

First record of *Teucrium aristatum* Pérez Lara (Lamiaceae) in Portugal

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Abstract

The annual *Teucrium aristatum* is reported from Portugal for the first time. Two isolated populations, composed of flowering and fruiting individuals, were found in small, seasonally flooded depressions in the municipality of Tavira, Algarve, in late spring of 2022, extending the known distribution of this globally rare species ca. 120 km westward. Total numbers fluctuated considerably in the last three consecutive years but are estimated to range between 250–1000 individuals. Due to its very limited distribution, single location and ongoing habitat loss, *T. aristatum* qualifies as regionally Critically Endangered in Portugal under criteria B1ab(iii)+2ab(iii).

Key words: Algarve, temporary ponds, Barrocais.

Resumen

Primer registro de *Teucrium aristatum* Pérez Lara (Lamiaceae) en Portugal

Se informa por primera vez de la presencia de la especie anual *Teucrium aristatum* en Portugal continental. A finales de la primavera de 2022 se encontraron dos poblaciones aisladas, compuestas por individuos en floración y fructificación, en pequeñas depresiones inundables en el municipio de Tavira (Algarve), lo que amplió la distribución conocida de esta especie, rara a nivel mundial, unos 120 km hacia el oeste. La población total fluctuó considerablemente en los últimos tres años consecutivos, pero se estima entre 250 y 1000 individuos. Debido a su distribución extremadamente reducida, su presencia en una sola localidad y el deterioro continuo de su hábitat, *T. aristatum* fue evaluado regionalmente como En Peligro Crítico en Portugal, con los criterios B1ab(iii)+2ab(iii).

Palabras clave: Algarve, charcas temporales, Barrocais.

Teucrium L. (Lamiaceae) is a widespread plant genus consisting of over 400 taxa distributed across warmer and temperate parts of the globe, with a diversity centre in the Mediterranean basin (Navarro, 2020a). The genus is adapted to various environmental conditions and soil types, with many species thriving in arid and semi-arid habitats, rocky terrains, and disturbed landscapes (Pavlova *et al.*, 2020). *Teucrium* species exhibit growth forms ranging from woody shrubs to, more rarely, small annuals (Özcan, 2020; Navarro, 2020b).



Teucrium aristatum Pérez Lara (1889: 90) is a small spring therophyte, 5–25 cm tall, endemic to the western Mediterranean. Despite its annual life cycle, the species belongs to a clade composed mostly by perennial subshrubs, including *Teucrium orientale* L., *T. pruinatum* Boiss. and *T. olivierianum* Ging. ex Benth. (Salmaki *et al.*, 2016). *T. aristatum* was known from only three disjunct regions - Saint-Martin-de-Crau (Bouches-du-Rhône, southern France), Guadalajara (Castilla-La Mancha near Madrid, central Spain) and western Andalucía (southern Spain) (Navarro, 2010; Puech & Tison, 2014; GBIF Secretariat, 2021) - where it inhabits seasonally flooded depressions in clayey and marly soils.

Teucrium aristatum is rare and localised throughout its range, and has been considered Endangered globally (Lansdown, 2025), as well as in the French, Spanish and Andalusian red lists of Vascular plants (Cabezudo *et al.*, 2005; Moreno *et al.*, 2008; IUCN France *et al.*, 2018). Moreover, the highly disjunct French population is regarded by some authors as a distinct taxon, *Teucrium aristatum* subsp. *cravense* (Maire, Molin. & Tallon) J.-M. Tison, based on its smaller achenes, compact habit, leaves with shorter terminal segments, and flowers that tend to remain partially closed even at maturity (Maire *et al.*, 1947; Puech & Tison, 2014). This distinction would make *T. aristatum* subsp. *aristatum* an Iberian endemic, but this taxonomic treatment is not widely accepted (Vivant, 1980; Navarro, 2010), and supporting genetic data are currently lacking.

Here we extend the distribution of *T. aristatum* ca. 120 km westwards from the Doñana National Park, in Huelva, to the contiguous Portuguese region of Algarve (Algarve biogeographic District). This species was first observed and collected in early June 2022 in Barrocais, a rural area in the municipality of Tavira, located between Moncarapacho and Santa Catarina do Bispo. This species was not included in the flora of Portugal in any previous treatments, i.e. Coutinho (1939), Sampaio (1946), Franco (1984), Sequeira *et al.* (2011), and *Flora Iberica* (Navarro, 2010), and we found no existing specimens under this or other names in the Portuguese herbaria we consulted (COI, PO, LISU, LISI, AVE, ALGU).

Teucrium aristatum was detected in a seasonally flooded area of around 1100 m², with a network of shallow temporary pools, surrounded by typical Barrocal vegetation of Mediterranean scrubland and dryland carob orchards. At this site, ca. 40 flowering and fruiting individuals were observed, growing on bare clay-rich soil with *Pulicaria paludosa* Link, *Mentha pulegium* L., *Eryngium galioides* Lam., and other annuals. Leaf and flower morphology, particularly the aristate calix, as well as the annual habit allowed unambiguous identification (Figure 1).

In 2023, only 14 plants were found at the original site but field surveys throughout the area revealed an additional ca. 300 plants, growing in another 400 m² seasonally flooded depression, located approximately 310 m from the first one. Both sites exhibited good recruitment in 2024 and 2025, with totals exceeding 300 individuals in each year. At the original site, plants were more abundant and occupied a larger area than in 2023. This apparent fluctuation in local abundance has been noted before (Navarro, 2010; Lansdown, 2025), and likely results from annual variations in rainfall and flooding regimes. Despite extensive surveys in nearby sites with similar conditions and plant communities, no additional sites were detected.

The general area where the *T. aristatum* population of Algarve was found has been considerably transformed in the past two decades by agricultural conversion of the natural garrigue, rock removal and opening of dirt tracks, including in the immediate vicinity of the two known populations. A nearby flooding area with potential habitat for this rare species was destroyed around 2015 to install an avocado orchard. The population was also under direct threat from a proposed solar farm in 2023, although the project was ultimately rejected. The area is appealing to economic activities as it is largely flat, and these threats remain plausible as the area is currently not protected.

Preliminary National Red List assessment

Given its rarity and endangered status in both Spain and France (Figure 2), we have conducted a preliminary Red List assessment for Portugal, using IUCN categories and criteria (IUCN, 2012; IUCN Standards and Petitions Committee, 2024). Extent of occurrence (EOO) and area of occupancy (AOO) are both extremely small (both estimated as 4 km² using GeoCAT, Bachman *et al.*, 2011). Although two sites are known, they were considered a single location as they are only ca. 310 m apart, close enough for any threat (e.g. development) to impact both simultaneously. The number of individuals is small (250–1000), and appears subject to large fluctuations. Given the existence of past, ongoing and plausible future

threats from development in the area, e.g. new intensive orchards, new solar parks, or housing developments, *T. aristatum* should qualify, in our assessment, as regionally Critically Endangered under criteria B1ab(iii)+2ab(iii), and should be considered in a future addition to the Portuguese Red List of Vascular Plants (Carapeto *et al.*, 2020). The species should be considered for special conservation measures, including the physical protection of the known sites, seed banking and assisted introduction in other temporary ponds in the area.

The following herbarium vouchers were prepared for future reference and deposited in the ALGU Herbarium:

***Teucrium aristatum* Pérez Lara**

PORTUGAL. Algarve (Ag): Tavira, NE of Barrocais, in temporary flooded depressions, 27 May 2023, D. Frade s.n. (ALGU-15869); *ibid.* loc., 4 June 2023, D. Frade s.n. (ALGU-15870). GPS coordinates were withheld by the authors to protect the two known sites.



Figure 1. *Teucrium aristatum* from Barrocais, Tavira, Portugal. A) Detail of calyces; B) general aspect of a population; detail of C) flowers and D) fruits. Photos by João Neiva.

Figura 1. *Teucrium aristatum* de Barrocais, Tavira, Portugal. A) Detalle de los cálices; B) aspecto general de una población; detalle de C) flores y D) frutos. Fotos de João Neiva.

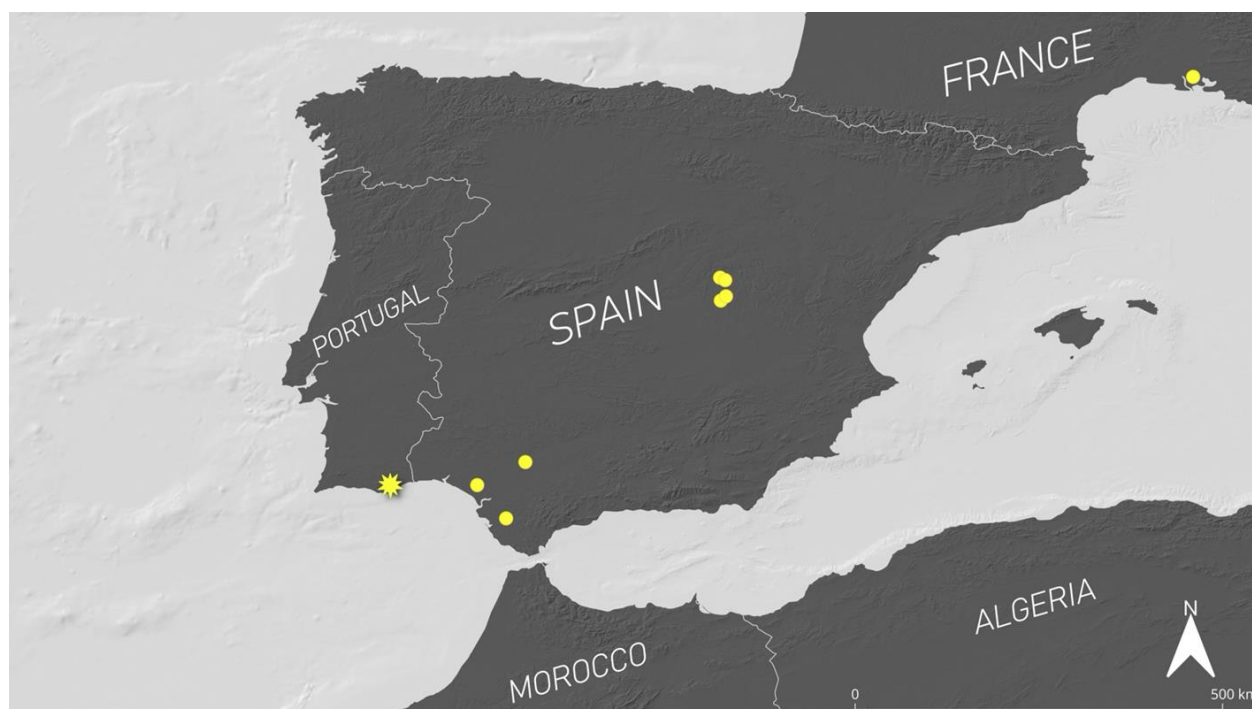


Figure 2. Known global distribution of *Teucrium aristatum*. Yellow dots: previous records, from Anthos (2025) and Puech & Tison (2011). Yellow star: Portuguese population reported in the present study.

Figura 2. Distribución global conocida de *Teucrium aristatum*. Puntos amarillos: registros previos, de Anthos (2025) y Puech & Tison (2011). Estrella amarilla: población portuguesa reportada en el presente estudio.

Conflict of interest

The authors declare no conflict of interest related to this publication.

CRediT authorship contribution statement

Conceptualization: JN, DGF. Investigation: JN, DGF. Visualization: JN. Writing-Original Draft Preparation: JN. Writing-Review & Editing: DGF.

Declaration of use of artificial intelligence (AI)

The authors declare that they have not used AI to generate the content of this manuscript.

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