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**THE OCCURRENCE OF *ARNOSERIDO-SCLERANTHETUM*
(CHOUARD 1925) R.Tx. 1937 IN THE SŁOWIŃSKI NATIONAL PARK**

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Abstract

The Park is situated on the Słowiński Coast and its almost whole area belongs to the Baltic Coastal Geobotanical Region. The studies were carried out in the cultivated fields of the SNP, mainly covered by pine forests, where agriculture plays a minor part. The material collected in the years 1997-1998 comprised 115 phytosociological relevés made by the Braun-Blanquet method, according to the classifications and nomenclature given by Kornaś (1972). The names of species were adopted after Mirek *et al.* (1995). The paper presents the occurrence and analytical characteristics of subatlantic association against the background of habitat condition. *Arnoserido-Scleranthetum* is floristically the poorest community of weeds developing in winter cereals of the SNP. It is differentiated into two variants: *A.-S. typicum* and *A.-S. myosotetosum* with *Anthoxanthum aristatum* Boiss.

Key words: phytosociology, cereal weed communities, soil-agricultural complexes, national park, Pomeranian region

INTRODUCTION

Fields under cultivation constitute 22.7% of the total area of the Słowiński National Park. As far as their farming usefulness is concerned, the predominant are rye soil complexes (76% of arable area), significantly smaller area is occupied by the cereal-fodder (18%) and wheat complexes (6%). Within the rye complexes about two-thirds are taken up by the weak and very weak rye complex, one-third by the good and very good rye complex (Mrozowski 1974).

Segetal flora and associations have not been fully researched. The occurrence of some segetal species in this region is described in the works of German researchers: Abromeit *et al.* (1894-1940), Ascherson and Graebner (1898-1899), Müller (1911). Herbarial collections of such German florists as Krause, Karl and Otte from the period of 1897-1943 in Department of Botany Herbarium SLTC (Mirek *et al.* 1997) are of major importance in locating many taxa, including those rare and endangered. More information on the segetal species distribution is provided by present

authors (Borowiec *et al.* 1974; Kuźniewski *et al.* 1981; Misiewicz and Sobisz 1981, 1987; Brzeg 1991; Rola and Kucharczyk 1992; Piotrowska *et al.* 1997; Sobisz unpubl; Sojka unpubl.).

MATERIALS AND METHODS

Field investigations were conducted in the 1997-1998 vegetation seasons and 115 phytosociological relevés were made by the Braun-Blanquet method, commonly used in Poland. Fifteen relevés coming from seven localities were used in this study. Soil-agricultural maps in the scale of 1:5000 and 1:25000 were applied to evaluate the habitat conditions. The nomenclature used to describe the soil conditions is based on that given by Dobrzański and Zawadzki (1981). The phytosociological table presents full information on the agricultural complex, the type of soil and its mechanical composition. It also presents the phytosociological constancy calculated according to the Braun-Blanquet 5-degree scale. The phytoindicative method was applied for ecological evaluation of the habitat conditions (Ellenberg 1950, Kutyna 1998). Average numbers for the temperature (T), moisture (W), reaction (R), nitrogen content (N) and biological activity (G) conditions were calculated for each relevé.

The classification and association nomenclature were given after Kornaś (1972), the names of weeds species after Mirek *et al.* (1995).

RESULTS

Arnosserido-Scleranthetum is a common association mainly in the west and north-west of the country (Warcholińska 1995). It has been described, among others, by Hołdyński (1983) from the Iława Lakeland; Kutyna (1988) from the Gorzów Valley; Bielska (1989) from the Lublin Region; Jackowiak *et al.* (1990) from Great Poland; Krasicka-Korczyńska (1990) from the Żnin Plain; Anioł-Kwiatkowska, Dajdok (1993) from the Oleśnica Plain; Szmeja (1996) from the Zaborski Landscape Park; Sobisz (1997) from the Krajna Lakeland; Ratuszniak, Sobisz (1999) from the „Słupia Valley” Landscape Park.

The acidophilous *Arnosserido-Scleranthetum* (Table 1) develops on strongly acidified soils (R=1.3-2.0) formed from full sands, loose and light-loamy rye complexes: very weak (7) and weak (6), and the cereal-fodder weak complex (9). Well-developed patches are to be found in the extensive, thin rye stands, in the close vicinity of swards and a dry coniferous forest. Because the soil is poor in edaphic components, the association assumes a loose structure - the mean coverage value in a typical sub-association is 38%, in the form with *Myosotis arvensis* (L.) Hill - 47%. Also the number of species (64) recorded in the whole table is relatively low.

Out of characteristic species only *Arnosseris minima* (L.) Schweigg. & Körte occurs with a high constancy and fulfils the association's diagnostic function. Similar quantitative conditions were observed in the vicinity of Łeba by Nowiński (1965). According to Wójcik (1978) the less frequently occurring *Anthoxanthum aristatum* may be considered as a characteristic species. It is worth emphasising here that in the investigated area it is attached to more moistened soils.

Table 1

Arnosserido-Scleranthetum (Chouard 1925) R.Tx. 1937

Subassociation	<i>typicum</i>										<i>myosotetosum</i>					Mean			
Successive number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15				
Number of releve	869	776	873	887	884	785	779	788	889	886	778	781	794	895	901				
day	9	29	9	19	19	12	29	12	19	19	29	29	12	19	19				
Date	VII	VI	VII	VII	VII	VII	VI	VII	VII	VII	VI	VI	VII	VII	VII				
month	98	97	98	98	98	97	97	97	98	98	97	97	97	98	98				
year	C	L	Si	C	GW	GW	Sm	Sm	SL	Si	W	SL	SL	SL	SL				
Locality																			
Soil unit	7 Bw	7 Bw	7 Bw	7 Bw	7A	7 Bw	7 M	6 Bw	7 Bw	6 Bw	9 M	9 Bw	9 M	9 Bw	9 M				
	ps	ps	ps	ps	ps	ps	pl	pgl	ps	pgl	ps	ps	ps	ps	psp				
	.zg	.pl	.pl	.pl	.pl	.pl		.ps	.pl	.pl	.pl	.pl	.pl	.pl					
	:zp							:pl											
Cover of cultivated plants [%]	50	20	50	60	50	40	55	50	50	60	50	60	20	50	40	48	44		
Cover of weeds [%]	40	35	40	50	40	25	45	35	40	30	50	45	45	55	40	38	47		
Area of releve [m ²]	100	50	50	100	50	50	80	50	100	50	80	50	100	100	50				
Number of species in releve	14	11	16	20	21	15	11	16	19	15	26	26	22	23	28	16	25		
Average value ecological index	T	2.4	2.0	2.1	2.2	2.1	2.3	2.1	2.3	2.1	2.2	1.8	1.9	1.9	2.0	1.9	2.2	1.9	
	W	3.3	2.8	3.4	2.7	3.7	3.3	2.7	3.3	2.7	3.2	2.6	2.3	2.6	2.6	2.5	3.1	2.5	
	R	1.2	1.5	1.4	1.4	1.2	1.3	1.3	1.3	1.5	1.2	1.9	1.9	1.8	2.6	2.0	1.3	2.0	
	N	2.5	2.6	2.8	2.9	3.0	2.3	2.3	2.3	2.8	2.2	2.5	2.6	2.5	3.1	2.6	2.5	2.6	
	G	2.2	2.1	2.0	1.8	1.8	2.0	1.8	1.8	1.6	1.8	2.2	1.9	1.9	2.5	2.1	1.8	2.1	
I. Cultivated plants																S	D	S	D
<i>Secale cereale</i>	3.4	2.2	3.3	4.3	3.3	3.4	3.3	3.4	3.3	4.4	3.4	4.4	2.2	3.3	3.4	1-10		11-15	
II. Ch. D. Ass. <i>Arnosserido-Scleranthetum minima</i>																			
<i>Arnosseris minima</i>	2.2	1.1	2.2	1.2	+	1.2	1.1	1.1	2.2	+	1.1	+	2.2	1.1	2.2	V	805	V	920
<i>Teesdalia nudicaulis</i>	+	.	+2	+	1.1	+	2.2	1.1	1.2	1.1	+2	+	.	1.1		V	415	IV	160
<i>Anthoxanthum aristatum</i>	1.2	+	2.2	+			IV	494
<i>Holcus mollis</i>	+	I	10		
<i>Veronica dillenii</i>	1.2	I	50		

The distinguishable species were found to be: *Teesdalea nudicaulis* (L.) R. Br., *Holcus mollis* L. and *Veronica dilleni* Crantz. The last taxon is a very rare floral component of the Słowiński National Park (Piotrowska *et al.* 1997). The floral composition is formed not only by the above taxa, but also such high coverage weeds as: *Agropyron repens* (L.) P. Beauv., *Fallopia convolvulus* (L.) Á. Löve, *Apera spica-venti* (L.) P. Beauv., occurring in the constancy class V and VI. Also frequent components are *Scleranthus annuus* L., *Spergula arvensis* L. and *Rumex acetosella* L., emphasising the acidophilous character of the association. The presence of the apophytes of sandy swards and dunes in the community indicates that it is a substitute community for the *Spergulo-Corynephorum* association. For a community developing in corns, the percentage of characteristic species of the *Centauretalia cyani* sub-order is inconsiderable.

The association was divided into two sub-associations: *typicum* (rel. 1-10) and *myosotetosum* (rel. 11-15). The A.-S *typicum* is floristically poor (from 11 to 20 species in a relevé, 15 on average) because it develops in habitats where soils are nutrient-deficient, overdried, acid, and of low biological activity (see average TWRNG values). The more favourable trophic and moisture conditions of the sub-association with a share of *Myosotis arvensis* are reflected in a higher number of species (from 22 to 28, average 24). Furthermore, it is characterized by a significant share of hygrophilous species (frequent and abundant occurrence of *Mentha arvensis* L. and the characteristic species of the compound *Nanocyperion flavescens*: *Juncus bufonius* L. and *Gnaphalium uliginosum* L.

In the phytocenoses of this sub-association a share of such species as: *Papaver argemone* L., *Arabidopsis thaliana* (L.) Heynh., *Veronica hederifolia* L., *Papaver dubium* L., which clearly indicates connections with the *Papaveretum argemones* association. According to Borowiec and Kutyna (1981) this state is a result of agricultural measures, e.g. organic manuring, liming of poor and acid soils. Patches of such communities can be found in the vicinity of Smółdziński Las, in fields along the roads to Kluki and Czołpino. The penetration of the components of the sand poppy association to the phytocenoses of *Arnosserido-Scleranthetum* has already been observed by many authors (Herbich 1982, Balcerkiewicz and Pawlak 1990, Hołdyński, Korniak 1994, Szmeja 1994, Ratuszniak and Sobisz 1999).

CONCLUSIONS

The occurrence of the subatlantic association *Arnosserido-Scleranthetum* was observed in the cultivated fields of villages located within the Słowiński National Park and its immediate protection zone. Comparing the distribution of its sites with the potential vegetation map of the Szczecin Sea-Coast and West Pomerania Lakeland (Jasnowski *et al.* 1995) one can see their marked concentration in the domination area of the subatlantic acidophilous beech-oak forest *Fago-Quercetum petraeae*.

Major floristic features of the studied agrophytocenosis and its internal differentiation were presented. The Ellenberg phytoindicative method was applied for the evaluation of habitat conditions.

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WYSTĘPOWANIE *ARNOSERIDO-SCLERANTHETUM* (CHOUARD 1925)
R.Tx. 1937 W SŁOWIŃSKIM PARKU NARODOWYM

Streszczenie

Park położony jest na Pobrzeżu Słowińskim i niemal w całości należy do geobotanicznej Krainy Brzeg Bałtyku. Na polach uprawnych położonych w granicach Słowińskiego Parku Narodowego stwierdzono występowanie subatlantyckiego zespołu *Arnosserido-Scleranthetum* (Table 1). Badania terenowe prowadzono w latach 1997-1998. Wykonano łącznie 115 zdjęć fitosocjologicznych powszechnie stosowaną w Polsce metodą Braun-Blanqueta. Klasyfikację i nomenklaturę zespołu podano według Kornasia (1972). Nazewnictwo gatunków ustalono za Mirkiem *et al.* (1995). Podano ważniejsze cechy florystyczne wyróżnionej agrofitycenozy, jej wewnętrzne zróżnicowanie i powiązania z warunkami siedliskowymi. Do ich oceny wykorzystano fitoindykacyjną metodę Ellenberga. Zespół chłodka drobnego i czerwca rocznego jest najuboższym florystycznie zbiorowiskiem segetalnym zbóż ozimych w SPN. Zróżnicowane warunki troficzno-wilgotnościowe znalazły swoje odzwierciedlenie w podziale zespołu na dwa podzespoły: *A.-S. typicum* i *A.-S. myosotetosum*.