



MATRICARIETUM DISCOIDEO-RECUTITAE JAROLÍMEK ET AL. 1997
AND *MATRICARIO-ANTHEMIDETUM COTULAE* DIHORU 1975 EX
MUCINA 1987 – TWO POORLY KNOWN ASSOCIATIONS FROM
THE *MALVION NEGLECTAE* (GUTTE 1966) HEJNÝ 1978 ALLIANCE
IN RURAL AREAS OF NORTH-WEST POLAND

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ABSTRACT. Studies were conducted in 50 villages of mediaeval origin in NW Poland. In eight of them were found patches of two *Malvion neglectae* associations: *Matricarietum discoideo-recutitae* and *Matricario-Anthemidetum cotulae*. The documentation comprising 19 phytosociological relevés was made according to the Braun-Blanquet approach in the years 2011–2013. Only one relevé dates from 2006 and was made in N Wielkopolska. Two new subassociations: *Matricarietum discoideo-recutitae medicaginetosum lupulinae* and *M. d.-r. typicum* were described. As a result of decline of traditional forms of management in villages both associations, and especially *Matricario-Anthemidetum cotulae*, are contemporarily strongly endangered.

KEY WORDS: ruderal vegetation, *Malvion neglectae*, rural areas, Pomerania, Lubuskie Lakeland, North-West Poland

INTRODUCTION

Data concerning the differentiation of vegetation of settlements in the rural landscapes of NW Poland were collected in the course of studies on their plant cover, conducted within the grant of NSC NN 305 062440. Out of numerous interesting ruderal communities worth special attention are two associations from the *Malvion neglectae* alliance, either not yet documented in Poland, or very poorly known. The aim of this paper is to give the first phytosociological documentation for these syntaxa from NW Poland.

MATERIAL AND METHODS

The documentation comprises 19 phytosociological relevés, made according to the BRAUN-BLANQUET (1964) approach in the years 2011–2013. Studied patches were found in eight out of 50 villages of mediaeval origin (WOJTERSKA et al. 2007) in NW Poland

(Fig. 1). Only one relevé dates from 2006 and was made in N Wielkopolska. All relevés were compiled in an analytical table. The distribution of villages, in which studied communities were documented, is shown in Figure 1, on the background of ATPOL (ZAJĄC 1978) grid.

The nomenclature of vascular plants follows MIREK et al. (2001), and only some taxa, mainly of lower rank, are named after RUTKOWSKI (2004). Names of mosses follow OCHYRA et al. (2003). Diagnostic role of species and syntaxonomical appurtenance of examined communities was accepted after JAROLÍMEK et al. (1997) and RATYŃSKA et al. (2010).

In order to describe the major directions of variation of studied communities, the relevé data underwent principal component analysis (PCA). Mean Ellenberg indicator values (EIV, ELLENBERG et al. 1992) were included in the analysis as passive variables. The calculation and graphic presentation of results was made with help of CANOCO 4.5 SOFTWARE (ter BRAAK & ŠMILAUER 2002).

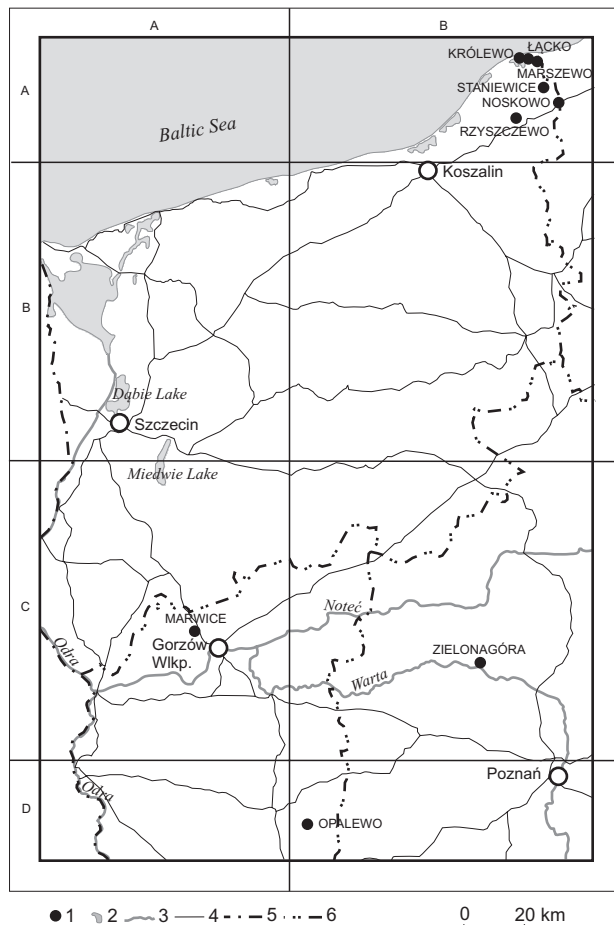


Fig. 1. Distribution of villages, in which the studied communities were documented, on the background of ATPOL grid: 1 – villages, 2 – water bodies, 3 – rivers, 4 – main roads, 5 – state boundary, 6 – boundaries of voivodships

RESULTS

Syntaxonomy

Cl.: *Stellarietea mediae* R. Tx. et al. in R. Tx. 1950

O.: *Sisymbrietalia* J. Tx. in Lohmeyer et al. 1962

All.: *Malvion neglectae* (Gutte 1966) Hejny 1978

Ass.: *Matricarietum discoideo-recutitae*
Jarolímek et al. 1997

Matricario-Anthemidetum cotulae Dihoru
1975 ex Mucina 1987

Characteristics of syntaxa

Matricarietum discoideo-recutitae (Table 1, rel. 1–12) is a ruderal community connected with settlements and their direct surroundings. Its patches occurred on road margins in the villages and among adjacent fields, as well as on recently disturbed areas, like evened ruins of farm buildings and construction places. Some patches developed in abandoned vegetable gardens. The phytocoenoses are floristically differentiated counting from 26 up to 77 taxa (medium 46). To the group of diagnostic species belong, except for *Chamomilla recutita*, characteristic and

dominating in the majority of patches, transgressive taxa from segetal communities. The most numerous are taxa characteristic for the order *Sisymbrietalia* and for the class *Stellarietea mediae*. Plants connected with treading, from both *Polygono-Poetea annuae* and *Molinio-Arrhenatheretea* classes, constitute constant element of the floristic structure of this unit. Perennial ruderal species of the *Artemisietea vulgaris* class are quite numerous, but with very low abundance and vitality. Physiognomy of phytocoenoses is mainly determined by two species of mayweeds (Figs. 2 and 3).

The authors of the first description of association (JAROLÍMEK et al. 1997) have not divided it into any units of lower rank. Our Table 1 shows yet distinct differentiation of *Matricarietum discoideo-recutitae* in two units, which we propose to rank as subassociations.

The first of them (rel. 1–4, Fig. 2) stands out with very high floristic richness (medium 71 taxa). All of these plots occurred in abandoned state farms, or in granges, on newly disturbed substrate, containing



Fig. 2. Fragment of the patch of *Matricarietum discoideo-recutitae medicaginetosum lupulinae* in Rzyszczewo (phot. M. Wojterska)



Fig. 3. Fragment of the patch of *Matricarietum discoideo-recutitae typicum* in Opalewo (phot. M. Wojterska)

rubble and mortar. They were found on big surfaces (reaching more than 100 m²) in two villages: Króléwo and Rzyszcze.

Syntaxonomical description

Matricarietum discoideo-recutitae medicaginetosum lupulinae subass. nova hoc loco

Nomenclatural type: Table 1, rel. 3 (oryg.) *holotypus hoc loco*

Differential taxa: *Barbarea vulgaris*, *Bryum argenteum*, *Cerastium holosteoides*, *Cirsium vulgare*, *Medicago lupulina*, *Plantago lanceolata*, *Poa pratensis* s.s., *Ranunculus repens*, *Rumex crispus*, *Vicia angustifolia*, *Vicia tetrasperma*.

The second, more widespread, typical subassociation (rel. 5–12, Fig. 3) is less rich in species (medium 34 taxa). The examined plots occurred on road margins in the village and among neighbouring fields and covered smaller areas. They were documented from six villages: Łącko, Marszewo, Noskowo, Opalewo, Staniewice and Zielonagóra, as well as noted in several other localities. As regionally differential species can be mentioned: *Centaurea cyanus*, *Erysimum cheiranthoides*, *Galinsoga parviflora* and *Polygonum persicaria*.

Syntaxonomical description

Matricarietum discoideo-recutitae typicum subass. nova hoc loco

Nomenclatural type: Table 11, rel. 14 (JAROLÍMEK et al. 1997: 164–165) *holotypus hoc loco*, *typus subass. et ass.*

The association has been stated so far only in Slovakia (JAROLÍMEK et al. 1997), NE Slovenia (ČARNI 2005), and Hungary (BORHIDI 2007). From Poland it has been mentioned in the list of plant associations of Wielkopolska (BRZEG & WOJTERSKA 2001) on the basis of unpublished data.

Matricario-Anthemidetum cotulae (Table 1, rel. 13–19) is a rare ruderal community (RATYŃSKA et al. 2010). In the study area its patches were found with-

in villages on extensively trodden poultry-yards. The floristic composition is stable (25–31 taxa, medium 28 per relevé). The diagnostic species are: *Anthemis cotula* (dominating characteristic species, Fig. 4 and 5) and *Potentilla anserina* (differential towards *Matricarietum discoideo-recutitae*). The association does not show distinct variability. Besides typical form (rel. 13–17), two patches are differentiated by hygrophilous plants: *Juncus bufonius*, *Polygonum hydropiper* and other *Bidentetea tripartitae* species (rel. 18–19). This partly confirms the variability within association, suggested by BRZEG & ROSADZIŃSKI (2006).

The syntaxon has been not validly described from Rumania (DIHORU 1975) and validated by MUCINA (1987). Further documentation origins from Slovakia (MUCINA 1987, JAROLÍMEK et al. 1997), Germany (PASSARGE 1996, SCHUBERT et al. 2001) and Poland (PAWLAK 1992, BRZEG & ROSADZIŃSKI 2006). SOWA, already in 1971 (p. 161), noticed in central Poland dense aggregations of *Anthemis cotula*, and indicated the necessity of their closer examination. The association is in NW Poland very rare, similarly to its characteristic species, only sporadically noted there in the contemporary floristic studies (e.g. TRUCHAN & SOBISZ 2007).

Principal Component Analysis (PCA, Fig. 6) shows both distinct differences between associations *Matricario-Anthemidetum cotulae* and *Matricarietum discoideo-recutitae* and subassociations within the second unit.

Passive projection of mean EIV onto the PCA ordination diagram (Fig. 7) shows that relevés distributed along first ordination axis differ in soil productivity and reaction requirements of plants constituting their floristic combinations. The species growing in the *Matricarietum discoideo-recutitae medicaginetosum* show lower requirements to soil fertility than those growing in *Matricarietum discoideo-recutitae typicum* and *Matricario-Anthemidetum cotulae*.



Fig. 4. The patch of *Matricario-Anthemidetum cotulae* in the poultry yard in Marwice (phot. M. Wojterska)



Fig. 5. Close-up of *Matricario-Anthemidetum cotulae* with participation of *Chenopodium glaucum* in Marwice (phot. M. Wojterska)

Table 1. Floristic composition and differentiation of *Matricarietum discoideo-recutitae* (rel. 1–12) and *Matricario-Anthemidetum cotulae* (rel. 13–19)

No of relevé	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19			
Locality (day)	K	K	K	Rz	N	Op	Ł	Ms	Ms	St	Zg	Op	Ms	Ms	Ł	Mw	Ł	Ł	K			
Date (month)	11	11	11	09	07	14	12	12	12	27	09	14	12	12	12	10	12	12	11			
Date (year)	07	07	07	06	06	06	07	07	07	05	06	06	07	07	07	08	07	07	07			
Aspect										SW			CONSTANCY									
Inclination [°]										3												
Cover of herb layer c [%]	90	80	70	70	60	80	75	75	80	75	85	85		90	90	80	70	70	75	90		
Cover of moss layer d [%]	10	10	+	20	-	+	-	-	-	-	-	-	-	-	+	+	+	5	10			
Area of relevé [m ²]	25	25	20	15	50	6	12	10	14	10	6	6	15	8	25	12	10	20	9			
Number of taxa	77	71	72	64	40	33	41	32	39	26	32	30	31	25	25	29	26	27	30			
I. Ch., *D. Ass.																						
<i>Chamomilla recutita</i>	4.4	4.4	3.4	4.4	2.3	3.4	4.4	3.4	3.4	3.1	4.4	1.2	V	1.1	+	+	.	+	2.2	.	IV	
* <i>Veronica persica</i>	+	+	+	.	+	1.2	+	+	1.1	+	+2	.	V	.	.	.	.	.	.	.	.	-
* <i>Vicia hirsuta</i>	1.1	+	1.1	+	r	+°	+2	.	.	.	+	.	IV	.	.	.	.	.	.	.	.	-
* <i>Veronica arvensis</i>	+	.	.	.	+	+2	.	1.1	+	.	+	.	III	.	.	.	.	.	.	.	.	-
<i>Anthemis cotula</i>	.	.	.	.	.	.	.	.	.	.	.	.	.	4.4	3.2	4.4	3.4	2.2	4.4	3.4	.	V
* <i>Potentilla anserina</i>	.	.	.	.	.	.	+2	.	.	.	.	.	I	+2	1.2	+	+2	+	2.3	.	.	V
II. Ch., *D. Malvion neglectae																						
* <i>Galinsoga ciliata</i>	.	.	.	.	.	.	.	+	+	.	.	+	II	1.1	r	.	.	r	.	.	.	III
<i>Urtica urens</i>	.	.	.	.	.	.	.	.	.	.	.	2.1	I	.	+	r	.	.	+2	.	.	III
<i>Aethusa cynapium</i> s.s.	+	+	+°	.	.	.	.	.	.	.	.	.	II	.	.	r°	.	.	.	.	.	I
* <i>Chenopodium polyspermum</i>	+	+	+	.	.	.	.	.	+	.	.	.	II	.	.	.	.	.	.	.	.	-
<i>Malva neglecta</i>	.	.	.	.	.	+2	.	.	.	.	.	+2	I	.	.	.	.	.	.	.	.	-
III. Ch. Sisymbrietalia																						
<i>Sisymbrium officinale</i>	.	+	r	r	.	1.3	+	1.1	+	.	1.1	.	IV	+	+	1.1	.	1.1	.	.	.	III
<i>Atriplex patula</i>	+	.	+	.	.	+	.	+	+	.	+	+	III	+	1.1	.	.	+	.	.	.	III
<i>Chenopodium album</i> var. <i>lanceolatiforme</i>	2.1	+	1.1	.	.	.	+	+	+	+	.	.	III	.	+	.	.	+	.	+	.	III
<i>Conyza canadensis</i>	1.1	.	+	+	+	+	r	.	.	.	+	+	IV	.	.	.	+	.	.	.	.	I
<i>Lactuca serriola</i>	.	+	r	+	.	.	.	.	r	.	.	.	III	.	.	.	.	.	.	.	.	-
<i>Descurainia sophia</i>	.	.	.	.	r	r°	.	.	.	.	.	.	II	.	.	.	.	.	.	.	.	-
IV. Ch. Stellarietalia mediae																						
<i>Capsella bursa-pastoris</i> var. <i>integrifolia</i>	2.1	2.1	2.1	1.1	2.1	2.1	+	1.1	1.1	1.1	1.1	2.3	V	+	1.1	1.1	.	+	+	+	V	
<i>Chenopodium album</i> s.s.	2.1	1.1	1.1	.	2.1	1.1	1.1	1.1	1.1	2.1	1.1	+	V	2.2	2.1	.	+	+	r°	+	V	
<i>Matricaria perforata</i>	2.2	2.2	2.1	+	2.2	1.1	2.2	2.1	2.1	.	.	.	IV	+	+2	+	2.1	.	1.2	.	.	IV
<i>Stellaria media</i>	+	+	+	+	r°	1.2	.	.	+	+2	.	+2	IV	+	.	+°	r	.	+	1.1	IV	
<i>Polygonum aviculare</i> s.s.	1.1	1.1	1.1	.	+	.	1.1	2.1	2.1	.	.	.	IV	+	1.2	.	.	.	.	.	.	II
<i>Apera spica-venti</i>	1.1	1.2	+	.	.	1.1	+	+	r	.	.	.	III	+2	+	.	.	.	.	.	+	III
<i>Geranium pusillum</i>	+	+	+	+	+	2.2	.	.	.	.	+	+	IV	.	.	.	.	.	+	.	.	I
<i>Fallopia convolvulus</i>	+	r	+	.	r	.	.	.	r	1.2	.	.	III	r	.	.	.	.	.	.	+	II
<i>Centaurea cyanus</i>	+	.	.	.	.	+	+	+	.	(+)	.	.	III	+	.	.	.	.	.	.	.	I
<i>Polygonum persicaria</i>	r	.	.	.	.	+°	+	.	.	+	.	.	II	+	.	.	+	.	.	.	.	II
<i>Galinsoga parviflora</i>	.	.	.	.	.	.	.	r	r	.	1.2	+	II	.	.	.	+	.	.	.	.	I
<i>Sonchus asper</i>	.	.	.	.	.	.	.	+	+	.	.	.	I	r	.	r	.	.	+	.	.	III
<i>Echinochloa crus-galli</i>	.	.	.	.	.	r	.	.	.	.	.	+	I	1.1	+	.	.	.	.	.	.	II
<i>Erysimum cheiranthoides</i>	.	.	.	.	.	r	.	.	.	(+)	r	.	II	.	.	.	.	.	.	.	.	-
<i>Lamium purpureum</i>	+	.	r	.	r	1.2	.	.	.	.	+	.	III	.	.	.	.	.	.	.	.	-
<i>Myosotis arvensis</i>	+	+	+	r	.	+	.	.	.	.	.	.	III	.	.	+	.	.	.	.	.	I
<i>Senecio vulgaris</i>	.	+	r	r	+	.	.	.	.	.	+	.	III	.	.	.	.	.	+	.	.	I
<i>Thlaspi arvense</i>	.	+	+	r	+	.	.	.	.	.	+	.	III	.	.	.	.	.	.	.	.	-
<i>Sonchus oleraceus</i>	r	+	.	.	.	.	+	.	.	.	.	.	II	.	.	.	.	.	.	.	.	-
<i>Viola arvensis</i>	+	+	.	+	r	1.2	.	.	.	.	.	.	III	.	.	.	.	.	.	.	.	-
<i>Polygonum lapathifolium</i> ssp. <i>pallidum</i>	r	r	r	.	.	.	.	.	.	.	.	.	II	+	.	.	.	.	.	.	.	I
<i>Vicia angustifolia</i>	+	+	+	r	.	.	.	.	.	.	.	.	II	.	.	.	.	.	.	.	.	-
<i>Vicia tetrasperma</i>	+	+	.	+2	.	.	.	.	.	.	.	.	II	.	.	.	.	.	.	.	.	-
<i>Arabidopsis thaliana</i>	.	r	.	r	+	.	.	.	.	.	.	.	II	.	.	.	.	.	.	.	.	-
<i>Polygonum monspeliense</i>	.	.	.	.	r	.	.	.	.	+	+	.	II	.	.	.	.	.	.	.	.	-
V. Ch. Polygono-Poetea annuae																						
<i>Chamomilla suaveolens</i>	2.1	2.1	2.1	2.2	3.4	3.4	1.2	2.1	3.4	2.4	2.1	5.4	V	1.1	3.4	3.1	+	3.2	2.1	2.1	V	
<i>Poa annua</i>	+	+	+	+2	2.1	1.2	+	1.2	+2	2.4	1.1	+2	V	1.1	1.1	1.2	1.2	.	1.2	2.3	V	
<i>Polygonum arenastrum</i>	.	+	+2	.	.	+	.	1.2	1.2	+2	1.2	+	IV	2.1	2.2	2.2	1.2	2.2	1.2	+2	V	
<i>Capsella bursa pastoris</i> var. <i>pinnatifida</i>	+	+	+	+	.	+	.	.	+	r	.	1.1	IV	.	.	+°	r	+	+	.	III	
<i>Bryum argenteum</i>	1.2	1.2	+	1.2	.	.	.	.	.	.	.	.	II	.	.	+2	1.2	+2	1.2	2.3	IV	
<i>Sagina procumbens</i>	.	.	.	.	.	.	.	.	.	.	.	.	-	.	.	.	+	.	1.2	.	.	II
<i>Lepidium ruderae</i>	.	.	.	.	.	.	.	.	.	.	.	.	-	.	.	.	+2	.	.	.	.	I

Table 1. cont.

No of relevé	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19					
VI. Ch. Molinio-Arrhenatheretea																								
<i>Plantago major</i>	1.1	1.1	1.1	1.1	1.1	+2	1.2	1.1	2.1	+	r	+2	V	1.2	1.2	+°	1.1	+	+°	2.1	V			
<i>Lolium perenne</i>	+2	+2	+2	+2	+2	.	1.2	2.1	+2	+	.	1.2	V	+2	+2	.	.	1.2	.	+	III			
<i>Trifolium repens</i>	+	+	+	2.2	+	.	+2	1.2	1.2	.	.	.	IV	r	.	+2	+2	+2	+2	+2	V			
<i>Poa trivialis</i>	+	1.1	+	2.1	+2	+°	.	+	+2	.	.	+2	IV	+2	+2	.	+	.	.	1.2	III			
<i>Taraxacum officinale</i> agg.	.	.	.	+	r	.	1.2	.	.	.	.	+2	.	II	+	.	+	2.2	.	+	III	
<i>Bromus hordeaceus</i>	.	+2	.	+2	.	1.2	.	.	.	.	.	.	+	II	.	.	.	.	.	+°	I	
<i>Ranunculus repens</i>	+°	+°	+	+2	.	.	r°	.	.	.	.	.	.	III	.	+	.	.	.	r	+2	III
<i>Plantago lanceolata</i>	r	+	+	+2	.	.	.	.	.	.	.	.	.	II	.	.	.	r	1.2	.	.	II
<i>Poa pratensis</i>	r	r	+°	1.1	.	.	.	.	.	.	.	.	.	II	.	+2	.	.	+2	.	.	II
<i>Cerastium holosteoides</i>	r	+	+	+	.	.	.	.	.	.	.	.	.	II	.	.	.	.	.	.	+°	I
<i>Trifolium pratense</i>	+2	+	+	.	.	.	.	.	.	.	.	.	.	II	.	.	.	.	.	+	.	I
<i>Rumex crispus</i>	r°	r°	r°	+	.	.	.	.	r°	.	.	.	.	III	.	.	.	.	.	.	.	-
<i>Holcus lanatus</i>	+°	.	+	+	.	.	+°	.	.	.	.	.	.	II	.	.	.	.	.	.	.	-
<i>Achillea millefolium</i>	.	+°	+	.	.	.	.	.	.	.	.	.	r	II	.	.	.	.	.	.	.	-
<i>Dactylis glomerata</i>	.	.	+	+2	.	.	.	.	.	+2	.	.	.	II	.	.	.	.	.	.	.	-
<i>Phleum pratense</i>	.	.	+	+	.	.	.	.	.	+2	.	.	.	II	.	.	.	.	.	.	.	-
VII. Ch. Artemisietea vulgaris																								
<i>Artemisia vulgaris</i>	+°	+	1.1	2.1	1.1	+2	+°	+°	1.1	.	.	+	V	+	+	+°	+	1.1	+°	+°	V			
<i>Urtica dioica</i>	+°	+°	+°	+	.	.	r	.	.	.	.	+	+	III	.	.	+2	+	+	1.2	+°	IV
<i>Elymus repens</i>	.	+	+	+	+	.	+	+	+	.	.	r	IV	+	1.2	.	.	+2	.	.	.	III		
<i>Cirsium arvense</i>	+°	+°	+°	.	r	.	+°	.	r°	r°	.	.	.	III	.	.	.	.	.	r°	.	I
<i>Galium aparine</i>	+	r	+	+2	.	+	.	.	.	.	.	+2	III	r	.	.	.	.	.	.	.	I
<i>Melilotus alba</i>	+	1.1	1.1	+	.	.	.	+	+	.	.	+	III	.	.	.	.	.	.	.	.	-
<i>Tanacetum vulgare</i>	+°	+°	+°	1.1	r°	.	.	+°	.	.	.	.	.	III	.	.	.	.	.	.	.	-
<i>Cirsium vulgare</i>	r°	+°	+°	+	.	.	.	r°	.	.	.	.	.	III	.	.	.	.	.	r°	.	I
<i>Medicago lupulina</i>	2.1	1.2	1.2	2.3	r°	.	.	.	.	.	.	+	.	III	.	.	.	.	.	.	.	-
<i>Myosoton aquaticum</i>	+°	+°	+°	II	+°	I	
<i>Arctium tomentosum</i>	+°	+°	+°	+°	II	+°	I	
<i>Galeopsis tetrahit</i>	+	r	+	.	.	.	.	.	.	r	.	.	.	II	.	.	.	.	.	.	.	-
<i>Lapsana communis</i>	r	.	.	.	.	.	.	.	.	r	.	.	.	I	r	.	.	r°	.	.	.	II
<i>Rumex obtusifolius</i>	r°	.	.	r	.	.	r°	.	.	.	.	.	.	II	.	.	.	r	.	.	.	I
VIII. Others																								
<i>Brassica napus</i>	+	.	.	+	.	r°	r	.	.	.	.	.	.	II	+	+	.	.	.	.	.	II
<i>Bromus carinatus</i>	+	+	.	r	.	+2	.	.	.	.	.	.	r	III	.	.	.	.	.	.	.	-
<i>Polygonum hydropiper</i>	1.2	1.2	II
<i>Rorippa palustris</i>	.	.	r	I	+2	I	
<i>Polygonum lapathifolium</i> s.s.	2.2	I	
<i>Bidens tripartita</i>	r	I	
<i>Juncus bufonius</i>	+	+	.	+2	II	+°	1.2	II
<i>Barbarea vulgaris</i>	+	+	2.1	+	II	.	2.1	-	
<i>Chenopodium glaucum</i>	+	.	r	I	.	.	.	1.2	I	
<i>Epilobium tetragonum</i>	.	r	+	.	.	.	r	II	-	
<i>Stachys sylvatica</i>	+	r°	r°	II	.	r°	-	

Abbreviations: K – Królewo, Ł – Łącko, Ms – Marszewo, Mw – Marwice, N – Noskowo, Op – Opalewo, Rz – Rzyszczewo, St – Staniewice, Zg – Zielonagóra

Sporadic taxa: **III.** *Asperugo procumbens* 11(+); *Bromus sterilis* 11(+); *Cannabis sativa* var. *spontanea* 11(+); *Chenopodium ficifolium* 1(+), 3(1.1); *Epilobium ciliatum* 1(+), 4(r); *Sisymbrium loeselii* 5(r); **IV.** *Amaranthus retroflexus* 12(+); *Anagallis arvensis* 1(+); *Anchusa arvensis* 1(+), 2(+), 16(r); *Anthemis arvensis* 2(+), 4(r); *Avena fatua* 7(+), 13(+); *Bromus secalinus* 8(+); *Chenopodium hybridum* 11(+), 12(+); *Euphorbia helioscopia* 12(+); *Fumaria officinalis* 5(+), 10(+); *Papaver dubium* 4(+), 5(+); *P. rhoeas* 1(+); *Scleranthus annuus* 1(r); *Sinapis arvensis* 1(+), 8(+); **VI.** *Agrostis stolonifera* ssp. *prorepens* 7(+), 9(+), 17(+); *A. gigantea* 3(+), 9(+); *Alopecurus geniculatus* 4(+), 5(+); *Arrhenatherum elatius* 4(+); *Festuca pratensis* 8(+), 9(+); *Geranium molle* 3(r); *Juncus compressus* 15(1.2); *J. tenuis* 15(+); *Leontodon autumnalis* 2(+), 19(r); *Odontites serotina* s.s. 2(+); *Poa palustris* 3(+); *Rumex acetosa* 4(r); *Stellaria graminea* 4(+); *Trifolium hybridum* s.s. 1(+), 4(+); *Veronica serpyllifolia* 1(r); *Vicia cracca* 4(+), 7(+); **VII.** *Anthriscus sylvestris* 1(+), 4(r); *Arctium lappa* 15(+); *A. minus* 11(+), 15(+); *Armoracia rusticana* 6(+); *Ballota nigra* s.s. 11(+); *Berteroa incana* 3(+); *Carduus crispus* 9(r); *Chelidonium majus* 3(r); *Convolvulus arvensis* 12(2.1); *Dipsacus sylvestris* 3(r), 15(r); *Epilobium hirsutum* 1(+), 3(r); *Equisetum arvense* 7(r), 9(+); *Galeopsis pubescens* 10(r); *Geum urbanum* 2(+), 3(r); *Glechoma hederacea* 17(+); *Heracleum sibiricum* 4(r); *Melandrium album* 4(+); *Rubus caesius* 7(1.2); *Stachys palustris* 10(r); *Torilis japonica* 3(r), 7(r); *Tussillago farfara* 5(+); **VIII.** *Arenaria serpyllifolia* 2(r), 4(+); *Barbula convoluta* 2(+), 3(+); *Brachythecium rutabulum* 1(+), 2(+); *Bryum* sp. 1(1.2), 2(1.2); *Ceratodon purpureus* 4(2.3), 16(+); *Gnaphalium uliginosum* 5(r), 7(+); *Phleum hubbardii* 1(r), 2(+); *Triticum vulgare* 1(+), 5(+); *Agrostis capillaris* 4(+); *Atriplex prostrata* ssp. *latifolia* 8(r); *Avena sativa* 7(+); *Barbarea stricta* 4(r); *Borago officinalis* 1(+); *Chenopodium rubrum* 3(r); *Epilobium parviflorum* 16(r); *Galeopsis ladanum* 1(+); *Hordeum vulgare* 10(+); *Phascum cuspidatum* 6(+); *Polygonum amphibium* fo. *terrestre* 7(+); *Plagiomnium* sp. 16(+); *Sambucus nigra* juv. 2(+); *Scrophularia nodosa* 3(r), 19(r); *Secale cereale* 10(+); *Solanum tuberosum* 10(+); *Syntrichia ruralis* 2(+); *Trifolium arvense* 4(+).

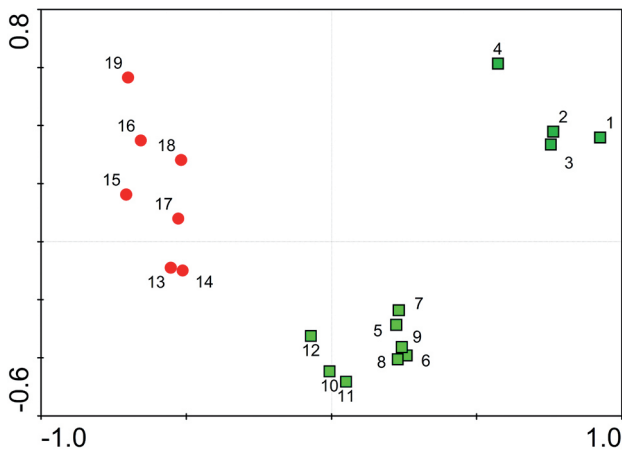


Fig. 6. PCA ordination diagram of relevés of both studied communities

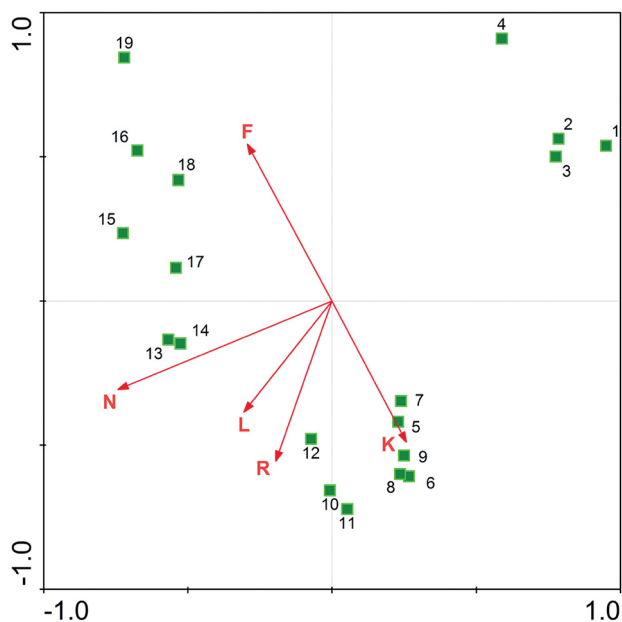


Fig. 7. Passive projection of mean EIV on the PCA ordination diagram of relevés of both studied communities: F – soil moisture, K – continentality, L – light, N – soil productivity, R – soil reaction

The second ordination axis shows differences between *Matricario-Anthemidetum cotulae* and *Matricarietum discoideo-recutitae medicaginetosum* in relation to *Matricarietum discoideo-recutitae typicum* in their plant preferences toward soil humidity and general continentality. Plants constituting *Matricario-Anthemidetum cotulae* show higher requirements toward humidity, whereas those of *Matricarietum discoideo-recutitae typicum* higher indices of continentality.

DISCUSSION

The published materials on *Matricarietum discoideo-recutitae* since the first description of this unit by JAROLÍMEK et al. (1997) are still very scarce (total 29 relevés, including 12 published in this paper). The controversial issue is the floristic richness of phyto-

coenoses. The mean number of species in one relevé in the original table (JAROLÍMEK et al. 1997) equals 16 (6–28), in the table of ČARNÍ (2005), containing only two relevés, it is even lower (7 and 10), whereas in our table it reaches 71 in the richer subassociation and 34 in the poorer typical one. In our plots much richer is the representation of characteristic species of *Sisymbrietalia* and *Stellarietetea mediae*. The typical for this association share of *Polygono-Poetea annuae* and of *Trifolio repentis-Plantaginietalia majoris* species is comparable in all materials. Much higher in NW Poland is also share of *Artemisietea vulgaris* species, they occur however with very low abundances and decreased vitality. This definitely higher floristic richness may result from more diversified spectrum of neighbouring habitats and plant communities, as well as from low intensity of disturbance. In Slovakia all plots were documented from places situated in direct neighbourhood of farm buildings, in the contact with other communities of *Malvion neglectae* and *Matricario-Polygonion arenastri* (JAROLÍMEK et al. 1997). Higher differentiation of habitats occupied by phytocoenoses of *Matricarietum discoideo-recutitae* in NW Poland results in its differentiation in two subassociations.

The geographic distribution of this community is not fully recognized. It has not been stated so far, for example, from Germany (SCHUBERT et al. 2001), Romania (SANDA et al. 2008) and Czech Republic (CHYTRÝ 2009).

Matricario-Anthemidetum cotulae is better documented both in Poland and in other countries of Central Europe, e.g. in Germany (PASSARGE 1996, SCHUBERT et al. 2001, BERG et al. 2004), Slovakia (MUCINA 1987, JAROLÍMEK et al. 1997) and Czech Republic (CHYTRÝ 2009). Not all authors agree on the syntaxonomy of community with *Anthemis cotula*. PENDER (1990, Table 5, rel. 1–2) includes patches with dominance of *Anthemis cotula* into *Urtico-Malvetum neglectae*. In Romania (SANDA et al. 2008) it is currently mentioned as a subassociation *Sclerochloa-Polygonetum avicularis* (Gams 1927) Soó 1940 *anthemidetosum cotulae* Viřalariu 1973, within a very broadly approached association placed in the *Plantaginetea majoris* class.

Both associations are characterized by a high frequency of *Polygono-Poetea annuae* species in the plots, which is typical trait of the *Malvion neglectae* communities (MUCINA 1987, JAROLÍMEK et al. 1997, BRZEG 2006).

Our data not only confirm the ecological requirements and place of the association *Matricarietum discoideo-recutitae* in the landscape, published by JAROLÍMEK et al. (1997) and ČARNÍ (2005), but broaden the spectrum of its habitats, adding to the courtyards and road margins in the fields, the newly disturbed places, mainly on ruins of destroyed farm buildings.

All above cited authors (MUCINA 1987, PAWLAK 1992, PASSARGE 1996, JAROLÍMEK et al. 1997, BRZEG & ROSADZIŃSKI 2006, CHYTRÝ 2009) are unanimous in their descriptions of ecological preferences of *Matricario-Anthemidetum cotulae* indicating on villages and on sites moderately disturbed by domestic fowl, enriched in nitrogen of organic origin. Such habitats are situated close to farm buildings, fences and small storage yards and parking places of agricultural machines and vehicles (Fig. 4).

CONCLUSIONS

The paper gives first documentation of two *Malvion neglectae* associations from NW Poland. Analogical data from other regions in Poland are scarce, hidden within tables of other communities (*Matricario-Anthemidetum cotulae*), or not existing in published materials (*Matricarietum discoideo-recutitae*).

The studies have brought about broadening of knowledge on synecological scale and differentiation of *Matricarietum discoideo-recutitae*, resulting in description of two new subassociations: *M. d.-r. medicaginetosum lupulinae* and *M. d.-r. typicum*.

Both associations, and especially *Matricario-Anthemidetum cotulae*, are connected with traditional forms of management in villages and therefore strongly endangered.

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