

## NEW EPIPACTIS (ORCHIDACEAE) SPECIES FOR THE ROMANIAN FLORA

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Corina, ARDELEAN , A., ARDELEAN , B., BOCEANU  
1 -Association P.P.V.N.C. Excelsior, Arad  
corinaepipactis@gmail.com  
2- myNature Association, Timișoara  
3 – Neptun 19, sc. A, apt. 6, Brasov

**Abstract.** Four *Epipactis* species are recorded as new taxa for the Romanian Flora: *Epipactis nordeniorum* Robatsch, *E. tallosii* A.Molnár & Robatsch, *E. exilis* P.Delforge and *E. pontica* Taubenheim. With this contribution, not only the number of *Epipactis* species in Romania is increased to fourteen, but also we fill in gaps in geographical distribution of *Epipactis* species at European level. For each investigated taxon, we provide information about the habitat type, associated plant species, and population size

**Key words:** *Epipactis nordeniorum*, *E. tallosii*, *E. exilis*, *E. pontica*, Romania, new occurrence records.

### INTRODUCTION

This paper presents four new species of *Epipactis* taxa as a new species for Romanian flora. Genus *Epipactis* is a very difficult taxonomic group and only few papers dealing with this taxon in Romania were published during the last decade. Comparing data from the most recent Romanian Floras (SÂRBU, I., ET AL., 2013, CIOCÂRLAN V., 2009) and other publications until now in Romania *Epipactis* genus is represented by ten species: *E. albensis* Novakova et Rydlo, *E. atrorubens* (Hoffm.) Besser, *E. helleborine* (L.) Crantz, *E. greuteri* H.Baumann & Künkele, *E. guegelii* K. Robatsch, *E. leptochila* (Godfery) Godfery, *E. microphylla* (Ehrh.) Sw., *E. palustris* (L.) Crantz, *E. persica* (Soo) Nannfeldt, *E. purpurata* J.E. Smith. Relative recently, Wuscherpfennig (2008) clarified the status of two of the *Epipactis* species which occur in Danube Delta: *E. guegelii* K. Robatsch which is confirmed by this author (WUCHERPFENNIG, W., 2008) as an endemic species for Romania and *E. persica* (Soo) Nannfeldt which was originally described in Romania as *Epipactis atrorubens* subsp. *danubialis* (ROBATSCH & RYDLO) CIOCÂRLAN & R.RÖSLER (CIOCÂRLAN V., 2011). The most recent addition of an *Epipactis* species to Romanian Flora was *E. greuteri* H.Baumann & Künkele recorded from the western side of the country in Semenice Mountains (C. ARDELEAN, 2011). In 2012 there is another addition publication which present *E. albensis* from Turzii Gorges (MOLNÁR A. V., SRAMKÓ G., 2012).

### MATERIAL AND METHODS

During our extensive research of the orchid species in many areas of Romanian we found four *Epipactis* species which has not been reported by national Floras or checklists up to now. The new *Epipactis* taxa we investigated starting with 2008 and up to 2017. For each investigated taxa we gathered data about habitat type and, associated plant species, data about population size. High resolution images of each morphological detail were taken with a DSLR Canon camera equipped with a macro lens and a ring flash. Voucher images were stored online in the database Nature Digital Object Repository (NDOR) and can be found within the species pages at <http://kladia.info>. Herbarium specimens of all four taxa will be deposited in a public herbarium as well as in the personal collection of the authors.

### RESULTS AND DISCUSSIONS

*Epipactis tallosii* A.Molnár & Robatsch

Synonymes: *Epipactis tallosii* A.Molnár & Robatsch ssp. *tallosii*.

**Description and diagnostic characters:** Rhizomatous perennial plant with 1(–2) stems, 10–18(35) cm high, stem yellowish green and pubescent at the tip; leaves (2) 3–5(7) yellowish green, spreading to erect with undulate margin, channeled, rounded to lanceolate 2-5 cm x 1-2,5 cm, the upper most leaf bract like, spirally arranged, lower bracts shorter or equal to flowers; inflorescence is near one-sided with 3–20 (35) small flowers, usually wide open but we did see exemplars with not so opened flowers, pendant, self pollinating, sepals pale-green, petals white to pinkish inside, junction epichile-hypochile is “U” shape, rather narrow, hypochile nectariferous, colored inside from light green to brown, epichile whitish to pinkish in colour, triangular-ovate in shape, longer than broad, rolled backwards, forming a swelling at the base with a grooved boss pinkish or greenish in colour; viscidium is well developed but non functional; rostellum non-functional and a powdery pollinia, already disintegrating in the bud; ovary is elongated, green, slightly hairy to glabrescent with a yellowish-green pedicel. It is an autogamous species. Peak flowering period in Romania is starting around middle of July through middle of August.

**Differences from related species:** *E. tallosii* is a variable species, on the field we encounter a great variability in the size of the exemplars. Anyway similar species are another known small size *Epipactis* taxa from western Europe which share almost the same habitat.

*E. albensis* at a first look may look similar but present clear morphological differences: the flowers are larger and the tepals or the bosses of the epichil rarely contain any hint of pink, the lowermost bract is larger; epichil long pointed and broader than long, most of the times with a greenish margins and pointed upwards, the passage to the hypochil to epichil is a “V” shape and the viscidium is missing. On top of this morphological differences as a habitat preference *E. albensis* need a specific habitat requirement high in moisture, usually along rivers or in immediate vicinity of the water, which is not the case at our location in Giroc forest.

Another similar species which is not mentioned in the Romania flora is *E. moravica*. This species is distributed in Czech Republic in South-East Moravia, in Slovakia and Hungary (BATOUŠEK, P., 2005). From the latest comprehensive publication regarding orchid taxa in Hungary the occurrence of *E. moravica* is considered uncertain (MOLNAR, A., 2012). There are several diagnostic characters which help to distinct this species from *E. tallosii* at the flower level: the flowers are half opened, the junction from epichil to hypochile is wide collar passage, the epichil is only slightly bent at the tip and the column has a clearly stalked anther.

NAGY G. in 2011 mention *E. moravica* in Mecsek Mountains in Hungary. He described this species as not a typical *E. tallosii*, the plants of *E. moravica* from Hungary shows flowers greater than *E. tallosii*, the wider epichil strongly triangular and lower bracts are stronger and sheet-like (NAGY, G., 2011). Considering that we think it may be important to note some more specific morphological aspect detail of *E. tallosii* from Romanian population. We observed that on the same exemplars the larger lowermost bract is much longer than the flowers as it is described in *E. moravica* but all the flowers morphological characters fitting *E. tallosii*. Studying this mismatch characters which occur in some exemplars in our Romanian population from Giroc and comparing data with another locations in Europe where this two species were documented ([http://www.aho-bayern.de/epipactis/fs\\_epipactis.html](http://www.aho-bayern.de/epipactis/fs_epipactis.html) , [http://www.aho-bayern.de/epipactis/fs\\_epipactis.html](http://www.aho-bayern.de/epipactis/fs_epipactis.html)) we come to a conclusion. There seems to be good differences between *E. moravica* and *E. tallosii* in Czech and Slovakia, but in Hungary as we come from the west to east the differences become very weak. Even that there is no pure *E. moravica* exemplars in Romania on some exemplars we can see characters of *E. tallosii* at some level. We need more studies in the future but for now our data with the help from the images documented in *Epipactis* webpage of AHO (<http://www.aho-bayern.de>) shows that there is a transition of characters in *E. tallosii* from Czech and Slovakia to Hungary and to Romania. Maybe Romania is the continuation of these transition populations. (TABLE I)

**General distribution:** *E. tallosii* it was first described from Hungary (MOLNAR A., 1996) and today is

confirmed in Czech Republic from South of Moravia and the South of Slovakia. Our find indicate Romania the most Eastern distribution of this species. (<http://e-monocot.org/taxon/urn:kew.org:wcs:taxon:70389>)

**Distribution, habitat and population data of *Epipactis tallosii* in Romania:** We find *E. tallosii* in the western side of Romania, in Banat region, on a low altitude in a forests near Giroc locality (Timis county) and near the river Mures in Arad (Arad county). We have observations of *E. tallosii* starting with the summer of 2008 until 2017. On the same locality, near Giroc, we found small size exemplars of two *Epipactis* species: *E. tallosii* and *E. nordeniorum*. We resume the identification in the next years because of not so good flowering seasons for *Epipactis* species in the area and the antropogenic factor which disturb the population of both species. We continue to observed each year both species during this years (collection date 11 July 2008, 3 July 2014, 5 July 2014, 18 July 2014, 3 July 2016, ). The habitat on this location is a thermophilous oak forests, Pannonian-Balkan oak-sessile oak woods (91M0) which can support a water deficit in summer at an elevation of 90 m. Dominant species is *Quercus cerris* mixed with *Ulmus procera*, *U. minor*, *Acer campestre*, *Acer tataricum*, *Cornus sanguinea*, *Euonymus europaeus*, *Rosa canina*, *Crataegus monogyna*, *Ligustrum vulgare*, *Genista tinctoria*, *Circaea lutetiana*, *Hypericum hirsutum*, *Clinopodium vulgare*, *Scrophularia nodosa*, *Vincetoxicum hirundinaria*, *Geum urbanum*.

The spatial distribution of *E. tallosii* in Giroc forest is local but represented by numerous exemplars (couple hundreds of exemplars) scattered on not so extended the area. The area is subject of a daily antropogenic pressures, being close to the locality it is a recreational area, also the forest is used for grazing in the hot summer days. This forest is a reminiscent old pannonian forest which today is much restrained and isolated by agricultural land use, some part of the forest does not have anymore their native composition in wood species and because of this the herbaceous flora is altered. We have many field trips in the surrounding forest and for now this is the single remnant *E. tallosii* population from this side of the Banat region.

The second location of *E. tallosii* is from Arad along the forested side of Mures river, Arad county (collection date 25 July 2017, 27 July 2017, 10 August 2017). The habitat here is an alluvial forests 91E0\*, Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion*, *Alnion incanae*, *Salicion albae*). The population is very local here and represented by tens of exemplars.

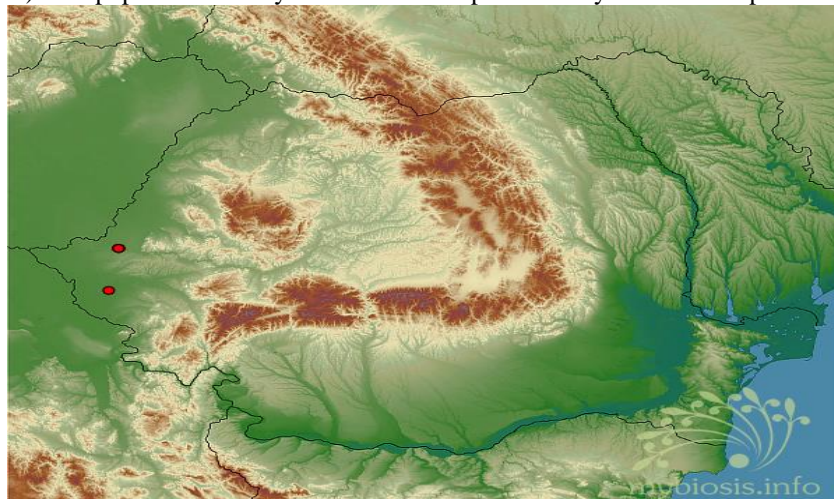


Fig.1 Map with distribution *E. tallosii* in Romania. (map generated from <https://kladia.info>)

***Epipactis nordeniorum*** Robatsch

**Description and diagnostic characters:** Rhizomatous perennial plant with 1(–2) stems, 4–35(40) cm high, stem yellowish green and pubescent at the tip; leaves 1-4 cauline dark green, orbicular shape 2-5 cm x 2-4 cm, 1-2 upper most leaf bract like, lower bracts shorter or equal to flowers; lax inflorescence is near one-sided with 3–30 small half-opening flowers, pendant, self pollinating, sepals pale-green, petals near equal white to pinkish, jointion epichile-hypochile is rather narrow, hypochile nectariferous, greenish-pink outside, epichile hear-shaped spreading-rolled backwards, forming a swelling at the base with a pinkish grooved boss; clinandrium is short well developed; rostellum non-functional and a powdery pollinia; ovary is puberulous light green, glabrescent with a pedicel coloured violet tint . It is an autogamous species. Peak flowering period in Romania is around middle of August through the first quarter of September.

**Differences from related species:** Similar species are other short stature *Epipactis* species which could share the same lowland forests habitat. In *E. helleborine* subsp. *minor* the leaves are longer and different shape ovate to lanceolate, specially the second leaf is much bigger. In *E. nordeniorum* the leaves are elliptic to broadly ovate. Besides these differences between these two species they have a different pollination, *E. helleborine* is an allogamous species and *E. nordeniorum* it is an autogamous species. *E. albensis* has is another similar species and the differences are already mentioned above in these paper. (TABLE II).

**General distribution:** *E. nordeniorum* was first described in Austria (ROBATSCH K., 1991). Today is confirmed in Austria (S-Steiermark, Burgenland), W-Hungary, Slovenia, Northern Croatia to Zagreb ([http://www.aho-bayern.de/epipactis/fs\\_epipactis\\_1.html](http://www.aho-bayern.de/epipactis/fs_epipactis_1.html)).

**Distribution, habitat and population data of *Epipactis nordeniorum* in Romania:** We find *E. nordeniorum* in three locations in the western side of Romania: near Giroc forest (Timis county), near Bradisoru de Jos (Caras-Severin county), near Madrigesti (Arad county). The first location is on a low altitude in a forests near Giroc locality (Timis county) in the same area as *E. tallossi* (collection date 20 July 2008, 6 August 2008, 18 September 2016, plants with fresh seed pods). The occurrence of *E. nordeniorum* in this location is much restrain, there is not a good population number, we found just few exemplars. *E. nordeniorum* share the same habitat as *E. tallossii* as described above. This location of *E. nordeniorum* are extremely endangered because of the hight anthropic pressure as is explained above and dramatic evolution in time of the forest humidity. This area belonged in the past century to the much extended area of the forest which in the past was passed by a small river. Today this humidity is missing and can barely be seen in the near by area, just the structure of the soil which is good of retaining water help survive this species here until now. The flowering time in this area seems to be affected in some years by the drought. Because of the dramatic change of in the habitat this may be last remnant exemplars of *E. nordeniorum* in this location.

The second locality is situated near Bradisoru de Jos (Caras-Severin county, collection date: 28 August 2016, plants in full bloom, 5 September 2016, plants in full bloom and plants with seed pods). The habitat here is an alluvial forests 91E0\*, Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion*, *Alnion incanae*, *Salicion albae*). The population from this location is very local and represented by tens of exemplars spreading along a small river that cross the forest. The plants prefers a humid and shady area on a wood litter with a low coverage of herb layer.

The last location were we found *E. nordeniorum* is from Madrigesti, Arad (collection date 26 September 2016, several plants with few blooming flowers and plants with fresh seed pods). The habitat here is similar to Bradisoru de Jos. It was a very late and unexpected find of *Epipactis* species at this time of the year. We did find few exemplars on very shady and humid area.

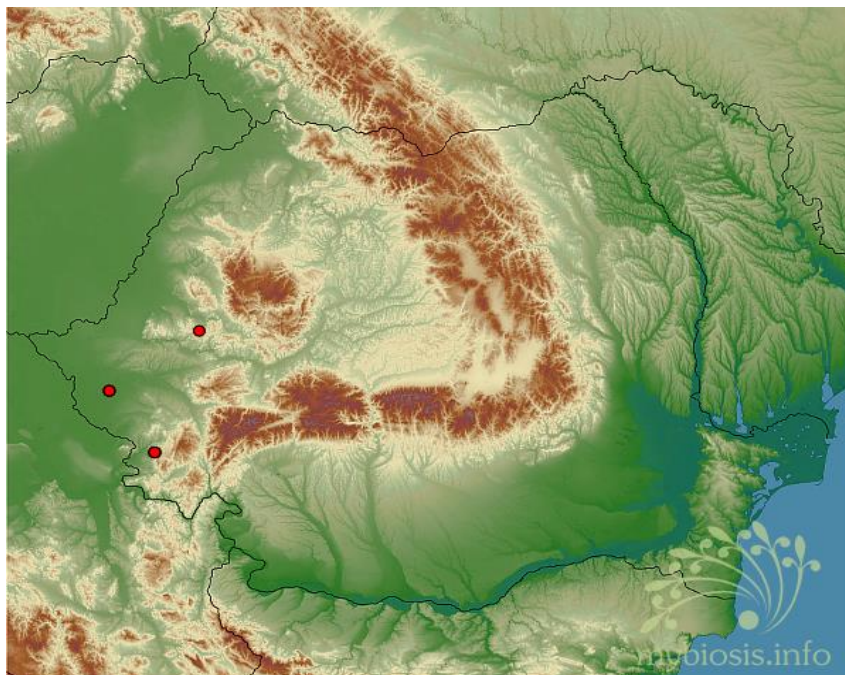


Fig.2 Map with distribution *E. nordeniorum* in Romania. (map generated from <https://kladia.info>)

***Epipactis pontica*** Taubenheim

Synonym: *Epipactis helleborine* subsp. *pontica* (Taubenheim) Sundermann

**Description and diagnostic characters:** Rhizomatous perennial plant with 1–2 stems, 15–30 cm high; slender stem, covered with dense hairs; dark green lanceolate leaves, spirally arranged, with the upper leaves smaller and bract-like, the lower bract longer than the flower; inflorescence lax with 4–14 small and half opening flowers, pendant and bell-shaped with yellowish-green tepals; hypochile pale green to brownish almost round-shaped and very small (2.5–3 × 2.5–4.2 mm) usually pale greenish-white; epichil round to transversely oval greenish white and slightly brownish or green in the center; connection epychil-hypochil “U” shaped; rostellum without a gland; pollinia disintegrating on the stigma at the time when the flowers open; ovary green, fusiform and slightly hairy with a short pedicel. *E. pontica* is a self-pollinating species. We found the peak flowering period for investigated area around middle of August.

**Differences from related species:** *E. pontica* has a quite distinct habitus, the flowers have little variability, with a small and round heart-shaped epichil, without reddish tint color. For an untrained eye this species may be overlooked as small specimens of *Epipactis helleborine* which has the different flower shape and more intensely colored and it is a cross pollinating species. Another similar species is *E. microphila* which may look somewhat similar but the flower have a characteristic wrinkled epichil and a pubescent ovary. *Epipactis albensis* is another similar species which can be differentiated from *E. pontica* by its triangular heart-shaped and long pointed epichil, also the viscidium is missing. *E. pontica* has has a transversely elliptical epichil without point and a well developed viscidium (TABLE III).

**General distribution:** *E. pontica* Taubenheim was originally described from Türkiye (Taubenheim, G. 1975) in the area of Bolu, Pass Dorukhan. In Europe it is confirmed in Czech Republic, Slovakia,

Bulgaria, Slovenia, Hungary, Austria, Italy and Serbia. (<http://e-monocot.org/taxon/urn:kew.org:wcs:taxon:70335>). One of the most recent find of *E. pontica* is probably in 2013 in Russia, in the West of Caucasus (AVERYANOVA, E.A., 2013).

**Distribution, habitat and population data of *Epipactis pontica* in Romania:** We found *E. pontica* in five sites. We found a small population in Postăvaru Mountains along a small water creek within the area called the Solomon Stone, (collection date 12 august 2014) in a shady places with North-East exposure and wood litter with a low coverage of herb layer at an elevation of 800m. Another site from Postăvaru Mountains is located in the North-West side within the Stejarisul Mare Natural Reserve (collection date 13 august 2014) in shady places with North to North-East exposure and wood litter with a very low coverage of herb layer at an elevation 970 m. The third site is located in Postăvaru Mountain, in the Valley of Water at the 950 m elevation (collection date 8 august 2014).

The fourth site is from Bucegi Mountains, on Dichiu Mountain (collection date 15 august 2014) at 1100 meters elevation. The last population of *E. pontica* was found in the vicinity of Suseni, Hunedoara county, near Cetatea Colt, (collection date 17 July 2016) at the 650 m elevation.

The sites in Postăvaru Mountains belong to the habitat Medio-European lime stone beech forests of the *Cephalanthero-Fagion*. Other orchid species identified in these sites are *Cephalanthera rubra* (L.) Rich., *C. damasonium* (Mill.) Druce, *C. longifolia* (L.) Fritsch, *Epipactis leptochila* (Godfery) Godfery, *E. purpurata* Sm., *Neottia nidus-avis* (L.) Rich., *Platanthera bifolia* (L.) Rich. Other significant plant species from the area: *Fagus sylvatica* L., *Picea abies* (L.) H.Karst., *Maianthemum bifolium* (L.) F.W.Schmidt, *Hepatica transsilvanica* (Fuss) Heuff., *Helleborus purpurascens* Waldst. & Kit., *Asplenium trichomanes* L., *Cystopteris fragilis* (L.) Bernh., *Polystichum aculeatum* (L.) Roth ex Mert., and *Lamium galeobdolon* (L.) L.

In the north-west of Postăvaru Mountains in Stejarisul Mare Natural Reserve we found another small population of *E. pontica* in a different habitat, Dacian Beech forest, *Symphyto-Fagion* which is a forest habitat endemic in the Carpathian. Again the plant prefers here a shady area with a very low coverage of herb layer. The population we found in Bucegi Mountains is located on Dichiu Mountain, the habitat is dominated by *Picea abies* and subdominated by *Fagus sylvatica* with a very low herb coverage.

The population from Suseni area (Cetatea Colt) is found on site dominated by *Fagus sylvatica* along a small water creek on shady spot. The spatial distribution of *E. pontica* in all locations is rare and local with scattered exemplars in a not so extended area. At the same time we found specimens in full bloom among with others specimens with young seed pods.

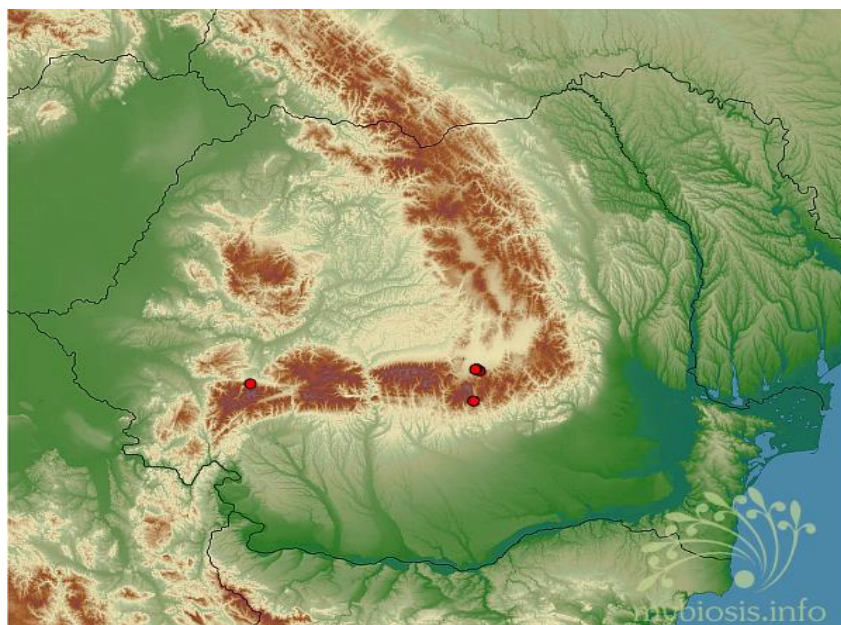


Fig.3 Map with distribution *E. pontica* in Romania. (map generated from <https://kladia.info>)

***E. exilis*** P.Delforge

Synonyms: *Epipactis gracilis* B. & H. Baumann, *Epipactis persica* (Soó) Nannfeldt subsp. *gracilis* (B. & H. Baumann) ROSSI. *nom. Illeg.*; *Epipactis persica* (Soó) Nannfeldt subsp. *exilis* (P. Delforge) Kreutz, comb. et stat. nov., *Epipactis baumanniorum* Ströhle.

**Description and diagnostic characters:** Rhizomatous perennial plant with 1(–4) stems, 15–35(50) cm high, stem green and glabrous; leaves 2–4, dark-green in colour with the middle ones oval-acuminate, spirally arranged, lower bracts longer than the flowers; inflorescence is lax and one-sided with 3–10 (15) flowers, pale-green, open, pendant, labelum 7–8.5 mm long, greenish-white, hypochile cupped, slightly nectariferous, epichile short, triangular to roundish, with 2 greenish or pale-pink and not so visible calluses, with a deep longitudinal groove; clinandre ± developed; passage epichil-hypochil is a wide “V” shape and not constricted; gynostemium sessile, rostellum elongated non-functional and a powdery pollinia; ovary is elongated, green, glabrescent. It is an autogamous species. Peak flowering period in Romania is around middle of August.

**Differences from related species:** Similar looking species is *E. persica* which is more robust and the flower looks different having the transition from the epichil to hypochil visible constricted. In Romania *E. persica* is found in the Danube Delta at a very different altitude and habitat type. (TABLE IV).

**General distribution:** *E. exilis* was originally described from Greece, Macedonia in Vermion Moutani. It is mentioned from Bulgaria, Greece, Italy, Sardegna, Hungary, Slovakia, France. (<http://e-monocot.org/taxon/urn:kew.org:wcs:taxon:333223>)

**Distribution, habitat and population data of *Epipactis exilis* in Romania:** We found a small population of *E. exilis* located in Piatra Mare Mountains: in 13 August 2014 at an elevation of 900 m, 30-31 July 2015 different exemplars at an elevation of 850 and 1000 m, 7 August 2016 at an elevation of 900 m. *E. exilis* prefers very shady places with a nordic exposure and wood litter with a very low herb coverage. Distribution of the population is sparse, with very scattered exemplars at the 850-1000 m elevation in the mountain. The habitat is Dacian Beech forest, *Symphyto-Fagion*. The tree layer is

represented by *Fagus sylvatica* the dominant species with 70-80% coverage followed by *Abies alba* Mill. and *Picea abies* (L.) H.Karst.. At the herbaceous level at the moment of the flowering time of *E. exilis* the most relevant plants were just *Symphytum cordatum* Waldst. & Kit ex Willd., *Hieracium transsilvanicum* Heuff., *Galium intermedium* Schult. and *Daphne mezereum* L.. On the same mountain, earlier in the year can be found other orchids like *Epipactis helleborine* (L.) Crantz, *Neottia nidus-avis* (L.) Rich., *Orchis mascula* subsp. *speciosa* (Mutel) Hegi which prefer the forest shade.

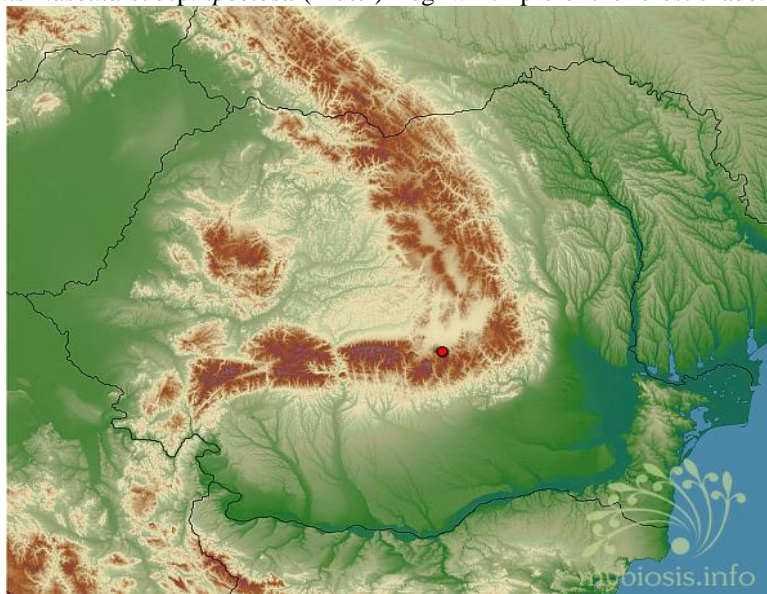


Fig. 4 Map with distribution *E. exilis* in Romania. (map generated from <https://kladia.info>)

## CONCLUSIONS

With this contribution, the number of *Epipactis* species increases to fourteen filling in the gaps in geographical distribution of *Epipactis* species at European level. We find that the habitat type where all these taxa occur in Romania show similarities with other locations from Europe. *E. tallossii* is more tolerant to the habitat preferences and can be found in thermophilous oak forests as in locations in Hungary (MOLNAR, A., 1996, ) but also along the river where there is a more fluctuant humidity around the years. *E. nordeniorum* prefers habitats with damp forest soil in a mixed wood forest with oak-alder, hornbeam in forest water streams (DELFORGE P., 2006). Because of the dramatic changes in the habitat one of the locations from Giroc forest (Timis county) with *E. nordeniorum* it is in endangered status and it may be the last remnant exemplars in this area. *E. pontica* shows affinities for beech-dominated forest (PRESSER H., 2002, ZISSIS ANTONOPOULOS, Z., TSIFTSIS, S., 2012, HRIVNÁK ET AL., 2014;). *E. exilis* seems to tolerate acidity in mixed wood forest of beech-coniferous habitat (RIBOULET, C., 2007; PETROVA, A.S., VENKOVA, D.Y., 2008).

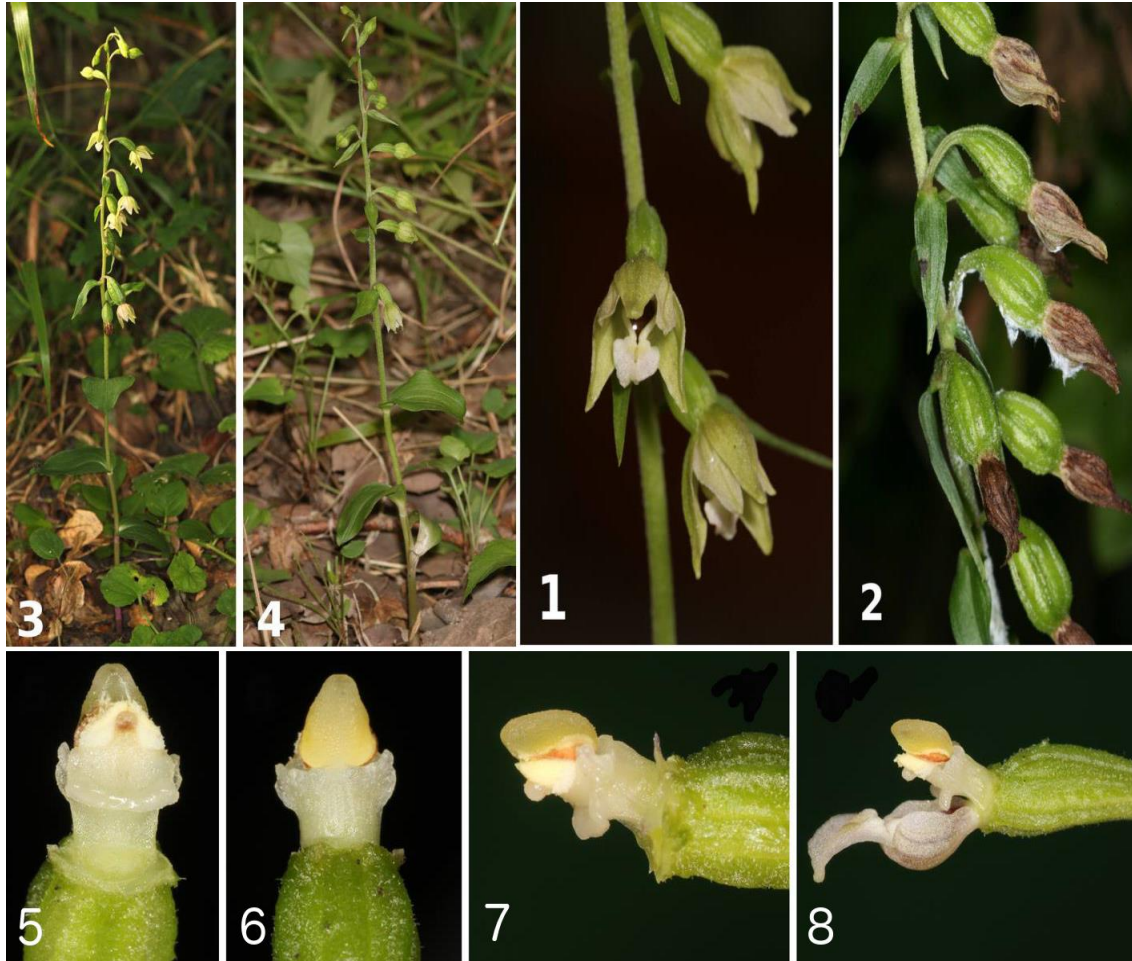
**Acknowledgements:** We would like to express our thanks to Mr. Helmut Presser for his generous and constructive comments and confirming identification for some of these species and to Mr. Mihai Boboccea for sharing the observation of *E. pontica* from Suseni area (Hunedoara county)



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- <http://mybiosis.info>
- <http://www.theplantlist.org>

Table I



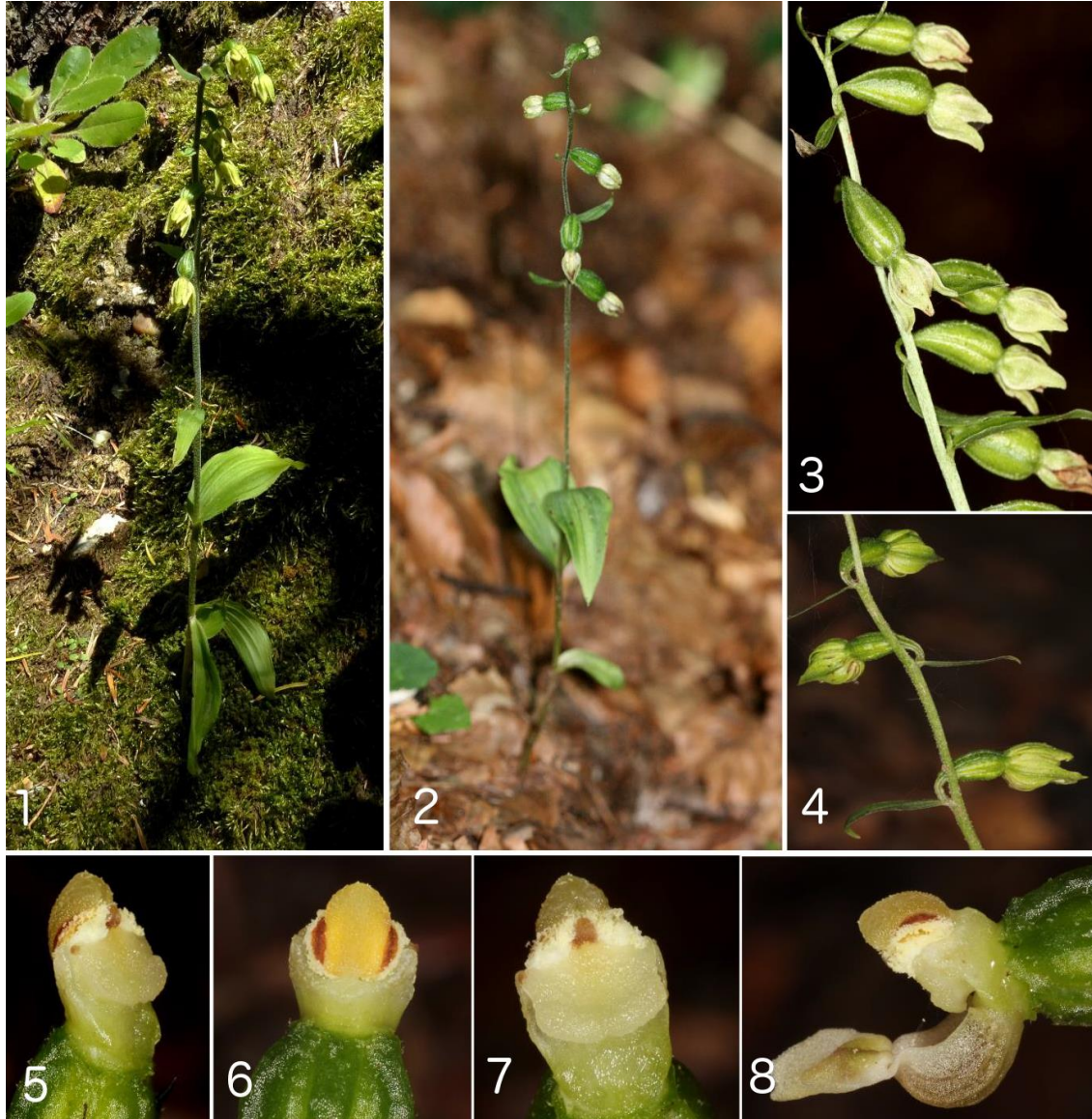
1-1-8 *Epipactis tallossii*, 1 flowers detail, 2 seed pods, 3-4 habitus habitus-flowering exemplar, 5-8 column detail (© C. Ardelean)

Table II



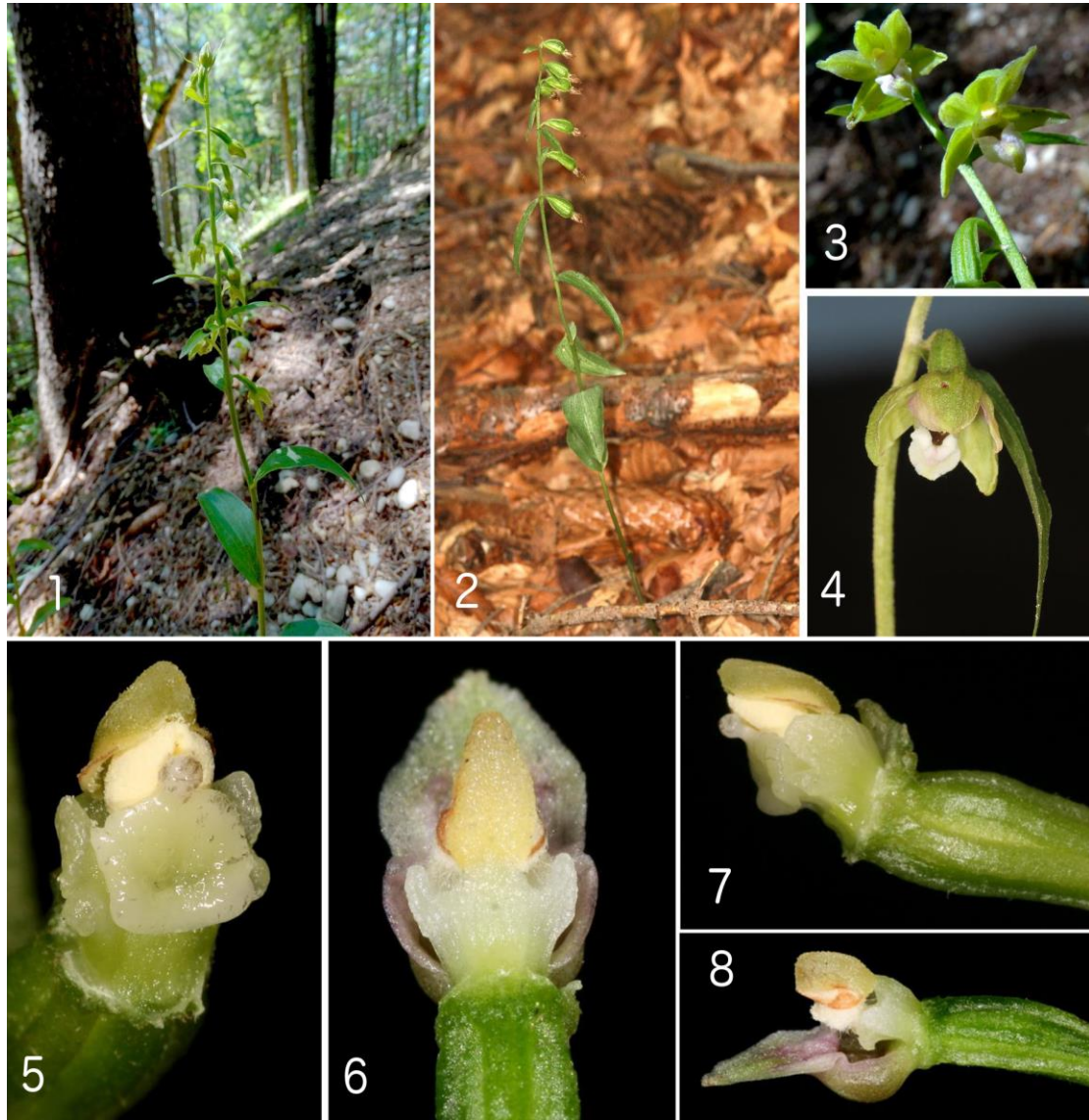
1-8 *Epipactis nordeniorum*, 1-2 habitus habitus-flowering exemplar,  
3 flowers detail, 4 seed pods, 5-8 column detail (© C. Ardelean)

Table III



1-8 *Epipactis pontica*, 1 habitus-flowering exemplar (© B. Boceanu), 2 exemplar with seed pods (© A. Ardelean), 3-4 flowers detail (© C. Ardelean), 5-8 column detail (© C. Ardelean)

Table IV



1-8 *Epipactis exilis*, 1 habitus-flowering exemplar (© B. Boceanu), 2 habitus exemplar with seed pods (© C. Ardelean), 3 flowers detail (© B. Boceanu), 3 flowers detail, 5-8 column detail (© C. Ardelean)