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Rare plants in the protected areas Pobiti kamăni in north-eastern Bulgaria

Abstract

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The distribution of rare species and the status of their populations in 13 areas declared protected, totalling 257.5 ha, is given. The rarest taxa are *Arenaria rigida* and *Dianthus pontederae* subsp. *kladovanus*.

Introduction

The geological landmark “Pobiti kamăni”, in the Varna region, consists of disclosures of sandy marine Eocene sediments. Striking upright limestone columns, which look like a fossilized forest in a sand desert, were the objects of one of the first areas to be protected in Bulgaria. Recently, a proposal for enlarging the protected territory has been accepted, and soon a set of 13 parcels totalling 257.5 ha will be declared protected (Fig. 1).

Davidov (1907) was the first to take notice of the peculiar flora growing on these tertiary sands. He lists 50 species (psammophytes, relicts and endemics) as constantly present in the Pobiti kamăni habitats. Data on the vegetation are found mainly in Jordanov (1936), Filipova (1971), and Kočev (1975).

The object of the present study is to assess the current status of rare species in the Pobiti kamăni protected areas.

Material and methods

The selection of the species investigated has been based on the lists of threatened species by Velčev (1984) and Lucas (1983).

The distribution of species by areas, as shown in Fig. 1, was recorded in 1992. Some of the areas were explored also in 1990, 1991, and 1993. Data on size, density and, in some cases, age structure of the populations are based mainly on visual observation. For species with smallish populations the surface area of the population was measured, and the number of individuals was counted.

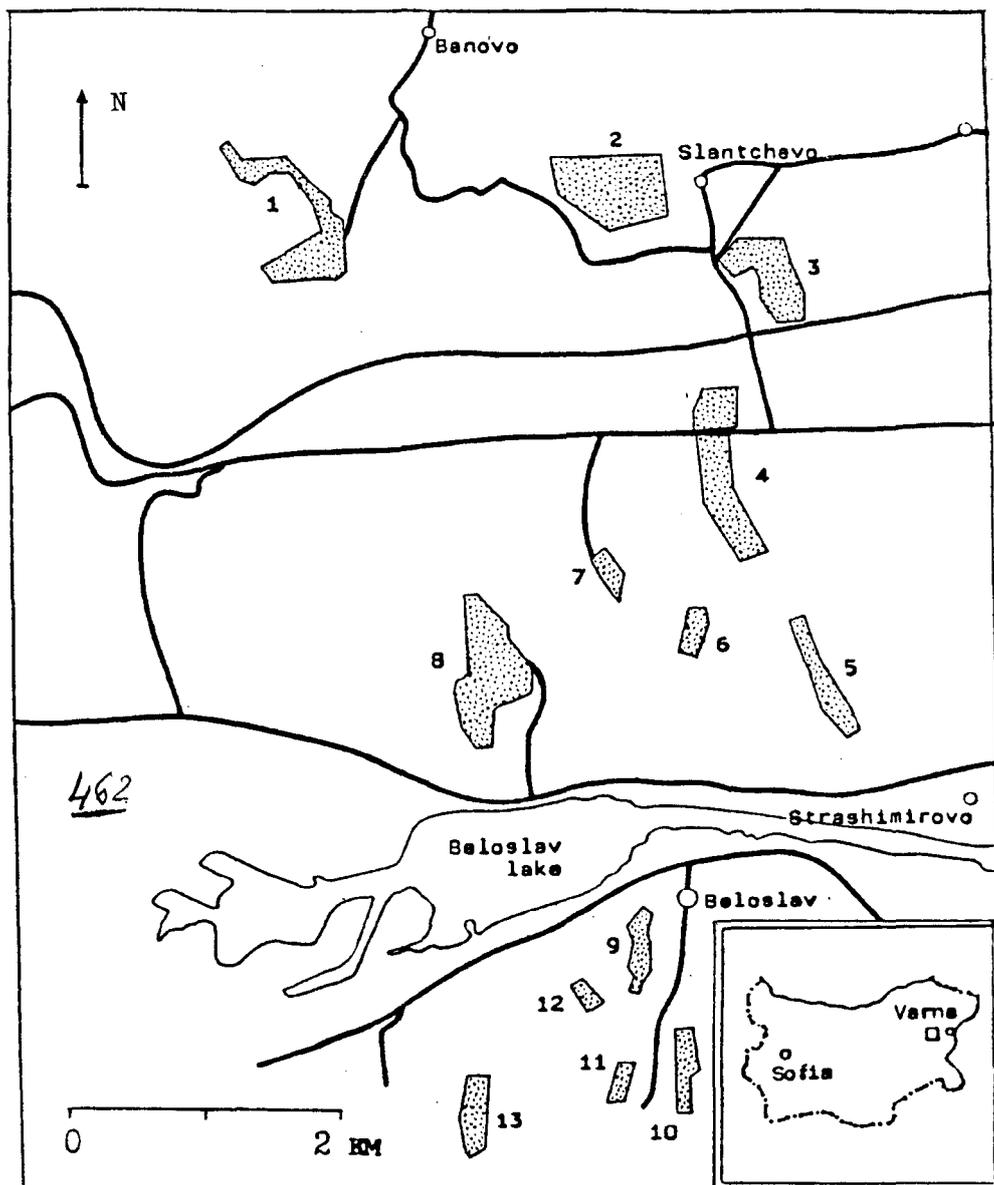


Fig. 1. Map of the protected areas Pobiti kamani. – 1, Banovo group (32.4 ha); 2, W. Slančevo group (81.2 ha); 3, S.E. Slančevo (33.5 ha); 4, central group, Dikili-taš (17.7 ha); 5, Strašimirovo group (5 ha); 6, Perčan tepe (1 ha); 7, W. sand-pit (1.5 ha); 8, Kanarata and sand-pit Drenaka (68.5 ha); 9, W. Beloslav (4.5 ha); 10, Teterlika (5.6 ha); 11, Avrenska poljana (1 ha); 12, Golija vrač (1.3 ha); 13, Pčelina (10 ha).

Table 1. Threat category and distribution of rare plant species in the protected areas Pobiti kamăni (numbered as in Fig. 1). Threat categories (TC) for Europe (Eur): V = vulnerable, R = rare, I = indeterminate (as defined in Lucas 1983); for Bulgaria (BG): E = endangered, R = rare (as defined in Velčev 1983); P = protected by Bulgarian law.

	TC		P	Presence (+) in protected areas (1-13)													area N°
	Eur	BG		1	2	3	4	5	6	7	8	9	10	11	12	13	
<i>Alyssum borzaeanum</i>	I			+	+	+	+	+	+			+	+	+		9	
<i>Anthemis regis-borisii</i>	R		P			+	+		+			+	+			5	
<i>Arenaria rigida</i>	R	R					+					+				2	
<i>Centaurea arenaria</i>		R		+	+	+	+	+	+	+		+	+	+	+	12	
<i>Cleistogenes bulgarica</i>		R	P	+		+	+	+	+	+	+	+	+	+	+	12	
<i>Corispermum nitidum</i>	V	R		+	+	+	+	+	+			+	+			8	
<i>Dianthus nardiformis</i>	V	R	P	+		+	+					+	+	+		6	
<i>D. pontederæ</i> subsp. <i>kladovanus</i>		R	P											+	+	2	
<i>Festuca arenicola</i>	V	R		+	+	+	+	+	+			+	+	+	+	10	
<i>Lepidotrichum uechtritziatum</i>	V	R	P	+	+	+	+	+	+			+	+	+	+	10	
<i>Secale sylvestre</i>		R		+		+	+		+			+	+	+		7	
<i>Syrenia cana</i>		E		+	+	+	+					+	+			6	
<i>Verbascum purpureum</i>	I	R		+		+	+	+		+	+	+	+		+	9	
Number of species per area				10	6	11	12	7	8	3	4	12	11	7	3	4	

Results and discussion

The 13 rare species growing in the studied areas, with their conservation status and distribution, are listed in Table 1. *Alyssum borzaeanum* Nyár., rare in a European context (Lucas 1983), is not included in the *Bulgarian red data book* (Velčev 1984). In the latter publication, the Pobiti kamăni populations of *Festuca arenicola* (Prodán) Soó are attributed to *Festuca vaginata* Waldst. & Kit.

Two species are found in two areas only. *Arenaria rigida* M. Bieb. has one sizeable population, with more than 1000 individuals on 0.4 ha, in area N° 9; and second one, with only 20 plants, in the central group. Both populations consist mostly of adult plants, juvenile and immature ones being extremely rare. A survey of Bulgarian herbaria (SO, SOM, SOA) shows that the species has been collected in only one further locality in Bulgaria, in the same region (Davidov, SOM N° 21532). The population of *Dianthus pontederæ* subsp. *kladovanus* (Degen) Stoj. & Acht. in area N° 11 comprises 120 plants spread over 500 m²; the population in area N° 13 consists of a few individuals only.

Three species have 5 or 6 localities each. The largest population of the Bulgarian endemic *Anthemis regis-borisii* Stoj. & Acht. is found in area N° 9, where its highest density coincides with that of *Arenaria rigida*. The populations of *Syrenia cana* (Piller & Mitterp.) Neilr., which in Bulgaria is only found on the tertiary sands of Pobiti kamăni, often cover sizeable surfaces. Individuals are usually scattered but in some spots they may be dense. The populations of *Dianthus nardiformis* Janka are found in stony places and are usually quite local, consisting mostly of adult individuals. Exceptions are the populations in areas N° 9 and N° 11, with a considerable percentage of young plants.

Both annuals, *Corispermum nitidum* Kit. and *Secale sylvestre* Host, often grow together in deep dry sands, where coverage of perennials is quite low.

Centaurea arenaria M. Bieb. ex Willd., *Lepidotrichum uechtrizianum* (Bornm.) Velen., *Cleistogenes bulgarica* (Bornm.) Keng, and *Festuca arenicola* (Prodán) Soó are found in 10 or more areas. The first two usually form scattered populations. The two grasses form well delimited stands and are often dominant in their plant associations.

There is no strong correlation between the size of a protected area and the number of rare species found. The central group (N° 4; 17.7 ha) and W. Beloslav (N° 9; 4.5 ha), with 12 rare species each, are the richest ones, followed by S.E. Slančevo (N° 3; 33 ha) and Teterlica (N° 10; 5.6 ha), with 11 rare species. Very small disclosures, however, even if well preserved like Avrenska Poijana (N° 11; 1 ha), support but few species. Just 4 of them are found in area N° 13, which is peripheral to the region. The number of rare species in disclosures resulting from recent human activity is low: only 3-4 rare species are found in sand pits (areas N° 7 and 8).

Conclusion

The Pobiti kamāni habitats support many rare species despite the intense human activity in the region. These protected areas are of importance, at a European scale, for the conservation of at least 7 taxa, the rarest being *Arenaria rigida* and *Dianthus pontederæ* subsp. *kladovanus*. The first is limited to this area in Bulgaria. Our results show that their country category should be "endangered" and "protected". Further studies, elsewhere in Bulgaria, are needed to elucidate the appropriate status of the second taxon.

Only the central group is partly guarded. Better protection measures are needed for all areas, but are particularly urgent for W. Beloslav. Considerable damage by grazing has been observed there since 1992.

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