



Article

Unravelling a century of misuse: typification of the name *Himantoglossum caprinum* (Orchidaceae: Orchideae)

GÁBOR SRAMKÓ^{1,2}, MIKLÓS ÓVÁRI³, ANDRIY V. YENA⁴, ALEXANDER N. SENNIKOV⁵,
LAJOS SOMLYAY⁶, RICHARD M. BATEMAN⁷ & ATTILA MOLNÁR V.²

¹MTA-ELTE-MTM Ecology Research Group, H-1117 Budapest, Hungary; E-mail: sramko.gabor@science.unideb.hu

²Department of Botany, University of Debrecen, H-4010 Debrecen, Hungary; E-mail: mva@science.unideb.hu

³Balaton Uplands National Park Directorate, H-8900 Zalaegerszeg, Hungary; E-mail: ovari@bfnp.kvvm.hu

⁴Department of Phytodesign and Botany, National University of Life and Environmental Sciences, Southern Branch "Crimean Agrotechnological University", 95492 Simferopol, Ukraine; E-mail: an.yena@gmail.com

⁵Finnish Museum of Natural History, FI-00014 Helsinki, Finland; E-mail: Alexander.Sennikov@helsinki.fi

⁶Hungarian Natural History Museum, H-1087 Budapest, Hungary; E-mail: somlyay@bot.nhmus.hu

⁷Jodrell Laboratory, Royal Botanic Gardens Kew, Richmond, Surrey, TW9 3AB, UK; E-mail: r.bateman@kew.org

There are two morphologically similar and closely related eastern species of lizard orchids of the Eurasian *Himantoglossum* Sprengel (1826: 694) that, according to current literature (Sundermann 1980, Buttler 1996, Kreutz 1998, Baumann *et al.* 2006, Delforge 2006), can easily be distinguished by anthocyanin markings on the labella ('lips') of their flowers, *H. caprinum* (Marschall von Bieberstein 1819: 602) Sprengel (1826: 694) is said to have papillate red spots on the lip, whereas *H. affine* (Boissier 1882: 56) Schlechter (1918: 287) lacks such marks. We consider the length of labellar papillae as another character separating them; the former has up to 0.5 mm long papillae, whereas in the latter they rarely reach 0.1 mm. Furthermore, two quantitative morphological characters consistently mentioned in the literature are said to show little if any overlap between—and therefore be diagnostic of—the two species: (i) the length of the lateral lobe of the labellum, and (ii) the length of the labellar spur.

The description of *H. caprinum* dates back to the 19th century, when Bieberstein discovered the species in the Crimea. In the second volume of his *Flora Taurico-Caucasica* (Marschall von Bieberstein 1808) he believed it was "*Orchis hircina*" [= *H. hircinum* (Linnaeus 1753: 944) Sprengel 1826: 694], first described from the Paris region. However, in the third volume of his *Flora* he described this plant as a new species under the name *Orchis caprina* Marschall von Bieberstein (1819: 602) (= *H. caprinum*), distinguishing the Crimean plant from Linnaeus' taxon by its less pubescent basal region of the labellum, wider lateral lobes, a shorter notch at the apex of the elongate central lobe of the lip, and a generally larger flower. The marking on the lip of *Orchis caprina* was not mentioned by its author or by any other botanists of the 19th century, until Schmalhausen (1897) mentioned "red spots" on the base of the lip of Russian (including Crimean) lizard orchids. After the influential *Flora of the USSR* (Nevski 1935), all relevant works (see above), including regional literature (Vakhrameeva & Tatarenko 2008), characterized *H. caprinum* as bearing large purplish flowers with red-purple spots on their lips.

Aceras affinis Boissier (1882: 56) (= *H. affine*) was described from Asia Minor without comparison of the new taxon with Bieberstein's (1819) species. *Himantoglossum affine* is uniformly characterized in the literature as having an unspotted lip, the feature treated as being the most distinctive of this species in current descriptions and keys (Kreutz 1998, Baumann *et al.* 2006, Delforge 2006). The lectotype was designated by Nelson (1968: 59).

While collecting material for our ongoing phylogenetic study of the genus *Himantoglossum* *s.l.* (Sramkó *et al.* 2011), we undertook fieldwork in the Crimea in 2007 and sampled only *H. affine* in many localities (Yena *et*

al. 2008). Unexpectedly, all specimens previously collected in the Crimea that we examined in herbaria (BP, CSAU, G, H, LE, W, YALT) also proved to be assignable to *H. affine*. Given the additional scientific evidence of our own extensive fieldwork, it has become evident to us that all Crimean *Himantoglossum* specimens belong to this species (Yena 2012). However, as noted above, it was *H. caprinum* that was described from the Crimea, and the overall lack of spotted lips of lizard orchids within this region raised doubts about the current consensus application of this name. We therefore re-evaluated the taxonomic relevance of the labellar marking, specifically whether the presence of spots on the lip is correlated with the two quantitative characters—lengths of the lateral labellar lobe and spur—that are considered to distinguish *H. caprinum* from *H. affine*.

We obtained morphological measurements (Fig. 1) from 174 flowers of 28 herbarium specimens (Table 1). Three groups of samples were defined *a priori*: (i) specimens with spotted lips (hereafter referred to as “spotted”); (ii) specimens with unspotted lips collected in Turkey (hereafter referred to as “unspotted”); and (iii) specimens (with unspotted lips) collected in the Crimea (hereafter referred to as “Crimean”). Three specimens belonging to the original collections of *H. affine* (group ii) and four belonging to the original collections of *H. caprinum* (group iii) were also included in the analyses.

TABLE 1. Specimens examined in this study.

taxon	original locality	current locality	collection year	collector	sample size (no. flowers)	herbarium collection
“spotted”	Blocksberg	Hu: Budapest	s.d.	Sadler	3	BP
“spotted”	Pesthidegkút	Hu: Budapest	2007	Somlyay	5	BP
“spotted”	Gyulafirátót	Hu: Veszprém	2006	Bauer	4	BP
“spotted”	Budapest	Hu: Budapest	1920	Wagner	6	BP
“spotted”	Wolfsthale	Hu: Budapest	s.d.	Heuffel	7	BP
“spotted”	Franzenshöhe	Hu: Budapest	1821	Müller	3	BP
“spotted”	s.n.	s.n.	s.d.	Sándor	5	BP
“spotted”	Wallendorf	Sl: Spišské Vlachy	1846	Kalchbrenner	11	BP
“spotted”	Domugled	Ro: Băile Herculane	1856	Heuffel	4	BP
“spotted”	A[lba]Carolinae	Ro: Alba Iulia	1857	Haynald	6	BP
“spotted”	Babadag	Ro: Babadag	1912	Prodan	3	BP
“spotted”	Szentgyörgy	Ro: Transsylvania [?]	1882	Szénert [?]	4	BP
“spotted”	Budae	Hu: Budapest	1890	Jurányi	8	BP
“unspotted”	Gheyra Cariae	Tr: Geyre (Aydin)	s.d.	Boissier	10	G-BOIS
“unspotted”	Bulghas Kiöi	Tr: near Kuyucak	s.d.	Balansa	9	G-BOIS
“unspotted”	Satt Dagh	Tr: Hakkari	1865	Hausknecht	4	G-BOIS
“unspotted”	Duluk Baba	Tr: Dülük	1887	Shepard	8	K
“unspotted”	Gusguthal, Gullek	Tr: Gülleç	1896	Siehe	4	WU
“unspotted”	Mehmetali	Tr: Mehmetali	2010	Sramkó	3	DE
Crimean	Tauria	Ua: Crimea	1807	Bieberstein	9	LE
Crimean	Tauria	Ua: Crimea	1807	Bieberstein	6	LE
Crimean	Sudagh	Ua: Sudak	1807	Bieberstein	12	H
Crimean	Laspi	Ua: Laspi	s.d.	Bieberstein	9	H
Crimean	Tauria	Ua: Crimea	s.d.	Bieberstein	6	H
Crimean	Tauria	Ua: Crimea	s.d.	Steven	5	BP
Crimean	Neusatz	Ua: Krasnogorskoye	1899	Wetschky	7	BP
Crimean	Neusatz	Ua: Krasnogorskoye	1899	Wetschky	8	G
Crimean	Skalystoye Skala	Ua: Skalyste	2007	Sramkó	5	DE

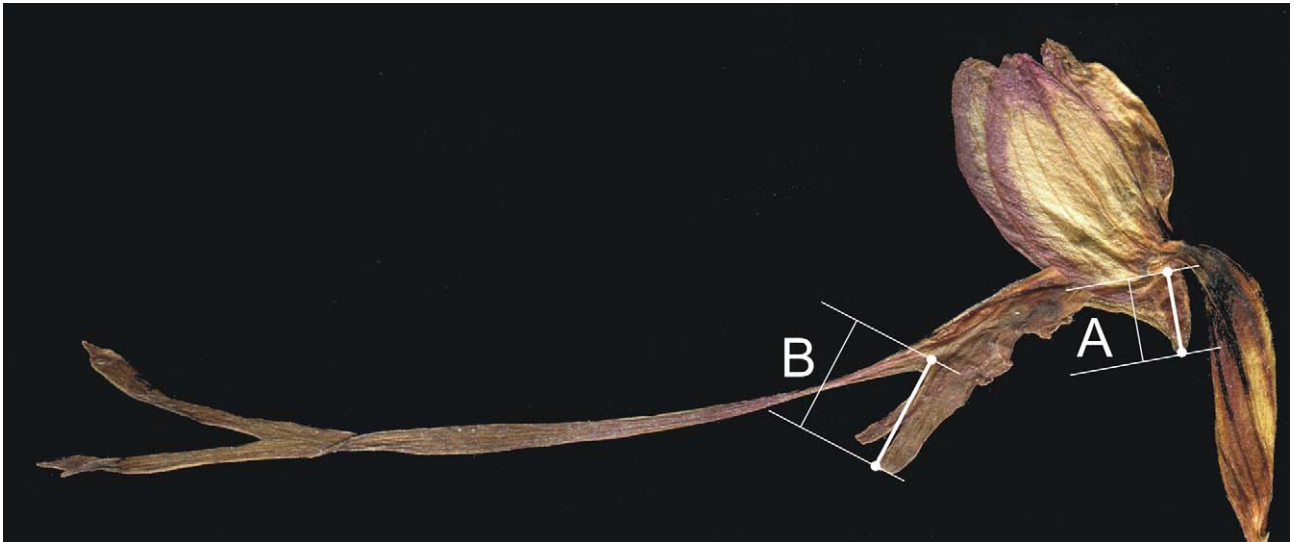


FIGURE 1. Distinctive characters (A: length of spur; B: length of lateral lobe) measured in this study as exemplified on a specimen from the Crimea

In order to compare the “Crimean” specimens with the other two prior groups we performed (i) multivariate analysis of variance (MANOVA) to test whether several samples have statistically the same mean, and (ii) a Kolmogorov-Smirnov test to determine whether two samples are taken from the same population by comparing the distribution of data. The data were visualized by plotting each variable separately as a boxplot. All statistical analyses and graphical operations were performed in PAST v.2.14 using the default settings (Hammer *et al.* 2001).

We found significant differences between the groups (Fig. 2). MANOVA analysis showed strong differences ($p < 0.001$) between the “spotted” and the “Crimean” as well as the “spotted” and “unspotted” specimens, whereas no such difference ($p = 0.17$) was found between the “unspotted” and “Crimean” specimens. As for the distribution of data, the Kolmogorov-Smirnov test showed highly significant difference ($p < 0.001$) between the data of the “spotted” and those of the “unspotted” and “Crimean” specimens for both lateral lobe length and spur length, whereas the data of the “spotted” and “Crimean” specimens showed weaker but nonetheless statistically significant differences (lateral lobe length, $p = 0.014$; spur length, $p = 0.017$).

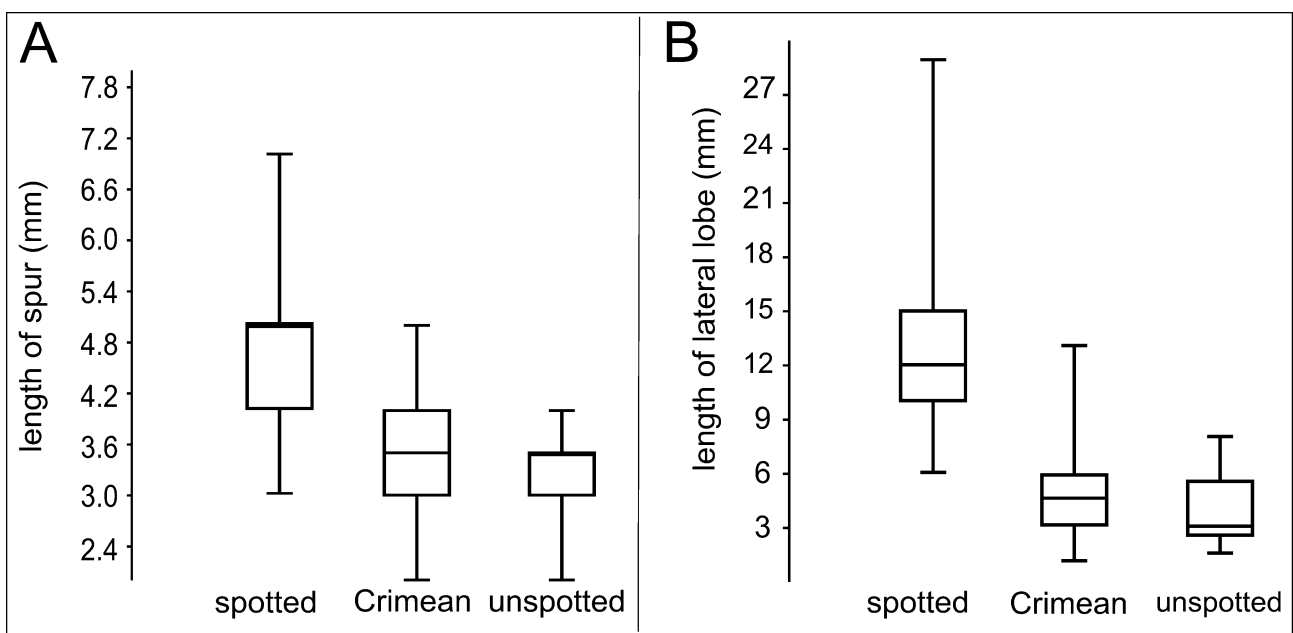


FIGURE 2. Differences between lengths of spur (A) and lateral labellar lobe (B) of the studied specimens.

These analyses demonstrate (i) the value of these quantitative traits in separating the “spotted” and “unspotted” species, (ii) that the names *H. caprinum* and *H. affine* refer to the same “unspotted” species (as typified below); and that consequently (iii) a new name (to be published in our forthcoming paper) must be applied to the “spotted” species that is distributed across the eastern Mediterranean from the Balkans to Asia Minor.



FIGURE 3. Lectotype of *Himantoglossum caprinum* (right-hand specimen, H 1239346).

Although there have been a few previous attempts to typify the name *H. caprinum*, no correctly designated type is presently available. A specimen stored in LE was published as the “type” of *H. caprinum* by Baumann (1978), and this sheet was later (1994) supplemented with a note referring to its “type” status by L. Averyanov. However, the specimen in question is not part of the original material of *Orchis caprina*, since it was collected by Ledebour in 1818 in the Crimea (“*legi ad montem Agermysh* [Mt. Agarmysh]”) and may have been identified by the collector after the publication of Bieberstein’s *Flora* (1819). In fact, there is no evidence that Bieberstein ever saw this specimen. Thus, Baumann’s type should be considered as a neotype (Art. 9.8 ICBN; McNeill *et al.* 2006), but it has no standing in the presence of the original material (see below).

In 2001, N. Fedoronchuk and L. Krytska (from KW) correctly annotated Ledebour’s specimen to state that it cannot be considered as “type” of *O. caprina* Bieb. Instead, Fedoronchuk intended as “lectotype” another LE specimen that was collected in Tauria (the Crimea) in 1807 and was labelled “*Orchis hircina*” by Bieberstein himself. Although this specimen is part of the original material of *O. caprina*, this type designation (actually a handwritten note attached to the specimen by Fedoronchuk) has not been published (N. Fedoronchuk *ex litt.*), i.e. the putative lectotype was not effectively designated (Art. 7.10 ICBN).

Two further sheets belonging to the original material of *O. caprina* (collected and labelled by Bieberstein) were discovered in H. Specimen *H 1239342* was collected in “Tauria” (undated) and labelled “*O. caprina*”. The other sheet bears two gatherings from the Crimea (Fig. 3). The right-hand specimen (*H 1239346*) was collected at Sudak (“Sudagh”) in 1807, the left-hand one (*H 1750572*) at Laspi (undated). The history of name changes [*hircina* → *tragodes* (Greek equivalent) → *caprina* (Latin equivalent)] can be directly traced from specimen *H 1239346*, which therefore optimally documents the progressive development of studies of this taxon by the original author (Rec. 9A.3 ICBN). Moreover, its label preserves further evidence that the author used this specimen to produce the diagnosis of the species; the statement *nectarium majus quam in O. hircina* on the label corresponds with “*flores ... majores: ... nectario quidquam ampliore*” in the protologue. As this specimen demonstrates the strongest evidence that it is part of the original material (Art. 9 Note 2 ICBN), we designate this specimen as the lectotype of *H. caprinum*. The key character states of this specimen are: labellum unspotted with papillae shorter than 0.1 mm, length of lateral lobe 7.2 ± 1.07 (mean \pm s.d.) mm, length of spur 3.3 ± 0.32 (mean \pm s.d.) mm (N=12). The name *H. affine* is recognized here as later synonym of *H. caprinum* (Art. 52.1 ICBN).

Himantoglossum caprinum (M.Bieb.) Sprengel (1826: 694) \equiv *Orchis caprina* Marschall von Bieberstein (1819: 602). Lectotype (designated here):—UKRAINE. Crimea: Sudak (“Sudagh”), 1807, [*M. Bieberstein*] *s.n.* (*H 1239346*!). Other original material in H and LE.

= *Himantoglossum affine* (Boiss.) Schlechter (1918: 287), *syn. nov.* \equiv *Aceras affinis* Boissier (1882: 56). Lectotype (designated by Nelson 1968: 59):—TURKEY. Aydin: Geyre (“*Cadmi pineta ad or. Gheyra Cariae*”), June 1842, *Boissier s.n.* (G 00150412!). Other syntypes in G-BOIS.

Acknowledgements

We gratefully acknowledge the help of I.V. Tatanov, L. Gautier, N.M. Fedoronchuk and N.B. Gaponenko, K.A. Efetov, J.P. Tóth, J. Tökölyi, C.A.J. Kreutz and W. Wucherpfenning. The helpful comments of our reviewers are also greatly appreciated. Research on the genus *Himantoglossum* was funded by the EU Marie Curie Actions (EU7KP), assisted by a NFÜ–OTKA MOBILITY grant (no. MB08-A 80332).

References

- Baumann, H. (1978) *Himantoglossum adriaticum* spec. nov.—eine bislang übersehene Riemenzunge aus dem zentralen nördlichen Mittelmeergebiet. *Die Orchidee* 29: 165–172.
- Baumann, H., Künkele, S. & Lorenz, R. (2006) *Orchideen Europas mit angrenzenden Gebieten*. Eugen Ulmer, Stuttgart, 336 pp.
- Boissier, E. (1882) *Flora Orientalis* 5, Part 1. H. Georg, Geneva & Basilea [Basel], 428 pp.
- Buttler, K.P. (1996) *Orchideen: Die wildwachsenden Arten und Unterarten Europas, Vorderasiens und Nordafrikas*. Mosaik Verlag, München, 287 pp.
- Delforge, P. (2006) *Orchids of Europe, North Africa and the Middle East*. A & C Black, London, 640 pp.
- Hammer, Ø., Harper, D.A.T. & Ryan, P.D. (2001) PAST: Paleontological statistics software package for education and data analysis. *Palaeontologia Electronica* 4: 9.
- Kreutz, C.A.J. (1998) *Die Orchideen der Türkei. Beschreibung, Ökologie, Verbreitung, Gefährdung, Schutz*. Selbstverlag, Landgraaf, 767 pp.
- Linnaeus, C. (1753) *Species plantarum*. L. Salvius, Holmiae [Stockholm], 1200 pp.
- Marschall von Bieberstein, F.A. (1808) *Flora taurico-caucasica* 2. Typis Academicis, Charkovia [Kharkov], 478 pp.
- Marschall von Bieberstein, F.A. (1819) *Flora taurico-caucasica* 3. Typis Academicis, Charkovia [Kharkov], 655 pp.
- McNeill, J., Barrie, F.R., Burdet, H.M., Demoulin, V., Hawksworth, D.L., Marhold, K., Nicolson, D.H., Prado, J., Silva, P.C., Skog, J.E., Wiersema, J.H. & Turland, N.J. (2006) *International code of botanical nomenclature (Vienna Code)*. Regnum Vegetabile 146. A. R. G. Gantner Verlag, Ruggell, 568 pp.
- Nelson, E. (1968) *Monographie und Ikonographie der Orchidaceen-Gattungen Serapias, Aceras, Loroglossum, Barlia*. Verlag E. Nelson, Chernex-Montreux, Textband, 79 pp.
- Nevski, S.A. (1935) Orchidaceae Lindl. In: Komarov, V.L. (ed.) *Flora of the USSR* 4. Academy of Sciences of the USSR, Leningrad, pp. 589–730.
- Schlechter, R. (1918) Mitteilungen über einige europäische und mediterrane Orchideen I. 1. Die Gattungen *Aceras*, *Himantoglossum* und *Anacamptis*. *Repertorium Specierum Novarum Regni Vegetabilis* 15: 273–290.
- Schmalhausen, I.I. (1897) *Flora sredney i yuzhnoy Rossii, Kryma i Severnogo Kavkaza [Flora of the Middle and Southern Russia, the Crimea and Northern Caucasus]* 2. Kushnerev & Co., Kiev, 752 pp.
- Sprengel, K.P. (1826) *Systema vegetabilium* ed. 16, 3. Dietrich, Göttingen, 936 pp.
- Sramkó, G., Molnár V., A., Hawkins, J.A. & Bateman, R.M. (2011) Evolution of the Eurasiatic genus *Himantoglossum* (Orchideae, Orchidoideae): an integrative phylogenetic approach. In: *Abstracts of the XVIII International Botanical Congress*. Committee of the XVIII IBC 2011, Melbourne, pp. 286–287.
- Sundermann, H. (1980) *Europäische und mediterrane Orchideen*. Brücke Verlag, Hildesheim, 279 pp.
- Vakhrameeva, M.G. & Tatarenko, I.V. (2008) *Himantoglossum caprinum* (M. Bieb.) C. Koch. In: Vakhrameeva, M.G., Tatarenko, I.V., Varlygina, T.I., Torosyan, G.K. & Zagulski, M.N. (eds.) *Orchids of Russia and adjacent countries (within the borders of the former USSR)*. A.R.G. Gantner Verlag, Ruggell, pp. 274–276.
- Yena, A.V., Sramkó, G., Óvári, M. & Kish, R. (2008) *Himantoglossum affine* (Boiss.) Schltr. In: Greuter, W. & Raus, T. (eds.) *Med-Checklist Notulae*, 27. *Willdenowia* 38: 472.
- Yena, A.V. (2012) *Prirodnaya flora Krymskogo poluostrova [Spontaneous Flora of the Crimean Peninsula]*. N. Orianda, Simferopol, 232 pp.