Flora Pannonica
Journal of Phytogeography & Taxonomy

Dactylorhiza lapponica (LAEST. ex HARTM.) SOÓ, a new taxon for Hungary

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Abstract
During the floristic research of Ebergőc fen meadow (NW Hungary, Győr-Moson-Sopron county, Ebergőc precincts), a small population of *Dactylorhiza lapponica* (LAEST. ex HARTM.) SOÓ was found in the May of 2006. The species, which was described from the Scandinavia, was detected in the mountains of Central Europe in the 1980's for the first time. In Ebergőc, which is the lowest of the so far known localities, *D. lapponica* lives in the more moist patches of the *Molinia* fen meadow. Present study discusses the diagnostic characteristics, the morphometric data of Ebergőc individuals and the phytocoenological conditions of the habitat.

Összefoglaló: *Dactylorhiza lapponica* (LAEST. ex HARTM.) SOÓ Magyarországon
Az Ebergőci-láprét (ÉNy-Magyaroszág, Győr-Moson-Sopron megye, Ebergőc községhatár) florisztikai kutatása során 2006. májusában a magyar flórára új *Dactylorhiza lapponica* (LAEST. ex HARTM.) SOÓ kis populációja került elő. A Skandináviából leírt fajt először az 1980-as években mutatták ki Közép-Európa hegyvidékein. Ebergőcön, amely Közép-Európában a legalacsonyabb, jelenleg ismert lelőhely, a *D. lapponica* kékperjés láprét nedvesebb foltjain él. A dolgozat közli a faj határozóbélyegeit, az ebergőci példányok morfometriai adatait és a lelőhely cönológiai viszonyait.

A *D. lapponica* a hazai fajok közül a *D. majalis*-ra hasonlít. Elkülöníti apró termete [10-25(-40 cm)], kevés [(2)3-4(-5)] szárlevele; rövid, tömött, kevés [3-15(-20)] tagú virágzata; végül a mézajak középső, hegyes, az oldalsóknál általában feltűnően hosszabb karéja.

Introduction

The number of *Dactylorhiza* species in Europe differs strongly among authors from 6 (SUNDERMANN 1980) to 49 species (DELFORGE 2006). DEVOS et al. (2003) sorted these taxa into six groups on the basis of morphological and cytological data: (1) the *D. sambucina* group, comprising diploid and triploid species, (2) the *D. incarnata* group, comprising diploid species and sometimes called the "diploid Marsh-Orchids", (3) the *D. majalis* group, or the "tetraploid Marsh-Orchids", comprising only tetraploid species, (4) the *D. maculata* group, or the "spotted Marsh-Orchids", comprising both diploid and tetraploid species, (5) the *D. iberica* group, comprising one diploid species, and (6) the *D. aristata* group, comprising also one diploid. Except last two ones all groups are included in the flora of the eastern part of Central Europe, where the number

of *Dactylorhiza* species is not more than 5-12 (see ADLER et al. 1994, MOLNÁR 2000, PROCHÁZKA 2002, VLČKO et al. 2003).

According to MOLNÁR et al. (1995) in Hungary five *Dactylorhiza* species exist. In MOLNÁR (2000) already six species are discussed as *D. ochroleuca* (SCHUR) HOLUB is regarded in species level, while *D. hyphaematodes* NEUMANN and *D. pulchella* (DRUCE) AVERYANOV have been detected in the last few years, are considered as subspecies of *D. incarnata* (L.) SOÓ. *D. incarnata* is relatively frequent all over of Hungary, and *D. majalis* is not rare in West Transdanubia. *D. fuchsii* (DRUCE) SOÓ and *D. sambucina* (L.) SOÓ is relatively sporadic, *D. ochroleuca* is extremely rare, while *D. maculata* (L.) SOÓ extinct from Hungary.

During the floristic research of chosen localities in northwestern Hungary (Győr-Moson-Sopron county) a degraded alkaline fen was recognized in surroundings of Ebergőc settlement, where *Dactylorhiza lapponica* (LAEST. ex HARTM.) SOÓ – a new species of Hungarian flora was found among other endangered plants. Brief description of the species and habitat characteristic is given and a commented list of all *Dactylorhiza* taxa of this locality is included.

Methods

Ebergőc fen meadow is situated in NW Hungary, in Győr-Moson-Sopron county, in the southern part of Ikva-sík region, in the boundary of Ebergőc, eastwards from the settlement, in a basin without an outlet (MAROSI – SOMOGYI 1990).

The Braun-Blanquet approach (sec. MORAVEC et al. 1994) was used in the field and during the synthetic phase of the work. Nomenclature of vascular plants follows SIMON (2000), except for *Dactylorhiza lapponica* (see below). Names of syntaxa are applied according to SOÓ (1980a).

Voucher specimen is deposited in the private herbarium of Angéla and Gergely KIRÁLY (Sopron).

Results and Discussion

Dactylohiza lapponica (LAEST. ex HARTM.) SOÓ [Nom. Nov. Gen. *Dactylorhiza* 4 (1962)]

Syn.: *Dactylorhiza pseudocordigera* (NEUMANN) SOÓ; *Dactylorhiza traunsteineri* (SAUT.) SOÓ subsp. *lapponica* (LAEST. ex HARTM.) SOÓ; *Orchis lapponica* (LAEST. ex HARTM.) RCHB.; *Orchis pseudocordigera* NEUMANN

Description (after VLČKO et al. 2003):

Stem 10-25(-40) cm tall, tinged with reddish-violet in upper part, leaves (2)3-4(5), narrow to broadly-lanceolate, keeled, blotched, very variable, 3-12 cm long, 0,6-2,5 cm wide. Inflorescence cylindrical, short, few-flowered; flowers 3-15(-20), dark purple to reddish-violet, middle sized to small; labellum 3-lobed, 4,5-9 mm long, 6-11 mm wide, often pale in the middle; pattern wide, red to dark purple, made from dots and incoherent stains; middle lobe often distinctly longer than lateral ones. The plants are very variable in height, flowers colour intensity, leaves shape and blotches. Flowering time is from May to June.

In Ebergőc typical *D. lapponica* and transitus of *D. lapponica* to *D. majalis* were found. The morphometrical data of the population is given in Tab. 1.

Tab. 1. Morphometrical data of *D. lapponica* and *D. lapponica* > *majalis* (Ebergőc fen meadow, G. KIRÁLY, 06. 12. 2006)
1. ábra. Méretadatok (*D. lapponica* és *D. lapponica* > *majalis*) (Ebergőci-láprét, KIRÁLY G., 2006. 06. 12.)

Diagnostic characters / *jellemzők*	***D. lapponica***		***D. lapponica > majalis***				**mean / *átlag***
	ind. 1	ind. 2	ind. 3	ind. 4	ind. 5	ind. 6	
height of stem / *a szár magassága* (cm)	26	21	29	30	32	28	27,7
number of leaves / *szárlevelek száma*	5	5	5	5	4	4	4,7
width of leaves / *a szárlevelek szélessége* (cm)	0,4-1,5	0,5-1,5	0,7-1,5	0,7-2,3	0,5-1,8	0,7-1,5	
length of leaves / *a szárlevelek hossza* (cm)	2,6-9,8	2,8-8,5	4,5-11,8	3,8-10,8	3,5-10,5	3,8-8,5	
width of 1. leaf from the bottom / *alulról 1. szárlevél szélessége* (cm)	1,5	1,5	1,3	2,1	1,8	0,5	1,5
length of 1. leaf from the bottom/ *alulról 1. szárlevél hossza* (cm)	6,7	6,5	7,5	7,0	10,0	7,0	7,5
width of 2. leaf from the bottom / *alulról 2. szárlevél szélessége* (cm)	1,7	1,5	1,5	2,3	1,4	1,5	1,7
length of 2. leaf from the bottom/ *alulról 2. szárlevél hossza* (cm)	9,8	8,5	11,0	10,8	10,5	8,5	9,9
width of 3. leaf from the bottom / *alulról 3. szárlevél szélessége* (cm)	1,2	1,3	1,2	1,6	0,9	1,0	1,2
length of 3. leaf from the bottom/ *alulról 3. szárlevél hossza* (cm)	8,0	6,5	11,8	10,0	7,5	7,0	8,5
width of 4. leaf from the bottom / *alulról 4. szárlevél szélessége* (cm)	0,6	0,8	0,9	1,2	0,5	0,7	0,8
length of 4. leaf from the bottom/ *alulról 4. szárlevél hossza* (cm)	3,9	4,2	8,5	5,7	3,5	3,8	4,9
width of 5. leaf from the bottom / *alulról 5. szárlevél szélessége* (cm)	0,4	0,5	0,7	0,7	-	-	0,6
length of 5. leaf from the bottom/ *alulról 5. szárlevél hossza* (cm)	2,6	2,8	4,5	3,8	-	-	3,7
number of flowers / *virágok száma*	6	10	14	14	13	6	10,5
length of inflorescence / *virágzat hossza* (cm)	2,8	4,0	7,5	6,5	6,5	4,5	5,3
length of outer tepals / *külső lepel hossza* (mm)	7,5-8,5	8,0-9,0	8,0-9,0	7,5-9,0	8,0-9,0	8,0-9,0	
width of labellum / *mézajak szélessége* (mm)	7,0-8,0	8,0	11,0-12,0	8,5-9,5	8,5-9,0	11,0-12,0	
length of spur / *sarkantyú hossza* (mm)	6,5-8,0	8,0-9,0	9,0-10,0	9,0	8,5-9,5	9,0-10,0	
length of bracts / *murvalevelek hossza* (mm)	13-18	14-18	16-25	14-26	14-20	16-22	

Dactylorhiza lapponica was described from Scandinavia. The species is included in the allotetraploid complex *D. majalis* sensu lato (AAGAARD et al. 2005). The origin of this complex is considered a result of repeated hybridization events between the diploid taxa *D. incarnata* (L.) SOÓ and *D. fuchsii* (DRUCE) SOÓ (HEDRÉN 1996, DEVOS et al. 2003).

The species grows in low-herbs communities along mountain streams, in springs and fens with high content of calcium; from lowlands (rarely) to mountainous altitudinal zone. Recent natural range of the species extends from Northern Europe, to the Alps and in Central Europe to the Carpathians (VLČKO et al. 2003, DELFORGE 2006), but presence of *D. lapponica* was detected recently in some Central European countries. First evidence of the species in this region was provided by REINHARD (1985) from Austria and Switzerland. GALLERACH – WUCHEPFFENIG (1987) found *D. lapponica* for the first time in Germany, and other new localities were published next year (BABORKA 1988, WUCHEPFFENIG – GALLERACH 1988). In France the species was firstly discovered by AMARDEILH (1997) in the second half of the nineties (Savoy district, eastern part of France), next localities were found by TYTECA – GEBRAUD (1998). *D. lapponica* in eastern part of this region (Poland, Slovakia) was appeared in 1993 (SZLACHETKO 1993, VLČKO 1995). In Slovakia, the first locality was found in Malá Fatra Mts. (VLČKO l. c.). The other localities were documented from that time mainly in northern part of the country; however not long ago (in 2001) an untold population of the species was found in Záhorská nížina lowland at about 150 m above see level (VLČKO et al. 2002).

The closest occurrence to its Hungarian locality is situated in Lower Austria (Niederösterreich), where *D. lapponica* exists in the mountainous belt. Its ecological requirements differ from the ones of *D. majalis*, as *D. lapponica* lives mainly in the initial part of fen spring rich in moss (VÖTH 1993). It must be noted that the habitat near Ebergőc has the same characteristics.

The locality of "Ebergőci-láprét" represents large-scale alkaline fens (the Natura 2000 biotope no. 7230 Alkaline fens) covering approx. 15 ha. The habitat is now strongly disturbed by anthropogenic effect. Original alkaline fen plant communities probably with dominance of Caricion davallianae alliance were drained and they are degraded significantly by now. The wet meadow communities of Molinion alliance (*Carex hostiana* type) predominate at present; while large areas are covered with *Phragmites communis*. Recent vegetation is influenced negatively by the self-seeding of woody species and the accumulation of old biomass respectively. This stage is a result of the abandon of the traditional management (cutting or pasturage).

Despite all this, many endangered and rare plant species are still survived there, for example *Iris sibirica, Salix rosmarinifolia, Scorzonera humilis, Schoenus nigricans* etc. Some species and hybrids of orchids such as *Epipactis palustris* and mainly several *Dactylorhiza* taxa were found. Particularly degraded communities of Caricion davallianae alliance are still occurring in small area around rivulet flowing through the southern part of the habitat. Although the grass species *Molinia coerulea* is also dominant, we recorded typical fen species (e.g. *Carex davalliana, Carex panicea* and *Valeriana dioica),* plants of wet meadows (e.g. *Cirsium rivulare, Sanguisorba officinalis, Serratula tinctoria, Succisa pratensis*) and characteristic plant species of Molinion alliance (*Salix rosmarinifolia, Carex hostiana*). Some individuals of *Dactylorhiza*

lapponica (Fig. 1.) were found in this relatively well-preserved part of the biotope. The population involved about eight plants situated close to the area of rivulet; two of them had typical features of the species and six other ones were probably hybrids with *D. majalis*. The phytosociological condition of the Ebergőc locality is shown in Tab. 2.

Tab. 2. Relevé in Ebergőc (Győr-Moson-Sopron county, Hungary), degraded alkaline fen named "Ebergőci-láprét", plot size: 5×5 m, altitude: ca 140 m s. m., slope orientation: - , declination: - , K. LÁJER et G. KIRÁLY, 06. 12. 2006.

2. táblázat. Az Ebergőci-lápréten készült cönológiai felvétel (5×5 m, 140 m tszf. m., KIRÁLY G. és LÁJER K., 2006. 06. 12.)

Abundance: E_1: 100%, E_0: 1%

E_1: *Achillea millefolium* s. l. +, *Angelica sylvestris* +, *Carex davalliana* +, *C. flacca* +, *C. hostiana* 1, *C. panicea* +, *Cirsium rivulare* 2a, ***Dactylorhiza lapponica*** **+**, *D. majalis* +, *Deschampsia cespitosa* 2a, *Euphorbia villosa* +, *Lysimachia vulgaris* 1, *Molinia caerulea* 4, *Poa pratensis* +, *Potentilla erecta* 1, *Pulicaria dysenterica* +, *Ranunculus acris* +, *Salix cinerea* +, *S. rosmarinifolia* 2a, *Sanguisorba officinalis* 1, *Scorzonera humilis* +, *Serratula tinctoria* +, *Succisa pratensis* +, *Valeriana dioica* +.

As many authors reported hybrids of *D. lapponica* with other taxa of the genus *Dactylorhiza* in Central Europe (see e. g. SOÓ 1980b, ADLER et al. 1994, PROCHÁZKA 2002, VLČKO et al. 2003), short description of all other taxa of this locality are discussed. The occurrence of all taxa mentioned below is concentrated to the area of degraded communities of Molinion alliance:

Dactylorhiza incarnata (L.) SOÓ subsp. *incarnata*

The second abundant *Dactylorhiza* taxon in this locality, population size of the species involved about one hundred individuals.

Dactylorhiza incarnata subsp. *pulchella* (DRUCE) SOÓ [syn.: subsp. *serotina* (HAUSSKN.) D. M. MOORE et SOÓ]

The subspecies grew together with nominate *D. incarnata* subsp. *incarnata*, but it was much rare. The number of individulas was some few plants only (the taxon was identified by MOLNÁR V. A. in the researched area).

Dactylorhiza majalis (REICHENB.) P. F. HUNT et SUMMERH. subsp. *majalis*

The species was scattered on several parts of the habitat, typical individuals of *D. majalis* were infrequent as most of the plants were hybrids with *D. incarnata* described as *D.* × *aschersoniana* (HAUSSKN.) BORSOS et SOÓ. Both subspecies of *D. incarnata* group hybridized with *D. majalis*. These hybrids predominated the mentioned locality and generally they are very frequent with presence of both parents. Usually *D.* × *aschersoniana* displaces the parental species (mainly *D. majalis*) gradually. In this area, some individuals were found which the hybrids of *D. majalis* and *D. lapponica* are probably.

Acknowledgements

The work was particularly supported by grants VEGA no. 1/3446/06, APVT-27-028704 and Bolyai Scholarship of HAS. Thank you for the help of LÁJER Konrád (Baja) and MOLNÁR V. Attila (Debrecen) in the field study.

Fig. 1. Voucher specimen of *Dactylorhiza lapponoica* from the locality "Ebergőci-láprét". A: habitus, B: inflorescence (photo: G. KIRÁLY, 06. 12. 2006).

1. ábra. A *Dactylorhiza lapponica* Ebergőci-lápréten gyűjtött bizonyító példánya. A: habitus, B: virágzat (fotó: KIRÁLY G., 2006. 06. 12.)

References

AAGAARD, S. M. D. – SÅSTAD, S. M – GREILHUBER, J. – MOEN, A. (2005): A secondary hybrid zone between diploid *Dactylorhiza incarnata* ssp. *cruenta* and allotetraploid *D. lapponica* (*Orchidaceae*). – Heredity **94**: 488-496.

ADLER, W. – OSWALD, K. – FISCHER, R. (1994): Exkursionsflora von Österreich. – Ulmer, Stuttgart, 1180 pp.

AMARDEILH, J. P. (1997): Orchidee nouvelle pour la France *Dactylorhiza lapponica* (LAESTAD) SOÓ en Savoie. – L'Orchidophile **28**: 55-58.

BABORKA, M. (1988): *Dactylorhiza lapponica* in Bayern. – Ber. Arbeitskrs. Heim. Orchid. **5**: 97-99.

DELFORGE, P. (2006): Orchids of Europe, North Africa and the Middle East. – Christopher Helm Publishers Ltd, London, 640 pp.

DEVOS, N. – TYTECA, D. – RASPÉ, O. – WESSELINGH, R. A. – JACQUEMART, A.-L. (2003): Patterns of chloroplast diversity among western European *Dactylorhiza* species (*Orchidaceae*). – Plant. Syst. Evol. **243**: 85-97.

GALLERACH, A. – WUCHERPFFENIG, W. (1987): *Dactylorhiza lapponica*: Erstnachweis für Deutschland. – Die Orchidee **38**: 306-307.

HEDRÉN, M. (1996): Genetic differentiation, polyploidization and hybridization in northern European *Dactylorhiza* (*Orchidaceae*): evidence from allozyme markers. – Plant. Syst. Evol. **201**: 31-55.

MAROSI S. – SOMOGYI S. (eds.) (1990): Magyarország kistájainak katasztere. – MTA Földrajztudományi Kutató Intézet, Budapest.

MOLNÁR V. A. (2000): *Orchidaceae* – Kosborfélék családja. In: SIMON T.: A magyarországi edényes flóra határozója. 4., átdolgozott kiadás – Nemzeti Tankönyvkiadó, Budapest, pp.: 705-725.

MOLNÁR V. A. – SULYOK J. – VIDÉKI R. (1995): Vadon élő orchideák. A hazai növényvilág kincsei. – Kossuth Könyvkiadó, Budapest, 160 pp.

MORAVEC, J. et al. (eds.) (1994): Fytocenologie. – Academia, Praha, 404 pp.

PROCHÁZKA, F. (2002): *Orchidaceae* JUSS. In: KUBÁT, K. et al. (eds.): Klíč ke květeně České republiky. – Academia, Praha, pp.: 767-783.

REINHARD, H. R. (1985): Skandinavische und alpine *Dactylorhiza*-Arten. – Jour. Eur. Orch. **17**: 321-416.

SOÓ R. (1962): Nomina nova generis *Dactylorhiza*. Combiationes novae ab auctore in Annales Univ. Scient. Budapest Sect. Biol 5. [recte: 3] (1960) non jure pleno publicatae. – ELTE, Budapest, 11 pp.

SOÓ R. (1980a): A magyar flóra és vegetáció rendszertani-növényföldrajzi kézikönyve VI. – Akadémiai Kiadó, Budapest, 556 pp.

SOÓ R. (1980b): *Dactylorhiza* NECKER ex NEVSKI. In: TUTIN T. G. et al. (eds.): Flora Europaea 5. – Cambridge University Press, Cambridge, pp.: 333-335.

SUNDERMANN, H. (1980): Europäische und mediterrane Orchideen, ed. 3. – Brücke-Verlag, Hildesheim, 280 pp.

SZLACHETKO, D. (1993): Kilka uwag o stoplamku Ruthego *Dactylorhiza ruthei*. Chrońmy Przyr. Ojcz. **49**(4): 85-88.

TYTECA, D. – GEBRAUD, O. (1998): Nouvelles observations sur *Dactylorhiza lapponica* (LAEST. ex HARTMAN) SOÓ en France. – L'Orchidophile **29**: 60-65.

VLČKO, J. (1995): *Dactylorhiza lapponica* (LAEST. ex RCHB. fil.) SOÓ, a new species of the Slovak flora. – Biologia (Bratislava) **50**: 331-332.

VLČKO, J. – DÍTĚ, D. – KOLNÍK, M. (2002): Vstavačovité (*Orchidaceae*). In: STANOVÁ, V. – VICENÍKOVÁ, A. (eds.): Biodoverzita Abrodu – stav, zmeny, obnova. – Daphne, Bratislava, pp.: 117-127.

VLČKO, J. – DÍTĚ, D. – KOLNÍK, M. (2003): Vstavačovité Slovenska – Orchids of Slovakia. – ZO SZOPK Orchidea, Zvolen, 120 pp.

VÖTH, W. (1993): *Dactylorhiza lapponica* (HARTM.) SOÓ (*Orchidaceae*) in Niederösterreich. – Verh. Zool.-Bot. Ges. Österr. **130**: 95-98.

WUCHERPFENNIG, W. – GALLERACH, A. (1988): Ein Vorkommen von *Dactylorhiza lapponica* (LÄST. ex RCHB. f.) SOÓ in Deutschland. – Ber. Arbeitskrs. Heim. Orchid. **5**: 100-109.