PHYTOCOENOLOGICAL CONTRIBUTIONS TO THE VEGETATION OF MOLDAVIA (ROMANIA)

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A new coenotaxon, namely as. *Staticeto-Artemisietum santonicae* Ţopa 1939, subass. *asteretosum oleifolii* subass. nova is proposed in this paper. This paper features also some comments on the ecology of the halophylous vegetation from the basin of Ciric river. The paper includes a newly proposed coenotaxon, as well as the conservation of the natural vegetation in the investigated region.

Key words: Ciric river basin, salt meadows, newly vegetal subassociation, conservation.

INTRODUCTION

This paper is a result of our field investigations concerning the basin of Ciric river, a water basin situated in the North-East of Iaşi city, and concerning the Nature Reserve "Valea lui David", both of them being situated in the North of the city of Iaşi. The study is a part of an CEEX scientific project, financed by the Education and Research Ministry in Romania.

The basin of Ciric river is situated in the South part of the Moldavian Plain, occupying an area of 58 km^2 – 5825 ha (over 2.9% of the area of Bahlui basin). The altitudes in this basin are: 216.7 m.s.l (on Ciric interfluve, Aroneanu hill), 204 m.s.l. on (Şorogari interfluve), and 36 m.s.l., at the confluence with Bahlui river.

The *geology* is represented by an alternation of marls, loams and sands, all of them being situated on sarmatian deposits.

The prevalent type of *soil* is cambic chernozem. Other soils are: humic gley soils, regosols, erodisoils, antrosoils and so on. In the area of the Ciric basin there are often met furrows and gulches.

The amount of *precipitations* has an yearly average of 587.9 mm (recorded between 1964 and 2004). The speed of winds is of 5.1 m/s from NW, 4.2 m/s from N, 4.2 m/s from S, and 3.9 m/s from SE. The air humidity is between 71% and 75%. The yearly average of *temperatures* is 9.4 °C.

The arable field occupies an area of 3002 ha (51.59%); the pasture lands occupy 947 ha (16.27%); the forests – 718 ha (12.34%); the human settlements –

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575 ha (9.88%); the vineyards and orchards – 360 ha (6.15%); there are 9 accumulation lakes, with 115 ha (1.98%).

Therefore, in the area of the water basin of Ciric river there is a multitude of habitats factors; by way of consequence, there is also a multifarious vegetation. There are a few vegetal associations, which ocupy various habitats (for instance, there is a vegetation made by xerophytic meadows, a vegetation of valleys with mesophytic meadows, artificial lacustrine basins, where an aquatic vegetation is developed, plateaux where still exist natural forests and so on). At the same time, the area of Ciric river basin is characterized by the existence of a varied range of anthropogenic vegetal associations, especially ruderal and weed herbaceous vegetation, denoting a strong impact of man and animals over the entire region.

MATERIAL AND METHODS

The methodology applied in this study follows the principles of the Central European School of Phytocoenology of Braun-Blanquet & Pavillard. We have made field investigations on itinerary. The surface of the relevées varies between 10 and 25 square metres. The botanic nomenclature is according to Oprea (2005).

RESULTS AND DISCUSSIONS

On the whole, the vegetation of the Ciric river basin could be classified under two categories, namely:

1. a vegetation made prevalently by woody plant species, plants which give also the physiognomy of the vegetal associations (natural forests, plantations, and boscages);

1. a vegetation edified prevalently by herbaceous plant species (meadows, aquatic and mire vegetal associations, halophytic associations, various weed herbaceous associations and so forth).

This study refers to the existence of the vegetation on the salting fields. This kind of vegetation is placed either along the river side or along the border of the lakes, anyway, in those place where by the vaporization of water, a large amount of salts is accumulated in the superficial strata of the soil; other way, those salts are accumulated on the slopes of the Ciric valley, nearby some hillside springs, even on dry slopes, as a result of the alteration process of the loams.

The characteristic plant species for class *Puccinellio-Salicornietea* Ţopa 1939 could be compulsory halophytes, such as the next ones: *Suaeda maritima, Spergularia salina, Salicornia europaea, Petrosimonia triandra, Halimione pedunculata, Camphorosma annua*, or optional halophytes, like the next ones: *Puccinellia distans, Puccinellia limosa, Limonium gmelini, Plantago schwarzenbergiana, Aster tripolium* ssp. *pannonicus, Artemisia santonica,*

Taraxacum bessarabicum, Atriplex hastata, Juncus gerardi, Lotus tenuis, Trifolium fragiferum and so on.

The phytocoenoses made by this plant category are framed out into the next vegetal associations: *Suaedetum maritimae* Soó 1927, *Puccinellietum limosae* Rapaics ex Soó 1933, *Staticeto-Artemisietum santonicae* Ţopa 1939, *Artemisio-Petrosimonietum triandrae* Soó 1943, *Camphorosmetum annuae* Rapaics ex Soó 1933, *Halimionetum verruciferae* (Keller 1923) Ţopa 1939, *Scorzonero parviflorae-Juncetum gerardii* (Wenzl 1933) Wendelbg. 1943, *Taraxaco bessarabicae-Caricetum distantis* Wendelbg. 1943, *Carici distantis-Festucetum orientalis* Sanda, Popescu 1999, *Crypsidetum aculeatae* Fenzel 1934 em. Mucina 1993, *Puccinellietum distantis* Soó 1937, *Artemisio santonici-Festucetum pseudovinae* Soó in Máthé 1933 corr. Borhidi 1996, *Peucedano officinalis-Asteretum sedifolii* Soó 1947 corr. Bordihi 1996.

The association *Staticeto-Artemisietum santonicae* has been described by Em. Ţopa, in 1939, from the next localities: Ungheni-Pârliţa, Buhăeşti, Larga Jijiei, and Ghidigeni, at altitudes between 46 m.s.l. and 110 m.s.l. In the original paper, the author gave a table with 8 relevées, made by himself in 1938; in that table, there are registered only 18 vascular plant species; on the other hand, we have registered 33 vascular plant species in our relevées (in 2005 and 2006). Those plant species that are registered in the original table (in the paper of Em. Ţopa), and which are not retrievable in our relevées, are the next ones: *Oenanthe silaifolia, Iris halophilla, Scorzonera austriaca* var. *mucronata, Lotus tenuis, Plantago cornuti* and *Lactuca saligna*, all of them being characteristic plant species for wetter salty pasture-lands. On the other hand, we have identified other plant species, characteristic for drier salty pasture-lands, situated as cluster shapes on slopes. All of these facts led us to propose, here and now, a newly vegetal subassociation, namely *asteretosum oleifolii* subass. nova, as a sub-unit at the association *Staticeto-Artemisietum santonicae* Ţopa 1939.

Unlike the type of the vegetal association (ass. *Staticeto-Artemisietum santonicae* Ţopa 1939), where *Aster oleifolius* is an absent species, in our relevées, from the Basin of the river Ciric, as well in the Nature Reserve "Valea lui David", the same species (*Aster oleifolius*) has indexes of AD with a relatively high value (A–D = 2-3), as well as maximum frequency values (see Table 1).

This newly proposed vegetal subassociation is developing on slopes (having various declivities), different exposures (this subassociation is situated on West and South-West exposures, in general), on soils having a medium concentration of salts in their shallow strata. This subassociation has a West-Pontic origin, having the largest spreading in Moldavia, especially in the Basin of the rivers Jijia and Bahlui (in the North of the Iaşi city). It is situated on salty marls, solidified or weakly solidified, appearing at the surface of the soils on slopes.

The slope salty pasture-lands in Moldavia region are originated from the Sarmatian marls more salinized, being well-known as saliferous soils (according to

Bucur N., Teşu C., Dumbravă I., Lucr. Şt. Inst. Agron. Iaşi, 1960), due to the fact that the soluble salty soils having a salinity effect have originated from the mother rock. The slope salty pasture-lands have evolved only under the influence of the water from rainfalls. Typologically, the slope salty pasture-lands are solonchaks, being in various stages of evolving solonetzing or solothing processes.

This newly proposed vegetal subassociation (subass. *asteretosum oleifolii* subass. nova) differs from the type of association (ass. *Staticeto-Artemisietum santonicae* Ţopa 1939) by its development only on dry slope salty soils.

The coenotaxonomic framing of this newly proposed vegetal subassociation is like the next:

Cl. *Puccinellio-Salicornietea* Ţopa 1939

Ord. *Puccinellietalia* Soó 1940

Al. *Puccinellion limosae* (Klika 1937) Wendelbg, 1943, 1950

As. *Staticeto-Artemisietum santonicae* Ţopa 1939

– **subass. *asteretosum oleifolii* subass. nova** (see table no. 1)

The relevé no. 5 (5*) in the next table is designated as a relevé type for this newly proposed vegetal subassociation.

Table 1

As. *Staticeto-Artemisietum santonicae* Ţopa 1939 subass. *asteretosum oleifolii* subass. *nova*

Floristic element	Surface of relevé (m^2)	10	20	25	25	25	20	25	25	20	25	K
	Coverage (%)	75	80	75	80	85	80	80	80	85	75	
	Exposure	V	V	V	V	V	V	V	V	N-V	N-V	
	Slope declivity (^{g})	1	2	2	2	3	3	2	3	5	5	
	Relevé number	1	2	3	4	**5***	6	7	8	9	10	
Caract. ass.												
Cont.-Euras.	*Artemisia santonicum* s.l.	4	3	2	2	3	3	3	3	4	3	V
Cont.-Euras.	*Limonium gmelinii*	+	+	+	+	+	+	+	+	1	1	V
Pont.-Medit.	*Podospermum canum*	-	-	-	-	-	-	-	-	+	+	I
Dif. subass.												
Cont.-Euras.	*Aster oleifolius*	3	3	3	3	3	3	3	1	2	2	V
Puccinellion limosae												
Pont.-Pan.	*Puccinellia distans* ssp. *limosa*	+	-	-	+	-	+	-	-	+	-	II
V Pont.	*Iris brandzae*	-	-	-	-	-	-	-	+	-	+	I
Puccinellietalia												
Pont.-Pan.	*Aster tripolium* ssp. *pannonicum*	+	-	-	-	-	-	-	-	+	+	II
Pan.-Carp.-Getic	*Aster sedifolius* ssp. *canus*	+	-	-	-	+	-	-	-	-	-	I

Pont.-Getic	*Dianthus pratensis* ssp. *racovitzae*	+	-	-	-	+	-	-	-	-	-	I
Cont.-Euras.	*Festuca pseudovina*	+	-	-	1	-	-	3	-	-	-	I
Pan.-Getic-Trans.	*Plantago scwartzenbergiana*	-	-	-	-	-	-	-	-	+	+	I
Cont.-Eur.	*Taraxacum bessarabicum*	-	-	-	-	-	-	-	-	-	+	I
Eur.	*Polygonum patulum*	-	-	+	+	-	+	+	-	-	-	I
Cont.-Euras.	*Bassia prostrata*	-	-	-	-	-	-	-	-	+	+	I
Circ.	*Myosurus minimus*	-	-	-	-	-	-	-	-	+	-	I
	Puccinellio-Salicornietea											
Euras.	*Gypsophila muralis*	-	-	+	+	+	+	-	-	-	+	III
Cont.-Euras.-Submedit.	*Allium scorodoprasum* ssp. *rotundum*	-	-	-	-	-	-	+	-	-	+	I
Cont.-Euras.	*Peucedanum latifolium*	-	-	-	-	-	-	-	+	-	-	I
Euras.	*Matricaria chamomilla*	-	-	-	-	-	-	-	-	+	+	I
Euras.	*Atriplex littoralis*	-	-	-	-	-	-	-	-	+	+	I
Circ.	*Juncus gerardi*	-	-	-	-	-	-	-	-	-	+	I
	Aliae											
Cont.-Euras.	*Aster linosyris*	+	+	+	+	1	+	+	1	+	+	V
Pont.-Centr. Eur.	*Agropyron cristatum* ssp. *pectinatum*	+	1	1	-	-	+	+	+	-	+	IV
Cont.-Euras.	*Achillea setacea*	-	+	-	-	+	-	-	+	+	+	III
Cont. Euras.	*Festuca valesiaca*	-	-	-	2	1	1	-	-	-	+	II
Cosm.	*Cynodon dactylon*	+	-	-	+	+	-	-	+	-	-	II
Pont.-Pan.-Balc.	*Veronica spicata* ssp. *orchidea*	-	-	+	+	-	-	+	-	-	+	II
Euras.-Submedit.	*Asparagus officinalis* ssp. *officinalis*	-	-	-	+	-	-	-	+	-	+	II
Submedit.	*Trifolium fragiferum* ssp. *bonannii*	-	-	-	-	-	-	-	-	-	+	I
Euras.	*Potentilla argentea*	-	-	-	-	-	-	-	+	+	-	I
Circ.	*Elymus repens ssp. repens*	-	-	-	-	-	-	-	+	+	-	I
Cont.-Euras.	*Alyssum desertorum*	-	-	-	-	-	-	-	-	+	+	I
Euras.	*Atriplex tatarica*	-	-	-	-	-	-	-	-	+	+	I

Date and place of the relevées: 1–8 Ciric river, upstream of the village of Dorobanți, Iași county, at 11.09.2006; 9–10 the Natural Reserve "Valea lui David", Miroslava commune, Iași county, at 16.06.2006

This kind of salty vegetation could be classified under the next international regulations, concerning the natural habitats:

– EUNIS: E6.2 – *Continental inland saline grass and herb-dominated habitats* (Ref.: Devillers, P., Devillers-Terschuren, J. and Vander Linden, C. (2001);

– Palearctic classification of the natural habitats: 15.A1, 15.A2 (Ref.: Bază de date.mdb)

– Habitat Directive of the European Union 43/92/EEC: *1530 *Pannonic and Ponto-Sarmatic salt steppes and salt marshes* (Ref.: New & amended habitat descriptions for Bulgaria & Romania, Revised after the February meeting of the SWG & further comments from Romania, Greece, Hungary & Italy).

CONSERVATION

– The conservation state of the investigated area is in a relatively good phase;

– There are not any obvious deteriorations of the natural habitat of this vegetal association, irrespectively of the vegetal subassociation;

– The risk factors, identified in the area of basins of the rivers Jijia and Bahlui, are the next ones:

– changings in the destination of the fields
– draining of the fields
– agricultural works (ploughing, over-sowing and so on)
– overgrazing.

There must be imposed some measures in order to avoid the above mentioned risks, or at least a diminution of them.

CONCLUSIONS

– It is necessary to complete this study with investigations in other regions in Romania;

– It is necessary to initialize a monitoring process over the biodiversity from the basins of the rivers Jijia and Bahlui;

– We must identify those potential threats, as well as a diminishing of them;

– As a result of the actual evaluations, the basin of the Ciric river could be a potential site Natura 2000, under the Habitat Directive 43/92/EEC;

– The newly proposed vegetal subassociation (namely subass. *asteretosum oleifolii* subass. *nova*) is differing by the type of the association (Ass. *Staticeto-Artemisietum santonicae* Ţopa 1939), by its floristic composition (the **P**resence and **AD** indexes of the species *Aster oleifolius* are significant), by its ecology (being developed on dry slope salty soils), and by its distribution area (having a West-Pontic distribution).

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