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NEW NAMES IN THE '*CYNOGLOSSUM MONTANUM* GROUP' (BORAGINACEAE) IN THE MEDITERRANEAN AREA

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Two new names and one new combination are created in the artificial *Cynoglossum montanum* group (Boraginaceae – Cynoglosseae): *Cynoglossum natolicum* (Bornm.) Sutorý and *Cynoglossum brandii* Sutorý from the Eastern Mediterranean, and *Cynoglossum maghrebicum* Sutorý from Morocco and Algeria. All taxa are discussed, their lectotypes are designated and their distributions are outlined.

Keywords. Boraginaceae, *Cynoglossum montanum*, new combination, new names.

Introduction

In his monograph of the Boraginaceae tribe Cynoglosseae, Brand (1921) distinguished two subspecies of *Cynoglossum montanum* L.: *C. montanum* subsp. *linnaeanum* Brand and *C. montanum* subsp. *extraeuropaeum* Brand. Even at that date, the method of delimiting them according to continental borders showed the artificial character of this group. The European *Cynoglossum montanum* subsp. *linnaeanum* Brand contains the type of the species (Selvi, 2008) and should, according to the current rules, be named *C. montanum* subsp. *montanum*, if accepted at this rank. *Cynoglossum montanum* subsp. *montanum* in its strict sense has a large distribution area, with isolated areas in central Spain and western France (Sutorý, 2007), extending into the mountains of Italy (Selvi & Sutorý, 2012), and then a rather continuous distribution from the south-eastern part of the Czech Republic and Slovakia (Sutorý, 1987), the eastern part of Austria, Hungary, Slovenia, Croatia, Bosnia-Herzegovina, Serbia, Kosovo, Macedonia, Albania, Romania and Bulgaria into Greece (Northern and Southern Pindos, Sterea Ellas, North Central and North East; Dimopoulos *et al.*, 2013). Its eastern boundaries in Europe are in today's Moldova, European Turkey and the Crimea, and the easternmost localities are probably those lying east of the Sea of Azov. In Asia, its distribution is limited to the belt going through northern Turkey as far as the province of Artvin (A1–A8 and B1–B9) and ending in southern Georgia (Batumi).

The morphological variability of *Cynoglossum montanum* subsp. *montanum* is particularly distinctive in the nutlets, which can either lack a distinct areola (Fig. 1A) or possess one (Fig. 1B). The differences in their proportions (Fig. 2) and shape (Fig. 3) from the other taxa discussed below are remarkable.

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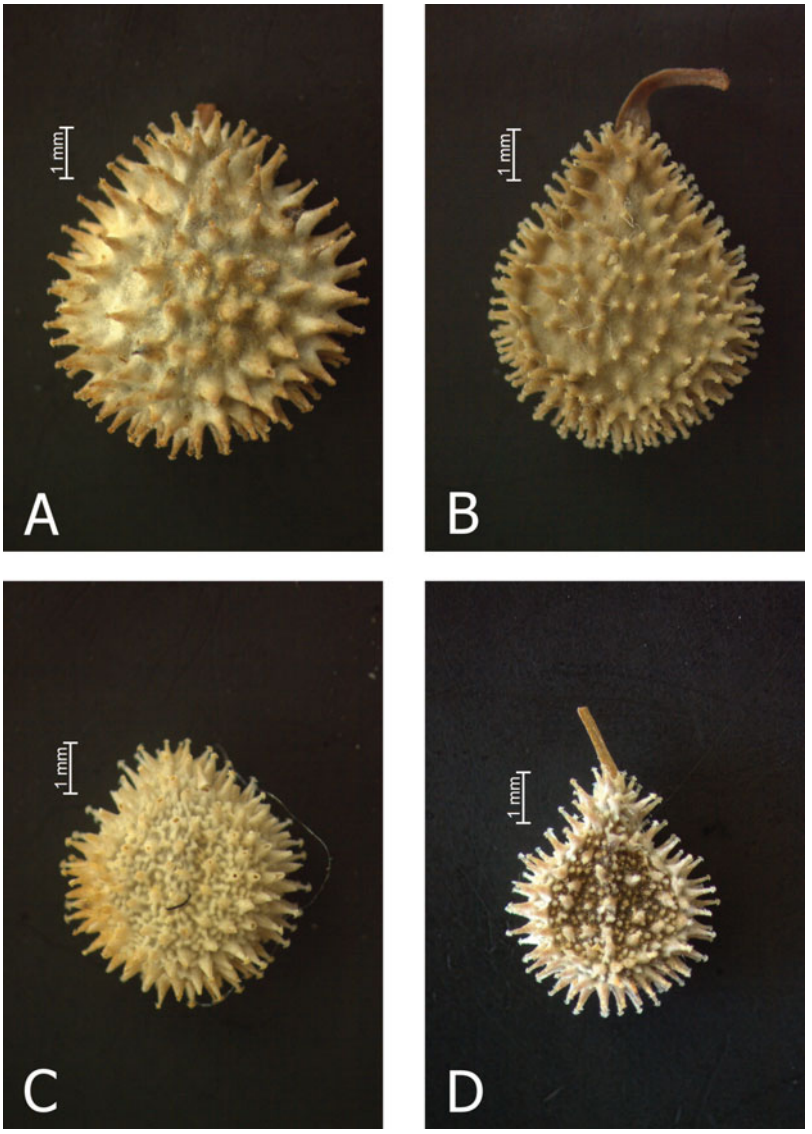

FIG. 1. (Colour online) Nutlets of *Cynoglossum* species: A, B, *C. montanum*; C, *C. natolicum*; D, *C. brandii*.

The other subspecies is *Cynoglossum montanum* subsp. *extraeuropaeum*, within which Brand (1921) included five varieties, all with extra-European distributions. One of them, the African *Cynoglossum montanum* subsp. *extraeuropaeum* var. *alpinum* Brand, has already been combined at species level as *C. alpinum* (Riedl, 1985: as *Cynoglossum alpinum* (Brand) Riedl, sp. nov., with *Schimper* 49 at W cited as 'holotype' and Brand's var. *alpinum* cited as a doubtful synonym; isonym published by Hilliard

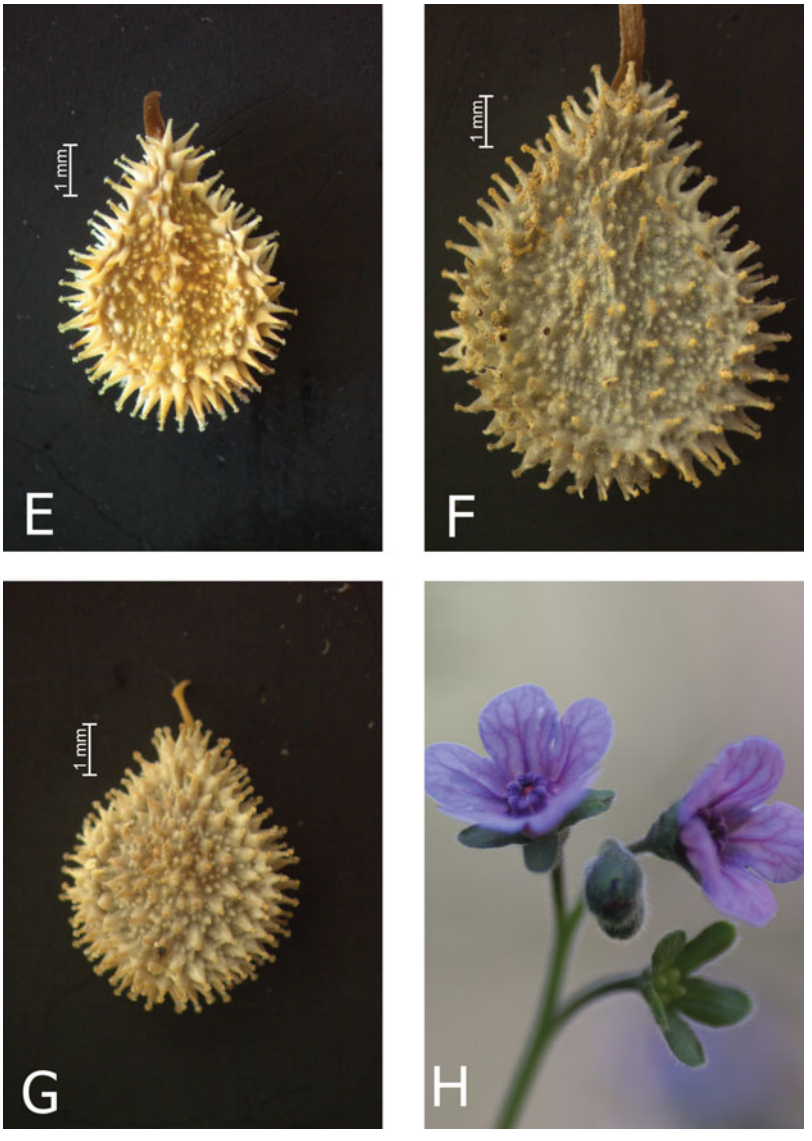

FIG. 1 (continued) (Colour online). Nutlets of *Cynoglossum* species: E, *C. nebrodense*; F, *C. maghrebicum*; G, *C. dioscoridis*. H, Flowers of *Cynoglossum maghrebicum*.

& Burtt, 1986, as *C. alpinum* (Brand) Riedl and lectotypified on *Schimper* 1194 at K). Because *Schimper* 49 was cited by Brand as one of the original syntypes of *Cynoglossum montanum* var. *alpinum*, the element of doubt expressed by Riedl (1985) in his synonymy disappears, and his citation of *Schimper* 49 as the 'holotype' can therefore be regarded as an earlier lectotypification of Brand's variety than that of Hilliard & Burtt (1986). The identity of *Cynoglossum montanum* subsp.

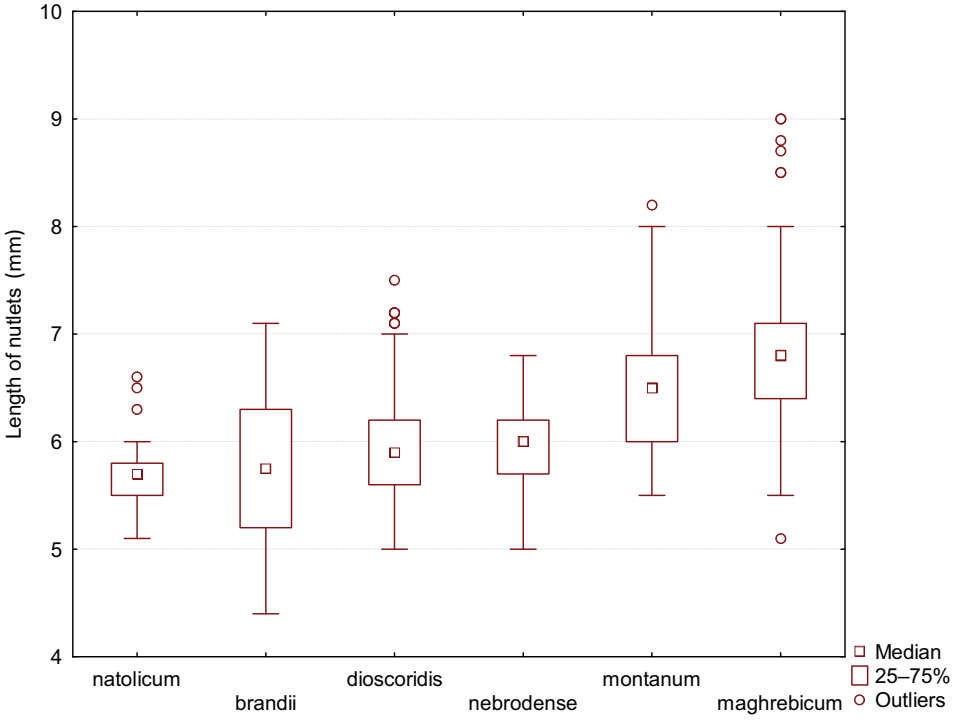

FIG. 2. (Colour online) Length of nutlets of *Cynoglossum* species.

extraeuropaeum var. *parvifolium* (Koch) Brand, described from north-east Turkey (A8 Çoruh: Pertakrek [= Peterek: see Edmondson & Lack, 1977]) is uncertain. The type specimen has been lost, and the description (despite its detailed character) had not been sufficient for proper identification. *Cynoglossum montanum* subsp. *extraeuropaeum* var. *latifolium* Brand is according to Brand (l.c.) and its description a monstrosity. The remaining two varieties and one subvariety (*Cynoglossum montanum* subsp. *extraeuropaeum* var. *asiaticum* Brand subvar. *natolicum* Brand and *C. montanum* subsp. *extraeuropaeum* var. *maroccanum* Brand) also both deserve specific rank and are discussed in this contribution. It is not the aim of this contribution to resolve all the variability of *Cynoglossum* in Turkey, Transcaucasia and the Middle East. Only the status of relatively clear and already established taxa is appropriately resolved.

Herbarium codes follow Thiers (continuously updated). Grid squares used in the *Flora of Turkey* (Davis, 1965) are used for characterisation of species distributions in Turkey.

NOMENCLATURAL CHANGES

Cynoglossum natolicum (Bornm.) Sutorý, **comb. et stat. nov.** – *Cynoglossum nebrodense* var. *natolicum* Bornm., Mitt. Thüring. Bot. Ver. N.F. 20: 40

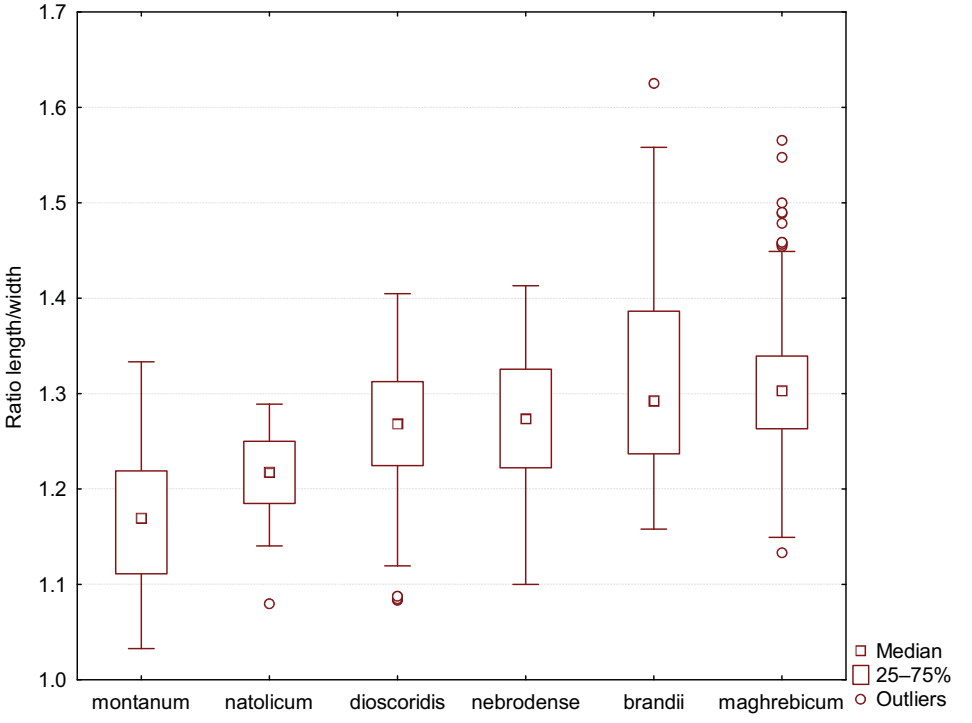

FIG. 3. (Colour online) Length:width ratio of nutlets of *Cynoglossum* species.

(1905). – *Cynoglossum montanum* var. *asiaticum subvar. natolicum* (Bornm.) Brand, Pflanzenr. IV, 252 (Heft 78): 127 (1921). – Type: Turkey, Amasia: in ruderatis, 360–400 m, *J.F.N. Bornmüller* Pl. Anatoliae orient. 751, (lectotype designated here, B; isolecto BM, K, LE, PH, W, WU). Syntypes, see below in section on distribution.

Cynoglossum montanum subsp. *extraeuropaeum* auct. (e.g. Meikle, 1985: 1125) non Brand.

[*Cynoglossum columnae β virescens* Bornm., in schedis.]

Iconography. Meikle, 1985: 1127, as *Cynoglossum montanum* subsp. *extraeuropaeum*.

Bornmüller initially considered this taxon a variety of *Cynoglossum columnae* Biv., and as such he issued it in 1889 in his exsiccatae series *Plantae Anatoliae orientalis* under no. 751. Differences in the nutlets (absence of a dorsal disc) led him to describe it later (Bornmüller, 1905) as a variety of *Cynoglossum nebrodense* instead. His diagnosis is very short and does not contain the most conspicuous characters: "*Mit purpurbraunroten Blüten, unberandeten Früchten und zungenformigen, stumpfen, an der Basis verbreitert stengelumfassenden Blättern*". Although the character of the nutlets certainly comes closer to *Cynoglossum nebrodense* than to *C. columnae*, they are assuredly not identical. The density of the glochids and small tubercles largely resembles *Cynoglossum creticum* Mill., as already enunciated by Meikle (1985).

Despite Bornmüller's consideration that this taxon was unlikely to be a separate species, the characters of the nutlets indicate the contrary. The nutlets lack a distinct dorsal disc and possess regularly distributed glochids on the dorsal surface interspersed with abundant, closely spaced, small tubercles; the nutlets are (5.1–)5.5–5.8(–6.5) mm long and (4.2–)4.5–4.8(–5.0) mm wide (Fig. 1C). Together with the colour of the flowers (dark purple brown; when dry conspicuously dark, often almost black) and obtuse leaves with soft indumentum, this taxon is clearly distinct from all others. The distribution area, with its centre in south-east Turkey, also supports this view. Brand (1921) included it in his very heterogeneous concept of *Cynoglossum montanum* at the rank of subvariety. Nevertheless, he distinguished it very well, as can be seen from the localities given, which correspond well with my estimations. Other authors have overlooked it (Güner *et al.*, 2012), misidentified it with the taxon proposed below as *Cynoglossum brandii* (Meikle, 1985 as *C. montanum* subsp. *extraeuropaeum,* misapplied: see below) or have not found any reasons to differentiate it as a separate taxon (Riedl, 1979).

Distribution. According to Bornmüller's original statement (Bornmüller, 1905), this taxon was reported from four localities: "*Ausser von Amasia (Bornm. exsicc. no. 751) liegt die Varietät von Tossia (prope Dikmen 10. V. 1892 leg. Sintenis; no. 5260* [syntypes JE, LD]) *und von Ineboli in Paphlagonien (prope Ibras 30. IV. 1892 leg. Sint. no. 3735* [JE = *C. montanum*]) *und von Güllek-Tepe in Cilicien (leg. Siehe, no. 415* [syntypes BM, K, HBG]) *vor*". We now know that the autochthonous distribution of this species is confined to Turkey (Davis's grid squares A5–A6, B2–B7 and C3–C6) and mountain ranges in the neighbouring parts of Syria (Jabal Saman) and Lebanon (Jabal Qammouaa and Jabal Barouk). It prefers calcareous and igneous substrates and grows at altitudes from as low as 400 m (in northern Turkey) to almost 2000 m in the southern parts of its distribution. It has a secondary occurrence in Cyprus, where it was collected for the first time in 1939 by Harald Lindberg (specimen deposited at K) on the Troodos Mountains. It is not expected to have been common there at that time. Lindberg collected it together with plants of his *Cynoglossum troodi* Lindb. without differentiating it. Many of his finds were collected in the proximity of the 'Olympus Hotel', which no longer exists, and a rich population of this species (according to my own observations in 2000) still survives there. It is not certain if the designation 'Troodos' on the labels of some other specimens can be applied to this locality as well. Meikle (1985) noticed its occurrence under the name *Cynoglossum montanum* subsp. *extraeuropaeum* Brand as "*Troodos, 5,500–5,700 ft. alt., chiefly on roughly terraced ground between the Nicosia road and the site of the former Olympus Camp Hotel*". Newly published localities clearly of adventive origin are "*Troodos Environment centre*" given by Hand (2003) and "*Troodos village, by the road to Prodromos, opposite base station of ski lift, 1800 m*" (Hand, 2015). He supposed that this species was more widespread on Cyprus and was only overlooked. This is not true, because it was originally confined to only one place and all other finds are derived from this source.

Cynoglossum brandii Sutorý, **sp. nov.**

Type: Turkey, Antalya province, on the road between Anamur and Ermenek, in the summit region of mountains, 36°17′15″N, 32°54′33″W, 1700 m, 23 vi 1977, *K. Sutorý* s.n. (BRNM 707463) (holo BRNM; iso B, BRNM, E, K, W).

Cynoglossum montanum subsp. *extraeuropaeum* var. *asiaticum* Brand, Pflanzenr. IV, 252 (Heft 78): 128 (1921). – Lectotype, designated here: [Turkey, Antalya], Elmalu [Elmalı], in collibus, 11 v 1860, E. Bourgeau (G; isolecto K, MPU, P, W); syntypes [Lebanon], "am Sanin. Ehrenberg (LE), Kneucker no. 124" (B); [Lebanon], "im Zederwalde oberhalb Bschere", *J. and F. Bornmüller*, Iter Syriacum II., no. 12186 (B, BM, BP, E, G, HBG, LE, LD, W, WU; [Turkey], "Pisidien" Heldreich no. 661 (BM, LD).

Cynoglossum nebrodense auct. non Guss. (1827).

Erect, biennial herb, 15–50(–60) cm tall. *Stems* often single, sometimes with additional stems from the base, densely and softly pubescent, hairs 1.5 mm long, appressed in upper part, without multicellular base. *Basal leaves* long-petiolate, oblong, subobtuse, densely pubescent, to 10 × 1.5 cm. *Upper leaves* sessile and smaller, acute, densely appressed pubescent. *Leaves of sterile rosette* long-petiolate, ellipsoid to oblong, to 20 × 5.5 cm; trichomes straight or slightly curved, soft, 1.5 mm long. *Inflorescences* with simple branches, with oblong or lanceolate bracts in lowermost parts of lower branches. *Pedicel* to 10(–15) mm long, slightly curved and elongated in fruit. *Calyx* lobes oblong, to 5 × c.2 mm, apex rounded, pilose, outside with 0.5 mm long trichomes, inside with sparse, stiff trichomes to 0.3 mm long. *Corolla* infundibuliform, maroon-purple, 4 mm long; tube c.1.7–2 mm and limb 1.5–2 mm long; lobes subcircular; faucal scales at mouth of tube, obscurely two-lobed, c.0.9 × 0.7 mm. *Anthers* oblong, c.0.7–0.8 mm long, inserted in middle of corolla tube, filaments 0.3 mm long. *Style* c.0.5 mm long. *Nutlets* (Fig. 1D) depressed ovoid, (4.4–)5.2–6.3(–7.1) × (3.5–)4.0–4.7(–5.5) mm; developed dorsal disc with regularly dispersed, 0.7–1.1 mm long, slim glochids and numerous small tubercles, attachment scar broadly lanceolate, c.1.8 × 1.3 mm, ending in thin awn.

Brand (1921) obviously mentions under his *Cynoglossum montanum* subsp. *extraeuropaeum* var. *asiaticum* all taxa occurring in the Middle East. He distinguished the above-mentioned *Cynoglossum natolicum* only at the subvariety level. Some of the localities given belong to plants of typical *Cynoglossum montanum* (all those reported from the Pontus region), some belong to *C. teheranicum* Riedl (those given from Iran ['Persia']) and some are identical with the species under discussion. Meikle (1985) lectotypified *Cynoglossum montanum* subsp. *extraeuropaeum* using Bourgeau's specimen from Turkey (Elmalı). The specimens selected belong to Brand's variety '*asiaticum*'. With lectotypification of subsp. *extraeuropaeum*, Meikle lectotypified var. *asiaticum* (which he cited as a synonym) as well, although he did not do so explicitly. The diagnosis of this taxon in Brand (1921) can be extracted from the key to the infraspecific taxa of *Cynoglossum montanum*: "*Corolla 4–5 mm longa; nuculae aeqaliter et dense glochidiatae; folia summopere 25 mm lata, folia basalia usque ad 20 cm cum petiolo longa; folia basalia apice obtusa, folia caulina acuta*". Meikle's type selection

was obviously coincidental, which proves that he erroneously identified this variety with plants growing on Cyprus belonging to another taxon, *Cynoglossum natolicum* (see above). This fact and the unsatisfactory nature of Brand's 'descriptions' in the key to infraspecific taxa of *Cynoglossum montanum* lead me to describe this taxon at species rank under the new name '*brandii*' to honour August Brand's work in the family Boraginaceae, rather than using a combination based on Brand's name.

The characters distinguishing *Cynoglossum brandii* from *C. montanum* are its smaller flowers, its narrower leaves (see original description above), its calyx lobes with stout trichomes on the inner side (clearly visible only on young flowers) and the shape of the nutlets (Fig. 1D). Differences from *Cynoglossum natolicum* are in the rounded nutlets with characteristic dense glochids, larger flowers with different colour and obtuse leaves with soft indumentum (see above).

Distribution. Cynoglossum brandii is confined to the mountains of southern Turkey (Davis's grid squares A4, B1–B6, B8, C1–C4 and C6, preferably calcareous except in B6), Syria and Lebanon, at elevations from about 900 m to over 2000 m.

The nutlets of both above-mentioned species are similar to those of *Cynoglossum nebrodense* in shape and dimensions, although in *C. natolicum* they tend to have a more rounded shape (lower length:width ratio), the nutlets being (5.1–)5.5–5.8(–6.5) mm long and (4.2–)4.5–4.8(–5.0) mm wide. *Cynoglossum brandii* tends to have longer fruits (see the description above). *Cynoglossum nebrodense* has a fairly distinctly developed dorsal disc sparsely covered with glochids and small tubercles (Fig. 1E). *Cynoglossum natolicum* (Fig. 1C) and *C. brandii* (Fig. 1D) are more densely covered. The latter seems to have glochids insignificantly longer and slender (cf. Fig. 1D, E).

Cynoglossum maghrebicum Sutorý, **sp. nov.**

Type: Morocco, Moyen Atlas, Jebel Hebri (2104 m), c.15 km SE of Azrou, east of the road Azrou – Timahdite, 33°21′31″N, 005°02′31″W, 2100 m, 18 vi 2009, *K. Sutorý* s.n. (BRNM 770956) (holo BRNM; iso B, BRNM, E, K, W).

Cynoglossum montanum L. subsp. *extraeuropaeum* Brand var. *maroccanum* Brand in Engler, Pflanzenr. IV, 252 (Heft 78): 126 (1921). – *Cynoglossum dioscoridis* var. *maroccanum* (Brand) Maire, Bull. Soc. Hist. Nat. Afr. Nord, 22: 56 (1931). – Lectotype, designated here: [Morocco] Dj. Ouensa, Montagne au S.O[uest] de la ville de Maroc [Marrakech], 1874, *Ibrahim* (K 00020941; isolecto LY, P; Syntypes, see below in section on distribution.

Cynoglossum dioscoridis var. *nebrodense* (Guss.) Ball, J. Linn. Soc. Bot. 16: 569 (1878) non Guss. (1827).

[*Cynoglossum maroccanum* Sennen, Campagnes Botaniques du Maroc Oriental de 1930 à 1935 des Freres Sennen et Mauricio, EE.CC: 110, (1936), nom. nudum ("*forte C. off. varietas"*).]

Cynoglossum officinalis auct. non L. (1753).

Cynoglossum nebrodense sensu Battandier, Fl. Algérie 2: 614 (1890) non Guss. (1827).

Erect, biennial herb, 25–60(–75) cm tall. *Stems* often single, sometimes with up to three additional ones originating from the base; densely and softly pubescent, hairs

1 mm long, in upper part appressed, acroscopic, without multicellular base. *Leaves* oblong with acute apex, dark green. *Basal leaves* broad petiolate, densely appressed pubescent. *Upper leaves* sessile and smaller, densely appressed pubescent. *Leaves of sterile rosette* ellipsoid to oblong, to 25 × 3.5 cm; trichomes straight, soft, 0.7 mm long. *Inflorescences* with mostly simple branches, lower sometimes forked, bracts in lowermost parts of branches. *Pedicel* to 10 mm long, slightly curved and elongated in fruit. *Calyx* lobes oblong, to 5 × c.2 mm, apex rounded, pilose outside. *Corolla* (Fig. 1H) infundibuliform, blue, 4.7–8 mm long; tube c.2 mm and limb 3–6 mm long; lobes subcircular, c.2.5 mm wide; veins on fresh flowers distinct, relatively conspicuous; faucal scales at mouth of tube obscurely two-lobed, c.0.7 × 0.5 mm. *Anthers* oblong, c.0.7–0.8 mm long, inserted in middle of corolla tube, filaments 0.3 mm long; pollen grains 11.3 × 7.8 µm. *Style* c.0.5 mm long. *Nutlets* (Fig. 1F) depressed ovoid, grey, (5.1–)6.4–7.1(–9.0) × (4.2–)4.9–5.5(–7.0) mm; dorsal disc well developed (but without distinct border), with sparsely but regularly dispersed 0.7–0.9 mm long slim glochids and numerous small tubercles, attachment scar lanceolate c.2.3–2.8 × 1.3 mm, ending in thin awn.

In older sources, this taxon was identified with *Cynoglossum nebrodense* Guss. (Battandier, 1890; later Jahandiez, 1923) or distinguished at the level of variety as *C. dioscoridis* var. *nebrodense* (Ball, 1878). In more recent works, it is given as a synonym of *Cynoglossum dioscoridis* Vill. (Sauvage & Vindt, 1952; Quézel & Santa, 1963; Greuter *et al.*, 1984; Valdés *et al.*, 2002; Ouyahya, 2007; Dobignard & Chatelain, 2011; Hilger *et al.*, 2015). It differs from both the above-mentioned taxa in the shape of its nutlets (cf. Fig. 1E, F, G) and in their dimensions (see Fig. 2). The leaves of *Cynoglossum dioscoridis* are lanceolate; its corolla is not so distinctly veined, and is light blue; the anthers are inserted in the upper third of the corolla tube; the nutlets have shorter (c.0.5 mm long) and thick, regularly dispersed glochidia; and the disc is created by an indistinct elevated border.

Brand's original description is found only in the identification key, in which "*Corolla 4–5 mm longa*" and "*Nuculae parce glochidiatae, saepe fere glabratae*" simply stand against "*Nuculae aequaliter et dense glochidiatae*" (under which he put all other varieties of his subspecies *extraeuropaeum*, namely vars *asiaticum*, *alpinum*, *parvifolium* and *latifolium*).

At species rank, the name '*maroccanum*' was used by Sennen & Mauricio (1934) and by Sennen (1936), in both cases as a nomen nudum. To avoid confusion with this name in future and taking into account Brand's unsatisfactory description, I have decided to describe this taxon at species rank under the new name '*maghrebicum*' (*maghreb* [Arabic], 'West', region of North Africa bordering the Mediterranean Sea), rather than using a combination based on Brand's name.

Distribution. The distribution of this taxon is limited to the mountains of Morocco (Rif, Moyen Atlas and Grand Atlas) and Algeria, at elevations of 900 m to 2500 m on various substrates (silicates, eruptive rocks, calcareous soils).

Brand (1921: 129) gives only a few precise specifications of its distribution. With the exception of Ibrahim's localities, they are all taken from older sources. "*Nordwestafrika: Auf Atlas und seinen Vorbergen. Marokko: zwischen Mogador* [Essaouira] *und Marokko* [Marrakech] *(Ball). Gebirge im Südwesten der Stadt Marokko* [Marrakech] *(Ibrahim* [BP, FI, G, K, LD, LE, LY, MPU, P]*). Djebel Labgurt (Ibrahim* [MPU, LY, P]*). Im Tale Ait Mesan (Ball). Zweifellos gehören zu dieser Form auch die Angaben für Algier: Djurdura, Behni Sahla, Monzaia usw.*"

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