

NEW DATA FOR THE DISTRIBUTION OF *EPIPACTIS LEPTOCHILA* (GODFERY) GODFERY IN ROMANIA

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Abstract: The paper presents new distribution data of *Epipactis leptochila* in Romania and a description of phytocoenotic context in which it develops. This species was identified in Northeastern of Romania, in Iași County (in Bârnova-Repedea and Uricani forests, near Iași City). The plant communities in which *E. leptochila* was identified is Aro orientalis – Carpinetum. This association is belonging to the habitat of community interest 91Y0 - Dacian oak-hornbeam forests, in Natura 2000 network.

Keywords: Orchidaceae, Iași, ROSCI0181 Pădurea Uricani, ROSCI0135 Pădurea Bârnova-Repedea, rare species, habitat type 91Y0.

Introduction

Epipactis Zinn is one of the most difficult genera taxonomically of Orchidaceae, mainly distributed in Eurasia, but is known also from North Africa, and North & Central America (Delforge, 2006).

The accepted name *E. leptochila* is based on *Epipactis viridiflora* Krock. var. *leptochila* Godfery, the latter taxon having locus classicus near Guildford (England) (Godfery, 1919).

Epipactis leptochila is a rhizomatous perennial species, with 1-3(5) erect stems, 20-(60)80 cm tall, yellowish-green, shortly pubescent in the upper part. The cauline leaves 3-6(10), yellow-green, in two rows, spreading, ovate-lanceolate to lanceolate for 2-3 upper ones, 5-11 × 2-6 cm and the upper ones gradually narrow. The middle leaves are longer than internodes. The bracts are linear lanceolate, acuminate. Lower bracts are very long – up to 8 cm, like the top leaf. Inflorescence is lax, 10-20(25) cm long, more or less one-sided, rachis is pubescent, with 8-35 flowers. Flowers are pendant to subhorizontal, pedicels reddish towards the base, rarely opening fully, mainly half-opening, sometimes cleistogamous. The perianth segments are yellowish-green, sometimes pink-tinted, spreading. The outer tepals are ovoid, acuminate, the lateral ones 9-15 × 6-8 mm. The inner tepals are 8-11 × 4-6 mm. Labellum is small and much thinner compared to the other *Epipactis* species. The hypochile is green or purplish to pink, with nectar, cup like, 4 × 4 mm, 3-4 mm deep. The constriction between hypochile and epichile is rather broad, U or V shape. The whitish-green epichile is spreading, directed obliquely forward, with reflexed margins, acuminate, as long as or longer than wide, 4-7(9) × 3-5 mm. The inferior ovary is pubescent, yellowish-green, fusiform to elongate, with longitudinal ribs, and it is sustained by a curved peduncle of 3-5 mm long. The clinandrium is developed. The rostellum is usually absent or present in bud, non-functional and later disappears. Viscidium sometimes

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present but not functional. Anther narrow, pollinia crumbly, rapidly turn to powdery, disintegrating on the stigma. It is a self-pollinating species (Young, 1962; Delforge, 2006; Petrova and Venkova, 2006).

This species has a high variability and this is the reason because Claessens and Kleynen (1999) consider that *Epipactis leptochila* presents a variability par excellence. The literature data (Claessens and Kleynen, 1999; AHO, 2019) highlight the species variability through: number of flowers, their colour, the label width, gynostemium shape, presence or absence of rostellum.

Young (1962) mentions that of the species of the *Epipactis* genus, *E. leptochila* is earliest blooming. It blooms 2 weeks before *E. helleborine*, and depending on altitude, the flowering period may oscillate from the end of June to the end of July (beginning of August) (Scappaticci and Démares, 2003).

Epipactis leptochila is a species which prefers shady places, on limestone substrate, through pure beech forests and mixed with fir, at altitudes between 700-1000 (1200) m, but can be found even at lower altitudes (300 m) in oak and hornbeam forests (Scappaticci and Démares, 2003). The species can also be found in ash-hazel coppice or birch scrub, in coniferous forests reaching up to 1500 m altitude (Squirrell et al., 2002; Rankou, 2011). Young (1962) analyzes species of the *Epipactis* genus and concludes that, compared to the other species, *E. leptochila* is a strongly calciphilous species.

Epipactis leptochila is currently known from the following European countries: Austria, Belgium, Bulgaria, Crimea, Croatia, Czech Republic, Denmark, France, Georgia, Germany, Great Britain, Greece, Hungary, Italy, Luxembourg, Netherlands, Poland, Russia, Serbia, Slovakia, Slovenia, Spain, Switzerland (Moore, 1980; Akhalkatsi et al., 2003; Delforge, 2006; Petrova and Venkova, 2006; Rankou, 2011; Fateryga et al., 2015; Djordjević et al., 2016; Fateryga et al., 2018; POWO, 2020; Euro+Med PlantBase).

Epipactis leptochila was first listed in Romania by Ciocârlan and Costea (1997) from Nemira Mts., near Slănic Moldova (Bacău County), on the left side of Dobru brook, between 800-1000 m altitudes, in a beech forest.

Epipactis leptochila is defined IUCN LC, but the current European populations trend is decreasing, populations are severely fragmented and rare. The main factors which could influence it negatively are residential and commercial development, human intrusions and disturbance (recreational activities, work and other activities), agriculture, natural ecosystem modifications, invasive species, diseases (Rankou, 2011).

In Romania, *Epipactis leptochila* is a rare species (Sârbu and Chifu, 2003; Oprea, 2005; Chifu et al., 2006; Ciocârlan, 2009; Sârbu et al., 2013). Because this is a species which prefers dark forests, the main causes that could lead to decrease or disappearance of populations could be the modification of natural ecosystem through activities of cutting and maintenance of forests, residential development from neighbourhood and the recreational activities practiced in the forest.

Materials and methods

Field observations were made during 2017-2019 vegetation seasons. The identification of plant communities where *Epipactis leptochila* grows was achieved through The Central European School method (Cristea et al., 2004). Species identification and synonymization was performed in agreement with Moore (1980), Delforge (2006), Sârbu et

al. (2013), Euro+Med PlantBase. In order to identify the plant associations were used the phytosociological papers performed by Sanda et al., 2008; Chifu and Irimia, 2014. For Natura 2000 habitats classification, we used *The Handbook for interpretation of Romania habitats* (Gafta et al., 2008).

The specimen collected is stored in The Herbarium of „Alexandru Ioan Cuza” University from Iași (acronym according to Thiers, 2020): I 184660.

Results and discussions

Epipactis leptochila (Godfery) Godfery was identified in the Northeastern part of Romania, in two new places near Iași City (Iași County) (Figure 1).

1. The first place with *Epipactis leptochila* was identified in the Uricani forest (Uricani village, Iași County) in 2017, in a small population with 6 individuals on 400 m².

The Uricani forest location is near the Uricani village (Miroslava commune, Iași County), on the Bahlui River Valley. The vegetation develops on eutricambisols (levigated chernozems and ash-gray soils), which have been installed on a substrate of sarmatic clay-marsh deposits (Dobrescu and Eftimie, 1966; Planul de management al sitului de importanță comunitară ROSCI0181 Pădurea Uricani și al rezervației naturale 2.538 Pădurea Uricani, 2017).

In 2007, the Uricani forest was declared a site of community importance in the Natura 2000 network - ROSCI0181 Pădurea Uricani. This site preserves two types of forest habitats: 91I0* (Euro-Siberian steppic woods with *Quercus* spp.) and 91Y0 (Dacian oak-hornbeam forests) (Mănoiu et Brânzan, 2013; Planul de management al sitului de importanță comunitară ROSCI0181 Pădurea Uricani și al rezervației naturale 2.538 Pădurea Uricani, 2017).

Epipactis leptochila was found in a phytocoenosis of Aro orientalis - Carpinetum (Dobrescu and Kovács 1973) Täuber 1992 association, belonging to Natura 2000 habitat of community interest, 91Y0 - Dacian oak-hornbeam forests. This phytocoenosis was identified at 155 m altitude, on a slightly inclined field (5°), with a Northwest exposure. The floristic composition is rich and varied with a multilayered structure. The tree layer has a coverage of 75% and is made by the following species: *Carpinus betulus*, *Tilia tomentosa*, *Quercus robur*, along with which we find also *Quercus petraea* and *Ulmus minor*. The shrub and juvenile layer is well developed, achieving a coverage of 35% where we meet *Sambucus nigra*, *Cornus sanguinea*, *Tilia tomentosa*, *Carpinus betulus* and *Ulmus minor*. The herbaceous layer has a coverage of 20% and is abundant in many characteristic species of the Carpinion alliance and the Fagetalia order (Table 1, relevé 1).

2. The second place with *Epipactis leptochila* was identified in 2018, in Bârnova-Repedea forest, in a small population with 10 individuals on 400 m².

Bârnova-Repedea forest is located in the Southern part of the Iași City. Vegetation develops on brown forest soils, gray forest soils, limestone rendzines, degraded chernozems, on a geological substrate that consists of sandy clays and limestone horizons (Dobrescu et al., 1964a). Studies on the flora and vegetation of the Bârnova-Repedea forest were performed by Raclaru and Bîrcă, 1959; Dobrescu et al., 1964b; Chifu et al., 1999; Stoica et al., 2017.

In 2007, the Bârnova-Repedea forest was declared a site of community importance in the Natura 2000 network - ROSCI0135 Pădurea Bârnova-Repedea. This site preserves

two types of forest habitats: 9130 (*Asperulo-Fagetum* beech forests) and 91Y0 (Dacian oak-hornbeam forests) (Mănoiu et Brânzan, 2013; Stoica et al., 2017).

As in the first place, *Epipactis leptochila* was also identified in a plant community of Aro orientalis - Carpinetum (Dobrescu and Kovács 1973) Täuber 1992 association, belonging to the Natura 2000 habitat of community interest, 91Y0 - Dacian oak-hornbeam forests. Phytocoenosis was identified at 256 m altitude, on slightly inclined field (7°), with Northwest exposure. The floristic composition is rich and varied, having a multilayered structure. The tree layer has a coverage of 75% and is built by *Carpinus betulus*, *Tilia tomentosa*, *Quercus robur*, together with some other species such as: *Prunus avium*, *Tilia cordata*, *Acer campestre*. The shrub and juvenile layer is very poorly developed, achieving a 5% coverage where we identified *Sambucus nigra*, *Crataegus monogyna*, *Rosa canina*, *Tilia tomentosa*, *Carpinus betulus*, *Ulmus minor*, *Acer campestre* and *Quercus robur*. The herbaceous layer achieves a 30% coverage in which *Carex sylvatica*, *Viola reichenbachiana*, *Brachypodium sylvaticum* and *Circaea lutetiana* species are abundant (Table 1, relevé 2).

Table 1. Plant communities with *Epipactis leptochila*:
1, 2. Aro orientalis - Carpinetum (Dobrescu et Kovács 1973) Täuber 1992

Relevé no.	1	2
Altitude (m, a.s.l.)	155	256
Exposure	NV	NV
Slope (°)	5	7
Cover of the tree layer (%)	75	75
Cover of the shrub and juvenile layer (%)	35	5
Cover of the herbaceous layer (%)	20	30
Surface (m ²)	400	400
Number of species	28	41
Association's characteristic		
<i>Carpinus betulus</i>	2-3	2
<i>Carpinus betulus</i> juv.	+	+
<i>Tilia tomentosa</i>	2	2-3
<i>Tilia tomentosa</i> juv.	1	+
Aro orientalis-Carpinenion		
<i>Scutellaria altissima</i>	+	-
Galio schultesii-Carpinenion		
<i>Campanula trachelium</i>	-	+
<i>Carex pilosa</i>	1	+
<i>Cephalanthera damasonium</i>	-	+
<i>Galium schultesii</i>	+	+
<i>Glechoma hirsuta</i>	+	-
<i>Lathyrus vernus</i>	+	-
<i>Prunus avium</i>	-	+
<i>Stellaria holostea</i>	+	-
<i>Tilia cordata</i>	-	1
Symphyto cordati-Fagion		
<i>Epipactis helleborine</i>	-	+
Fagetalia		
<i>Asarum europaeum</i>	-	+
<i>Carex sylvatica</i>	-	2
<i>Epipactis leptochila</i>	+	+

<i>Epipactis purpurata</i>	+	-
<i>Euphorbia amygdaloides</i>	-	+
<i>Galium odoratum</i>	-	+
<i>Geranium robertianum</i>	-	+
<i>Mercurialis perennis</i>	1	-
<i>Milium effusum</i>	+	-
<i>Pulmonaria officinalis</i>	+	+
<i>Salvia glutinosa</i>	+	-
<i>Sanicula europaea</i>	-	+
<i>Stachys sylvatica</i>	-	+
Alnion incanae et Alno-Fraxinetalia		
<i>Acer campestre</i>	-	+
<i>Acer campestre</i> juv.	-	+
<i>Anthriscus sylvestris</i>	-	+
<i>Circaea lutetiana</i>	-	+
<i>Sambucus nigra</i>	+	-
<i>Sambucus nigra</i> juv.	-	+
<i>Ulmus minor</i>	+	-
<i>Ulmus minor</i> juv.	-	+
Quercu-Fagetea		
<i>Brachypodium sylvaticum</i>	+	+
<i>Convallaria majalis</i>	+	+
<i>Crataegus monogyna</i> juv.	-	+
<i>Geum urbanum</i>	+	+
<i>Hedera helix</i>	+	-
<i>Lathyrus niger</i>	+	-
<i>Mycelis muralis</i>	+	+
<i>Polygonatum hirtum</i>	+	-
<i>Quercus petraea</i>	1	-
<i>Quercus robur</i>	1	1
<i>Quercus robur</i> juv.	-	+
<i>Rosa canina</i> juv.	-	+
<i>Viola reichenbachiana</i>	+	1
Quercetea pubescentis		
<i>Clinopodium vulgare</i>	-	+
<i>Cornus sanguinea</i>	+	-
Molinio-Arrhenatheretea		
<i>Lysimachia nummularia</i>	-	+
<i>Prunella vulgaris</i>	-	+
Variae syntaxa		
<i>Astragalus glycyphyllos</i>	-	+
<i>Campanula persicifolia</i>	-	+
<i>Stachys germanica</i>	-	+

Place and date of the relevés: 1. Uricani Forest, 23.06.2019; 2. Bârnova-Repedea Forest, 25.06.2019.

Conclusions

Epipactis leptochila was identified in Uricani forest and in Bârnova-Repedea forest (Iași County). In both places, vegetation develops on soils that have been built on a limestone substrate. The species grows in phytocoenoses belonging to the Natura 2000 habitat type 91Y0 - Dacian oak-hornbeam forests.

E. leptochila was recorded in small populations (with a small number of individuals) in both forests. Therefore, for this species we must take special protective measures.

For Romania, the presence of this species in Iași County makes us to believe that *Epipactis leptochila* could be found in some other regions from our country, in habitats that fulfill the proper conditions necessary for the species development.

Because it is a species that prefers shady places, and grows on calcareous soils, any change and intervention in its habitat leads to the populations extinction. This means that all newly discovered populations must be protected. The main causes that could endanger the stability of these newly identified populations are: residential development, natural ecosystem modifications and recreational activities practiced in forest areas.

On the basis of the number of individuals (between 6 and 10) and the condition of populations, we can define *E. leptochila* as IUCN category CR C2a(i) in Romania.

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Figure 1. *Epipactis leptochila* (Godfery) Godfery (photo: Adriana Postolache)