



## *Micromeria silicii*, a new species from Croatia and its relationships with taxa of the *M. microphylla* group (Lamiaceae)

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### Abstract

*Micromeria silicii*, a new species from St. Andrea (Svetac) and Biševo Islands of Dalmatia (Croatia) is described and illustrated. Previously, it was attributed to *M. microphylla*, but careful morphological investigation allowed to differentiate it from the latter. In order to emphasize the relationships with the other taxa currently attributed to *M. microphylla* group were examined also *M. acropolitana*, *M. cyprica*, *M. carpatha*, *M. hispida*, *M. sphaciotica* and *M. rodriguezii*, which are distributed in various territories of the Mediterranean area. All these species were studied from the taxonomical, nomenclatural and chorological point of view, as well as a new iconography was provided for some of them. Besides, an analytical key for all investigated species is given too.

**Key words:** Adriatic, endemic species, Mediterranean, *Micromeria*, taxonomy

### Introduction

The genus *Micromeria* Benth (1829: 1282) belongs to the family Lamiaceae and it is distributed in the Mediterranean-Macaronesian region, eastern Africa, Arabian Peninsula, India and southern China (Bräuchler *et al.* 2008). According to Bräuchler *et al.* (2008) and recent literature data (Puppo & Meimberg 2015, Duman & Dirmenci 2017, Tan *et al.* 2020) the genus *Micromeria* s.str. includes ca. 100 accepted taxa (species and subspecies) and several doubtful taxa require a thorough review. Morphologically *Micromeria* differs from the allied genera in having a thickened leaf margin due to a continuous sclerenchymatous vein, bracteoles always present, calyx lobes straight or spreading, and corolla with upper lip emarginated, curved upwards (Bräuchler *et al.* 2008). From the phylogenetic point of view, using cladistic analysis based on molecular data (Bräuchler *et al.* 2010), this genus in a strict sense, is monophyletic and morphologically well defined.

Within the genus *Micromeria*, the populations belonging to the group of *M. microphylla* (d'Urville 1822: 327) Benth (1834: 377) occurring in the Mediterranean area are examined here. On the basis of the literature data (Šilić 1979, Meikle 1985, Mus & Rosselló 1987, Morales-Valverde 1991, Bräuchler *et al.* 2008, Morales 2010, Tan *et al.* 2010, Hand *et al.* 2011, Pignatti 2018), they show a relevant morphological variability which led to conflicting positions on their taxonomic treatment. In order to clarify their morphological correlations, we have carried out in-depth investigations for having useful information to resolve the complexity of this group.

*Micromeria microphylla* was described by d'Urville as *Thymus microphyllus* d'Urville (1822: 327) from material collected in the Maltese Archipelago and later it was recorded from other Mediterranean territories, such as Sicily, southern Italy, Croatia, Balearic Islands and Cyprus (Gussone 1828, 1844, Šilić 1979, Meikle 1985, Greuter *et al.* 1986, Morales-Valverde 1991, Morales 2010, Pignatti 2018). Species closely related to *M. microphylla* were successively described from Crete as *M. sphaciotica* Boissier & Heldreich ex Benth (1848: 220) and *M. hispida* Boissier

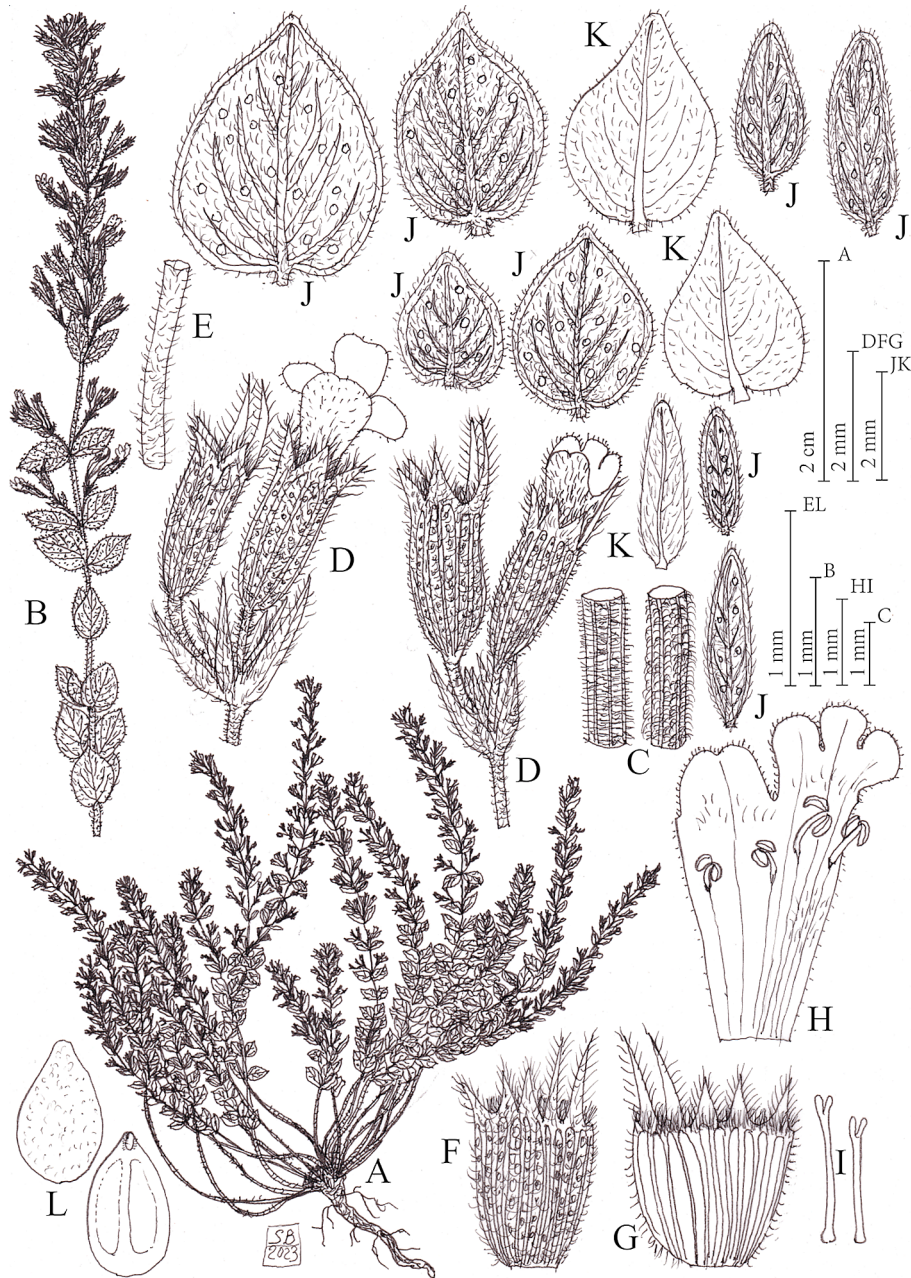
& Heldreich ex Bentham (1848: 215), from Cyprus as *M. cypria* Kotschy in Unger & Kotschy (1865: 270), from Karpathos as *M. carpatha* Rechinger f. (1949: 208), from Greece as *M. acropolitana* Halácsy ex Maire & Petitmengin (1908: 179), and from the Balearic Islands as *M. rodriguezii* Freyn & Janka (1874: 16). Besides, *M. microphylla* was recorded also from the island of St. Andrea in Croatia by Šilić (1979: 253), providing a detailed illustration of calyces and leaves. Previously Visiani (1847) attributed the plant coming from this island to *M. graeca* (Linnaeus 1753: 586) Bentham ex Reichenbach (1831: 311) but describing it as var. *pauciflora* Visiani (1847: 196). The name *Thymus microphyllus* was lectotypified by Bräuchler in Bräuchler *et al.* (2008a: 393) using a specimen kept in the herbarium of Paris (P), collected by d'Urville in Malta and labelled as “*Thymus melitensis*”, an unpublished name not cited in the protologue. This specimen, as emphasized by Bräuchler *et al.* (2008a) and Ferrer-Gallego *et al.* (2020), represents the original material that d'Urville relied for the description of *T. microphyllus*. Probably this last name was introduced by the author before sending his manuscript to print in substitution of the name *T. melitensis*, that he thought of giving to this species, since he realized that it had a wider distribution than initially believed. As stressed by Ferrer-Gallego *et al.* (2020), this lectotypification is ineffective according to Art. 9.12 (Thurland *et al.* 2018), therefore the syntypes quoted by d'Urville (1822) in the protologue could be used for the new typification. They are two specimens labelled as “*Calamintha minima, annua, thymi-folia*” in Tournefort's and Vaillant's herbaria conserved in P. Base on that, Ferrer-Gallego *et al.* (2020) formally designated as lectotype the specimen from the Vaillant's herbarium (2-D code PL03248895, barcode P04049884). Unfortunately, this new lectotypification is in clear contrast with the traditional concept and current usage of the name *M. microphylla*, since the designated specimen comes from the collection carried out by Tournefort in Crete, who donated partially it to his pupil S. Vaillant (Rees 1819). The specimen at issue must be attributed to *M. sphaciotica*, a species closely related to *M. microphylla* but morphologically very distinct (Greuter *et al.* 1986, Tan *et al.* 2010, Dimopoulos *et al.* 2013). In order to resolve this intricate question, Del Guacchio *et al.* (2022) proposed to conserve the name *Thymus microphyllus* with its nomenclatural type. This proposal allows to treat *M. microphylla* as a species circumscribed to some central Mediterranean territories (Malta, Sicily with neighbouring islets and southern Italy), in agreement with the most recent literature data (Tan *et al.* 2010, Siljak-Yakovlev *et al.* 2011, Dimopoulos *et al.* 2013, Strid 2016, Pignatti 2018, Senar *et al.* 2020) has to be considered morphologically well distinct from the other Mediterranean vicariant taxa occurring in the Balears, (*M. rodriguezii*), Greece (*M. acropolitana*), Crete (*M. sphaciotica* and *M. hispida*), Karpathos (*M. carpatha*) and Cyprus (*M. cypria*). As concern, the population from Croatia its correct identification remains somewhat doubtful. Therefore, it was interesting to carry out morphological investigations on living and herbarium materials on these populations, which are currently circumscribed to two Dalmatian islands, St. Andrea (Svetac) and Biševo, both belonging to the Vis Archipelago. During field surveys, individuals of this *Micromeria* were found along the rocky coast on calcareous outcrops, where they grew exclusively in the crevices. According to the literature (Ginzberger 1921, Pavletić 1978, 1979, Šilić 1979, Nikolić 2019, 2020, Kremer *et al.* 2021, 2022), these plants were referred to *M. microphylla*, basing mainly on the habit, as well as on the leaf and flower traits. A detailed morphological investigation emphasized relevant differential features that allow to distinguish very well the Dalmatian populations from the typical *M. microphylla* occurring in Malta and Sicily, as well as from the other taxa belonging to this species complex. Therefore, they can be treated as a new species for the science, named *M. silicii*.

## Material and methods

The morphological study regarding *Micromeria silicii* was carried out on living plants preserved in alcohol and glycerine solution, as well as on 20 herbarium specimens kept in CAT and ZAGR herbarium, coming from the Dalmatian islands of St. Andrea (Svetac) and Biševo in Croatia. Besides, we examined for comparison several herbarium specimens kept in B, BC, BP, CAT, PAD, SARA, ZA, ZAGR, and also from some virtual herbaria (AMD, BR, FI, G, GH, GOET, H, JE, K, L, LJU, LY, M, MA, MPU, O, P, PAL, PI, PRC, RO, S, STU, TCD, U, US, VAL, VTA, W, WAG, WU and Z) regarding the following species: *M. acropolitana*, *M. carpatha*, *M. cypria*, *M. hispida*, *M. microphylla*, *M. rodriguezii* and *M. sphaciotica*. The material was observed under a Zeiss Stemi SV 11 Apo stereomicroscope at 6–66x magnification.

## Taxonomic treatment

*Micromeria silicii* Bogdanović, Ljubičić, L. Sáez & Brullo *sp. nov.* (Fig. 1)



**FIGURE 1.** *Micromeria silicii*. A. Habit. B. Branch with inflorescences. C. Stem indumentum. D. Cymes. E. Cyme peduncle. F. Open calyx dorsal view. G. Open calyx ventral view. H. Open corolla ventral view. I. Styles and stigmas. J. Leaves abaxial face. K. Leaves adaxial face. L. Mericarps. Illustration by S. Brullo based on living material coming from Biševo Island (type locality) in Croatia.

*A Micromeria microphylla* foliis crassiusculis, indumento brevior, pedicello 1–1.6 mm longo, pilis 0.1–0.2 longis, calyce 3–3.7 mm longo, tubo pilis incurvis 0.05–0.2 mm longis, dentibus superioribus 0.6–0.8 mm longis, corolla 3.5–4 mm longa, fauce sparsim pilosa, labio superiore 0.6–0.8 mm longo, 0.8–1 mm lato, labio inferiore 0.8–1.3 mm longo, 1–1.2 mm lato, non exertis staminibus, filamentis staminorum superiorum 0.4–0.5 mm longis, stylo 1.1–1.5 mm longo, nucula 0.8–1 x 0.4–0.5 mm, differt.

**Type:**—CROATIA. Dalmacija, otok Biševo, Rt Gatula, rub strmaca, u stijeni, 1 June 2020, 42°57'18,30"N, 15°59'51,84"E, S. Bogdanović *s.n.* (holotype ZAGR58964!, isotypes CAT!, ZAGR!).

= *M. graeca* Benth var. *pauciflora* Visiani (1847: 196). **Type:**—CROATIA. Ad rupes maritimas scopuli S. Andrea prope Lesina, *Stalio* 1358 (PAD-HD04822!), lectotype designated here (upper specimen).

**Description:**—Dwarf, suffruticose, 8–20 cm tall, with compact and robust caudices, provided with several simple slender stems, procumbent to ascending, sometimes erect, densely pubescent with patent or retrorse short hairs, 0.1–0.3 mm long. Stem internodes 2–4 mm long, basal ones rarely up to 13 mm long, with opposite leaves, provided with hairs 0.1–0.3 mm long. Lower leaves fleshy, subsessile, ovate to ovate-cordate, 2.5–6 × 2–4.5 mm, acute at the apex, with thickened margin, sometimes slightly revolute, 3–4 nerved, sparsely hairy and shiny on adaxial side, densely hairy and glandular on abaxial side, hairs appressed to patent, 0.1–0.5 mm long, with prominent veins, median and upper leaves lanceolate to linear-lanceolate, 2.5–4.4 × 0.9–1.5 mm. Inflorescence terminal, quite compact, 2.5–5 cm long, verticillasters of 2 pedunculate fascicles, each 1–3-flowered; peduncles up to 1–2 mm long, bracts lanceolate, 1–2 mm long. Flower pedicel 1–1.6 mm long, with hairs 0.1–0.2 mm long. Calyx 3–3.7 mm long, with tube covered by curved hairs 0.05–0.2 mm long, teeth covered with right hairs, 0.2–0.4 mm long, lower teeth long lanceolate, 1.1–1.5 mm long, upper teeth triangular, 0.6–0.8 mm long. Corolla pale pink, 3.5–4 mm long, tube exerted from the calyx, with a throat sparsely hairy, upper lip 0.6–0.8 mm long, 0.8–1 mm wide, retuse at the apex, lower lip 0.8–1.3 mm long, 1–1.2 mm wide, trilobed. Stamens included in corolla, or slightly exerted, upper filaments 0.4–0.5 mm long. Style 1.1–1.5 mm long, with bifid stigma, 0.2–0.3 mm long. Mericarps ovoid, blackish, 0.8–1 × 0.4–0.5 mm, beaked at the apex, convex dorsally, ventrally with two hollows.

**Iconography:**—Tab. 58 in Šilić (1979).

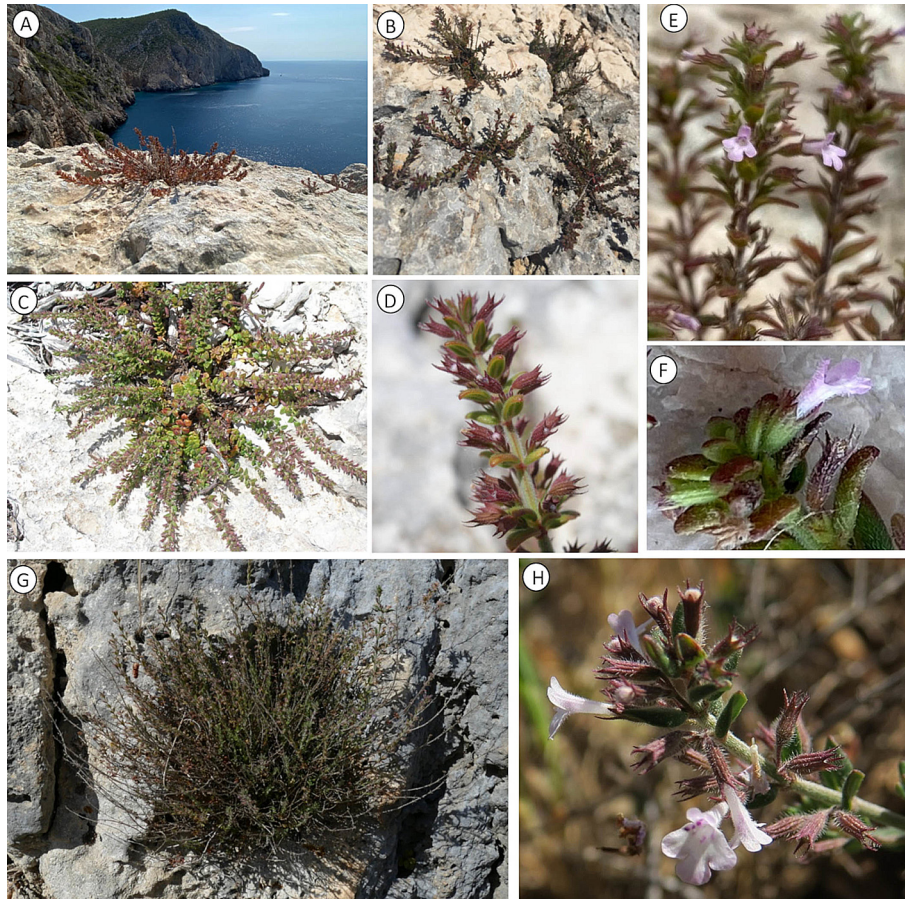
**Distribution and ecology:**—Based of herbarium and field investigations, *M. silicii* is currently known from the island St. Andrea (Svetac) and Biševo, belonging to the Vis Archipelago in Croatia (Fig. 2). It is a very rare species occurring in few stands of these two islands, where it is localized on calcareous outcrops near the shoreline (Fig. 3 A–F). In these places it grows together with other endemic chasmophytes, such as *Centaurea ragusina* Linnaeus (1753: 912), *Cynanchica staliana* (Visiani 1850: 11) P.Caputo & Del Guacchio in Del Guacchio & P.Caputo (2020: 775), *Cynanchica visianii* (Korica 1979: 72) P.Caputo & Del Guacchio in Del Guacchio & P.Caputo (2020: 776), *Limonium busianum* Bogdanović & Brullo (2015: 11), *L. zankii* Bogdanović & Brullo (2015: 28) and *Micromeria kernerii* Murbeck (1892: 53). Besides, other species are also frequent among them *Convolvulus cneorum* Linnaeus (1753: 157), *Silene sedoides* Poirlet (1789: 164), *Helichrysum italicum* (Roth 1790: 19) G. Don (1830: 342), *Daucus gingidium* Linnaeus (1753: 242), *Erica multiflora* Linnaeus (1753: 355), *Rosmarinus officinalis* Linnaeus (1753: 23) and others.



**FIGURE 2.** Distribution map of species belonging to *Micromeria microphylla* group based on herbarium materials: *M. silicii* (red dots), *M. microphylla* (black dots), *M. rodriguezii* (green dots), *M. acropolitana* (blue dot), *M. sphaciotica* (yellow dot), *M. hispida* (orange dots), *M. carpatha* (pink dot) and *M. cypria* (purple dots).

**Etymology:**—This species is dedicated to the botanist Čedomil Šilić (1937–2010), who studied the genus *Micromeria* for the Balkan flora.

**Phenology:**—It flowers from May to early July, and fruits from late June to July.



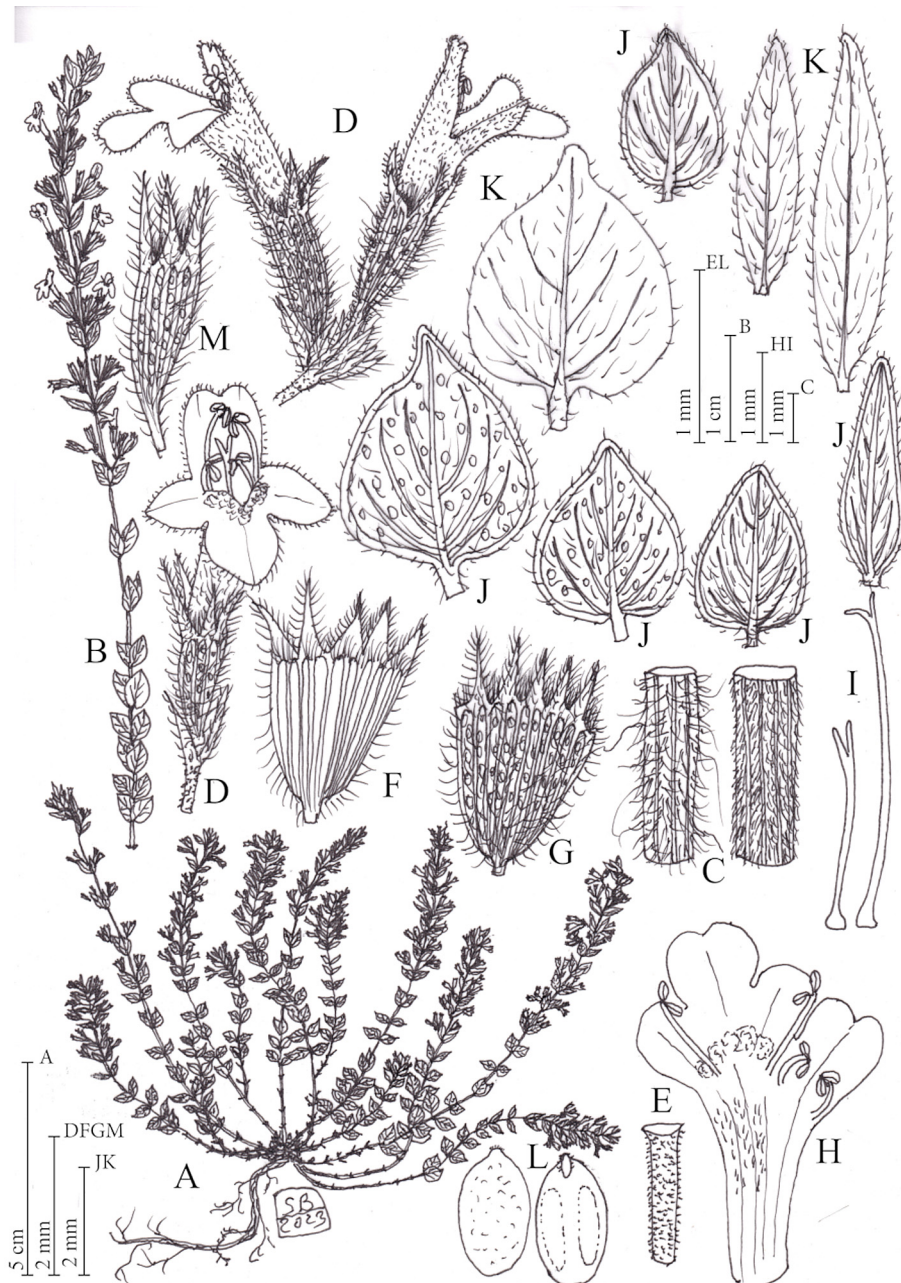
**FIGURE 3.** Phenological features of *Micromeria silicii*. **A.** Biševo Island, Cape Gatula (*locus classicus*), natural habitat. **B–C.** Habit in natural places. **D.** Detail of the inflorescence. **E–F.** Detail of the inflorescence with corolla. **G.** Habit of *M. microphylla* from Sicily. **H.** Detail of the inflorescence with corolla from Sicily. (Photos A–F by S. Bogdanović, G–H by S. Cambria).

**Remarks:**—Even when an epithet is available as an infraspecific synonym, that is in our case *Micromeria graeca* var. *pauciflora*, it has no priority out of its rank, according to Art. 11.2 of the ICN (Turland *et al.* 2018). Further, in the protologue of *M. graeca* var. *pauciflora* (Visiani 1847: 196) there is a note referring to *M. pauciflora* as an annotated name in herbarium specimen by Visiani, that is not formally published and therefore we prefer to use a new name (*Micromeria silicii*) for this Adriatic endemic species. As concerns its relationships with the other species of *M. microphylla* group (Table 1), *M. silicii* is more similar to *M. microphylla* s. str., since both share a habit procumbent to ascending, dimorphic leaves, the basal ones ovate to cordate, the upper ones lanceolate to linear-lanceolate, verticillaster always few flowered (1–3), but several diacritic features allow to differentiate them very well. In particular, *M. silicii* shows stems always simple, covered by shorter hairs (0.1–0.3 mm long), patent to retrorse, calyx longer (3–3.7 mm long), with hairs shorter (0.05–0.4 mm long), markedly bilabiate, with upper teeth many shorter than lower ones, corolla shorter (3.5–4 mm long), with tube included in the calyx, stamens included in the corolla tube, mericarps bigger (0.8–1 × 0.4–0.5 mm). On contrary, *M. microphylla* is characterized by stems simple to branched, covered by longer hairs (0.3–0.8 mm long), patent to reflexed, calyx shorter (2.5–3.2 mm long), slightly bilabiate, with upper teeth a little shorter than lower ones, corolla longer (4.5–6 mm long), with tube long exerted from the calyx, stamens exerted from corolla tube, mericarps smaller (0.6–0.8 × 0.3–0.4 mm). Individuals collected on St. Andrea Island and attributed to *M. microphylla* were used for molecular study by Kremer *et al.* (2022) that show a genome very similar to that one of *M. kernerii*. From the observation of the photo of this material (Fig. 6 Mm) published previously by those authors (Kremer *et al.* 2021), its identification is clearly incorrect, since it corresponds to *M. kernerii* for the erect stems, all linear leaves and dense verticillasters similar to the plant shown on Fig. 6 Mk. From this, it can be deduced that a specimens of *M. kernerii* were collected by the authors instead of *M. microphylla*, both species occurring on the island of St. Andrea (Pavletić 1978), justifying its phylogenetic position in the neighbour-joining tree shown in Kremer *et al.* (2022: Fig. 1). As concerns the morphological affinities of *M. silicii* with the other species of this group it must be emphasized that *M. acropolitana* differs from the latter in having stem erect and branched with reflexed hairs,

leaves cordate-lanceolate to oblong-lanceolate, 0.4–1.5 mm wide, verticillaster up to 5(–7)-flowered, calyx smaller (2.4–2.5 mm long), with subequal teeth (0.6–0.8 mm long), covered by hairs 0.5 mm long, corolla smaller. *Micromeria carpatha* is well differentiated from *M. silicii* by longer size, with stem subglabrous and very branched, leaves scabrid, the basal one cordate lanceolate, up to 2.4(–3) mm wide, corolla shorter, stamens exserted from the tube, mericarps smaller (up to 0.6 mm long). *Micromeira sphaciotica* differs in stems often branched, with hairs up to 0.8 mm long, leaves uniformly ovate to lanceolate, not more than 2.5 mm wide, verticillaster up to 5-flowered, calyx usually 2.5–3 mm long, lower teeth shorter (0.9–1 mm long), corolla longer (5–6 mm long), with tube long exserted from the calyx. *Micromeria hispida* in comparison with *M. silicii* differs in stem simple or branched covered by longer hairs (0.4–0.7 mm long), leaves ovate to lanceolate, narrower (max. 2.4 mm wide), calyx longer (4.5–5 mm long), covered by longer hairs (0.4–0.8 mm long), with upper teeth longer (1.2–1.5 mm long) and also lower teeth (1.6–2.2 mm long), corolla longer (5–6.5 mm long), with tube exserted from the calyx and stamens slightly exserted from the corolla tube. As concerns *M. cypria* it is characterized by higher stem, ascending to erect, usually branched, leaves up to 9 mm long, verticillaster often more flowered (up to 7 flowers), longer corolla (5–5.5 mm long), long exserted from the calyx, stamens exserted from the corolla tube, mericarps smaller (0.7 × 0.4 mm). Finally, *M. rodriguezii* is well differentiated in having stems always covered by retrorse hairs, leaves more or less uniform, verticillaster 2–5 flowered, calyx up to 4(–4.5) mm long, with teeth subequal, 0.8–1.7 mm long, corolla longer (5–6.5 mm long), and slightly exserted from the calyx.



**FIGURE 4.** *Micromeria cypria*. **A.** Habit. **B.** Branch with inflorescences. **C.** Cyme. **D.** Flowers. **E.** Open calyx ventral view. **F.** Open calyx dorsal view. **G.** Open corolla ventral view. **H.** Cyme peduncle. **I.** Leaves abaxial face. **J.** Leaves adaxial face. **K.** Stem indumentum. Illustration by S. Brullo based on material coming from Cyprus (type locality).



**FIGURE 5.** *Micromeria microphylla*. **A.** Habit. **B.** Branch with inflorescences. **C.** Stem indumentum. **D.** Cymes. **E.** Cyme peduncle. **F.** Open calyx ventral view. **G.** Open calyx dorsal view. **H.** Open corolla ventral view. **I.** Styles and stigmas. **J.** Leaves abaxial face. **K.** Leaves adaxial face. **L.** Mericarps. Illustration by S. Brullo based on living material coming from Malta (type locality).

**Additional examined specimens (paratypes):—CROATIA.** Dalmacija, otok Svetac, uz kuće kamenjar uz put, 43°1'21,13"N, 15°45'29,81"E, 26 July 2018, *S. Bogdanović s.n.* (ZAGR 48168!, ZAGR 48169!); Dalmacija, otok Biševo, Trešjavac vršni plato, na rubu litica, 42°57'37,15"N, 16°0'13,37"E, 26 May 2016, *S. Bogdanović & I. Ljubičić s.n.* (ZAGR 42838!, ZAGR 42821!); o. Svetac kod Visa, 10–20 m elevation, (iznad abrazone zone valova), (kod crkvice Sv. Andrija), solo calc. & dol., 25 June 1978, *Č. Šilić s.n.* (LJU 10094309!, SARA!, WU 0150208!); Insel San Andrea westl. von Lissa: Oberhalb Porto Slatina, 6–9 June 1911, *A. Ginzberger & A. Teyber s.n.* (WU 0150206!).

#### Remarks on *Micromeria microphylla* complex

Apart from the description of the new species from Croatia, we provide the taxonomical, nomenclatural and chorological consideration on the species that according to the literature belong to *M. microphylla* complex. In the Table 1 the main comparative morphological features regarding these species are listed. The investigated taxa are:

**TABLE 1.** Main morphological features of the species belonging to the *Micromeria microphylla* group.

Character	<i>M. microphylla</i>	<i>M. silicii</i>	<i>M. acropolitana</i>	<i>M. carpatha</i>	<i>M. cypria</i>	<i>M. hispida</i>	<i>M. sphaciotica</i>	<i>M. rodriguezii</i>
Stem tall (cm)	5–15	8–20	up to 30	15–25	10–30	5–15	(5–)10–20	5–25(–36)
Stem habit	procumbent to ascending	procumbent to ascending	erect	erect	ascending to erect	procumbent to ascending	procumbent to ascending	procumbent to suberect (sometimes erect)
Stem branches	simple or branched	simple	branched	very branched	simple or branched	simple or branched	simple or branched	simple or branched
Stem indumentum	patent to reflexed	patent or curved	reflexed	subglabrous	patent	patent	patent	retorse
Stem hairs length (mm)	0.3–0.8	0.1–0.3	0.1–0.4	–	0.05–0.5	0.4–0.7	0.1–0.5(–0.8)	0.1–0.3(–0.4)
Leaf shape basal ones	ovate to cordate	ovate to ovate-cordate	cordate-lanceolate	cordate-lanceolate	ovate to lanceolate	ovate to lanceolate	ovate to lanceolate	ovate to ovate-lanceolate
Leaf shape upper ones	lanceolate to linear-lanceolate	lanceolate to linear-lanceolate	oblong-lanceolate	oblong-lanceolate	ovate to elliptical	ovate to lanceolate	ovate to lanceolate	ovate to ovate-lanceolate
Leaf size (mm)	3–6 × 0.9–4	2.5–6 × 0.9–4.5	1.8–5 × 0.4–1.5	3.3–6 × 0.7–2.4(–3)	3–9 × 1.5–5	2.4–5.6 × 1.2–2.4	3.5–8 × 0.9–2.5	(1.2–)2–4(–6.5) × (1–)1.5–3.5(–4.5)
Leaf hair insertion	appressed	appressed to patent	appressed to patent	scabrid	appressed	patent	patent	appressed
Leaf hair length (mm)	0.1–0.4	0.1–0.5	0.2–0.5	0.1	0.2–0.8	0.3–0.7	0.1–0.7	0.05–0.4
Verticillaster number flower	1–3	1–3	2–5(7)	1–3	1–7	1–3	1–5	2–5
Calyx length (mm)	2.5–3.2	3–3.7	2.4–2.5	3–3.5	3–4	4.5–5	2.5–3(–3.5)–	2.5–4(–4.5)
Calyx upper teeth length (mm)	0.8–1.1	0.6–0.8	0.6–0.8	0.8–0.9	0.5–0.7	1.2–1.5	0.6–0.7	0.8–1.7
Calyx lower teeth length (mm)	1–1.5	1.1–1.5	0.6–0.8	1.2–1.5	0.9–1.2	1.6–2.2	0.9–1	0.8–1.7
Calyx hair length (mm)	0.3–0.8	0.05–0.4	0.5–1	0.1–0.2	0.1–0.3	0.4–0.8	0.2–0.5	0.2–0.5(–0.6)
Corolla length (mm)	4.5–6	3.5–4	3	3	5–5.5	5–6.5	5–6	5–6.5
Corolla tube calyx exertion	long exerted	included	included	included	long exerted	exserted	long exerted	slightly exerted
Stamen tube position	exserted	included	exserted	exserted	exserted	slightly exerted	slightly exerted	included
Nutlet size (mm)	0.6–0.8 × 0.3–0.4	0.8–1 × 0.4–0.5	–	0.6	0.7 × 0.4	–	–	0.8–1.2 × 0.3–0.6



### 1) *Micromeria acropolitana* Halácsy ex Maire & Petitmengin (1908: 421)

≡ *Satureja acropolitana* (Halácsy) Greuter & Burdet in Greuter & Raus (1984: 302).

**Type** (lectotype designated by Bräuchler in Bräuchler *et al.* 2008a):—GREECE. In Acropoli Athenarum, 30 August 1906, *R. Maire & M. Petitmengin 1073* (lectotype WU0040407!).

**Description:**—Stems up to 30 cm tall, branched, erect, densely hairy, reflexed, 0.1–0.4 mm long; leaves subsessile, acute, 1.8–5 × 0.4–1.5 mm, basal ones often cordate-lanceolate, upper ones oblong-lanceolate, densely hairy on both sides, with hairs 0.2–0.5 mm long; verticillasters of 2 pedunculate fascicles, each 2–5(–7)-flowered; calyx 2.4–2.5 mm long, with teeth 0.6–0.8 mm long, linear-triangular, densely pubescent, patent, tube hairs 0.5–1 mm long, teeth hairs shorter (0.1–0.3 mm long); corolla 3 mm long, with tube included in the calyx; stamens exerted from the tube.

**Habitat and ecology:**—Rocky places, on calcareous substrata and also in crevices of archeological site.

**Iconography:**—Fig. 5a in Tan *et al.* (2010).

**Chromosome number:**—2n = 30, Siljak-Yakovlev *et al.* (2011).

**Distribution:**—Greece, Attica, Acropolis of Athens (Fig. 2).

**Notes:**—This species was described by Maire & Petitmengin (1908) almost simultaneously with Halácsy (1908) and it is successively accepted by Chater & Guinea (1972), Greuter *et al.* (1986), Doroszenko (1986), Tan *et al.* (2010), Siljak-Yakovlev *et al.* (2011) and Dimopoulos *et al.* (2013), while Bräuchler *et al.* (2008a) treated it doubtfully as a synonym of *M. microphylla*.

**Specimina visa:**—GREECE. Attica, Athen, Akropolis und Philopappos, Fels und steinige Abhänge, ca. 150 m, 14 May 1967, *W. Lippert & B. Zollitsch s.n.* (M0158796!).

### 2) *Micromeria carpatha* Rechinger f. (1949: 208)

**Type** (lectotype designated by Bräuchler in Bräuchler *et al.* 2008a):—GREECE. Karpathos, 5 June 1886, *Forsyth Major 165a* (lectotype G00087102!, isolectotype Z000039167!).

= *Micromeria microphylla* Rechinger f. (1943: 526) non Bentham (1834: 377), pro. parte.

**Description:**—Stems 15–25 cm tall, very branched, erect, subglabrous; leaves subsessile, acute, 3.3–6 × 0.7–2.4(–3) mm, basal ones often cordate-lanceolate, upper ones oblong-lanceolate, scabrid, with very short hairs (0.1 mm long) on both sides; verticillasters of 2 pedunculate fascicles, each 1–3-flowered; calyx 3–3.5 mm long, with upper teeth 0.8–0.9 mm long, linear-triangular, lower teeth 1.2–1.5 mm long, pubescent, hairs patent, 0.1–0.2 mm long; corolla 3 mm long, slightly exerted, with tube included in the calyx; stamens exerted from the tube; mericarps 0.6 mm long.

**Habitat and ecology:**—Calcareous rupestrian stands, as cliffs, rocks, walls, ravines and boulders.

**Iconography:**—Fig. 5d in Tan *et al.* (2010).

**Chromosome number:**—unknown.

**Distribution:**—Greece, Karpathos island (Fig. 2).

**Notes:**—This species was described by Rechinger (1949) and it is accepted by Tan *et al.* (2010), Dimopoulos *et al.* (2013) and Strid (2016). Chater & Guinea (1972), Greuter *et al.* (1983, 1986) treated it as a synonym of *M. sphaciotica*, while Doroszenko (1986) and Bräuchler *et al.* (2008a) as a synonym of *M. microphylla*.

### 3) *Micromeria cypria* Kotschy in Unger & Kotschy (1865: 270), Fig. 4

≡ *Satureja graeca* subsp. *cypria* (Kotschy) Holmboe (1914: 159).

≡ *Satureja cypria* (Kotschy) Prain (1921:233).

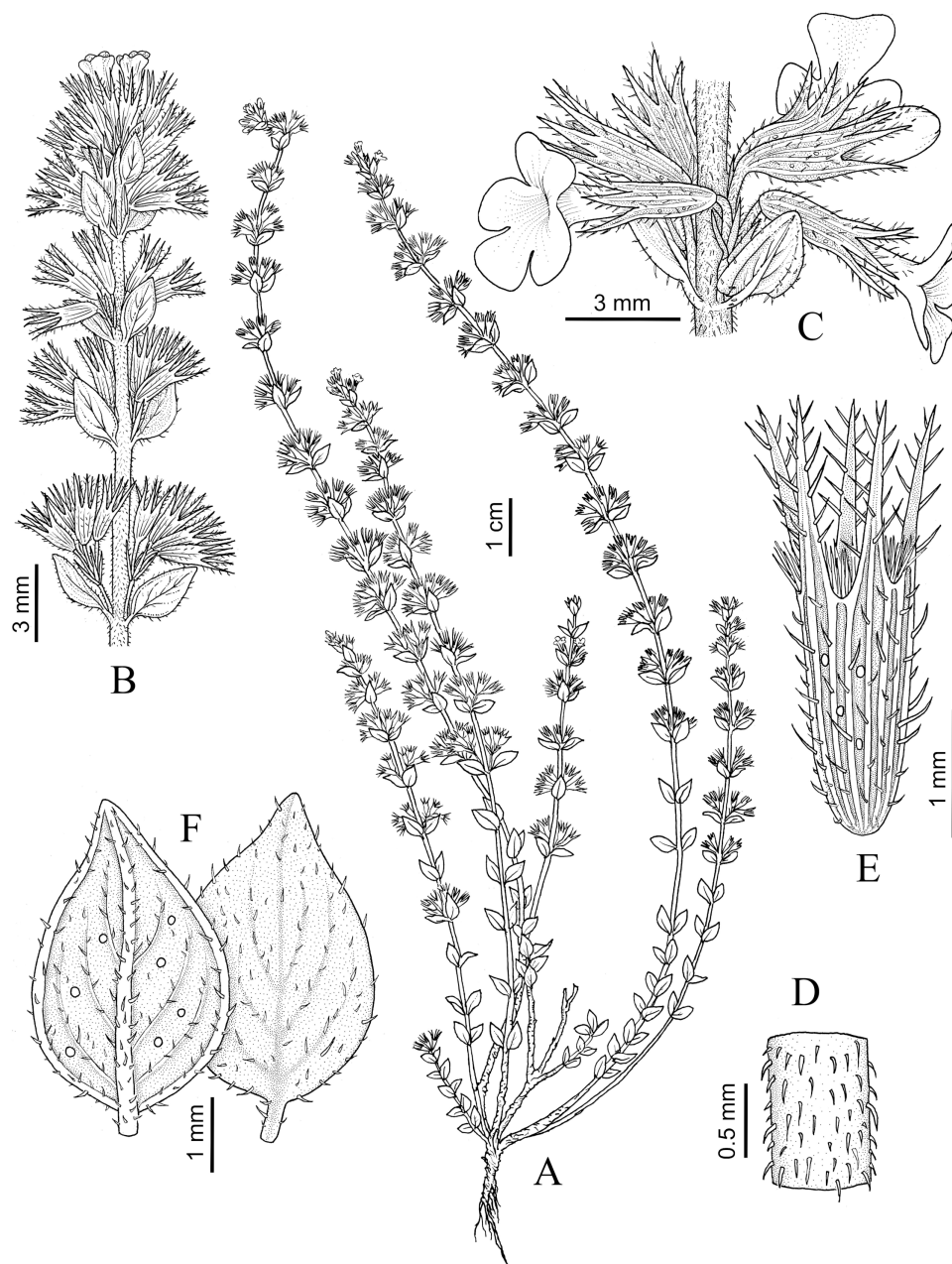
≡ *Micromeria graeca* subsp. *cypria* (Kotschy) Chapman (1949: 430).

≡ *Micromeria graeca* subsp. *cypria* (Kotschy) Rechinger f. (1950: 430).

**Type** (lectotype designated by Bräuchler in Bräuchler *et al.* 2008a):—CYPRUS. In scopulorum fissures montis Pentadactylos et Buffavento, 1500' elevation, April 1862, *Kotschy 338* (lectotype W0014293!, isolectotypes JE00007501! but excluded specimens marked by X, K000193721!, P00714527!, P00714528!, S08-10884!, BP-TRA 00573276!).

= *Micromeria cypria* var. *villosissima* Lindberg (1946: 29) **Type:** lectotype designated by Väre (2012):—CYPRUS. distr. Kyrenia, Ayios Hilarion, in fiss. rup. sicc., 7 June 1939, *H. Lindberg s.n.* (lectotype H-1413162!).

= *Satureja graeca* Linnaeus subsp. *graeca* var. *pauciflora* (Visiani) Briquet (1895: 420) pro. parte (type not located).



**FIGURE 6.** *Micromeria rodriguezii*. **A.** Habit. **B.** Branch with inflorescences. **C.** Cymes. **D.** Stem indumentum. **E.** Calyx. **F.** Leaves abaxial and abaxial face. Illustration by L. Sáez based on material coming from Balearic Islands, Mallorca, Palma, Génova (BC 49863).

**Description:**—Stems 10–30 cm tall, ascending to erect, simply branched, hairy, hairs patent, 0.05–0.5 mm long; leaves sessile, ovate to lanceolate, acute, 3–9 × 1.5–5 mm, hairy, with appressed hairs, 0.2–0.8 mm long on both sides; verticillasters of 2 pedunculate fascicles, each 1–7-flowered; calyx 3–4 mm long, tube with hairs 0.1–0.2 mm long, upper teeth 0.5–0.7 mm long, triangular, lower teeth 0.9–1.2 mm long, triangular-subulate, hairy, hairs patent, 0.2–0.3 mm long; corolla 5–5.5 mm long, with tube long exerted from the calyx; stamens exerted from the tube; mericarps 0.7 × 0.4 mm.

**Habitat and ecology:**—Calcareous rupestrian stands, as cliffs, rocks, walls, ravines and boulders.

**Chromosome number:**—unknown.

**Distribution:**—Cyprus Island, Kyrenia Mt range (Fig. 2). According to Hand (2011) specimens identified as *M. microphylla* were collected in the western part of the island near Androlikou gorge.

**Notes:**—It was described by Kotschy in Unger & Kotschy (1865) and later accepted by Lindberg (1946) and Greuter *et al.* (1986), while Holmboe (1914) consider it as a subspecies of *M. graeca*. Besides, Meikle (1985) believes that *M. cypria* may fall within the variability of *M. microphylla*, since the differential characters between the two

species do not result very clear. This opinion is also shared by Hand *et al.* (2011) too. Based on our investigations, using herbarium materials coming from the type locality, the Cyprian populations are morphologically quite distinct from the typical ones of *M. microphylla*, as well as from other species belonging to this group. Therefore, we agree with Greuter *et al.* (1986) to keep them distinct at a specific level as proposed by Kotschy in Unger & Kotschy (1865).

**Specimina visa:**—CYPRUS. Insula Cyprus, in rupium fissuris Mt Xerobuno, prope St. Claysostomo, May 1889, Pichler *s.n.* (LY0495763, P03833405!); Kornos (Kyrenia range), In and among rocks in limestone ravines above Larnaca—Lapithou, 306–457 m, 3 April 1941, P. H. Davis 2995 (H1490680!); distr. Kyrenia, Pentadactylos, in fiss. rup. siccis. juxta Armeniae Monastery, 5 July 1939, H. Lindberg *s.n.* (H1413163!); distr. Kyrenia, Boghazi, in saxosis siccis. in valle rivuli supra opp. Kyrenia, 5 June 1939, H. Lindberg *s.n.* (H1413161!); distr. Kyrenia, Agios Hilarion, in fiss. rup. sicc., 7 June 1939, H. Lindberg *s.n.* (H1413164!); distr. Kyrenia, Buffavento, Castle, 23 April 1973, P. Laukkonen 283 (H1088576!); Kytrea, 2 February 1966, O. Houvila 65 (H1088742!); In M. Pentadactylos, May 1880, P. E. E. Sintenis & G. Rigo 121 (K000193722!, PRC462224!, P03833404!, P02971198!, P02971199!, P02971200!); Pentadactylo range, Buffavento, rupi calcaree, 6 July 2013, G. Giusso del Galdo & S. Brullo *s.n.* (CAT!).

#### 4) *Micromeria hispida* Boissier & Heldreich ex Bentham (1848: 215)

≡ *Satureja candica* Greuter & Burdet (1985: 302).

≡ *Satureja hispida* (Bentham) Nyman (1855: 102).

≡ *Clinopodium hispidum* (Bentham) Kuntze (1891: 515).

**Type** (lectotype designated by Bräuchler in Bräuchler *et al.* 2008a):—CYPRUS. Creta in rupestribus Eparchia Mirabello, April 1846, T. de Heldreich (lectotype G-BOIS00769782!, isolectotypes GH00001324!, GOET004294!, WAG0004454!, K001070122!, STU-PH-2012-002616!).

**Description:**—Stems 5–15 cm tall, procumbent or ascending, simple or sparingly branched, sparsely villous, hairs patent, 0.4–0.7 mm long; leaves subsessile, ovate to lanceolate, acute, 2.4–5.6 × 1.2–2.4 mm, densely villous, with patent hairs, 0.3–0.7 mm long on both sides; verticillasters of 2 pedunculate fascicles, each 1–3-flowered; calyx 4.5–5 mm long, with upper teeth 1.2–1.5 mm long, linear-triangular, lower teeth 1.6–2.2 mm long, pubescent, hairs patent, 0.4–0.8 mm long; corolla 5–6.5 mm long, with tube long exerted from the calyx; stamens slightly exerted from the tube.

**Habitat and ecology:**—Calcareous rupestrian stands, as cliffs, rocks, walls, ravines and boulders, as well as in xeric Mediterranean phrygana and grasslands.

**Iconography:**—Fig. 5e in Tan *et al.* (2010).

**Chromosome number:**—unknown.

**Distribution:**—Crete Island, central-eastern part (Fig. 2).

**Notes:**—It was described by Bentham (1848) and transferred by Greuter & Burdet (1985) to the genus *Satureja* with a new name *S. candica*. This species is usually accepted in the current literature (Chater & Guinea 1972, Doroszenko 1986, Turland *et al.* 1993, Jahn & Schönfelder 1995, Bräuchler *et al.* 2008a, Tan *et al.* 2010, Dimopoulos *et al.* 2013, Strid 2016).

**Specimina visa:**—CRETE. Selinaris. Nomos Lasithiou, dans le gorge traversée par la route Agios Nikolaos, sur une pente rocheuse, a proximite du monastere d'Agios Georgios, April 1997, G. v. Buggenhout 18344 (BR0000026283869V!, BR0000027466636V!, B100086801!, P03281976!, H1725504!); Insel Kreta, Eparchia Ierapetras, Afendis Kavousi, Gipfel, 1 July 1994, R. Jahn *s.n.* (B100086802!); Selinaris, Kreta, russen Heraklion (Malia en Vrahassion) Agios Nikolaos, 3 May 1982, G. v. Buggenhout *s.n.* (BR000002669245V!, P03281975!); Agios Georgios Selinaris (Kriti), April 1976, G. v. Buggenhout *s.n.* (BR0000022434845!); Agios Georgios Selinaris, gelegen op de weg Iraklion-Agios Nikolaos (Kreta, nomos Lassithiou), tussen rotsblokken bij het kloos, 18 April 1976, G. v. Buggenhout *s.n.* (BR0000026189918V!); Distr. Kaenurio, Montes Psiloriti (Ida), in saxosis calc. supra Vorisia, ca. 1300 m, 5 July 1942, K. H. Rechinger 14338 (US02809551!); In saxosis infra Korfes et Kroussona, distr. Malevisi, 4 June 1899, A. Baldacci 90 (P03599402!, P03599403!, P03599404!); Creta: eparch. Mirabello, int. Malea et Neochori, 21 April 1846, T. de Heldreich *s.n.* (LY0017464!); in rupestribus provinciae Mirabello Cretae rariss, April 1846, T. de Heldreich *s.n.* (K000193592!); In rupestribus prov. Mirabello, Creta, 21 April 1846, T. de Heldreich *s.n.* (TCD0018162!); in rupestribus submontosis de Maglia à Kainourio Korio (Eparchia de Mirabello), 21 April 1846, T. de Heldreich 1422 (G-BOIS00769782!); In rupestribus pr. Kainurio-Chorio (Eparchia Mirabello) Cretae, 21 April 1846, T. de Heldreich 1422 (WU0074660!).

**5) *Micromeria microphylla* (d'Urville) Bentham (1834: 377), nom. cons. prop. Fig. 5**

≡ *Thymus microphyllus* d'Urville (1822: 327), nom. cons. prop. (Del Guacchio *et al.* 2022).

≡ *Satureja microphylla* Gussone (1828: 120).

≡ *Satureja microphylla* Gussone (1844: 91) nom. illeg.

≡ *Clinopodium microphyllum* (d'Urville) Kuntze (1891: 515).

**Type** (lectotype designated by Bräuchler in Bräuchler *et al.* 2008a):—MALTA. *Thymus melitensis*, Malte, d'Urville (lectotype P04231225!), typ. cons. prop. (Del Guacchio *et al.* 2022).

= *Thymus melitensis* d'Urville ex Gussone (1844: 91), pro syn. nom. illeg.

= *Micromeria melitensis* Tineo in Chodat (1924: 245) pro syn. nom. illeg.

= *Micromeria microphylla* var. *glabriuscula* Bentham (1834: 377) (type not located).

= *Micromeria microphylla* var. *gussonei* Lojacono in Chodat (1924: 15) pro syn. nom. illeg.

= *Micromeria microphylla* var. *villosa* Bentham (1834: 377) (type not located).

= *Thymus micranthus* Gussone (1826: 245) non Brotero (1804: 176) (type not located).

= *Piperella filiformis* C. Presl (1826: XXXVII) non *Thymus filiformis* Aiton (1789: 313) (type not located).

**Description:**—Stems 5–15 cm tall, procumbent or ascending, simply branched, hairy, hairs patent or reflexed, 0.05–0.4 mm long; leaves subsessile, basal ones ovate to cordate, acute, 3–5 × 2.5–4 mm, hairy, with appressed hairs, 0.3–0.8 mm long on both sides, upper ones lanceolate to linear-lanceolate, acute, 3–6 × 0.9–1.6 mm, hairy, with hairs 0.1–0.4 mm long; verticillasters of 2 pedunculate fascicles, each 1–3-flowered; calyx 2.5–3.2 mm long, with upper teeth 0.8–1.1 mm long, linear-triangular, lower teeth 1–1.5 mm long, triangular, hairy, hairs patent, 0.3–0.8 mm long; corolla 4.5–6 mm long, with tube long exerted from the calyx, with throat glabrous; stamens exerted from the tube, filaments of upper stamens 0.8–1.5 mm long; style 2.3–4.5 mm long; mericarps 0.6–0.8 × 0.3–0.4 mm.

**Habitat and ecology:**—It occurs on rocky walls and rocky outcrops of calcareous and volcanic substrata.

**Iconography:**—Fig. 3147 in Fiori (1933), Fig. 5b in Tan *et al.* (2010).

**Chromosome number:**—unknown.

**Distribution:**—Malta Archipelago (Malta, Gozo and Comino), Sicily and neighbouring islands (Favignana, Marettimo, Lampedusa, Linosa and Lipari), Italy (Apulia) in Lazio is adventitious (Lucchese 1988, Pignatti 2018, Fig. 2).

**Notes:**—This species, described by d'Urville (1822) from Malta, was erroneously lectotypified by Bräuchler in Bräuchler *et al.* (2008a) and successively correctly retypified by Ferrer-Gallego *et al.* (2020). In order to maintain the name proposed by d'Urville (1822) applied to the Maltese plant, Del Guacchio *et al.* (2022) propose *Thymus microphyllus* as nomen conservandum and the lectotype proposed by Bräuchler in Bräuchler *et al.* (2008a) as type conservandum. Currently, this species is considered endemic to Malta, Sicily and Italy by Greuter *et al.* (1986), Casha (2015) and Pignatti (2018).

**Specimina visa:**—MALTA. Comino, 15 April, 1987, *S. Brullo, P. Pavone & G. Ronsisvalle s.n.* (CAT060.885!); Malta, Naxxar, 16 April, 1987, *S. Brullo, P. Pavone & G. Ronsisvalle s.n.* (CAT060.875!); Malta, Wadi Babu, 24 September 1985, *S. Brullo s.n.* (CAT060.884!); Malta, Saint Julien, 11 April 1987, *S. Brullo, P. Pavone & G. Ronsisvalle s.n.* (CAT060.886!); Malta, Misraim, Ghonoa, 28 June 1973, *S. Brullo & G. Ronsisvalle s.n.* (CAT060.877!); Malta, Mistra Bay, 26 June 1973, *S. Brullo & G. Ronsisvalle s.n.* (CAT060.876!); Malta, Salina Bay, 26 November 1985, *S. Brullo s.n.* (CAT060.883!); Malta, Ghemieri, 12 April 1984, *S. Brullo & G. Ronsisvalle s.n.* (CAT060.881!); Malta, Santi Valley (Birgemma), 12 April 1984, *S. Brullo & G. Ronsisvalle s.n.* (CAT060.879!); Malta, Dingli, 12 April 1984, *S. Brullo & G. Ronsisvalle s.n.* (CAT060.880!); Malta, Melleha, soil overlying calcareous rock, 22 October 1974, *L.Y.Th. Westra & J.v. Rooden 166* (U1402465!); Insula Gozo, Ta'Lunzjata, small valley between Kercem and Victoria, 60 m, 15 April 1969, *K. U. Kramer & L. Y. Th. Westra 4405* (U1402467!); Insula Malta steep S. escarpment of Melleha Ridge, S. of Melleha, 125 m, 30 Aprile 1968, *K. U. Kramer & L. Y. Th. Westra 4263* (U1402466!); Malta, la Valetta, rochers, 14 April 1938, *R. Maire & M. Weiller 1193* (MPU369177!); Flora Melitensis, November 1882, *Ruhmer 95* (PAL37846!); Insula Malta, in collibus saxosis, rara, 4 April 1896, *M. F. Spencer s.n.* (B!). SICILY. Monserrato (Modica), 15 March 1971, *S. Brullo s.n.* (CAT060.868!); Monti Climiti, 9 June 1988, *G. Fichera & F. Scelsi s.n.* (CAT060.867!); Fiume Tellaro, 7 March 1969, *S. Brullo s.n.* (CAT060.869!); Modicano rupi, 26 April 1971, *S. Brullo s.n.* (CAT060.870!); Modica, 23 April 1983, *S. Brullo s.n.* (CAT060.871!); Cava d'Ispica, April 1987, *F. Scelsi s.n.* (CAT060.873!); Cava d'Ispica, 10 May 1987, *S. Brullo, P. Minissale & F. Scelsi s.n.* (CAT060.872!); Cava d'Ispica, 28 May 1988, *S. Brullo s.n.* (CAT060.874!); Fontane Bianche (SR), 5 March 1989, *G. Fichera s.n.* (CAT060.863!); M. Climiti, Siracusa, 17 April 1979, *S. Brullo & F. Fagotto s.n.* (CAT060.862!); Cassibile-Cava Grande, June 1975,

*S. Brullo* s.n. (CAT060.861!); Lipari, M. S. Angelo, 26 Aprile 1982, *S. Brullo* s.n. (CAT060.860!); Lampedusa, Capo Grecale, 21 March 1986, *S. Brullo*, *P. Minissale*, *P. Pavone* & *G. Spampinato* s.n. (CAT060.859!); Lampedusa, 17 March 1985, *S. Brullo*, *P. Minissale* & *G. Spampinato* s.n. (CAT060.858!); Lampedusa, 23 April 1977, *S. Brullo* s.n. (CAT060.857!); Linosa, April 1977, *S. Brullo* s.n. (CAT060.856!); Insel Lampedusa, Albero sole, 18 April 1959, *J. Kohlmeyer* 648 (B!); Monte Amara, 13 Aprile 1980, *M. Grillo* s.n. (CAT060.855!); Campolato, 4 Aprile 1980, *M. Grillo* s.n. (CAT060.864!); Siracusa, locis aridis rupestribus collim, April 1898, *G. Rigo* 124 (B!, BP-TRA-00573278!); Siracusa, tussen stenen van Grieks amphitheater, 7 April 1959, *J. Th. Koster* 6700 (L2791360!); Siracusa, 21 July 1897, *A. Palyi* s.n. (BP-TRA 00573285!); Favignana, in locis saxosis aridis, April 1890, *H. Ross* 63 (B!, O-V2248247!, L2791363!, BP-TRA-00573279!, BP-TRA-00573280!); In aridis insulae Favignana, 3 May 1855, *E. & A. Huet du Pavillon* (O-V2248248!, L2791361!, WAG1711191!, VTA058866!); Terranova, in collibus sterilibus, April, *A. Todaro* 853 (U1402468!, VTA058867!, LY0491623!, PAL17198!); Insula Favignana, April 1888, *H. Ross* s.n. (AMD81847!); Comiso, *V. Tineo* s.n. (LY0740067!); In Sicilia meridionalis, May, *M. Lojacono* s.n. (PAL17326!); Castelvetro, 1890, *G. Reina* s.n. (PAL17199!). **ITALY.** Gallipoli, in collibus aridis calcareis, May 1917, *M. Guadagno* s.n. (PI039567!); Ostia Antica, sui muri aridi delle rovine e nei pavimenti marmorei, 20 June 1988, *F. Lucchese* s.n. (FI, RO).

## 6) *Micromeria rodriguezii* Freyn & Janka (1874: 16), Fig. 6

- ≡ *Micromeria nervosa* Bentham subsp. *rodriguezii* (Freyn & Janka) Nyman (1881: 590).
- ≡ *Satureja rodriguezii* (Freyn & Janka) Pau (1900: 68).
- ≡ *Micromeria biflora* var. *rodriguezii* (Freyn & Janka) Knoche (1922: 346).
- ≡ *Satureja cordata* subsp. *rodriguezii* (Freyn & Janka) O. Bolòs & Vigo (1983: 94).
- ≡ *Micromeria filiformis* subsp. *rodriguezii* (Freyn & Janka) Bonafè (1980: 56).
- ≡ *Satureja microphylla* subsp. *rodriguezii* (Freyn & Janka) O. Bolòs & Vigo (1996: 301).
- ≡ *Satureja rodriguezii* (Freyn & Janka) Rivas-Mart., Costa & Loidi (1992: 217).
- ≡ *Micromeria microphylla* subsp. *rodriguezii* (Freyn & Janka) Romo (1994: 261).

**Type** (lectotype designated by Bräuchler in Bräuchler *et al.* 2008a):—SPAIN. Minorca, in valle barranco del Favaret prope Mahon, 29 March 1873, *C.F. Hegelmaier* s.n. (lectotype STU-PH-2011-072456!).

- = *Micromeria rodriguezii* f. *major* Sennen (1917: 192) **Type**: (lectotype designated by Rosselló & Sáez 2000):—SPAIN. Balearic Islands, Mallorca. Baléares: Route de Valdemora, à 6 km de Palma, 13 July 1914, *Bianor* (lectotype BC-Sennen 836596!).
- = *Micromeria knoechei* Sennen & Bianor in Sennen (1917: 193) **Type**: (lectotype designated by Rosselló & Sáez 2000):—SPAIN. Balearic Islands, Mallorca. Collines près de Palma, May 1913, *F. Bianor* Pl. Espagne-F. Sennen n.º 2039 (lectotype BC-Sennen 836597!).
- = *Satureja microphylla* var. *condensata* L. Chodat (1924: 245) **Type**: (lectotype designated by Rosselló & Sáez 2000):—SPAIN. Balearic Islands, Mallorca, Torre den Pau, March–April 1921 (lectotype G!).
- = *Satureja microphylla* subsp. *majoricensis* L. Chodat (1924: 247) (type not located).
- = *Micromeria rodriguezii* var. *acuminifolia* Sennen (1933: 62) **Type**: (lectotype designated by Rosselló & Sáez (2000):—SPAIN. Balearic Islands, Mallorca Fossé—Route de palma à Valldemossa. Soller (Mallorca Baléares), 26 December 1911, *Bianor* (lectotype BC-Sennen 836599!).
- ≡ *Satureja rodriguezii* var. *acuminifolia* (Sennen) Sennen (1933: 62).
- ≡ *Micromeria rodriguezii* var. *major* (Sennen) Sennen (1933: 62).
- ≡ *Satureja knoechei* (Sennen & Bianor) Sennen (1933: 63).

**Description**:—Stems 5–25(–36) cm long, procumbent to suberect (sometimes erect), simple or branched, densely hairy to tomentose, with retrorse hairs, 0.1–0.3(–0.4) mm long; leaves subsessile, ovate to ovate-lanceolate, sparsely hairy, with appressed hairs, 0.05–0.4 mm long on both surfaces, acute to subacute at the apex, (1.2–)2–4(–6.5) × (1–)1.5–3.5(–4.5) mm; verticillasters of 2 pedunculate fascicles, each 2–5-flowered; calyx 2.5–4(–4.5) mm long, tube with antrorse hairs, 0.05–0.35(–0.5) mm long, with subequal teeth, linear-lanceolate to subulate, 0.8–1.7 mm long, hairs antrorse, 0.2–0.5(–0.6) mm long; corolla 5–6.5 mm long, with tube slightly exerted from the calyx; stamens included in tube; mericarps 0.8–1.2 × 0.3–0.6 mm.

**Habitat and ecology**:—Open scrub, rocky places, stone-walls and roadsides on calcareous, sandy and marl substrata.

**Iconography**:—Tab. 129A in Willkomm (1889: 68); Fig. 22 in Morales Valverde (1991).

**Chromosome number**:—2n = 50 (Morales 1994).

**Distribution:**—Endemic to the Balearic Islands: Mallorca, Menorca, Eivissa and for Formentera (Gil & Llorens 2001); recently reported by Senar *et al.* (2020) from a single location in Eastern Spain, Castellón province (Fig. 2).

**Notes:**—This species was described by Freyn & Janka (1874), but often treated as synonym of *M. filiformis* Bentham (1834: 378) by Chater & Guinea (1972), or as subspecies of the latter (Bonafè 1980; Bräuchler *et al.* 2008), while other authors (Mus Amezquita & Rosselló 1987, Morales Valverde 1991, Morales 2010) consider it as synonym of *M. microphylla*. It is recognized as a distinct species by Willkomm (1889), Chodat (1924) and Senar *et al.* (2020), or as subspecies of *M. nervosa* (Nyman 1881), of *M. cordata* (Bolòs & Vigo 1983) and of *M. microphylla* (Bolòs & Vigo 1996).

**Specimina visa:**—**SPAIN.** Baleares: Ins. Minorca: barranco del Favaret prope Mahon, 29 March 1873, *I. et C.F. Hegelmaier s.n.* (JE00007503!); Ins. Minorca in declivibus apricis vallis Son Blanc, 3 April 1873, *F. Hegelmaier s.n.* (STU-PH-2011-069575!); Ins. Minorca, barranco de Algender ad rupes calcareas, 1 April 1873, *F. Hegelmaier s.n.* (STU-PH-2011-075532!); Ins. Majorca, ad castellum Bellver prope Palma, 12 April 1873, *F. Hegelmaier s.n.* (STU-PH-2011-073100!); Ins. Majorca, ad muriracata urbis Palma, 11 April 1873, *F. Hegelmaier s.n.* (STU-PH-2011-073760!); Mallorca, Fossé—Route de Palma à Valldemossa. Soller, 26 Dec 1911, *Bianor* (BC-Sennen 836599!); Mallorca, Cala Mandrago, 18 April 2001, *R. Böcker SP-M 333* (B!); Mallorca, Collines près de Palma, May 1913, *F. Bianor*, Pl. Espagne-F. Sennen n.º 2039 (BC-Sennen 836597!); Mallorca, Chemins et collines autour de Palma, 11 July 1914, *Bianor*, Pl. Espagne-F. Sennen n.º 2037 (BC 49867!); Mallorca, Route de Valldemora [Valldemossa], à 6 km de Palma, 13 July 1914, *F. Bianor*, Pl. Espagne-F. Sennen n.º 2036 (BC 49864!, MA104550!); Mallorca, Artà, 24 May 1915, *L. Garcias Font* (BC 600942!); Palma de Mallorca a Génova, 20 March 1918, *P. Font-Quer* (BC 49939!); 12 July 1932, Cala Major, Palma, 12 May 1932, sine leg. (BC 49863!); Palma, à Génova, 12 Apr 1933, *F. Sennen*, Pl. Espagne-F. Sennen n.º 8622 (BC 82427!); Artà, 15 Apr 1936, *Kennedy* (BC 103461); Mallorca, S'Aigo de Palma, 4 Sept 1947, *P. Palau Ferrer* (BC 601110!); Mallorca, Torrent Gros, Pont d'Inca, 2 May 1949, *P. Palau-Ferrer 166* (BC 112645!), Mallorca, entre Felanitx i Porto Colom, 2 May 1971, *F. Masclans* (BC 607564!); Mallorca, castell de Santueri, Felanitx, 370 m, rocky places, 24 Apr 2000, *L. Sáez LS-5346* (*L. Sáez*, pers. herb.); Menorca, Caminos cerca de Mahón, Apr 1870, *J. Rodriguez-Femenias* (BC 654515!); Alayor, 16 March 1874, *J. Rodriguez-Femenias* (BC 654512!); Menorca, Binisarmenya, 13 June 1876 *J. Rodriguez Femenias* (BC 49871!); Menorca, Fonduco, Mahón, grietas peñascos, 19 Jan 1913, *P. Font-Quer* (BC 49861!); Cala San Esteban, 19 May 1913, *P. Font-Quer* (BC 49870!); Santa Ponsa de Alayor, 30 May 1913, *P. Font Quer* (BC 49872!); Cala Figuera, Mahón, 8 July 1913, *P. Font-Quer* (BC 49868!); Menorca, San Clemente, 24 Dec 1913, *P. Font-Quer 917* (BC 49860!); Menorca, Mahón, camino de Trepucó, 6 March 1914, *P. Font-Quer* (BC 49866). Eivissa, Cala Jondal, 16 May 1918, *Gros* (BC 49937!). **SPAIN.** Castellon: Santa Magdalena de Polpis, cami del Saltet, pr. Mas de Xarpa, 120 m, depressió de desugàs de l'aigua de l'AP-7, pastures d'annuals, sobre gleres calcaires, 26 August 2018, *R. Senar s.n.* (VAL241026!); ibidem, cami de la autopista (margen derecha en sentido Tarragona), 124 m, 6 May 2019, *B. Plana, P.P. Ferrer-Gallego & E. Laguna s.n.* (VAL2422218!).

## 7) *Micromeria sphaciotica* Boissier & Heldreich ex Bentham (1848: 220)

≡ *Satureja sphaciotica* (Bentham) Greuter & Burdet (1985: 306).

**Type** (lectotype here designated):—GREECE. Creta in rupibus faucis Aratana, Sphakia, July 1846, *T. de Heldreich s.n.* (lectotype G-DC00478886!, isolectotypes G00418066!, G-BOIS00418066!, G-BOIS00330680!, GOET004296!). The holotype designated by Bräuchler in Bräuchler *et al.* (2008a) has to be rejected, because he cited the sentence reported in the protologue and not that of the herbarium label.

**Description:**—Stems (5–)10–20 cm tall, procumbent or ascending, simple or sparingly branched, villous, hairs patent, 0.1–0.5(–0.8) mm long; leaves subsessile, ovate to lanceolate, acute, 3.5–8 × 0.9–2.5 mm, hairy, with patent hairs, 0.1–0.7 mm long on both sides; verticillasters of 2 pedunculate fascicles, each with 1–5-flowered; calyx 2.5–3(–3.5) mm long, with upper teeth 0.6–0.7 mm long, linear-triangular, lower teeth 0.9–1 mm long, pubescent, hairs patent, 0.2–0.5 mm long; corolla 5–6 mm long, with tube long exserted from the calyx; stamens slightly exserted from the tube.

**Habitat and ecology:**—Cliffs and rocky walls on calcareous substrata.

**Iconography:**—Fig. 5c in Tan *et al.* (2010).

**Chromosome number:**—unknown.

**Distribution:**—Crete, gorges of Aradena near Sfakia (Fig. 2).

**Notes:**—This species described by Bentham (1848) is treated as a doubtful taxon by Chater & Guinea (1972), or as synonym of *M. microphylla* by Doroszenko (1986) and Bräuchler *et al.* (2008a). It is accepted as valid species by

Greuter & Burdet (1985), Turland *et al.* (1993), Jahn & Schönfelder (1995), Tan *et al.* (2010), Dimopoulos *et al.* (2013) and Strid (2016).

**Specimina visa:**—CRETE. Ile de Crete, Region des plateaux (400m–600m), roches d'Aradena Sphakia, 1845, *V. Raulin 280* (P03599405!), sub. *M. hispida*; Gole di Aradena, 24 April 2022, *S. Cambria s.n.* (CAT!); *Calamintha minima*, annua, thymi-folio, Inst. rej. herb. 194. herbier de Vaillant (P-Vaillant 04049884!); *Calamintha minima* annua Thymifolio, herb. *Tournefort no. 1312 B* (P-Tournefort 00652340!).

### Key to the species belonging to the *Micromeria microphylla* group

1. Stem always erect, corolla 3 mm long.....2
- Stem procumbent to ascending (rarely erect), corolla 3.5–6.5 mm long .....3
2. Leaves densely hairy, with hairs appressed to patent, 0.2–0.5 mm long, calyx 2.4–2.5 mm long, covered by hairs 0.5–1 mm long, with teeth subequal, 0.6–0.8 mm long.....*M. acropolitana*
- Leaves scabrid, with hairs up to 0.1 mm long, calyx 3–3.5 mm long, covered by hairs 0.1–0.2 mm long, bilabiate with upper teeth 0.8–0.9 mm long and lower teeth 1.2–1.5 mm long.....*M. carpatha*
3. Stem with hairs always retrorse, calyx with teeth subequal.....*M. rodriguezii*
- Stem with hairs patent or sometimes retrorse, calyx bilabiate .....4
4. Calyx 4.5–5 mm long, with upper teeth 1.2–1.5 mm long and lower teeth 1.6–2.2 mm long.....*M. hispida*
- Calyx 2.5–4 mm long, with upper teeth 0.6–1.1 mm long and lower teeth 0.9–1.5 mm long.....5
5. Stem with hairs always patent, leaves subequal along the stem (ovate to lanceolate), verticillaster up to 5–7 flowers.....6
- Stem with hairs mixed (patent to reflexed or curved), leaves dimorphic, basal ones ovate to cordate, upper ones lanceolate to linear-lanceolate, verticillaster with max. 3 flowers .....7
6. Leaves up to 5 mm wide, with appressed hairs, calyx 3–4 mm long ..... *M. cypria*
- Leaves max. 2.5 mm wide, with patent hairs, calyx 2.5–3(–3.5) mm long.....*M. sphaciotica*
7. Stem with hairs 0.3–0.8 mm long, calyx 2.5–3.2 mm long, with upper teeth 0.8–1.1 mm long, corolla 4.5–6 mm long, with tube long exerted from the calyx, stamens exerted from corolla tube, mericarps 0.6–0.8 × 0.3–0.4 mm .....*M. microphylla*
- Stem with hairs 0.1–0.3 mm long, calyx 3–3.7 mm long, with upper teeth 0.6–0.8 mm long, corolla 3.5–4 mm long, with tube included in the calyx, stamens included in the corolla tube, mericarps 0.8–1 × 0.4–0.5 mm..... *M. silicii*

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