	+	+	III
Polygonum aviculare	+	-	-	-	-	I

Convolvulus arvensis	+	-	-	-	-	I
Bromus tectorum	-	+	-	-	-	I
Article IX. Variae syntaxa						
Dianthus armeria	+	-	-	+	-	II
Agrimonia eupatoria	+	-	-	+	-	II
Elaeagnus angustifolia	+	-	-	-	-	I
Lepidium campestre	-	-	-	-	+	I

Place and date of the surveys:

1,4,5. Dobrovăț, 1.07.2004, 18.07.2004; 2,3. Codăești, 1.07.2004

The phytocoenological composition: The characteristic species *Poa pratensis* is accompanied by species in the classes *Molinio-Arrhenatheretea*, *Festuco-Brometea* and *Artemisietea vulgaris*. Among the species with a significant presence we mention: *Lolium perenne*, *Lotus corniculatus*, *Trifolium repens*, *Prunella vulgaris*, *Achillea setacea* etc. (Table II).

In the frame of these phytocoenoses, we can recognize three levels: the upper one (*Poa pratensis*, *Lolium perenne*, *Bromus commutatus*, *Medicago falcata*, *Achillea setacea*), the medium layer (*Glechoma hederacea*, *Trifolium repens*, *Prunella vulgaris*, *Trifolium pratense*) and the inferior layer (*Potentilla reptans*, *Bellis perennis*, *Plantago lanceolata*, *Plantago media* etc.). Because of intensive grazing, some meadows are degraded by the decrease of percentage of participation or even the disappearance of some good fodder species, and the meadow is invaded by some species with thorns.

After the analysis of the surveys undertaken we noticed the following:

- from **the spectrum of bioforms** it results the predominance of hemipterophytes (63.45%), followed by terrophytes (17.30%), geophytes (9.62%), hemiterrophytes (7.70%) and fanerophytes (1.93%) (fig. 2a);

- **the floristic elements spectrum** indicates the predominance of the Euro-Asian elements (40.38%), cosmopolite ones (15.39%) and European (17.31%), followed by circumpolar ones (9.62%), Pontic (9.61%), continental Euro-Asian elements (5.76%) and temperate Asian elements (1.93%) (fig. 2b);

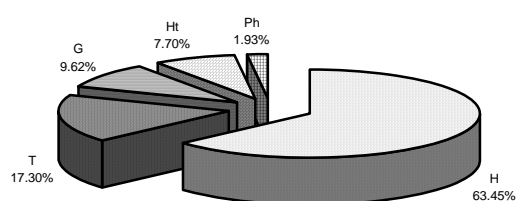


Fig.2a. The bioform spectrum of ass. *Poëtum pratensis* Räv., Căzăc. et Turenschi ex Räv. et Mititelu 1958

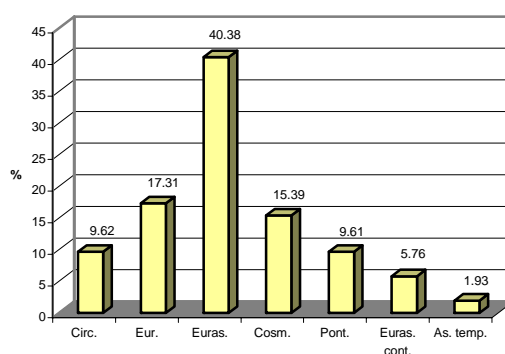


Fig.2b. The floristic elements spectrum of ass. *Poëtum pratensis* Räv., Căzăc. et Turenschi ex Räv. et Mititelu 1958

- the **spectrum of ecological indices** underlines the presence of species that bare moderate shadow (41.86%), amphitolerant when it comes to temperature (46.51%) and humidity (25.59%), with area of spreading in central Europe (37.21%), developing on soils with average content of mineral nitrogen (16.28%), amphitolerant to the reaction of the soil (58.14%) (fig. 2c).

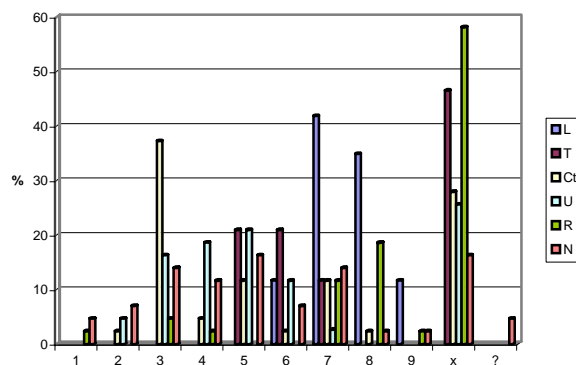


Fig. 2c. The ecological indices spectrum of ass. *Poëtum pratensis* Răv., Căzăc. et Turenschi ex Răv. et Mititelu 1958

Observations: The association was mentioned in the basin of Vaslui (Mititelu and collab., 1995), but without presenting floral surveys.

Conclusions

These phytocoenoses occupy small surfaces, being met on moderately humid to humid soils, used especially as grazing areas;

The two types of phytocoenoses have high economic value, both due to the presence of numerous species with high fodder value and of the good melliferous and medicinal species;

Due to overgrazing and to the human influence, some meadows of these phytocoenoses are degraded by diminishing the percentage of participation or even the disappearance of some good fodder species, and the meadow is invaded by some species with short period of development, with thorns (*Eryngium campestre*, *Cirsium arvense*, *Cirsium vulgare*, *Carduus acanthoides*) or toxic (species in the genus *Euphorbia*).

Bibliography

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