

# *Euphorbia paniculata* subsp. *calcicola* U.Schwarzer & Vicens subsp. nov. (*Euphorbiaceae*), a new taxon of the southwestern Portugal

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**Abstract.** A new subspecies of *E. paniculata* Desf., *E. paniculata* subsp. *calcicola* U.Schwarzer & Vicens subsp. nov., is described. It grows in the proximity of the town of Sagres—southwestern Portugal—on calcareous substrate.

**Resumen.** Se describe una nueva subespecie de *E. paniculata* Desf., *E. paniculata* subsp. *calcicola* U.Schwarzer & Vicens subsp. nov. Crece en la proximidad de la ciudad de Sagres—suroeste de Portugal—en sustrato calcáreo.

**Keywords.** *Euphorbiaceae*, Iberian Peninsula, taxonomy.

**Palabras clave.** *Euphorbiaceae*, Península Ibérica, taxonomía.

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## INTRODUCTION

The genus *Euphorbia* L., in strict sense, is represented in the Iberian Peninsula by 54 species (Benedí & al. 1997). Some species are quite variable morphologically and subspecies are recognized. This is the case of *E. paniculata* Desf., a species with a wide distribution range in the Iberian Peninsula and North Africa. This species has habitat preferences restricted to marshes or areas close to streams, which result in populations appearing in isolated patches. In the Iberian Peninsula, *E. paniculata* was previously known from its southwestern quadrant (Benedí & al. 1997) until further explorations discovered some populations in the southeastern provinces of Murcia and Almería (Sánchez Gómez & al. 2006).

During recent fieldwork in the Sagres Peninsula of Portugal, two populations of *Euphorbia* with unclear identity were discovered. The general aspect resembled *E. paniculata* subsp. *monchiquensis* (Franco & P.Silva) Vicens, Molero & C.Blanché, but the leaves were clearly different, more similar to those of *E. clementei* Boiss.

## MATERIAL AND METHODS

Some specimens were collected in order to be preserved in BCN, LISE and the personal herbarium of one the authors

—U. Schwarzer—. Their morphology was compared to individuals of *E. paniculata* subsp. *monchiquensis* from populations in the southern Portugal and to herbarium specimens kept in BCN.

In addition, one specimen—SALA 41999— from this area—identified by Vicens & al. (1996) and Simon & Vicens (1999) as *E. clementei*— was also revised.

## RESULTS

### *Taxonomic treatment*

After examining the specimens and attending the existence of taxonomic characters to discriminate the studied individuals from other subspecies of *E. paniculata* we propose this new taxon:

*Euphorbia paniculata* subsp. *calcicola* U.Schwarzer & Vicens subsp. nov. Types: Portugal, Sagres, Barranco do Martinhal, lat. 37.019868, long. –8.935009, 2–IV–2017, U. Schwarzer US03\_2017\_01 (holo-: BCN 143355). Portugal, Sagres, Barranco do Rebolinho, lat. 37.026507, long. –8.922868, 5–V–2017, U. Schwarzer US05\_2017\_02 (para-: ex herb. U. Schwarzer). Portugal, Vila do Bispo, Sagres, Barranco do Martinhal, 18–III–2018, U. Schwarzer US03\_2018\_01 (para-: LISE 96315). Portugal, Sagres,

4–V–1980, F. Amich, E. Rico and J. Sánchez s.n. (para-SALA 41999). Figs. 1, 2.

LSID: [urn:lsid:ipni.org:names:77185791-1](http://urn:lsid:ipni.org:names:77185791-1)

*Euphorbia paniculata* subsp. *calcicola* subsp. nov. is closely related to *E. paniculata* subsp. *monchiquensis* (fig. 3), from which it differs in its higher stature, growing as a slender bush with 3–4 woody stems up to 200 cm, leaves shorter and more elliptic to ovate—lanceolate in *E. paniculata* subsp. *monchiquensis*—. Especially when young, the leaves are densely covered with short hairs (fig. 1), the older leaves keep the hairs along the margin and along the abaxial midrib. The bracts are ovate to rhomboid-orbicular and not ovate to lanceolate. The capsules differ in the pattern of surface papillae. *Euphorbia paniculata* subsp. *paniculata* and *E. paniculata* subsp. *welwitschii* (Boiss. & Reut.) Vicens, Molero & C. Blanché are quite different from *E. paniculata* subsp. *calcicola* subsp. nov.: they are shorter plants, up to 70 (100) cm high, and their leaves have a truncate base. The differences are summarized in table 1.

*Etymology*.—From Latin *calculus*, *-a*, *-um*: that thrives in calcareous soil.

*Distribution and habitat*.—The new subspecies was found in two dry seasonal water courses in the Sagres Peninsula—Costa Vicentina, Algarve, southwestern Portugal— (figs. 2, 4). The habitat is densely covered with a Mediterranean permanent shrub community of the *Asparagus albi-Rhamnion oleoidis* Rivas-Goday ex Rivas Martínez

1975. Due to constant winds on this southwestern edge of the European continent, this community has to be considered as climax stadium of the vegetation. The new taxon of *Euphorbia* grows sheltered by the bushy vegetation.

#### Identification key for the subspecies of *Euphorbia paniculata*

The new subspecies can be inserted in existing taxonomic keys (Benedí & al. 1997) as follows:

1. Plant up to 70 (100) cm, leaves truncate at the base ..... 2
  - Plant up to 150 to 200 cm, leaves attenuate ..... 3
2. Leaves oblong-lanceolate; seeds 3–4 mm long ..... *E. paniculata* Desf. subsp. *paniculata*
  - Leaves elliptic, seeds 2.3 to 2.8 mm long ..... *E. paniculata* subsp. *welwitschii* (Boiss. & Reut.) Vicens & al.
3. Plant up to 150 cm; leaves up to 100 mm long, lanceolate; pleiochasial bracts up to 75 mm long, from ovate to lanceolate ..... *E. paniculata* subsp. *monchiquensis* (Franco & P.Silva) Vicens & al.
  - Plant up to 200 cm; leaves up to 35 mm long, elliptic to ovate; pleiochasial bracts up to 20 mm long, ovate to rhomboid-orbicular ..... *E. paniculata* subsp. *calcicola* U.Schwarzer & Vicens subsp. nov.



**Fig. 1.** Young leaves of *E. paniculata* subsp. *calcicola* U.Schwarzer & Vicens subsp. nov. from Sagres—Algarve, Portugal—. [Photograph by U. Schwarzer, 5–XI–2017.]

**Table 1.** Comparison of the four subspecies of *E. paniculata* Desf.

	<i>E. paniculata</i> Desf. subsp. <i>paniculata</i>	<i>E. paniculata</i> subsp. <i>wehwitschii</i> (Boiss. & Reut.) Vicens & al.	<i>E. paniculata</i> subsp. <i>monchiquensis</i> (Franco & P.Silva) Vicens & al.	<i>E. paniculata</i> subsp. <i>calvicola</i> U.Schwarzer & Vicens subsp. nov.
Lifeform	Hemicriptophyte or chamephyte slightly lignified at base	Hemicriptophyte	Nanophanerophyte or chamephyte lignified at base	Nanophanerophyte with woody stems
Length	up to 70 (100) cm	up to 70 (100) cm	up to 150 cm	up to 200 cm
Leaves	25–60 (70) × 15–25 mm, oblong-lanceolate, margins normally serrulate and truncate base, glabrous or nearly glabrous	30–40 × 15–25 mm, elliptic, margins normally serrulate and truncate, glabrous	(20) 40–100 × 10–20 mm, lanceolate, margins normally entire and attenuate base, glabrous or sparsely hairy	(20) 25–35 × (5) 10–15 mm, elliptic to ovate, especially young leaves densely hairy, nearly tomentose, older leaves with hairs on leaf margin and midrib
Pleiochasial bracts	15–35 × 15–30 mm, elliptic	15–30 × 15–25 mm, ovate	20–75 × 15–30 mm, ovate to lanceolate	15–20 × 15–20 mm, ovate to rhomboid-orbicular
Capsule	4–6 mm, subspherical, covered with hemispheric papillae	4 mm, subspherical, covered with hemispheric papillae	4 mm, subspherical, densely covered with hemispheric papillae	3–4 mm, subspherical, sparsely covered with small papillae
Ecology	Diverse habitats linked to water, including watercourses and marshes, on silicic substrate	Humid places with <i>Vinca difformis</i> Pourt. and <i>Rubus cf. ulmifolius</i> Schott among shrublands on alkaline substrate, <i>Viburno tinifolium</i> Rivas Martínez & al 1990	Relict groves of <i>Quercus canariensis</i> Willd., on silicic substrate, characteristic to <i>Euphorbia monchiquensis-Quercetum canariensis</i> Malato Béliz in Rivas Martínez & al. 1990, but also in other habitats (Fox & Deil 2004).	Banks in dry seasonal water courses, on alkaline substrate —lime—, in permanent shrub communities of <i>Asparago albi-Rhamnon oleoidis</i> Rivas-Goday ex Rivas Martínez 1975
Altitude	100–900 m a.s.l.	50–200 m a.s.l.	100–600 m a.s.l.	10–30 m a.s.l.
Chorology	Scattered through South of Iberian Peninsula and coast of the Maghreb	Endemism of Serra de Sintra and surroundings of Lisbon	Endemism of Serra de Monchique —Algarve, Lower Alentejo—, southern Portugal	Endemism of Sagres Peninsula —Algarve—, southwestern Portugal





**Fig. 2.** Habit of *E. paniculata* subsp. *calcicola* U.Schwarzer & Vicens subsp. nov. from Sagres —Algarve, Portugal—. [Photograph by U. Schwarzer, 2–IV–2017.]



**Fig. 3.** Young leaves of *E. paniculata* subsp. *monchiquensis* (Franco & P.Silva) Vicens & al. from Aljezur —Algarve, Portugal—. [Photograph by U. Schwarzer, 5–IX–2017.]

## DISCUSSION

As a southwestern Iberian endemism, *E. paniculata* subsp. *calcicola* subsp. nov. occurs only in the thermomediterranean, dry, and rocky limestone coastland of Sagres Peninsula, where it copes with long drought periods.

This taxon is restricted to places very close to seasonal water courses which have water only for a few hours during rainfall events. Within this microhabitat the plants occupy the first bank, about one meter above the bed of the water course. The habitat of *E. paniculata* subsp. *calcicola* subsp. nov. is close to the Atlantic Ocean, but plants occur only in sites at elevation higher than 10 m a.s.l. Due to the short length of the water courses one can find plants between 10 and 30 m a.s.l.

The geological ages of the localities are Early Miocene and Upper Jurassic. The plants grow in clayey soil as weathering product of the dominant limestone rock.

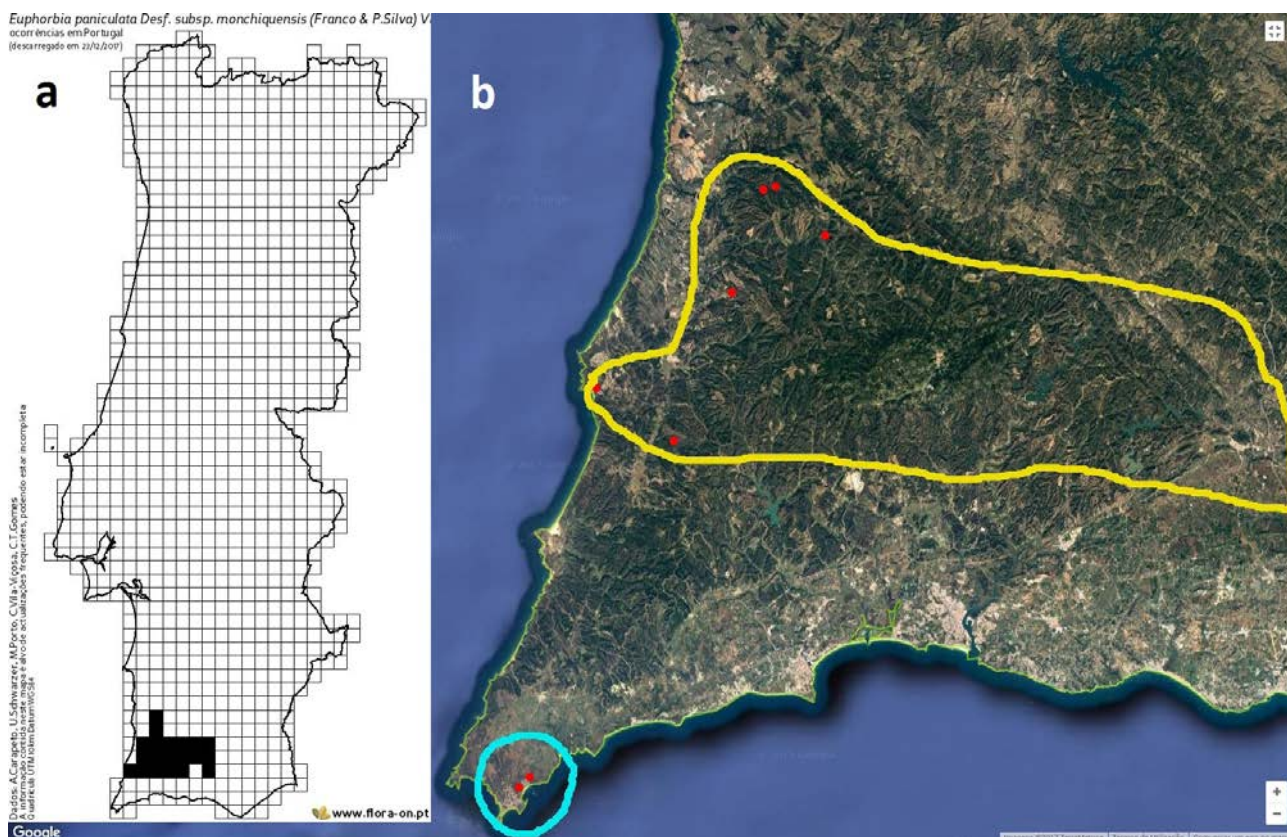
The origin of this subspecies could be explained (Vila-Viçosa & al. 2018) by the splitting of the distribution area of an ancestral form of *E. paniculata*, which potentially

occupied most of the southern Iberian Peninsula —Algarve and Andalusia— at the time of maximum glaciation in Europe —about 20.000 years—. At this time the area was occupied by the ancestors of the *Euphorbio-Quercetum canariensis* Woodland.

The population of *E. paniculata* subsp. *calcicola* subsp. nov. is estimated in 50–100 individuals and thus has to be considered as a threatened species. Despite the fact that the plants are growing within a protected area —Parque Natural do Sudoeste Alentejano e Costa Vicentina— they are threatened by intensive grazing. During the drought period in late summer and autumn, sheeps and goats invade the permanent shrub communities of *Quercus coccifera* L. and other bushes where *E. paniculata* subsp. *calcicola* subsp. nov. occurs. The plants are not affected by direct grazing but by the activity of the livestock around the bushes seeking edible plants under the shelter of tall plants.

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**Fig. 4.** Distribution maps: **a**, *E. paniculata* subsp. *monchiquensis* (Franco & P.Silva) Vicens & al. 2017); **b**, *E. paniculata* subsp. *monchiquensis* —yellow contour, approximate— with those localities checked for this work —red dots—, as well as those of *E. paniculata* subsp. *calcicola* U.Schwarzer & Vicens subsp. nov. —red dots within blue contour.



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