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THE *HORDEETUM MURINI* AND *LEPIDIO DRABAE-AGROPYRETUM* IN THE COASTAL PART OF SLOVENIA

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ABSTRACT

In ruderal places of the coastal part of Slovenia, two associations dominated by winter annual species, Hordeetum murini *Libbert 1933* (Stellarietea mediae) *and* Lepidio drabae-Agropyretum repentis *T. Müller et Görs 1966* (Artemisietea vulgaris), *were studied.*

Key words: ruderal communities, *Stellarietea mediae*, *Artemisietea*, vegetation, Slovenia

INTRODUCTION

The aim of the work is to present two ruderal communities occurring in late spring in the coastal part of Slovenia. They appear close to each other on ruderal sites and are assigned to two different classes; the *Hordeetum murini* to the class of weed communities *Stellarietea mediae* and the *Lepidio drabae-Agropyretum* to the order of dry and initial semi-ruderal grasslands *Agropyretalia repentis* within the class of ruderal vegetation *Artemisietea vulgaris*.

Some investigations of this type of vegetation in the neighbouring regions have already been carried out: in NE Italy (Poldini, 1980, 1989), in the Goriško region (Seljak, 1989) and in the Koper region (Kaligarič, 1992).

From the respective alliances (*Sisymbrion* and *Convolvulo-Agropyrion*) the *Erigero-Lactucetum serriolae* Lohm. ap. Oberd. 1967, *Bromo-Hordeetum murini* (Allonge 1922) Lohm. 1950 and *Brometum sterilis* Görs 1966 of the *Sisymbrion* and *Brachypodio-Agropyretum intermedii* Poldini 1980 and *Conyzo-Cynodontetum* (Felf. 1942) Eliáš 1978 of the *Convolvulo-Agropyrion* were indicated by Poldini (1980). Later he indicates the *Urtico-Malvetum neglectae* Lohm. 1950, *Conyzo-Lactucetum serriolae* Lohm. in Oberd. 1957, *Hordeetum murini* Libbert 1932, *Bromus sterilis* comm. and *Mercurialis annua* comm. of the *Sisymbrion* and the *Brachypodio-Agropyretum intermedii* Poldini 1980 of the *Convolvulo-Agropyrion* (Poldini, 1989).

The *Convolvulo-Agropyretum repentis* Felf. 1943, *Cardario drabae-Agropyretum* Müller et Görs 1969 and *Cynodonto-Sorgetum halepensis* (Laban 1974) Kojić 1979 of the *Convolvulo-Agropyrion* were found by Seljak (1989).

The *Cynodonto-Sorgetum halepensis* (Laban 1974) Kojić 1979 of the *Convolvulo-Agropyrion* was recorded by Kaligarič (1992).

STUDY AREA

The research was carried out in the Submediterranean part of Slovenia (Wraber, 1969). According to the phytogeographical division proposed by Zupančič *et al.* (1989), this region can be divided into the district of Koper and Šavrinska Brda and partly into the district of Karst and Vipava valley (only Sežana, Senadolice, Črni Kal and Krvavi potok) of the Northern coast sector, Adriatic province of the Mediterranean region.

The soil develops mainly over terra rossa and, above all, in the district of Karst and Vipava valley over limestone bedrock. The climate is under the influence of the Mediterranean sea and can be treated as Submediterranean (Ogrin, 1993). Some climate data for Koper are as follows: the mean annual temperature is 13.8°C; the mean temperature in the coldest month (January) 4.5°C; the mean temperature of the warmest month (July) 23.3°C, the mean rainfall 960 mm. The potential natural vegetation is the *Ostryo-Quercetum pubescentis* (Ht.) Trinajstić 1974.

METHODS

The relevés were made and elaborated according to

the standard procedure of the Braun-Blanquet method (Braun-Blanquet, 1964). The sample plots were visited several times during the year, in order to find also the species that did not blossom at the time when the relevé was made. The nomenclature of the plant species follows Trpin & Vreš (1994).

RESULTS

1. Sintaxonomical classification

Hordeetum murini Libbert 1933
Sisymbrion officinalis R. Tx., Lohmeyer, et Preising in R. Tx. 1950
Sisymbrietalia J. Tx. in Lohmeyer *et al.* 1962
Stellarietea mediae R. Tx., Lohmeyer et Preising in R. Tx. 1950

Lepidio drabae-Agropyretum repentis T. Müller et Görs 1966
Convolvulo-Agropyrion repentis Görs 1966
Agropyretalia repentis Oberd. *et al.* 1967
Artemisietea vulgaris Lohmeyer *et al.* in R. Tx. 1950

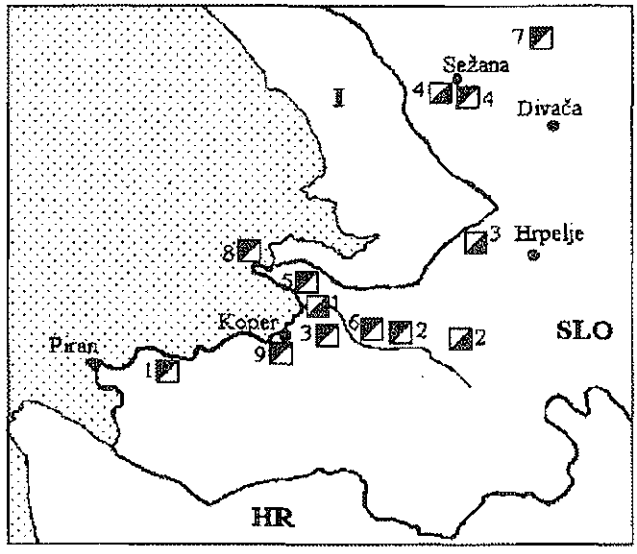

Fig. 1: Localisation of the relevés. Numbers correspond to those in the Tab 1 ( ) and 2 ( ).
Sl. 1: Prikaz lokalitet. Številke se ujemajo s tistimi iz tabele 1( ) in 2 ( ).

2. *Hordeetum murini* Libbert 1933

In April and May, communities dominated by *Hordeum murinum* can be found in the region. *Hordeum murinum* forms almost monodominant stands with *Bromus sterilis* as codominant species. Since *Hordeum murinum* is a winter annual species, these communities disappear later in the summer. In the respective territory, the communities were found on the road edges, in parking places, in parks and in other similar ruderal places. They thrive in places where gravel is metaled and where only a minor quantity of soil can be found between stones.

In the region of transitional type between central European and Mediterranean regions, it is also possible that, besides *Hordeum murinum*, *H. leporinum* occurs. The distinction between these taxa is rather difficult as differential characters were taken than those proposed by Pignatti (1982).

The vegetation is classified within the *Stellarietea mediae*, the *Sisymbrietalia* and the *Sisymbrion*, the alliance of small, erect, winter annual herbs and grasses. These species are typical of the regions with mild submediterranean climate in the south and southeast of Europe (Mucina, 1993).

	1	2	3	4	5	6	7	8	9
Ass. char. spec.									
Hordeum murinum	3	4	4	4	4	4	4	5	4
SISYMBRION & SISYMBRIETALIA									
Bromus sterilis	2	1	2				+	1	
Silene alba		+					+	+	
Lepidium virginicum	+			+					
Sisymbrium officinale				+				+	
Bromus tectorum					+	+			
Bromus hordeaceus							+		+
STELLARIETEA MEDIAE									
Capsella bursa-pastoris	+		+			+		+	+
Chenopodium album		+	1	1	+				
Avena barbata	1				+	+			
Sochus asper		+		+		+			
Fallopia convolvulus	+			1					
Stellaria media				1					+
Picris echioides					+			+	
Other species									
Convolvulus arvensis		+	+	+	+	+	+		+
Cichorium intybus	+	+		+	+	+	2		
Taraxacum officinale		+	1	+		+	+	+	
Lolium perenne		+			1	2	+	2	+
Plantago lanceolata	+	1	+	+	+				
Diplotaxis tenuifolia	+	2	+	1				+	
Trifolium repens	+						+	+	+
Agropyron repens			+		+		+	+	
Achillea collina				+	+		+	+	
Plantago major	+						+	1	
Clematis vitalba		+	+					+	
Dactylis glomerata		+			+	+			
Arrhenatherum elatius		+				+	+		
Poa sylvicola							+	+	+
Rumex crispus	+		+						
Poa annua	+								2
Artemisia absinthum			+		1				
Artemisia vulgaris			+				+		
Veronica agrestis				+					+
Polygonum arenastum						+			+

***Tab. 1: Analytical table of the** Hordeetum murini.*
***Tab. 1: Analitična tabela združbe** Hordeetum murini.*

Sites of the relevés: 1. Belveder, ruderal place, 21.5. 1997, coverage 80%, 3m²; 2. Cepki, road edge, 21.5. 1997, 90%, 7 m²; 3. Bertoki, road edge, 21.5.1997, 90%, 7 m²; 4. Sežana, 21.5.1997, on the railway, 100%, 2 m²; 5. Ankaran, road edge, 21.5.1997, 100%, SSW, 3°, 5 m²; 6. Dekani, road edge, 21.5.1997, 100%, 2 m²; 7. Senadolice, gravel deposit, 22.5.1997, 80%, 3 m²; 8. Debeli rtič, foot of hedge, 21.5.1997, 100%, E, 2°, 5 m²; 9. Koper, in a park, 21.5.1997, 100%, 6 m².

Less common species: 1. *Lepidium graminifolium* +, 2. *Pastinaca sativa* 1, *Rumex obtusifolius* +, 3. *Cardaria draba* +, *Daucus carota* +, *Medicago sativa* +, *Diplotaxis muralis* +, *Portulaca oleracea* +, 4. *Conyza canadensis* +, *Medicago lupulina* 1, *Geranium rotundifolium* +, 5. *Verbena officinalis* +, *Carex hirta* +, *Lapsana communis* +, *Potentilla reptans* +, 6. *Mercurialis annua* +, *Allium rotundatum* +, *Foeniculum vulgare* +, *Mentha* sp. +, *Sambucus ebulus* +, 7. *Picris hieracioides* +, *Chelidonium majus* +, *Pimpinella saxifraga* +, 8. *Cirsium arvense* 1, *Rumex conglomeratus* +, *Arctium lappa* +, *Euphorbia helioscopia* +, *Ranunculus acris* +, 9. *Bromus madritensis* +, *Torilis nodosa* +, *Alopecurus mysuroides* +.

3. *Lepidio drabae-Agropyretum repentis* T. Müller et Görs 1966

This association was found in the Goriško region, in Dornberg, Šmartno and Komen by Seljak (1989). It was established that these communities develop on the initial sites, mainly in renewed vineyards. According to Kaligarič (1992), similar communities do not appear in the vineyards of Koprsko gričevje, nor were the communities signalized from the neighbouring Italy (Poldini, 1989).

The communities are very well recognisable in late spring when the dominant species blossoms. The sites are dry and warm and it is found on road verges and in similar ruderal places. *Cardaria draba* (syn. *Lepidium draba)* forms almost monodominant stands, with only a few other species, such as *Convolvulus arvensis, Cichorium intybus, Picris hieracioides, Agropyron repens,* to mention only the most common ones.

This assocaition is classified witin the *Agropyretalia repentis* and *Convolvulo-Agropyrion repentis,* the alliance of species poor ruderal communities. Mucina (1993, 1997) defined this order as an order of the *Artemisietea.* These communities were considered as pioneer by Müller (1978). According to Mucina (1993) these communities are the next stage of succession of the *Stellarietea mediae (e.g.* in vineyards). This is also the case in our situation. In the course of a succession process on ruderal sites, the *Lepidio-Agropyretum* follows the *Hordeetum murini.*

	1	2	3	4
Ass. char. spec.				
Cardaria draba	4	3	4	4
CONVOLULO-AGROPYRION & AGROPYRETALIA				
Convolvulus arvensis	+	+	+	+
Agropyron repens		+	+	
Diplotaxis tenuifolia		+		+
ARTEMISIETEA				
Cichorium intybus	+	+	+	+
Picris hieracioides		+	+	+
Reseda lutea		2		+
Artemisia absinthum		+	1	
Melilotus officinalis		+	+	
Other species				
Plantago lanceolata	3			1
Verbena officinalis	2	+		
Trifolium repens	+	+		
Taraxacum officinale	+		+	
Arrhenatherum elatius	+		+	
Plantago major	+		+	
Lolium perenne	+			+
Rumex crispus		1		+
Sochus asper		+	+	
Calystegia sepium		+	+	
Bromus sterilis		+		+
Bromus tectorum		+		+
Lamium maculatum			+	+

Tab. 2: Analytical table of the *Lepidio drabae-Agropyretum repentis.*
Tab. 2: Analitična tabela združbe *Lepidio drabae-Agropyretum repentis.*

Sites of the relevés: 1. Ankaran, road edge, 21.5. 1997, 100%, 2 m²; 2. Črni kal, gravel deposit, 21.5. 1997, 80%, 10 m²; 3. Krvavi potok, road edge, 21.5. 1997, NNW, 10°, 5 m²; 4. Sežana, ruderal place, 21.5. 1997, 5 m².

Less common species: 1. *Bromus hordeaceus* +, *Poa annua* +, *Rumex conglomeratus* +, *Catopodium rigidum* +, 2. *Rubus fruticosus* 1, *Geranium rotundifolium* +, *Clematis vitalba* +, *Medicago lupulina* +, *Mercurialis annua* +, *Galeopsis pubescens* +, *Helianthus tuberosus* +, *Lactuca serriola* +, *Sanguisorba minor* +, 3. *Artemisia vulgaris* 2, *Achillea collina* +, *Dactylis glomerata* +, *Silene alba* +, *Fallopia convolvulus* +, *Cirsium arvense* +, *Daucus carota* +, *Medicago sativa* +, *Euphorbia cyparissias* +, *Festuca rubra* +, *Galium mollugo* agg. +, *Trifolium pratense* +, *Viola arvensis* +, *Euphorbia peplus* +, *Salvia verticillata* +, 4. *Capsella bursa-pastoris* +, *Poa sylvicola* +, *Trifolium repens* +, *Medicago falcata* +.

ZDRUŽBI *HORDEETUM MURINI* IN *LEPIDIO DRABAE-AGROPYRETUM* V OBALNEM DELU SLOVENIJE

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POVZETEK

Združbo, kjer dominira mišji ječmen (Hordeum murinum), *zlahka najdemo v aprilu in maju, ko vrsta cveti in gradi skoraj monodominantne sestoje na cestnih robovih, na parkiriščih, v parkih na podobnih ruderalnih rastiščih. Združba* Lepidio drabae-Agropyretum repentis *se prav tako razvije v pozni pomladi. Floristično revne sestoje najdemo na cestnih robovih, ob poteh in na drugih ruderalnih rastiščih. Združbi se razvijeta na podobnih rastiščih, vendar jih uvrščamo v različna vegetacijska razreda: združbo* Hordeetum murini *v razred plevelnih združb* Stellarietea mediae *in združbo* Lepidio drabae-Agropyretum *v red* Agropyretalia repentis, *ki ga po nekaterih novejših raziskavah uvrščamo v razred ruderalnih združb* Artemisietea vulgaris. *Iz sistematske uvrstitve lahko sklepamo tudi na njihove singenetske povezave: združbi* (Hordeetum murini) *iz skupine enoletnih plevelov sledi združba* (Lepidio-Agropyretum) *iz skupine dvo do večletnih ruderalnih združb.*

Ključne besede: ruderalne združbe, *Stellarietea mediae, Artemisietea,* vegetacija, Slovenia

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