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FIELD HEDGES OF SOUTHERN PART OF THE GARDNO LAKE – A RARE, ENDANGERED AND INTERESTING VASCULAR PLANTS REFUGE

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Abstract

This paper presents results of floristic investigations on the southern part of the Gardno Lake. In 2005-2006 vegetation seasons 81 rare, endangered and interesting vascular plants were found. Among them there are 27 species protected by law (19 strictly and 8 partially) (Ustawa… 2004), e.g.: *Dactylorhiza majalis*, *Epipactic helleborine*, *E. palustris*, *Galium odoratum*, *Hepatica nobilis*, *Lycopodium annotinum*, *Matteucia struthiopteris*, *Lilium martagon*, *Listera ovata*, *Lonicera periclymenum*, *Ornithogalum nutans*. The *Euphorbia palustris* found on the investigation area is in direct danger of extinction in the Western Pomerania region.

Key words: field hedges, Gardno Lake, rare and endangered species, central part of Polish Pomerania

INTRODUCTION

Field hedges are of great significance for the structure of agricultural landscapes. They change the climatic and hydrological properties of the area and counteract the wind erosion of soils and their drying up. Microclimatic changes caused by field hedges on adjacent fields increase the yields of crops plants. In agricultural areas forests most frequently occur as small, isolated patches. Generally they cover places unsuitable for agriculture – steep slopes, stream valleys, wet field depressions, etc. The number of species in the forest island depends upon the area of an island, its shape, age, isolation, habitat diversity and anthropogenic disturbances (Loster 1991). The structure of field hedges, the diversity of their flora and vegetation are very variable and are caused mainly by their origin, local habitat conditions and the degree of human impact.

The aim of this work was to present the vascular plants under strict and partial protection, rare, endangered and interesting flora from the field hedges of southern part of the Gardno Lake.

MATERIALS AND METHODS

This paper describes the physiognomy and flora of field hedges and the threats posed to them in the southern part of Gardno Lake on Słowińskie Coast (Kondracki

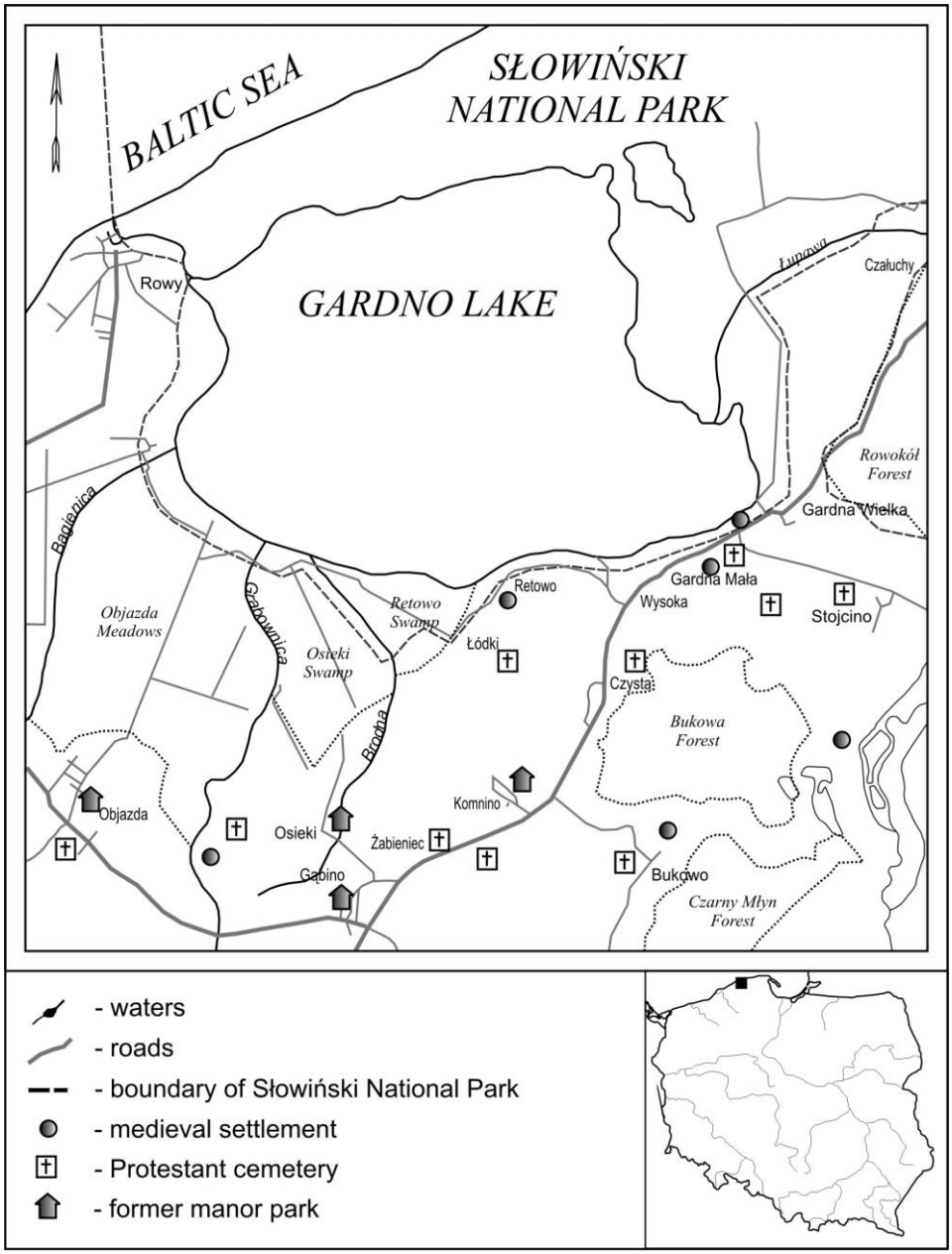

Fig. 1. Southern part of Gardno Lake

1998). Field investigations were conducted in 2005-2006. The research covered 4 former manor parks located in Gąbino (**G**), Komnino (**K**), Objazda (**Ob**) and Osieki (**Os**), as well as 10 Protestant cemeteries in the following places: Bukowo (**B**), Czysta (**Cz**), Gardna Mała (**GM**) (2 objects), Komnino, Łódki (**Ł**), Objazda, Osieki, Stojcino (**S**) and Żabieniec (**Ż**). The research has also been done in the former medieval settlements, that were located in the following places: Bukowo, Czarny Młyn (**CM**), Gardna Mała, Gardna Wielka (**GW**), Osieki and Retowo (**Rt**) (Fig. 1).
Five types of habitats were identified in the studied area: former manor parks, Protestant cemeteries, medieval settlements, groves and thickets and also field ponds and wet field depressions. Distribution of these field hedges is presented in figure 1.
Names of recorded vascular plants follow Mirek et al. (2002). The considered taxa encompassed the protected species listed by the Ministry of Environmental from 9th July of 2004 (Government Regulations and Laws Gazette No 168, item 1764).
Categories of threat for Western Pomerania region were quoted from Żukowski and Jackowiak (1995), Gdańskie Pomerania by Markowski and Buliński (2004), Poland and Łódź Heights by Warcholińska (1994, 2006). The following symbols and abbreviations were used in the table 1: **!!** – strict protection, **!** – partial protection, **E** – endangered (in direct danger of extinction), **V** – vulnerable, **R** – rare, **I** – species of indeterminate threat (Ex – extinct, missing; E, V or R), **K** – species of insufficiently known threat, **RE** – extinct in the region, **VU** – vulnerable, **NT** – nearly threatened, **LC** – least concerned, **DD** – data deficient, **RR** – locally rare, **1…6** – number of localities.
The ascription of a taxon to a given threat category is based, according to the International Union for the Conservation of Nature and Natural Resources, on quantitative and qualitative criteria (IUNC 2001).

CONCLUSIONS

Eighty one rare taxa about differential endangered scale and also interesting vascular plants species from 39 families have been noted on the studied area. There were 19 species under strict protection and 8 species under partial protection. There were 30 species in the former manor parks, 22 species on the Protestant cemeteries and medieval settlements, 31 species on the groves and field were and also on the field ponds and wet field depressions there were 18 species.
There were 11 vulnerable species in Gdańskie Pomerania, as well as 10 in Western Pomerania among the found plants. 4 taxa are common for both regions and they are as follows: *Aconitum variegatum*, *Aquilegia vulgaris*, *Epipactis palustris* and *Utricularia australis*. There were 29 taxa from locally rare category (RR), e.g.: *Chrysanthemum segetum, Conium maculatum, Corydalis intermedia, Dianthus carthusianorum, Digitalis purpurea, Digitaria ischaemum, Echinops sphaerocephalus, Euphorbia esula, Hydrocotyle vulgaris, Liriodendron tulipifera, Spergula morisonii, Thalictrum flavum* and *Vicia grandiflora*.
The *Euphorbia palustris* found in Gardna Mała is in direct danger of extinction in the Western Pomerania region.

Table 1

Rare, endangered and interesting vascular plants on the southern part of the Gardno Lake

Family/Species	Protec Loc	Marko Bul ński	Żukow Jacl	Warch (19	Forme par s	Protes cen ries	Medie sett emer	Grov	Field r fiel
		Categories of threats							
1	2	3	4	5	6	7	8	9	10
Lycopodiaceae									
Lycopodium annotinum	!!				-	-	-	1 – Os	-
Equisetaceae									
Equisetum hyemale L.	RR				-	-	-	1 – Cz	1 – Rt
Athyriaceae									
Matteucia struthiopteris (L.) Tod.	!!	NT	V		-	2 – GM, S	-	-	-
Polypodiaceae									
Polypodium vulgare L.	!!				-	3 – Cz, Ob, Ż		-	-
Taxaceae									
Taxus baccata L.	!!	VU	R		2 – G, Os	1 – Cz	-	1 – S	-
Magnoliaceae									
Liriodendron tulipifera L.	RR				1 – G	-	-	-	-
Corylaceae									
Corylus colurna L.	RR				1 – K	-	-	-	-

1	2	3	4	5	6	7	8	9	10
Fagaceae									
Castanea sativa Mill.	RR				1 – Os	-	-	-	-
Ulmaceae									
Ulmus laevis Pall.		NT			2 – G, Os	-	3 – GM, Os, Rt	-	-
Ulmus minor Mill. emend. Richens		NT			1 – K	1 – S	-	1 – Ł	-
Ulmus minor var. *suberosa* Rehd.	RR				1 – K	-	-	-	-
Polygonaceae									
Reynoutria sachalinensis (F. Schmidt) Nakai	RR				1 – Ob	-	1 – CM	-	-
Chenopodiaceae									
Chenopodium bonus-henricus L.		NT	R		-	-	1 – B	1 – GM	-
Chenopodium rubrum L.	RR				-	-	-	-	1 – Ł
Chenopodium polyspermum L.				LR	-	-	-	2 – B, S	-
Caryophyllaceae									
Dianthus carthusianorum L.	RR				-	-	1 – Cz	-	-
Holosteum umbellatum L.	RR				-	-	-	1 – Ł	-
Herniaria glabra L.				DD	1 – Ob	1 – S	-	-	-
Agrostemma githago L.				VU	-	-	2 – CM, GW	-	-
Spergula morisonii Boreau	RR				-	-	1 – Rt	1 – Ł	-
Aceraceae									
Acer campestre L.		NT	R		1 – G	-	-	-	-

1	2	3	4	5	6	7	8	9	10
Euphorbiaceae									
Euphorbia esula L.	RR				-	1 – Cz	1 – GW	-	-
Euphorbia palustris L.	RR		E		-	-	-	-	1 – Ł
Ranunculaceae									
Actaea spicata L.		LC	V		1 – Os	-	-	-	-
Aconitum variegatum L.	!!	VU	V		-	1 – Cz	-	-	-
Aquilegia vulgaris L.	!!	VU	V		1 – G	1 – S	-	-	-
Anemone ranunculoides L.	RR				3 – K, Ob, Os	1 – Os	-	2 – Ł, Rt	-
Hepatica nobilis Garsault	!!				1 – Os	-	-	1 – Ł	-
Thalictrum flavum L.	RR				-	-	-	-	1 – Cz
Papaveraceae									
Papaver rhoeas L.				VU	2 – K, Os	-	-	-	-
Papaver dubium L.				LR	-	-	2 – CM, Rt	-	-
Corydalis intermedia (L.) Merat	RR				1 – G	-	1 – B	-	-
Brassicaceae									
Neslia paniculata (L.) Desv.				VU	-	-	1 – Os	-	-
Sinapis arvensis L.				VU	2 – Ob, Os	-	4 – B, CM, Os, Rt	1 – Cz	-
Guttiferae									
Hypericum humifusum L.				VU	-	-	-	-	1 – Ł

1	2	3	4	5	6	7	8	9	10
Saxifragaceae									
Ribes nigrum L.	!				-	-	-	2 – Cz, M	3 – B, GW, Rt
Fabaceae									
Vicia grandiflora Scop.	RR				-	-	1 – GW	-	-
Vicia tenuifolia Roth		VU			-	-	-	1 – Ż	-
Lathyrus tuberosus L.		VU			-	1 – GM	-	1 – G	-
Ononis spinosa L.	!				2 – G, Os	-	-	1 – GM	-
Anthyllis vulneraria L.	RR				-	-	-	1 – K	-
Ornithopus perpusillus L.	RR				-	-	1 – Rt	-	-
Malvaceae									
Malva alcea L.	RR				1 – K	-	3 – B, CM, Os	-	-
Apiaceae									
Hydrocotyle vulgaris L.	RR				-	-	-	-	1 – Ł
Conium maculatum L.	RR				1 – G	-	-	1 – Rt	-
Heracleum sosnowskyi Manden.	RR				1 – G	1 – Cz	-	-	1 – S
Primulaceae									
Hottonia palustris L.	RR				-	-	-	-	1 – Ł
Cuscutaceae									
Cuscuta europaea L.		NT			-	-	-	1 – CM	-

1	2	3	4	5	6	7	8	9	10
Scrophulariaceae									
Mimulus guttatus DC.		NT			-	-	-	-	1 – Rt
Chaenorhinum minus (L.) Lange		NT			-	-	1 – GW	-	-
Digitalis purpurea L.	RR				-	1 – Cz, M	-	-	-
Lentibulariaceae									
Utricularia australis R. Br.	!!	VU	V		-	-	-	-	1 – Ł
Lamiaceae									
Nepeta cataria L.		VU			-	-	1 – CM	-	-
Caprifoliaceae									
Lonicera periclymenum L.	!!	VU			2 – G, Os	3 – B, GM, S	-	1 – Ł	-
Menyanthaceae									
Menyanthes trifoliata L.	!				-	-	-	-	2 – Ł, Rt
Apocynaceae									
Vinca minor L.	!				1 – G	5 – B, Cz, GM, Ł, Ob	-	-	-
Rubiaceae									
Galium odoratum (L.) Scop	!				-	2 – B, Ł	-	1 – Ł, Rt	-
Asteraceae									
Filago vulgaris Lam.		DD	V		-	-	1 – GW	-	-
Helichrysum arenarium (L.) Moench	!				-	-	1 – CM	1 – Ż	-

1	2	3	4	5	6	7	8	9	10
Chrysanthemum segetum L.	RR				-	-	1 – Ob	-	-
Echinops sphaerocephalus L.	RR				1 – G	-	-	-	-
Centaurea cyanus L.		VU			2 – Ob, Os	-	4 – CM, GM, GW, Rt	1 – Cz	-
Hydrocharitaceae									
Stratiotes aloides L.	RR			-	-	-	-	-	1 – Ł
Liliaceae									
Lilium martagon L.	!!	NT	V		-	1 – Cz	-	-	-
Ornithogalum nutans L.	!!				-	1 – S	-	-	-
Ornithogalum umbellatum L.	!!			LR	1 – G, K	-	-	-	-
Muscari comosum (L.) Mill.	!!				-	1 – GM	-	-	-
Convallaria maialis L.	!				1 – Ob	3 – B, Cz, K	-	2 – Ł, Rt	-
Amaryllidaceae									
Leucoium vernum L.	!!				1 – G	-	-	-	-
Galanthus nivalis L.	!!	DD	I		2 – K, Ob	6 – B, Cz, GM, K, Ł, S		1 – Ł	-
Juncaceae									
Juncus capitatus Weigel		VU	R		-	-	-	-	1 – Ł
Juncus tenuis Willd.	RR				-	-	-	-	1 – Rt

1	2	3	4	5	6	7	8	9	10
Poaceae									
Bromus secalinus L.		NT	V	VU	-	-	2 – B, CM	-	-
Digitaria ischaemum (Schreb.) H. L. Muhl.	RR				-	-	1 – Os, Rt	-	-
Cyperaceae									
Carex arenaria L.	!				-	-	1 – GW	1 – Rt	-
Carex flacca Schreb.		NT			-	-	-	1 – Ł	-
Carex lepidocarpa Tausch		LC	V		-	-	-	-	1 – Ł
Orchidaceae									
Epipactis palustris (L.) Crantz	!!	VU	V		-	-	-	-	1 – Ł
*Epipactis helleborine (*L.) Crantz	!!				1 – Os	-	-	1 – Ob	-
Listera ovata R. Br.	!!				-	-	-	1 – Ł	-
Dactylorhiza majalis (Rchb.) P.F. Hunt & Summerh.	!!	NT			-	1 – Cz	-	1 – Rt	-

REFERENCES

IUNC, 2001. IUNC Red List Categories and Criteria: Version 3.1. IUNC Species Survival Commission. IUNC, Gland-Cambridge.

Kondracki J., 1998. Geografia Polski. Mezoregiony fizyczno-geograficzne. (Geography of Poland. Physico-geographical mesoregions). PWN, Warszawa, (in Polish).

Loster S., 1991. Różnorodność florystyczna w krajobrazie rolniczym i znaczenie dla niej naturalnych i półnaturalnych zbiorowisk wyspowych. (Floristic richness in an agricultural landscape and the maintenance of natural and semi-natural island communities). *Fragm. Flor. Geobot.* 36(2), 427-457, (in Polish).

Markowski R., Buliński M., 2004. Ginące i zagrożone rośliny naczyniowe Pomorza Gdańskiego. (Endangered and threatened vascular plants of Gdańskie Pomerania). *Acta Bot. Cass. Monogr.* 1, (in Polish).

Mirek Z., Piękoś-Mirkowa H., Zając A., Zając M., 2002. Krytyczna lista roślin naczyniowych Polski. (Flowering Plants and Pteridophytes of Poland. A Checklist). W. Szafer Institute of Botany, Polish Academy of Science, Kraków, (in Polish).

Ustawa z dn. 16 kwietnia 2004 o ochronie przyrody. (Act from the 16th of April 2004 about the nature protection). DzU 2004 no. 92, pos. 880.

Warcholińska A.U., 1994. List of threatened segetal plant species in Poland. In: Antropization and environment of rural settlements. Flora and vegetation. (Eds.) S. Mochnacký, A. Terpó, Botanical Garden, P.J. Safarik University, Košice, 206-219.

Warcholińska A.U., 2006. Threatened segetal flora species of the Łódź Heights. *Biodiv. Res. Conserv.* 3-4, 391-394.

Żukowski W., Jackowiak B., 1995. Lista roślin naczyniowych ginących i zagrożonych na Pomorzu Zachodnim i w Wielkopolsce. W: Ginące i zagrożone rośliny naczyniowe Pomorza Zachodniego i Wielkopolski. (List of the endangered and threatened plants in the Western Pomerania and Wielkopolska. In: Endangered and threatened vascular plants of Western Pomerania and Wielkopolska). (Eds.) W. Żukowski, B. Jackowiak, Poznań, (in Polish).

ZADRZEWIENIA ŚRÓDPOLNE POŁUDNIOWEJ CZĘŚCI JEZIORA GARDNO – OSTOJĄ RZADKICH, ZAGROŻONYCH I INTERESUJĄCYCH ROŚLIN NACZYNIOWYCH

Streszczenie

Badania florystyczne zadrzewień śródpolnych południowej części jeziora Gardno prowadzone były w sezonach wegetacyjnych 2005-2006. Stwierdzono 81 rzadkich, zagrożonych i interesujących taksonów roślin naczyniowych. 27 z nich jest objętych ochroną prawną (19 – ochroną całkowitą i 8 – częściową). Do gatunków tych należą między innymi: *Dactylorhiza majalis, Epipactic helleborine, E. palustris, Galium odoratum, Hepatica nobilis, Lycopodium annotinum, Matteucia struthiopteris, Lilium martagon, Listera ovata, Lonicera periclymenum, Ornithogalum nutans*. *Euphorbia palustris* odnotowany nad brzegiem rzeki Grabownicy (dopływ Gardna) jest gatunkiem bezpośrednio zagrożonym wymarciem (E) na Pomorzu Zachodnim.