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CURRENT STATUS OF THE RARE SPECIES *LATHYRUS TRANSSILVANICUS* IN BULGARIA

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Abstract

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The present research aims to clarify the current status of the rare species *Lathyrus transsilvanicus* (Spreng.) Fritsch (Fabaceae) in Bulgaria, which was until recently considered as extinct in this country. The presence of the species is confirmed and data on the current status of its population and habitat are reported. Reassessment according to the criteria of the IUCN Red List Categories is made, showing that the species should be considered as “Critically Endangered” at local level.

Key words: *Lathyrus transsilvanicus*, Bulgarian flora, *Calthion*, *Orobus*

Introduction

The genus *Lathyrus* L. includes some 150 species found mainly in Europe, Asia, North America, the temperate regions of South America and tropical East Asia (Bässler, 1973, Kupicha, 1983). In the Bulgarian flora the genus is represented by 30 species, related to 9 sections (Kozuharov, 1976; Tosheva, 2005).

One of the representatives of the section *Orobus* - *Lathyrus transsilvanicus* (Spreng.) Fritsch (Fabaceae) was first found for the Bulgarian flora in 1903 (Neichev, 1906; 1909). It was found in Central Stara planina Mts. (the valley of river Armankaya, district Gabrovo) at 1600 m a. s. l. (sub *Orobus aureus* Stev. f. *glaucus* Neič.). Despite the attempts to confirm its presence the species has not been found since 1905 and is currently considered as “Regionally Extinct” for the Bulgarian flora (Petrova and Vladimirov, 2009; Tosheva et al., 2011).

In July 2007 near the locality mentioned by Neichev the authors found a small group of *Lathyrus* species determined later as *Lathyrus transsilvanicus* (Spreng.) Fritsch.

Materials and Methods

The information for the distribution, comparative morphological, chorological and phenological survey of the species is based on samples collected from the field, the available literature data and specimens deposited in the Herbarium of Sofia University (SO) and the Herbarium at the Agricultural University, Plovdiv (SOA). The voucher specimens of the new collections are deposited in the Herbarium of Sofia University (Table 1).

The area diagnosis follows Meusel et al. (1965). The localities in Bulgaria are shown on an UTM-Grid map (scale 1: 1500000, square side 10 km). The GPS-coordinates of the locations in Central Stara planina Mts. are visualized on an orthophoto map of the region (Figure 1).

The habitat characterization of *L. transsilvanicus* is made according to the principles of Braun-Blanquet phytosociological school (Mueller-Dombois and Ellenberg, 1974). The three locations of the species are considered different vegetation stands in which the species abundances were estimated by Braun-Blanquet old cover-abundance scale (Braun-Blanquet, 1964) (Table 2).

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Table 1

Specimens of *Lathyrus transsilvanicus* (Spreng.) Fritsch. in Bulgarian herbaria

Specimen	Collection data
SO-107569	Central Stara Planina Mts., Triglav massif (Stara Zagora district), The seven gorges locality, South-West of Mazalat hut, at 1500 m a.s.l. On rocky and wet terrains, close to the timber-line, near watercourses in grass communities with predomination of <i>Molinia caerulea</i> ; N 42,75896; E 25,10523; 12. 07. 2007; Leg. Y. Marinov/Det. A. Tosheva.
SO-107570	Central Stara Planina Mts., Triglav massif (Stara Zagora district), The seven gorges locality, South-West of Mazalat hut, at 1450 m a.s.l. On rocky and wet terrains, close to the timber-line, near watercourses in grass communities; N 42,75809; E 25,10548; 29.05.2011; Leg. Y. Marinov/Det. A. Tosheva.
SO-46904	Stara Planina, Armankaja, 07.1903 (sub <i>Orobis aureus</i> Steven f. <i>glauca</i> Nejceff) ; Leg./Det. Neichev
SOA-6830	Stara Planina, Armankaja, 1905 (sub <i>Orobis aureus</i> Steven f. <i>glauca</i> Nejceff) ; Leg./Det. Neichev

Table 2

Phytosociological characteristics of the localities of *Lathyrus transsilvanicus* in Central Stara planina Mts

Location	1	2	3
Altitude	1600	1600	1600
Aspect	SE	E	SE
Slope, degrees	45	40	40
Rocks	limestone	limestone	limestone
Humidity	wet	wet	moist
Community area, m ²	500	400	300
Cover total, %	90	95	95
<i>Calthion palustris</i> Tüxen 1937			
<i>Cirsium oleraceum</i> (L.) Scop.	2	+	+
<i>Angelica sylvestris</i> L.	+	+	+
<i>Filipendula ulmaria</i> (L.) Maxim.	2	r	r
<i>Caltha palustris</i> L.	1	+	+
<i>Dactylorhiza saccifera</i> (Brongn.) Soó	+	r	-
<i>Hypericum umbelatum</i> A. Kerner	+	r	r
<i>Molinion caeruleae</i> Koch 1920			
<i>Molinia caerulea</i> (L.) Moench	3	—	—
<i>Quercus-Fagetum</i> Braun-Blanquet et Vlieger in Vlieger 1937			
<i>Fagus sylvatica</i> L.	+	+	+
<i>Galium odoratum</i> (L.) Scop.	+	+	+
<i>Mycelis muralis</i> (L.) Dumort.	r	+	+
<i>Sanicula europaea</i> L.	+	+	+
<i>Asarum europaeum</i> L.	+	r	r
<i>Acer pseudoplatanus</i> L.	+	r	—
<i>Carpinus betulus</i> L.	r	—	r
<i>Galio-Urticetum</i> Passarge ex Kopecký 1969			
<i>Stachys sylvatica</i> L.	+	+	r
<i>Salvia glutinosa</i> L.	+	+	r
<i>Anthriscus nitida</i> (Wahlenb.) Garcke	r	+	+
<i>Petasites albus</i> (L.) Gaertner	1	+	—
<i>Geranium robertianum</i> L.	+	+	—
<i>Aegopodium podagraria</i> L.	1	+	—
Others			
<i>Rubus idaeus</i> L.	+	+	+
<i>Mercurialis perennis</i> L.	2	+	1

Table 2

Location	1	2	3
<i>Telekia speciosa</i> (Schreb.) Baumg.	1	+	+
<i>Ranunculus platanifolius</i> L.	+	r	r
<i>Euphorbia amygdaloides</i> L.	+	+	+
<i>Aremonia agrimonoides</i> (L.) DC.	+	+	+
<i>Campanula rapunculoides</i> L.	+	+	+
<i>Moehringia trinervia</i> (L.) Clairv.	+	+	+
<i>Hepática nobilis</i> Miller	+	r	+
<i>Prenanthes purpurea</i> L.	2	1	+
<i>Corylus avellana</i> L.	+	+	–
<i>Daphne mezereum</i> L.	+	r	–
<i>Rubus hirtus</i> Waldst. & Kit.	r	–	+
<i>Spiraea chamaedifolia</i> L.	+	+	–
<i>Alchemilla viridiflora</i> Rothm.	1	+	–
<i>Geranium sylvaticum</i> L.	+	+	–
<i>Circea lutetiana</i> L.	+	r	–
<i>Lilium martagon</i> L.	+	r	–
<i>Melica nutans</i> L.	1	+	–
<i>Cruciata glabra</i> (L.) Ehrend.	+	+	–
<i>Primula veris</i> L.	r	r	–
<i>Senecio nemorensis</i> L.	+	+	–
<i>Tanacetum macrophyllum</i> (Waldst. & Kit.) Schultz Bip.	+	r	–
<i>Carex pallescens</i> L.	+	+	–
<i>Carex acuta</i> L.	+	–	+
<i>Carex divulsa</i> Stokes	+	+	–

Results and Discussion

Morphology and biology (Figure 2)

Perennial herbaceous plant with subterranean rhizome. Stem erect, 30–80 cm high, without wings. Leaves paripinnate, mucronate, with 2–4 pair of lanceolate to obovate leaves, 40–100 mm long, greyish green and with scarce hairs on the lower side, green and glabrous above. Flowers clustered by 8–12 in racemes. Calyx with unequal teeth. Petals yellow. Fruit linear, brown red legume. Fl. V–VI, fr. VII–VIII.

Distribution and habitat

The species belongs to the European floristic element (Balc-Transsilv-Pann). Its distribution range covers Central Europe with southern limit in the Balkan Peninsula. The most southern point of its distribution is in the Central Stara planina Mts. (Figure 1).

The species grows in three locations (Figure 1). They are close to each other and occupy an area of 1200 m². The species is found on steep slopes (40°–45°) of southeastern to eastern exposition on calcareous terrains. In the three localities 47, 11 and 4 individuals were observed, respectively.

In its distribution range (Central Europe) *L. transsilvanicus* is known to inhabit deciduous forests – from shady beech to sparse xerophilous oak forests (Didukh, 2009; Carpathian Biodiversity Information System). In Central Stara planina Mts. the species takes part in tall-herb plant communities of forest clearings in the beech belt on calcareous terrains and moist to wet soils. These ecological characteristics and the species composition of the communities show affiliation to the alliance *Calthion palustris* Tüxen 1937 of *Molinio-Arrhenatheretea* Tüxen 1937 class (Hájková, 2008). Characteristic species of this alliance are *Cirsium oleraceum*, *Angelica sylvestris*, *Caltha palustris*, *Filipendula ulmaria*, *Dactylorhiza sac-cifera* (Table 2). In one of the locations the vegetation is dominated by *Molinia caerulea* but the species complex and habitat characteristics show no resemblance to the alliance *Molinion caeruleae* Koch 1926 from the same vegetation class. Being strongly attached to the shady beech forests and the timber-line, the habitats of *L. transsilvanicus* are normally rich of *Quercus-Fagetum* species (Table 2; Figure 1). This association to the forest belt is also marked by *Galio-Urticetea* Passarge ex Kopecký 1969

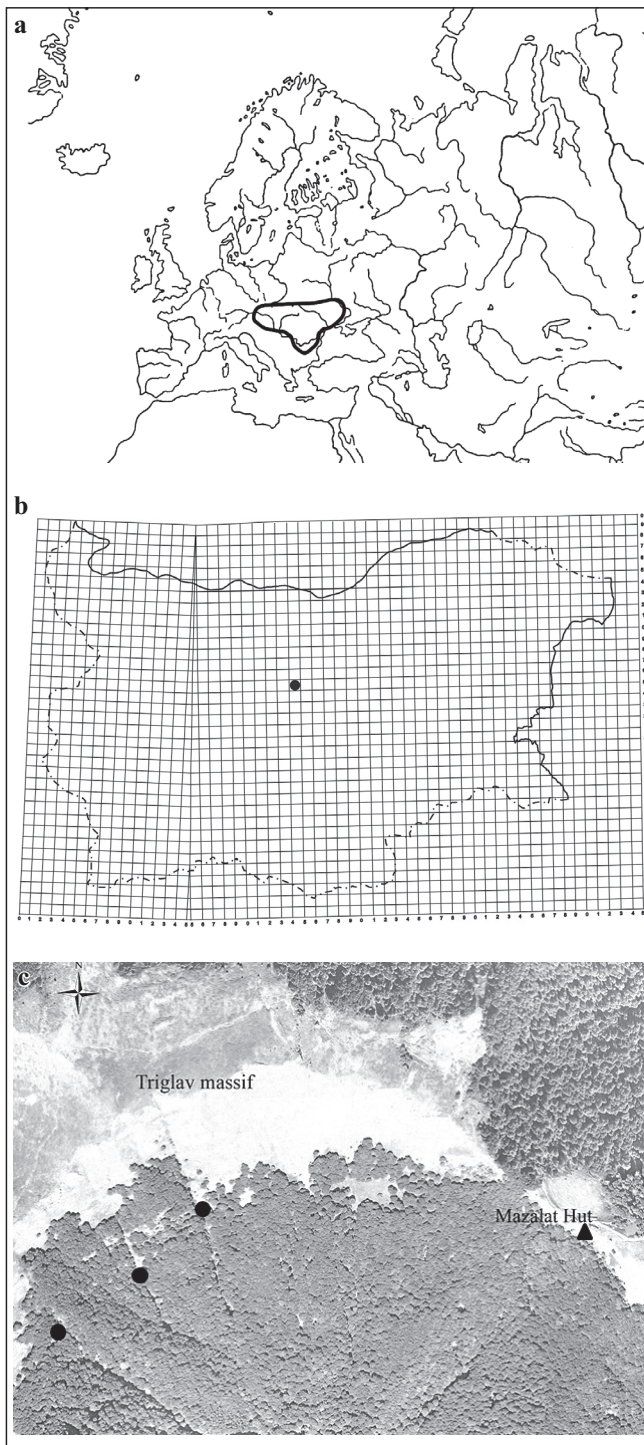


Fig. 1. Distribution range of *Lathyrus transsilvanicus*:
a) general distribution; b) distribution in Bulgaria (●);
c) locations of the species in the Central Stara planina
Mts (●)



Fig. 2. *Lathyrus transsilvanicus*



Fig. 3. Habitat of *Lathyrus transsilvanicus*

species (*Stachys sylvatica*, *Petasites albus*, *Geranium robertianum*, *Aegopodium podagraria*). The last show the presence of anthropogenic pressure probably caused by tourism and grazing in the region.

In summary, *L. transsilvanicus* is a mesophilous species which in Stara planina Mts takes part in *Calthion* communities distributed on watersides of the streamlets in the subalpine mountain belt (Figure 3). The attachment to the timber-line and the anthropogenic pressure in the region make its habitat more complex and heterogeneous in structure. According to EUNIS habitat classifications the habitat of *L. transsilvanicus* relates to E5.572 Moesian tall herb communities. It is included in the Red Data Book of Republic of Bulgaria under category “Vulnerable” (Roussakova, 2011).

Conclusion

Reevaluation of the threat status and suggestions for further conservation measures

The reassessment of the status of *L. transsilvanicus* is made in the present study according to the criteria of the IUCN Red List Categories (IUCN, 2001). On the basis of our investigation we suggest that the species should be considered as “Critically Endangered” [CR B1ab(iii)+2ab(iii); D]. The area of occupancy is less than 10 km² (around 100 m²) and is known to exist with several individuals. Maintenance of the population by immigration seems rather unlikely. As shown by observations, the seed productivity of the species was observed to be very low and the seed germination of the representatives of the genus is known to be poor (Bässler, 1973). The critically small size of the population also makes it highly vulnerable to natural disasters and other unpredictable events.

The population of the species is located in the Central Balkan National Park. It is protected by the Biodiversity Act (2002) and is included in the Red List of the Vascular Plants in Bulgaria (Petrova and Vladimirov, 2009) and the Red Data Book of Republic of Bulgaria (Tosheva et al., 2011). For securing the long-time protection the locations of *L. transsilvanicus* a protected territory should be declared. There is also necessity of profound and long-term studies on its reproductive biology and population dynamics.

In conclusion, the species needs the implementation of special conservation measures. The Biological Diversity Act requires the establishment of protected areas in accordance with the regulations of the Protected Areas Act. The population of *L. transsilvanicus* is located within the borders of the Central Balkan National Park, which is also a NATURA 2000 site. The necessary conservation measures should include preparation of an action plan for the species, as well as further detailed survey of the national population, combined with annual monitoring of the localities. This will serve as a prerequisite for implementation of other appropriate measures, including ex-situ conservation and artificial propagation.

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