

# TAXONOMICAL DIFFERENTIATION OF THE COMPLEX *EUPHORBIA CHARACIAS* L. S.L. [SECT. *ESULA*] IN THE SOUTHWESTERN IBERIAN PENINSULA

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**Abstract.** Plant specimens of *Euphorbia* L. Sect. *Esula* Dumort from southwest Portugal, previously identified as *Euphorbia characias* subsp. *characias* L., have been analyzed. These specimens exhibit considerable morphological and ecological variability. Populations comprising tall individuals with yellow, mutic nectaria, consistently found growing along streams, are clearly distinct from both *E. characias* L. and *E. wulfenii* Hoppe ex W.D.J.Koch, their closest taxa. We herein describe *Euphorbia vincentina* U. Schwarzer & Capelo sp. nov., corresponding to these populations, which constitute an endemic species of southwestern Portugal.

**Keywords:** *Euphorbia*, Portugal

*Euphorbia* L. is a vast genus comprising approximately 1,800 species, widely distributed in temperate and tropical regions. In the Iberian Peninsula, within the section *Esula* Dumort., six taxa of perennial herbs can be found (Benedí et al., 1997), sometimes woody at the base, hairless or clothed; leaves alternate, entire, with pinnate secondary nerves, with margins gently serrated or entire; margin of nectaria, truncate or emarginate, or often with two acute or obtuse appendices; fruit with non-spongy pericarpium; cocci with smooth or granular quills; generally smooth seeds (Can & Küçüner, 2015). *Euphorbia characias* L. is a common plant in woodland hedges and thicket clearings in the Mediterranean Region, throughout southern Europe and reaching the Black Sea and Anatolia. Other similar species include *Euphorbia kotschyana* Fenzl (Anatolia) and *E. thomsonii* (Cyprus and southern Turkey). In the Mediterranean Region, and within the scope of *E. characias* s.l., two taxa treated as subspecies are currently recognized: the western Mediterranean *E. characias* subsp. *characias* L., Sp. Pl. 463 (1753) (from Portugal to Crete) and *E. characias* subsp. *wulfenii* (Hoppe ex W.D.J.Koch) Radcl.-Sm. [Feddes Repert. 79 (1–2): 55 (1968)] with a central-to-eastern Mediterranean distribution (Tutin, 1968).

In most Floras covering the territories of Portugal, or in general the southwest of the Iberian Peninsula (Coutinho, 1913, 1939; Sampaio, 1946; Franco, 1971; Benedí et al. in Castroviejo et al., 1997), all populations of *Euphorbia characias* s.l. have been systematized within *E. characias* subsp. *characias*. However, in spite of some recognizable variability, proposed taxa still fall within the scope of *E. characias* subsp. *characias*: e.g. *E. characias* var. *lusitanica* O.Bolós, Mem. Soc. Brot. 21: 325 (1971) (Franco, 1971; Govaerts et al., 2000).

During field work exploring the potential distribution of *E. paniculata* subsp. *calcicola* (Schwarzer and Vicens,

2018), in the southwest of Portugal, one of the authors found plants similar to *E. characias* unusually tall, with striking yellowish glands, and at sites along streams. Further explorations revealed more populations in southwestern Portugal possessing such a consistent character combination and ecology, distinct from those of *E. characias*. We now formally propose these plants belong to a new taxon based on morphological, biogeographical, and ecological data.

## MATERIAL AND METHODS

We surveyed the territory of southwest Portugal, focusing on habitat types known to harbor *Euphorbia characias* s.l. and, specifically, populations suspected to represent taxonomic novelties. Voucher specimens were deposited at the Herbarium of the Instituto Superior de Agronomia in Lisbon, Portugal (LISE), and at the Herbarium of the University of Porto (PO). This collection included specimens subsequently designated as type material, comprising both the holotype and isotypes. Morphological observations and measurements of the collected material were conducted using standard binocular microscopes, measured with ultraviolet illumination, and documented through digital imaging. Comparisons with specimens of the *Euphorbia characias* complex (*sensu lato*) were made using material from the herbaria LISE, LISI, LISU, and COI.

## RESULTS

In the eastern Mediterranean, with a few populations spreading as far west as southern France, tall plants with yellow nectaria with long horns correspond to *Euphorbia characias* subsp. *wulfenii* (Hoppe ex W.D.J.Koch) Radcl.-Sm., basionym: *Euphorbia wulfenii* Hoppe ex W.D.J.Koch, Syn. Fl. Germ. Helv. 631 (1837). The southwestern

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FIGURE 1. Holotype of *Euphorbia vicentina* U. Schwarzer & Capelo, deposited at PO (sub *Euphorbia characias* subsp. *rivulare*).

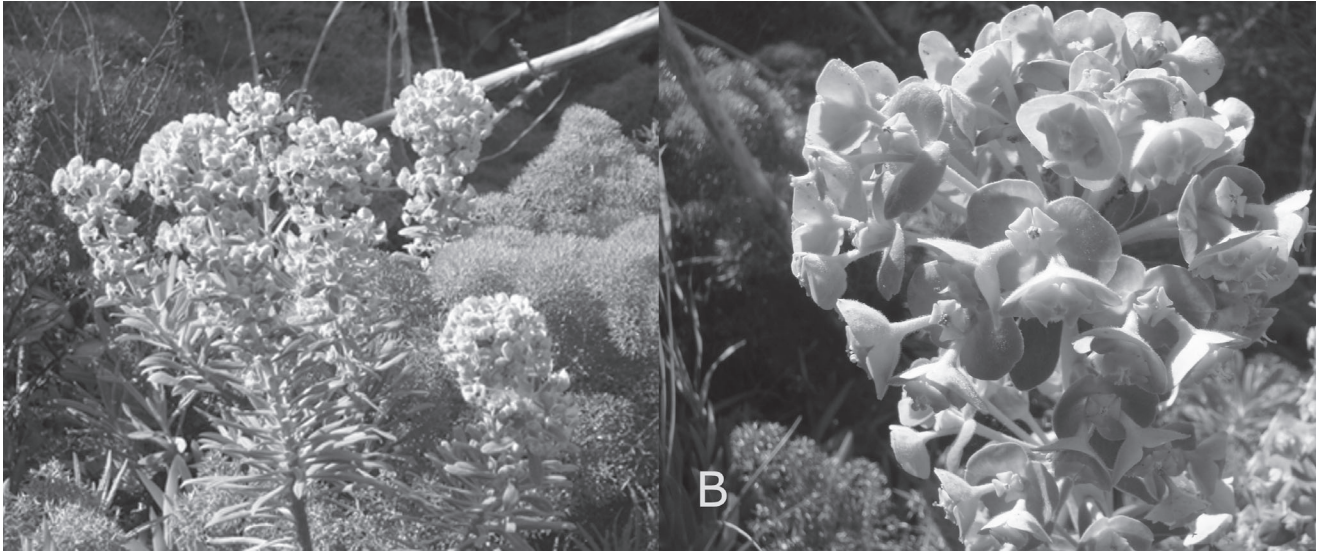


FIGURE 2. A, habit; B, inflorescence

<i>Euphorbia</i> sect. <i>Esula</i> in SW Portugal	<i>E. characias</i>	<i>E. wulfenii</i>	<i>E. vicentina</i>
Stems	Usually up to 80 cm	Up to 180 cm	Up to 180 cm
Nectaria	Dark reddish-brown, rarely yellow-brown, with short horns (0.3 - 0.5 mm) or emarginate	Yellow-green, with long horns (3-4 mm)	Yellow-green, seldom yellow-light brown, emarginate without horns, or rarely with short horns (0.3 - 0.5 mm)
Dichasial bracts	Fused to the center, forming a shallow bowl with a diameter of 9-16 mm	2/3 fused, funnel-shaped, 13-21 mm in diameter	Fused up to 3/4 ca. 20 mm diameter
Number of lateral shoots	> 10	> 10	< 10
Pleocasium ray length	30 - 50 mm	50 (100) mm	> 80 mm (120 mm)
Number of dichasia levels (bifurcations)	2 (3)	2 (3)	(3)4
Seed surface	Smooth	Tuberculate	Smooth

TABLE 1. Summary of the main features separating the three species of *E. characias* complex.

Note: Features and measures of *E. characias* subsp. *characias* and *E. wulfenii* were taken from herbarium specimens at LISE and LISI herbaria and from Tutin (1968), Franco (1971), and Benedí et al. (1997).

Portuguese taxon does not correspond to *Euphorbia characias* subsp. *wulfenii*, owing in particular to the absence of long horns in nectaria, a greater number of rays in the pleiochasium, dichasial bifurcation level reaching four times, plesiochasial bracts fused up to three-fourths, a smaller number of lateral shoots, and, significantly, the presence of smooth seeds as opposed to the tuberculate seeds of *E. wulfenii* (see Tab. 1 for a detailed comparison). In turn,

the southwestern Portuguese plants do not correspond to *E. characias* either, due to nectaria yellow color (not dark red/brown), smaller dichasial bracts, etc. (Tab. 1).

We evaluated the degree of taxonomical dissimilarity and distinguishable character combinations among the three taxa as corresponding, in all, to the rank of species instead of subspecies. Furthermore, biogeographical and ecological features set these taxa apart: *E. characias* in the western



FIGURE 3. Distribution of *Euphorbia vicentina* U. Schwarzer & Capelo in SW Portugal. Base-map from Google (2025) showing the area in SW Portugal; retrieved 16 July 2025 from [https://www.google.com/maps/@37.5823535,-8.3391281,9z?entry=ttu&g\\_ep=EgoyMDI1MDcxMy4wIjKXMDSoASAFQAw%3D%3D](https://www.google.com/maps/@37.5823535,-8.3391281,9z?entry=ttu&g_ep=EgoyMDI1MDcxMy4wIjKXMDSoASAFQAw%3D%3D) with overlaid points from Epicollect5™.

Mediterranean, *E. wulfenii* in the eastern Mediterranean, and the Portuguese southwestern riverine taxon, as a regional endemic. Thus, we consider *Euphorbia characias* L. and *Euphorbia wulfenii* Hoppe ex W.D.J.Koch as autonomous species and propose, as new, *Euphorbia vincentina* sp. nov. also as an autonomous taxon with the rank of species (see Tab. 1 and Key).

#### TAXONOMY

***Euphorbia vincentina*** U. Schwarzer & Capelo, sp. nov. TYPE: PORTUGAL: Vale da Ribeira das Cercas, Marmeleite, Portugal, Lat: 37.31578, Long: -8.674284, 15.05.2022, leg. U. Schwarzer (holotype: PO-V73302, sub “*Euphorbia characias rivulare*, ssp. nova U. Schwarzer &

Capelo”). Fig. 1

**Description:** A perennial forb, often woody at the base, fetid, hairy, with a thick rhizome. Stems, erect, reaching up to 180 cm (220 cm), with leaf scars, branched in the lower part, with up to 8 (10) pseudo-verticillate fertile lateral branches, hairy, and often purplish. Leaves 130 mm x 6–10 (20) mm lanceolate, oblanceolate, or linear, thick, very consistent, sessile, entire, with a revolute margin, the base attenuate, apex acute or subobtusate, mucronate, and hairy, adaxial surface dark green with a simple indumentum, especially in the leaf margins, while the abaxial surface is whitish. Pleiochasium with 9–20 rays up to 80(100) mm long, usually bifurcating 4(3) times, defining several dichasia levels. Pleochasial bracts elliptic or spatulate and entire. Dichasial bracts ovate and fused up to three-fourths

of their length. Cyathium *ca.* 2 mm wide. Nectaria are often yellow-green or seldom light brown, emarginate or with two very short appendages (0.3–0.5 mm). Fruit 4–5 mm x 4–5 mm, spherical, tomentose, deeply sulcate, with a pedicel longer than 2.5 mm. Cocci are rounded and smooth. Smooth seeds.

**Derivation:** “*vincentina*,” pertaining to the Coast of St. Vincent, in Southernwestern continental Portugal.

**Phenology:** Flowering from January to May

**Distribution and habitat:** *Euphorbia vincentina* Schwarzer & Capelo (Fig. 2) appears to be endemic to southwestern Portugal, with its entire distribution within the biogeographic Monchique Sierran and San Vicente Coastal Districts (Monchiquense-Algarvian Sector) (Rivas-Martínez et al., 2017), both with thermo- to mesomediterranean thermotypes and a subhumid to humid ombrotype (Rivas-Martínez et al., 2017). See Fig. 3. The new species has been found between Aljezur and Monchique (Algarve) and Odemira and Sines (Alentejo), always near streams or temporary water lines crossing sclerophyllous evergreen tall-hedge vegetation of the *Pistacio lentisci-Rhamnetalia alaterni* Rivas-Martínez 1975 order. Accounting for Annex I habitat types in use in the European Union, the optimum of *E. vincentina* would be in habitat type 5330 [“Thermo Mediterranean pre-desert scrub”] (CEC, 1992).

**Material labeled “*Euphorbia characias*” that corresponds to *Euphorbia vincentina* sp. nov.**

SERRA DE MONCHIQUE entre Belém e Fóia, pr. «Abrigo da Montanha», 22-IV-1968, Bellot & Casaseca 2248 (MA), R. Fernandes & al. 10422 (COI), Vasconcellos 68204 (LISI); Ribeira de Pisões, 22-IV-1968, Dias & Gama 911 (LISFA), R. Fernandes & al. 10425 (COI), Galiano, Malato-Beliz & Montserrat 5965 (EL VE, JACA, S E V), Rozeira & al. 9684 (PO); entre Monchique e Alferce, soto, 22-IV-1968, Dias & Gama 1012 (LISFA), Galiano, Malato-Beliz & Montserrat 5984 (ELVE, JACA, SEV), Rozeira & al. 9685 (PO).

***Euphorbia vincentina* sp. nov.** observed by the authors (LISE s.n.)

SERRA DE MONCHIQUE, Monte da Gingeira, 18.3.2013, U. Schwarzer; Barranco dos Pisões, 19.03.2013, U. Schwarzer; Convento da N.S. do Desterro, 3.12.2017, U. Schwarzer; Ribeiras das Cercas, Aljezur, 24.12.2020, U. Schwarzer; Rochas, Marmeleite, 21.05.2025, U. Schwarzer; Ribeira das Cercas; Marmeleite 19.09.2021 U. Schwarzer; COSTA VICENTINA, Praia do Amado, 25.12.2015, U. Schwarzer; Santa Susana, 3.2.2019, U. Schwarzer; Barranco de Vale da Telha, 1.4.2016, U. Schwarzer; Ribeira de Monte Clérigo, 30.12.2016, U. Schwarzer; Praia da Amoreira, 25.03.2025, U. Schwarzer; Palazim, 20.04.2025, U. Schwarzer; U. Schwarzer; COSTA ALENTEJANA, Furnas, 27.04.2015, U. Schwarzer; Foros do Galeado, 24.8.2021, U.

Schwarzer; Ribeira de Morgavel, 31.3.2018, U. Schwarzer;

**Conservation:** The Extent of Occurrence (EOO) of *E. vincentina* is estimated to be approximately 1,780 Km<sup>2</sup>. We propose the Threat Category, strictly based on EOO, using the IUCN (2012) B1 criterium, to be Endangered f).

#### DISCUSSION

*E. vincentina*, apparently once included as an extreme of variation within *E. characias* subsp. *characias* (Franco, 1971), has, otherwise, a consistent discrete character correlation that is confined to a precise biogeographical scope: the Monchiquense-Algarvian Sector of the Western Lusitanian-Andalusian Coastal Province of the Mediterranean Region of the Holarctic Kingdom (Takhtajan, 1986; Rivas-Martínez et al., 2017). Also, its ecological requirements seem to set it apart from *E. characias*. Moreover, as we adopt a narrower species concept for *E. vincentina* and because it shows a level of dissimilarity to *E. characias* comparable to that of *E. wulfenii*, the rank of species that we now propose seems appropriate. We expect ongoing molecular studies to be consistent with its taxonomic independence.

*E. vincentina* significantly adds to the biogeographical originality of the southwest of the Iberian Peninsula, where a wealth of endemic taxa and vegetation types is found (Vila-Viçosa and Arsénio, 2021). Conservation measures ensuring the protection of the Annex I habitat types (CEC, 1992) [habitat 5330] where *E. vincentina* occurs, and monitoring of its population status, are advisable.

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KEY TO THE SPECIES OF THE *EUPHORBIA CHARACIAS* COMPLEX (S.L.) IN SW PORTUGAL.

1. Plants up to 30–80 cm tall, nectaria mostly reddish-brown to dark brown, truncate, seldom horned . . . . . *E. characias*  
 1'. Plants up to 180 cm tall, nectaria mostly yellow, rarely light brown, sometimes with horns . . . . . 2  
 2. Pleocasium with 9–20 rays, up to 30(50) mm long, 2(3) times dichotomous (forked), nectaria with long curved horns (0.5–4.0 mm). . . . . *E. wulfenii*  
 2'. Pleocasium with >20 rays, up to 60(75) mm long, (3)4 times dichotomous, nectaria truncate or with slightly acuminate corners, or with very short horns (0.3–0.5 mm) . . . . . *E. vincentina*