

Calamintha sandaliotica (Lamiaceae) a new species from Sardinia

by

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Abstract

Calamintha sandaliotica is described as a species new to science and illustrated. It occurs on calcareous rocky crevices in SW Sardinia. Its ecology, chorology and taxonomical relationships are examined. A key to European *Calamintha* is provided.

Keywords: *Calamintha*, endemic flora, Iglesiente, Lamiaceae, taxonomy.

Introduction

During field investigations on the flora of Sardinia, it was found a peculiar population of *Calamintha* Miller, very different from the other species known in the Mediterranean area. It colonizes the rocky crevices in a gorge of Paleozoic limestones and dolomites in the Iglesiente subsector. Morphologically, the plants were characterized by a pulvinate suffruticose woody habit, and very small leaves and flowers. Due to these features, unusual in the genus *Calamintha* (Litardière, 1955; Ball, 1972; Ball & Getliffe, 1972; Davis & Leblebici, 1982; Morales & Luque, 1997), this population represents a well differentiated taxon and must be treated as a species new to science.

Materials and methods

The taxonomical study is based on literature data and herbarium specimens (CAG, CAT, FI, G, M, W, WU), but most of the morphological analyses were based on living material of *C. grandiflora* (L.) Moench, *C. sylvatica* Bromf. ssp. *sylvatica* and ssp. *ascendens* (Jordan) P.W. Ball, *C. nepeta* (L.) Savi ssp.

Resumen

Se describe e ilustra la nueva especie *Calamintha sandaliotica*, característica de los acantilados calizos de la parte suroccidental de Cerdeña. Se examina su ecología, corología y las relaciones taxonómicas. Se presenta también una clave para las especies europeas del género *Calamintha*.

Palabras clave: *Calamintha*, flora endémica, Iglesiente, Lamiaceae, taxonomía.

nepeta and ssp. *glandulosa* (Req.) P.W. Ball, *C. cretica* (L.) Lam., *C. incana* (Sibth. & Sm.) Boiss. and *C. rouyana* (Briq.) Pericás & Rosselló collected by us during field work in Sardinia, Sicily, S Italy, Baleares, Corse, Crete, and Greece.

Results

***Calamintha sandaliotica* Bacchetta & Brullo, sp. nov.** (Fig. 1, 2, 3)

A C. nepeta habito lignoso, limbo foliorum 5-12 mm longo et 4-11 mm lato, 1-5 dentibus in quoque lato, pedicello 0.5-3 mm longo, bracteolis 0.5-1.2 mm longis, calice 3-3.5 mm longo, dentibus inferioribus 0.9-1.1 mm longis et superioribus 0.4-0.6 mm longis, corolla 5.5-6 mm longa, nucula leviter papillosa differt.

Shrub, pulvinate, 30-70 cm tall, branches woody, densely leafy, with glandular hairs above. Leaves with minute glandular hairs, peduncle 3-8 mm long, limb triangular-ovate, rounded at apex, 5-12 mm long, 4-11 mm wide, crenate or subentire, with 1-5 rounded teeth on each side. Cymes 3-9(12)-flowered. Pedicels 0.5-3 mm long. Bracteoles lanceolate-subulate, 0.5-

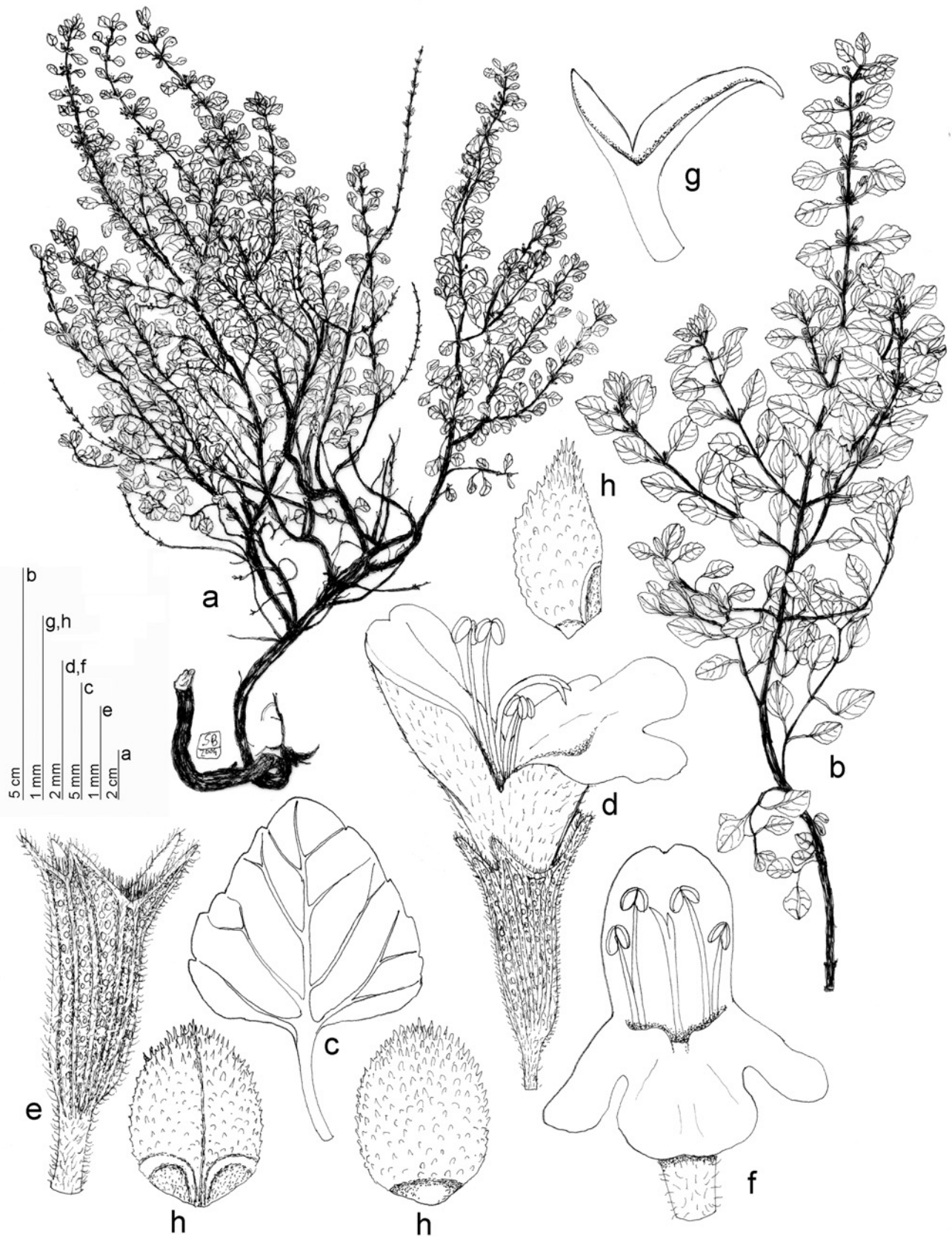


Fig. 1. *Calamintha sandaliotica* (holotype, CAT): **a**, habit; **b**, branch; **c**, leaf; **d**, flower; **e**, calyx; **f**, corolla; **g**, stylar branches; **h**, nutlets.

1.2 mm long. Calyx 3-3.5 mm long, 1-1.1 mm in diameter, with minute glandular hairs; hairs in the mouth 0.2 mm long, included or shortly exerted; lower teeth narrowly triangular, 0.9-1.1 mm long, upper teeth triangular, 0.4-0.6 mm long. Corolla white-lilac to lilac, outside hairy, 5.5-6 mm long; upper lip retuse, 2-2.5 mm long, lower lip often spotted, trilobed, 2-2.5 mm long, lightly papillose inside. Stamens long exerted, upper ones 1.5-2 mm long, lower ones 3-3.5 mm long. Styler branches unequal, the upper 0.6 mm long, the lower 1 mm long. Nutlets blackish-brown, slightly papillose, 1 mm long, 0.7 mm wide.

Holotype: ITALY. **Sardinia.** Cagliari, Is Lisandrus, Gola di San Nicolò (Buggerru – CA), 13-VII-2000, Bacchetta, Brullo, Casti, Giusso & Guarino s.n. (CAT; isotypes, CAG, CAT, FI, MA).

Etymology: The epithet refers to Sandalia, an old name for Sardinia.

Distribution: This species is very rare and localized in a small gorge near Buggerru (Fig. 4) in the Iglesiasen-te subsector (SW Sardinia).

Habitat: *Calamintha sandaliotica* is a typical chas-mophyte, occurring in rocky habitats of Paleozoic limestones and dolomitic-limestones at an altitude of 80-260 m. This area is characterized by a mediterranean pluviseasonal-oceanic bioclimate. Thermotypes range between upper thermomediterranean and lower mesomediterranean, and ombrotypes between upper dry and lower subhumid (Bacchetta, 2000). The species is a member of a rupestral community of *Asplenietea trichomanis* (Br.-Bl. in Meier & Br.-Bl., 1934) Oberd. 1977, rich in Sardinian and Cyrno-Sardinian endemics, as *Bellium crassifolium* Moris var. *canescens* Gennari, *Helichrysum saxatile* Moris ssp. *morisianum* Bacch., Brullo & Mossa, *Sesleria insularis* Sommier ssp. *morisiana* Arrigoni, *Seseli praecox* (Gamisans) Gamisans, and *Bituminaria morisiana* (Pignatti & Metlesics) Greuter.

Phenology: Flowering in May-September, fruiting in July-December.

Conservation status: For its rarity, low number of individuals in the only known population, and threat caused by climbers (the site is very popular for free climbing and other outdoor activities), we suggest to add *C. sandaliotica* in the regional red lists of the IUCN, as critically endangered (CR). In particular, basing on the criteria of IUCN (2001, 2003), the following specific category is proposed: CR B1ab(ii,iii,v) + 2ab(ii,iii,v); C2a(ii).

Taxonomic remarks: According to Ball (1972), Ball & Getliffe (1972), Davis & Leblebici (1982), Pignatti (1982), Cantino & al. (1992), Wagstaff & al. (1995), and Morales & Luque (1997), *Calamintha* must be considered a natural genus, morphologically well differentiated from the allied genera *Acinos* Miller, *Clinopodium* L., *Melissa* L., *Micromeria* Benth., or *Satureja* Miller. *Calamintha* includes perennial species, generally herbaceous and often woody at the base, occurring mainly in nemoral places, dwarf-shrub communities, grassland and synanthropic habitats. *Calamintha sandaliotica* differs from the known species of the genus not only by its distinct woody habit, but also on its ecological requirements, as it grows in rock crevices. The new species, both in habit and ecology, is closely related to *C. rouyana*, endemic to Majorca (Balearic Islands), which grows in similar calcareous rocky areas of Sierra de Tramuntana, at 900-1400 m a.s.l. (Rosselló & Sáez, 2001); although they differ in several important characters (Table 1).

Calamintha sandaliotica is also morphologically related to *C. nepeta*, mainly in some leaf, inflorescence and flower characters (Fig. 2, 3; Table 1). Some authors distinguish two subspecies within *C. nepeta*: ssp. *nepeta* and ssp. *glandulosa* (Ball, 1972; Ball & Getliffe, 1972; Davis & Leblebici, 1982; Pignatti 1982), while others consider *C. nepeta* just a variable species (Garbari & al., 1991; Morales & Luque, 1997). Our herbarium and field studies clearly demonstrated that there are two taxa involved, both with a set of constant traits across populations (Table 1). *Calamintha nepeta* s.l. mainly differs from *C. sandaliotica* in its herbaceous habit, larger leaf limbs and longer calyx. Morphologically, *C. sandaliotica* shows a closer relationship with *C. nepeta* ssp. *glandulosa*, although they can be clearly differentiated (Fig. 2, Table 1).

Representative specimens

ITALY. **Sardinia:** Cagliari, San Nicolò (Buggerru – CA), 6-VI-1999, Bacchetta & Brullo (CAG, CAT); Is Lisandrus, Gola di San Nicolò (Buggerru – CA), 8-XII-2000, Brullo, Casti & Giusso (CAT); Is Lisandrus (Buggerru), 170 m – esp. NNE 30°, calcari paleozoici, termomedit. sup.-secco sup., 31-V-2005, Bacchetta & Pontecorvo (CAG).

Key to European *Calamintha*

1. Leaves with craspedodromous venation; calyx 12-16 mm long, subglabrous; corolla purplish, 25-42 mm long **C. grandiflora**
1. Leaves with camptodromous venation; calyx 3-10 mm long, tomentose to pubescens; corolla white to lilac or pink, 5-20 mm long **2**

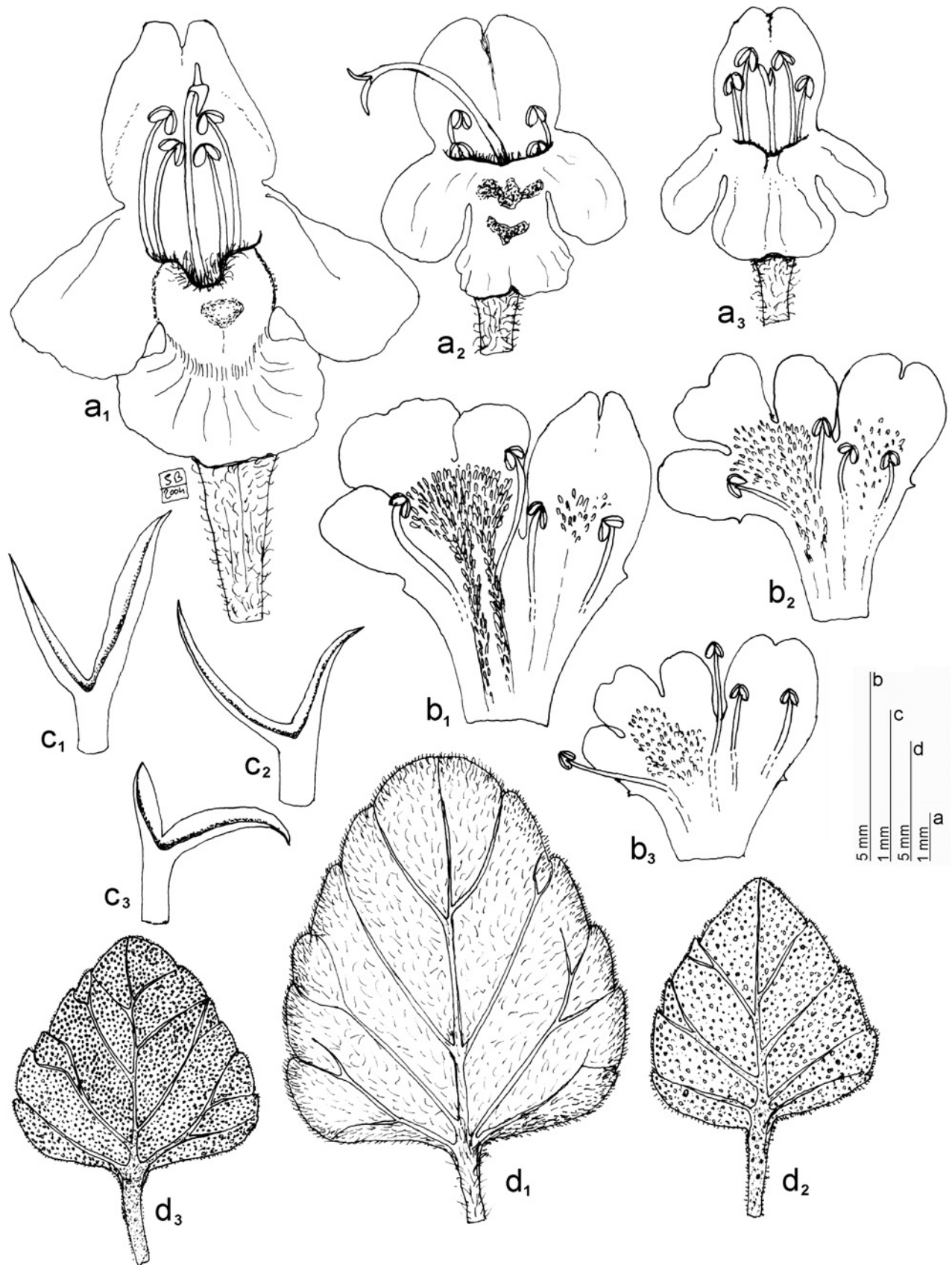


Fig. 2. *Calamintha nepeta* ssp. *nepeta* (1), from Catania (Sicily); *C. nepeta* ssp. *glandulosa* (2), from Osini (Sardinia) and *C. sandaliotica* (3), from locus classicus: **a**, corolla; **b**, inner surface of the opened corolla; **c**, styler branches; **d**, leaf.

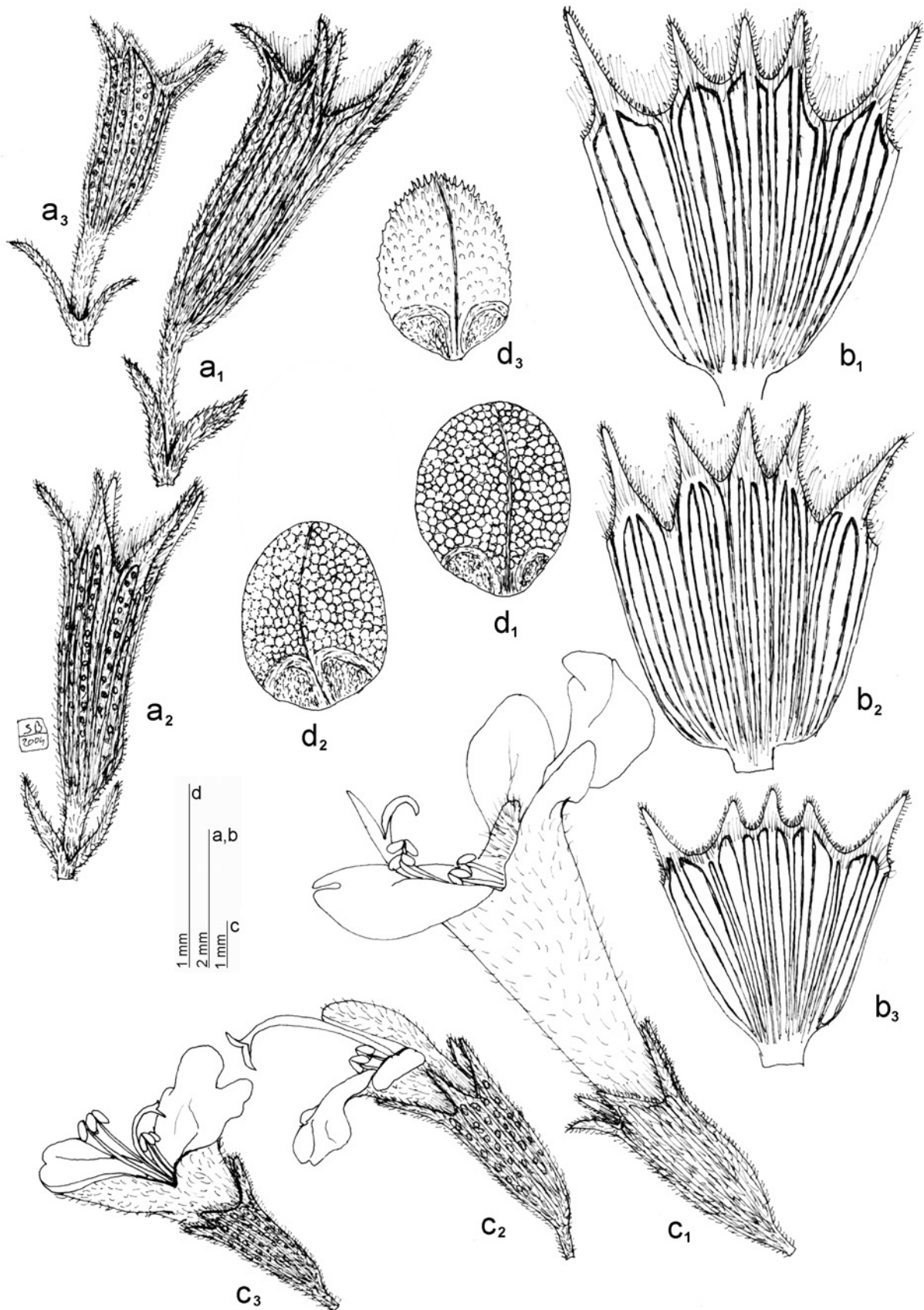


Fig. 3. *Calamintha nepeta* ssp. *nepeta* (1), from Catania (Sicily); *C. nepeta* ssp. *glandulosa* (2), from Osini (Sardinia) and *C. sandaliotica* (3), from locus classicus: **a**, calyx; **b**, inner surface of the opened calyx; **c**, flower; **d**, nutlet.

2. Branches woody or woody almost at the base; leaves 3-15 × 3-12 mm; calyx 3.5-5 mm long **3**
2. Branches herbaceous; leaves 8-70 × 8-45 mm; calyx 4.5-10 mm long **6**
3. Half-shrub pulvinate, 30-70 cm tall; calyx 3-3.5 mm long; corolla 5.5-6 mm long **C. sandaliotica**
3. Small chamaephyte, 5-40 cm tall; calyx 3.5-5 mm long; corolla 6.5-11 mm long **4**
4. Leaves green, sparsely hairy, ovate to ovate-lanceolate, 2.5-6 mm wide; calyx sparsely hairy **C. rouyana**
4. Leaves densely grey-pubescent, broadly ovate or suborbicular, 5-12 mm wide; calyx dense hairy **5**
5. Leaves broadly ovate, subentire to crenate-serrate; calyx with dense long patent hairs with upper teeth 0.5-1 mm long and lower teeth 2 mm long; corolla white **C. cretica**
5. Leaves suborbicular, always subentire; calyx with short appressed or crispate hairs with upper teeth 0.2-0.4 mm long and lower teeth 1-1.5 mm long; corolla pale-pink **C. incana**
6. Leaves hairy, glandular; calyx 4.5-6 mm long with lower teeth sparsely short ciliate, 1-2 mm long **7**
6. Leaves puberulous to densely hairy, eglandular; calyx 5.5-10 mm long with lower teeth densely long ciliate, 2-4 mm long **8**
7. Leaves with inconspicuous glandular hairs, long and loosely hairy, with 5-9 teeth on each side; cymes lax 10-20 flowered;

Tab. 1. Comparison of morphological characters of *Calamintha sandaliotica* and allied taxa.

Characters	<i>C. sandaliotica</i>	<i>C. rouyana</i>	<i>C. nepeta</i> ssp. <i>nepeta</i>	<i>C. nepeta</i> ssp. <i>glandulosa</i>
HABIT	pulvinate shrub, 30-70 cm tall	small chamaephyte, 5-20 cm tall	rhizomatous perennial herb, 30-80 cm tall	rhizomatous perennial herb, 20-50 cm tall
BRANCHES	woody, densely leafy, with glandular hairs in the upper part	woody, densely leafy in upper part, densely covered with glandular hairs	herbaceous, sparsely leafy, densely hairy	herbaceous, sparsely leafy, with glandular hairs
LEAVES	with minute glandular hairs	sparsely covered with glandular hairs	inconspicuously glandular, with long and loose hairs	with minute glandular hairs
LEAF PEDUNCLE	3-8 mm long	1-2 mm long	3-5 mm long	1-6 mm long
LEAF LIMB	triangular-ovate, rounded at apex, 5-12 mm long, 4-11 mm wide, crenate or subentire, 1-5 rounded teeth on each side	ovate to ovate-lanceolate, obtuse to rounded at apex, 3-9 mm long, 2.5-6 mm wide, crenate-serrate, 1-3 teeth on each side	broadly ovate, obtuse at apex, 10-35 mm long, 8-25 mm wide, deeply crenate-serrate, rarely subentire, 5-9 teeth on each side	ovate, obtuse to rounded at apex, 8-20 mm long, 8-16 mm wide, subentire to crenate-dentate, 2-5 teeth on each side
CYMES	dense, (1)3-9(12)-flowered	lax, 1-3-flowered	lax, (5)10-20-flowered	dense, 5-11-flowered
FLOWER PEDICEL	0.5-3 mm long	1-2 mm long	8-22 mm long	0.5-5 mm long
BRACTEOLAS	lanceolate-subulate, 0.5-1.2 mm long	subulate-lanceolate, 0.8-1 mm long	subulate, 1.5-4 mm long	lanceolate-subulate, 1-1.5 mm long
CALYX	3-3.5 mm long, 1-1.1 mm in diameter, with minute glandular hairs; hairs on the mouth 0.2 mm long, included or shortly exerted	3.5-4 mm long, 1.5-2 mm in diameter, with sparse minute glandular hairs; hairs on the mouth 0.3-0.5 mm long, longly exerted	5-6 mm long, 1.3-1.6 mm in diameter, with loose hairs, inconspicuously glandular; hairs on the mouth 0.4-0.6 mm long, longly exerted	4-5.5 mm long, 1-1.5 mm in diameter, with minute glandular hairs; hairs on the mouth 0.6-0.8 mm long, longly exerted
CALYX TEETH	lower teeth 0.9-1.1 mm long; upper teeth 0.4-0.6 mm long	lower teeth 1.2-1.5 mm long; upper teeth 0.5-1 mm long	lower teeth 1.8-2.5 mm long; upper teeth 1-1.2 mm long	lower teeth 1.5-1.8 mm long; upper teeth 1.2-1.5 mm long
COROLLA	white-lilac to lilac, outside hairy, 5.5-6 mm long	pink to pink-lilac, outside hairy and glandular, 6.5-8 mm long	white to lilac, outside hairy, 10-15 mm long	white to lilac, outside hairy, 7-10 mm long
COROLLA LIPS	upper lip retuse, 2-2.5 mm long; lower lip often spotted, trilobed, 2-2.5 mm long, lightly papillose inside	upper lip retuse, 1.8-2.2 mm long; lower lip spotted, trilobed, 2.5-3.0 mm long, densely papillose inside	upper lip emarginate, 4-4.2 mm long; lower lip spotted, trilobed, 4.5-5.5 mm long, densely papillose inside	upper lip emarginate, 2.5-3 mm long; lower lip spotted, trilobed, 3-4 mm long, densely papillose inside
STAMENS	long-exserted, upper 1.5-2 mm long, lower 3-3.5 mm long	long-exserted, upper 1.5 mm long, lower 2.5 mm long	long-exserted, upper 2-3 mm long, lower 4-5.5 mm long	short-exserted, upper 1-1.2 mm long, lower 1.6-2 mm long
STYLAR BRANCHES	unequal, upper 0.6 mm long, lower 1 mm long	unequal, upper 0.5 mm long, lower 0.7 mm long	unequal, upper 1 mm long, lower 1.5 mm long	unequal, upper 0.9 mm long, lower 1.2 mm long
NUTLETS	brown-blackish, slightly papillose, 1 mm long, 0.7 mm wide	pale brown, minutely alveolate, 0.9-1 mm long, 0.5-0.6 mm wide	brown-blackish, minutely alveolate, 1-1.1 mm long, 0.85 mm wide	dark-brown, minutely alveolate, 0.9-1 mm long, 0.8-0.9 mm wide

- flower pedicel 8-22 mm long; bracteoles 1.5-4 mm long; calyx loosely hairy and inconspicuously glandular, lower teeth 1.8-2.5 mm; corolla 10-15 mm long; stamens long exserted, 2-5.5 mm long ***C. nepeta* ssp. *nepeta***
7. Leaves with minute glandular hairs, with 2-5 teeth on each side; cymes dense 5-11 flowered; flower pedicel 0.5-5 mm long; bracteoles 1-1.5 mm long; calyx with minute glandular hairs, lower teeth 1.5-1.8 mm; corolla 7-10 mm long; stamens shortly exserted, 1-2 mm long ***C. nepeta* ssp. *glandulosa***
8. Calyx 6.5-10 mm long, lower teeth 3-4 mm long; corolla 13-20 mm long ***C. sylvatica* ssp. *sylvatica***
8. Calyx 5.5-7 mm long, lower teeth 1.2-3 mm long; corolla 9-15 mm long ***C. sylvatica* ssp. *ascendens***

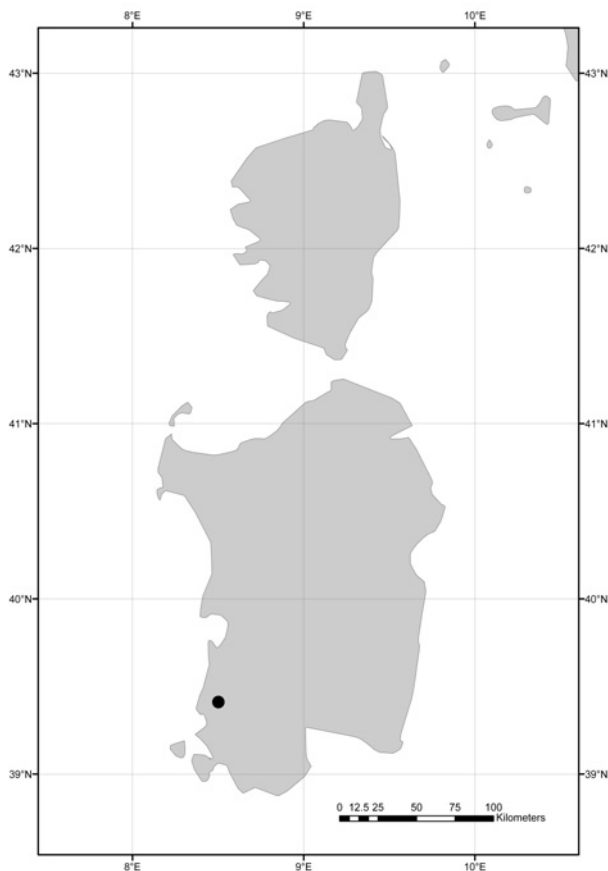


Fig. 4. Distribution map of *Calamintha sandaliotica*.

Acknowledgements

The authors thank R. Guarino for the English text revision, M. Mus Amezquita for the specimens and M. Vicens for the nutlets of *C. rouyana*.

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Editor asociado: S. Castroviejo

Recibido: 1-VIII-2005

Aceptado: 7-X-2005