



## *Micromeria tenensis* (Lamiaceae), a new species from Tenerife, Canary Islands

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### Abstract

Based on molecular and morphological evidence, a new species of *Micromeria* is described for Tenerife, Canary Islands. *Micromeria tenensis* is endemic to the massif of Teno, occurring between 100–1000 m elevation. It is characterized by having more or less pendulous branches, tomentose stems and leaves, hispid calyx, and calyx apices triangular to lanceolate, densely white hispid.

**Key words:** Macaronesia, Spain, Teno, wild thyme

### Resumen

Sobre la base de evidencia molecular y morfológica, se describe una nueva especie de *Micromeria* para Tenerife, Islas Canarias. *Micromeria tenensis* es endémica al maciso de Teno, ocurriendo entre los 100–1000 m de elevación. Se caracteriza por tener ramas más o menos pendulares, tallos y hojas tomentosos, cáliz hispido, y dientes del cáliz triangulares a lanceolados, densamente blanquecino-híspidos.

**Palabras clave:** Macaronesia, España, Teno, tomillos

### Introduction

*Micromeria* Bentham (1829: 1282) is a genus of the family Lamiaceae Martinov (1820: 355), subfamily Nepetoideae Burnett (1835: 971), subtribe Mentinae Dumortier (1827: 48) (Harley *et al.* 2004). It is characterized by leaves with a thickened margin, caused by a continuous sclerenchymatous vein, bracteoles present, calyx lobes straight or spreading, and posterior lip of the corolla emarginated and curved upwards (Bräuchler *et al.* 2008). *Micromeria* is distributed in parts of Asia and Africa, and the Mediterranean and Macaronesian regions. The highest number of species is found in the Canary Islands, where 21 of the 54 recognized species of *Micromeria* grow (Pérez de Paz 1978; Puppo & Meimberg 2015a, 2015b).

Recent molecular analyses (Puppo *et al.* 2014a, 2015) revealed that species of *Micromeria* within each island of the Canary Islands are more closely related to each other than taxa from other islands, supporting each taxon as a single-island endemic. To incorporate this new molecular evidence, a taxonomic revision of *Micromeria* in the Canaries was published in 2015 (Puppo & Meimberg 2015a, 2015b).

Among the Canary Islands, Tenerife has the most complex geological history as it used to be three islands in the late Miocene, Adeje (11.6 Myo), Teno (7.4 Myo), and Anaga (5.8 Myo), that got secondarily connected by the formation of the central shield (Ancochea *et al.* 1990). Thus, Tenerife as it is today, is composed of geologically older

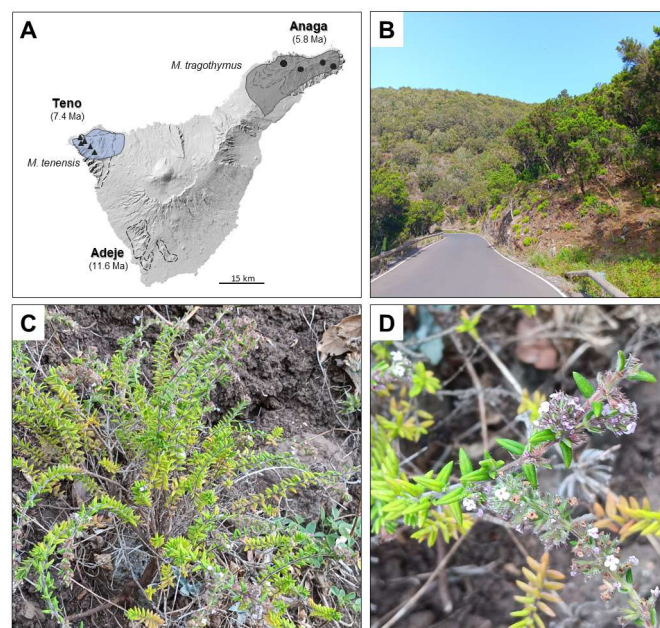
areas, remnants of those paleo-islands, and a younger area in the center of the island (Fernández-Palacios *et al.* 2011, Juan *et al.* 2000). Diversification patterns in many taxa reflect this geological history (Juan *et al.* 2000, Carine *et al.* 2004, Trusty *et al.* 2005, Mairal *et al.* 2015, Puppo *et al.* 2016).

Molecular analyses of *Micromeria* taxa from Tenerife using microsatellite data and population-based sampling show that individuals assigned to *M. tragothymus* Webb & Berthelot (1844: 73) [former *M. varia* Benth (1834: 374), see Puppo *et al.* 2014b, 2017] form different genetic clusters that correlate to Tenerife's paleo-islands (Puppo *et al.* 2016, Curto *et al.* 2017). This divergence had been previously shown in a phylogenetic study using nuclear markers, with fewer samples, and morphometric analyses (Puppo *et al.* 2014a). *Micromeria tragothymus* in its classic distribution in the massif of Anaga constitutes an older, distinct lineage, while the specimens formerly recognized as *M. varia* from Teno constitute a different, more recent taxon.

In order to reflect the distinctiveness of this taxon from Teno, we hereby formally describe it as a new species, *Micromeria tenensis*.

## Material and Methods

For this study, we revised the material of *Micromeria tragothymus* (= *M. varia*) deposited at the University of La Laguna Herbarium (TFC) in Tenerife and consulted the taxonomic revisions and other relevant literature for the genus (Pérez de Paz 1978, Puppo & Meimberg 2015a, 2015b, Puppo *et al.* 2014a, 2015, 2016, Curto *et al.* 2017). We also collected fresh material in the massifs of Anaga and Teno in July 2023 (Fig. 1). This material has been deposited in the TFC herbarium. Herbaria codes are according to Thiers (2023).



**FIGURE 1.** A. Map of Tenerife showing distribution of *Micromeria tenensis* in Teno (blue) and *M. tragothymus* in Anaga (dark grey); Dashed lines indicate remnants of paleo-islands; Triangles and black dots indicate collections made in July 2023. B–D. *Micromeria tenensis*, habitat (B), habit (C), and detail of flowering branch (D). Photos taken by P. Puppo.

## Taxonomic treatment

*Micromeria tenensis* Puppo & P. Pérez, *sp. nov.* (Figs. 1–3)

Diagnosis:—Differing from *M. tragothymus* in having more or less pendulous branches (vs. erect); stems tomentose (vs. strigose); leaves ovate, villous or pilose adaxially, densely tomentose abaxially (vs. narrowly lanceolate, revolute, sparsely strigose adaxially, glabrous abaxially but strigose on the midvein); calyx hispid with abundant translucent sessile glands (vs. strigose with few glands), calyx apices triangular to lanceolate, densely white hispid, 0.3–0.7 mm long (vs. subulate to falcate, strigose, 1.5 mm long).

Type:—SPAIN. Tenerife: Claros fayal-brezal en Teno Alto, 879 m, UTM 28 R: 0317271-3135723, 05 July 2023, P. Puppo & P.L. Pérez de Paz *s.n.* (Holotype: TFC 54.826; Isotypes: B; G; K; LPA; MA; ORT; TFC).

Description:—Subshrub, up to 30 cm high, highly branched; branches persisting and entangled, more or less pendulous, basal part of branches shedding bark, stems tomentose throughout with long, soft, white hairs. Basal leaves opposite and decussate, shortly petiolate, petioles less than 1 mm long, densely tomentose, internodes conspicuous; blades herbaceous 4–6 mm long × 1.5–3 mm wide, ovate, basal ones straight, upper ones somewhat revolute, green sometimes tinged with red or yellow, villous or pilose adaxially, densely tomentose abaxially. Cymes shortly pedunculated arranged on the tip of young branches; peduncles 1–1.5 mm long, densely tomentose; bracts present, 1–1.5 mm long, tomentose. Calyx tubular, green tinged with purple or red, hispid with abundant translucent sessile glands, 2.5–3 mm long, calyx apices triangular to lanceolate, densely white hispid, 0.3–0.7 mm long. Corolla white to lilac, 4–5 mm long, exerted, lower lip projected downwards. Anthers lilac included or barely exerted. Style included or exerted.

Phenology:—Like other species of *Micromeria* on the island, *M. tenensis* flowers mostly from March to June, rarely throughout the year.

Distribution and ecology:—Distributed throughout the Teno massif, from the coastal zone to the highest parts between 100–1000 m elevation growing mostly on shallow, eroded areas.

Etymology:—The species epithet refers to its distribution in the massif of Teno.

Conservation status:—This new species is locally abundant and has a wide area of distribution in the massif of Teno, so it is considered as LC (Least Concern) according to the categories of the IUCN (2022).

## Discussion

Phylogenetic relationships (*e.g.* Puppo *et al.* 2014a) as well as analyses using codominant markers (*e.g.* Puppo *et al.* 2016) show *M. tragothymus* as an older lineage, more similar to other narrow endemics from Anaga such as *M. glomerata* Pérez de Paz (1974: 78) and *M. rivas-martinezii* Wildpret (1974: 73). *Micromeria tenensis* appears as a younger lineage, derived from the older species of Teno, *M. densiflora* Benth (1834: 375), and more related to species growing in the central part of the island such as *M. ericifolia* (Roth) Bornmüller (1924: 198) [former *M. hyssopifolia* Webb & Berthelot (1844: 72), see Puppo *et al.* 2014b, 2017].

The lectotype of *M. tragothymus* designated by Pérez de Paz (see Pérez de Paz 1978, Puppo *et al.* 2017), was collected by Baker-Webb and the locality is only indicated as ‘the island of Tenerife’. Pérez de Paz designated this specimen as the type stating that it is very similar to the plants that can currently be observed in several localities of Anaga, choosing the latter as the ‘classical area of the species’ (Pérez de Paz 1978, p. 175). Pérez de Paz did highlight morphological differences between the populations of *M. tragothymus sensu lato* (= *M. varia* subsp. *varia*) from Anaga and those existing in the northern half of the Teno massif (Pérez de Paz 1978, pp. 193–195), differences that molecular analyses later confirmed (*i.e.* Puppo *et al.* 2014a, 2016).

The original distribution proposed for *M. varia* subsp. *varia* in Tenerife (Pérez de Paz 1978) was along the northern band of Tenerife, from Teno to Anaga. Molecular and morphological evidence, however, suggests that the taxon present along the northern part of the island, between Teno and Anaga, is in fact *M. ericifolia* (= *M. hyssopifolia*). Thus, *M. tenensis* would be endemic to the massif of Teno, *M. tragothymus sensu stricto* would be endemic to Anaga, and *M. ericifolia* would be distributed in the middle, between the massifs, and all around the central part of the island up to 2000 m elevation (Pérez de Paz 1978, Puppo *et al.* 2014a, Puppo *et al.* 2016).

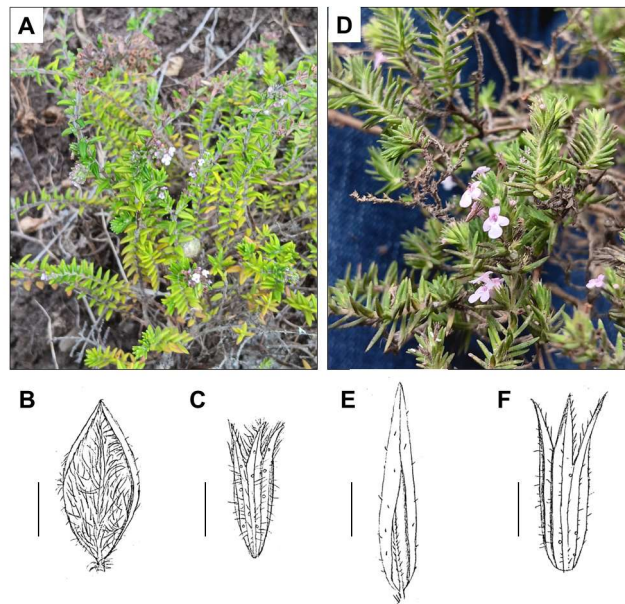
In its typical distribution in Teno Alto, *M. tenensis* resembles the habit of *M. teneriffae* (Poir.) Benth (1834: 378) with pendulous branches, ovate, almost straight leaves, and conspicuous internodes (Fig. 1C). *Micromeria teneriffae* is endemic to the massif of Anaga, extending its range to the southeast of the massif, up to the Roques de Fasnia. *Micromeria teneriffae* differs from the new species in that the whole plant is glabrous, the leaves are ovate to cordate and are covered with sessile glands abaxially. In areas of strong winds such as the eroded landscapes of “Las Zahorras” in Teno Alto or the coastal slopes of Teno Bajo, *M. tenensis* shows a smaller habit, and prostrated or decumbent branches. In these areas, the leaves of *M. tenensis* resemble more those of *M. tragothymus*, fasciculated, revolute, and ericoid though the dense pubescence of *M. tenensis* as well as the shorter apices of the calyx remain unchanged.

Including the newly described *M. tenensis*, there are now nine species of *Micromeria* in Tenerife, all single-island endemics.

With the recognition of *M. tenensis*, the following hybrid name should be revised: *Micromeria* × *broussonetii* Santos-Guerra, Acevedo-Rodríguez & Reyes-Betancort (2011: 158), hybrid resulting from the crossing of *M. densiflora* × *M. varia* subsp. *varia* should now be *M. densiflora* × *M. tenensis*.



FIGURE 2. Holotype of *Micromeria tenensis* Puppo & P. Pérez (TFC 54.826).



**FIGURE 3.** A–C. *Micromeria tenensis*, flowering branches (A), leaf, abaxial (B), and calyx (C). D–F. *M. tragothyms*, flowering branches (D), leaf, abaxial (E), and calyx (F). Scale bars indicate 2 mm for leaves and 1 mm for calyces. Photos and drawings by P. Puppo.

### Other material examined

***Micromeria tenensis*:**—SPAIN. Tenerife: Teno, Los Andenes, 23 March 1976, *P. Pérez s.n.* (TFC-5693); Teno Alto, 10 June 1978, *unknown s.n.* (TFC-32.164); Degollada de Teno Alto, 823 m, UTM 317536-3136504, 20 May 2010, *Pedro Luis Pérez de Paz s.n.* (TFC-49.646); Lomo del Bujamé, Teno, Buenavista, 705 m, UTM 316573-3137268, 20 May 2010, *Pedro Luis Pérez de Paz s.n.* (TFC-49.650); Risco de Bujamé, Teno, 600 m, UTM 316554-3137590, 20 May 2010, *Pedro Luis Pérez de Paz s.n.* (TFC-49.649); Macizo de Teno, Baracán, June 2011, *Vicente Lucía s.n.* (TFC-50.086); Cárcavas pastoreadas de Teno Alto, 600 m, UTM 315535-3137834, 16 November 2011, *Pedro L. Pérez de Paz s.n.* (TFC-50.236); Degollada de El Palmar, Teno Alto, 826 m, UTM 28 R: 0317271-3135723, 05 July 2023, *P. Puppo & P.L. Pérez de Paz s.n.* (TFC-54.825); Casas Teno Alto (pueblito), Pista La Mulata, 803 m, UTM 28 R: 0316148-3136709, 05 July 2023, *P. Puppo & P.L. Pérez de Paz s.n.* (TFC-54.827); Paisaje erosivo “Las Zahorras”, Pista de La Mulata, Teno Alto, 735 m, UTM 28 R: 0315889-3137072, 05 July 2023, *P. Puppo & P.L. Pérez de Paz s.n.* (TFC-54.829); Tabaibal-Cardonal halófilo y árido, Barranquillos de la zona, 179 m, UTM 28 R: 0313904-3138335, 05 July 2023, *P. Puppo & P.L. Pérez de Paz s.n.* (TFC-54.830).

***Micromeria tragothyms*:**—SPAIN. Tenerife: Bco. de San Andrés, 17 April 1976, *Pedro Luis Pérez de Paz s.n.* (TFC-32.965); Carretera de Iguete de San Andrés, Anaga, 150 m, UTM 385011-3154864, 17 May 2010, *Pedro Luis Pérez de Paz s.n.* (TFC-49.633); Afur, Anaga, 420 m, UTM 378916-3159058, 18 May 2010, *Pedro Luis Pérez de Paz s.n.* (TFC-49.638); Bco. de San Andrés, Sta. Cruz, Anaga, 240 m, UTM 383168-3156461, 18 May 2010, *Pedro Luis Pérez de Paz s.n.* (TFC-49.636); Cabecera del Bco. de Antequera, Anaga, 529 m, UTM 387643-3158473, 19 May 2010, *Pedro Luis Pérez de Paz s.n.* (TFC-49.644); Filo del Lomo que separa el Bco. de Antequera del Bco. de Ijuana, 305 m, UTM 388725-3157862, 19 May 2010, *Pedro Luis Pérez de Paz s.n.* (TFC-49.642); Collado entre Roque de Juan Bay y Roque de Antequera, Anaga, 250 m, UTM 389404-3157821, 19 May 2010, *Pedro Luis Pérez de Paz s.n.* (TFC-49.641); Bco. Iguete de San Andrés, Anaga, 226 m, UTM 28 R: 0386561-3157818, 05 July 2023, *P. Puppo & P.L. Pérez de Paz s.n.* (TFC-54.822); Cruce de El Bailadero, Anaga, 678 m, UTM 28 R: 0382082-3158328, 05 July 2023, *P. Puppo & P.L. Pérez de Paz s.n.* (TFC-54.821); Casas de la Cumbre, Anaga, 832 m, UTM 28 R: 0378601-3156960, 05 July 2023, *P. Puppo & P.L. Pérez de Paz s.n.* (TFC-54.820); Carretera Los Batanes, Anaga, 720 m, UTM 28 R: 0373089-3157874, 05 July 2023, *P. Puppo & P.L. Pérez de Paz s.n.* (TFC-54.819)

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