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Threatened and spreading plant species in the protected area 'Błota Rakutowskie' (northern Poland)

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Abstract: Rare, protected and threatened plants were studied in 'Błota Rakutowskie' – a NATURA 2000 site protected due to its ornithological value. The site includes primarily wetlands and the Rakutowskie Lake, which is now very shallow and overgrown mainly by plant communities of the class Charetea. In summer, part of the lake floor is exposed and succession of marsh and meadow communities takes place. Near the lake there are vast areas of marsh communities and wet meadows. The lake and the surrounding marshes have been a Nature Reserve 'Jezioro Rakutowskie' since 1982. Floristic research carried out in 2004 has proved a high participation of protected and threatened taxa in the flora of this area. Some of the species tend to spread, e.g. *Cladium mariscus, Eleocharis quinqueflora* and *Gentianella amarella*. During this study, 45 species that are protected or threatened in Poland or its central and northern regions were noted there. Out of them, 18 taxa are legally protected. The analysis concerns not only vascular plants but also charophytes and bryophytes.

Key words: protected species, threatened species, calcicole, vegetation succession, flora

'Błota Rakutowskie' (=Rakutowo Wetlands) are a site protected according to the Bird Directive as part of the European Ecological Network NATURA 2000. It is located in the Płock Basin, within the area of the Gostynin-Włocławek Landscape Park, in the lowlands of northern Poland. 'Błota Rakutowskie' encompass the bird reserve 'Jezioro Rakutowskie' (417.07 ha, including the Rakutowskie Lake and its vicinity) and adjacent meadow complexes.

The Rakutowskie Lake is big but shallow. Every year its area is becoming smaller and smaller. In 1927 the water area was 361.3 ha, but in 1981 only 165 ha. This water body is located in a vast and flat area, which hinders water runoff. This has once led to draining of adjacent areas and, at the same time, to accelerating the processes leading to the decline of the lake. The lake is mainly overgrown by plant communities of the class Charetea. The specificity of the lake is that during the summer, vast areas of the lake floor (over 50 ha) are exposed. Around the lake there are marshes and wet meadows. Lacustrine chalk occurs in the sediments, so many calcicoles grow there.

Floristic research was carried out in 2004. Localities of species that are rare, protected or threatened in the region were marked on the map. Furthermore, the research involved observations of the population size and dynamic trends of rare plants. Floristic documentation was compiled in the table. Results of some observations from 1983 and 1994 were used for this comparison.

Legally protected species were chosen according to the Regulation of 9 July 2004. Threat categories of the regions: Kujawy-Pomerania (Rutkowski 1997), Wielkopolska (Żukowski & Jackowiak 1995), central Poland (Jakubowska-Gabara & Kucharski 1999) and of Poland (Siemińska *et al*. 2006; Ochyra 1992; Zarzycki & Szeląg 2006) were specified. Nomenclature of vascular plants follows Mirek *et al*. (2002), whereas nomenclature of mosses follows Ochyra *et al*. (2003).

The research showed a high contribution of protected and threatened species in the flora. Out of the total number of 266 taxa (including 237 vascular plants), 45 legally protected and threatened species in Poland or some of its regions were recorded.

Table 1. Protected and threatened components of the flora of 'Błota Rakutowskie'

Species	Population size	Habitat	Protected species	Threat categories				Dynamic trends
				K-P	W	CP	P	
Charophyta								
Chara aculeolata	++	W					E	
Chara aspera	+	W					E	
Chara fragilis	+	W					V	
Chara polyacantha	+	W	SP				E	↓
Chara tomentosa	+++	R, W					R	
Nitellopsis obtusa	+	W					R	
Bryophyta								
Bryum neodamense	+	R	SP				V	
Calliergonella cuspidata	+++	M, O, R	pp					
Campyliadelphus elodes	+	M, R					I	
Climacium dendroides	+	M, O	pp					
Hamatocaulis vernicosus	+	M, R	SP					↓
Leptodictyum humile	++	M, O, R	SP				I	
Batrachium trichophyllum	+	W	SP					↓
Spermatophyta								
Calamagrostis stricta	+++	M, O, R			V			
Carex diandra	+	R			V	VU		
Carex disticha	++	M, R			V	LR lc		
Carex flacca	+	M				VU		
Carex lasiocarpa	++	F, M, O, R				VU		
Centaurium pulchellum	+	F	SP			CR		↓
Cladium mariscus	+++	F, M, O, R	SP	V	R	CR		↑
Cnidium dubium	++	M, O, R		V	V	VU	V	
Dactylorhiza incarnata	+	M	SP		V	VU		↓
Eleocharis quinqueflora	+++	F, M, R		I	V	LR nt		↑
Epipactis palustris	+	M	SP	V	V	EN	V	↓
Euphrasia caerulea	+	M			K		R	↓
Euphrasia nemorosa	+	M			K		R	
Frangula alnus	++	M, O, R	pp					
Gentiana pneumonanthe	+	M	SP	E	E	CR	V	↓
Gentianella amarella	+	M	SP	V	E		E	↑
Juncus alpino-articulatus	++	F, M, O, R			V	LR nt		↑
Lathyrus palustris	++	M, O, R		V	V	EN	V	
Nuphar lutea	++	R, W	pp					
Nymphaea alba	+	R, W	pp					
Salix myrsinifolia	+	R			V	EN		
Salix repens subsp. *rosmarinifolia*	++	F, M, O				LR lc		
Schoenoplectus tabernaemontani	++	F, R				VU		
Scrophularia umbrosa	+	O, R				LR lc		
Scutellaria hastifolia	+	F		V		CR	V	↓
Taraxacum palustre coll.	+	F, M		V		CR		
Teucrium scordium	+	M, R			V	VU	V	
Thalictrum flavum	+	M, O				VU		
Triglochin maritimum	+	F			V	CR		↓
Utricularia vulgaris	++	F, R, W	SP					↓
Valeriana dioica	+	M			V			
Viola stagnina	++	M, R	SP	V	E	CR	E	

Explanations: Population size: +++ large; ++ medium; + small; Habitat: F – temporarily flooded places; M – wet meadows and pastures; O – osier-beds, wet forests; R – rushes, tall sedges; W – waters; Protected species: SP – strict protection; pp – partial protection; Threat categories: K-P – in Kujawy-Pomerania (Rutkowski 1997); W – in Wielkopolska (Żukowski & Jackowiak 1995); CP – in central Poland (Jakubowska-Gabara & Kucharski 1999); P – in Poland (Siemińska *et al*. 2006; Ochyra 1992; Zarzycki & Szeląg 2006); CR – critically endangered; E or EN – endangered; I – indeterminate; K – insufficiently known threat; LR lc – lower risk category, least concern; LR nt – lower risk category, near threatened; R – rare; V or VU – vulnerable; dynamic trends: ↑ – spreading; ↓ – declining

In the group of the 45 analysed taxa (Table 1), a high contribution of threatened and rare species on a local scale was observed. However, because of the habitat specificity of the area, some species have numerous localities (Fig. 1), large populations, and even show a tendency to spread.

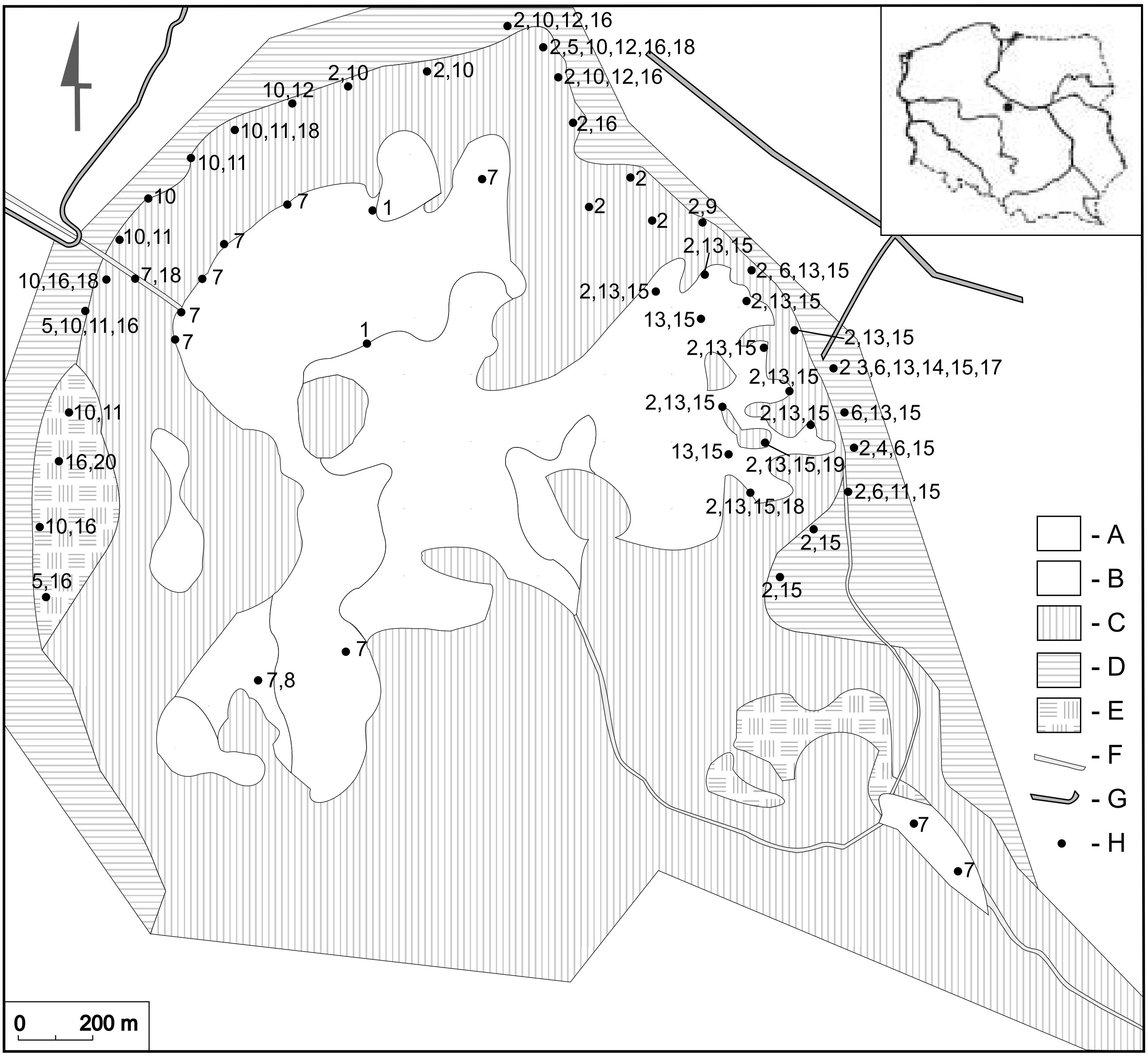

Fig. 1. Localities of selected rare and threatened species
Explanations: A – standing waters; B – temporarily emerges of lake floor; C – rushes; D – meadows; E – shrubs; F – rivers and ditches; G – roads; H – localities of species
1 – *Chara polyacantha*; 2 – *Cladium mariscus*; 3 – *Dactylorhiza incarnate*; 4 – *Epipactis palustris*; 5 – *Gentiana pneumonanthe*; 6 – *Gentianella amarelle*; 7 – *Nuphar lutea*; 8 – *Nymphaea alba*; 9 – *Batrachium trichophyllum*; 10 – *Viola stagnina*; 11 – *Carex disticha*; 12 – *Cnidium dubium*; 13 – *Eleocharis quinqueflora*; 14 – *Euphrasia caerulea*; 15 – *Juncus alpino-articulatus*; 16 – *Lathyrus palustris*; 17 – *Scutellaria hastifolia*; 18 – *Teucrium scordium*; 19 – *Triglochin maritimum*; 20 – *Valeriana dioica*

In the study area, rare and declining species include *Chara polyacantha*, *Hamatocaulis vernicosus*, *Gentiana pneumonanthe*, *Centaurium pulchellum*, *Epipactis palustris* and *Dactylorhiza incarnata*. In contrast, the threatened taxa that clearly spread there, are mainly *Cladium mariscus*, *Eleocharis quinqueflora*, *Carex viridula* and *Juncus alpino-articulatus*. Especially the first 3 are very numerous (thousands of individuals). *Gentianella amarella* is rarer (several hundreds of individuals) but in recent years its tendency to spread has also been noted. *Schoenoplectus tabernaemontani*, *Carex disticha*, *Cnidium dubium* and *Viola stagnina* also have large but stable populations in this area.

The main cause of frequent occurrence of some rare species is the occurrence of habitats rich in limestone. The tendency of some plants to spread, however, results from the existence of pioneer habitats and early stages of vegetation succession on the periodically exposed lake floor.

However, taking into consideration the need to protect the dwelling places of important bird species, it is suggested to stabilize the water level and thus stop the succession of marsh vegetation in the places where in summer the lake floor is exposed. In effect, further expansion of *Cladium mariscus*, *Eleocharis quinqueflora* and some other calcicoles will be limited.

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