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## A new species of *Anthemis* sect. *Hiorthia* (Asteraceae) from SE Sicily

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### Abstract

A new species of *Anthemis* sect. *Hiorthia* (Asteraceae) is described from Sicily. This taxon, named *A. piagnattiorum*, is confined to a restricted area of the Hyblaean territory (SE Sicily), in the Natural Reserve of Cava Grande (Cassibile, Siracuse), where it takes shelter on carbonate rocky habitat and participates, with other Sicilian endemic taxa, to the composition of a termophilous chasmophytic community (*Putorio calabrica*–*Micromerietum microphyllae*).

**Keywords:** *Anthemis*, chasmophyte, endemic flora, Sicily, Hyblaean plateau

### Introduction

A monographic revision of North African taxa of *Anthemis* has been published by Oberprieler (1998). This monograph is based on detailed morphological studies and is enriched with chromosome numbers and karyotypes for most taxa.

In the flora of Italy, *Anthemis* L. is represented by 17 species and 10 additional subspecies (Greuter 2008). *A.* sect. *Hiorthia*, including a rich contingent of punctual endemics, is of considerable phylogeographical and systematic relevance. In Sicily, that section, up to now, was represented by two endemic species: *A. cupaniana* Tod. ex Nyman, frequent in mountain localities of the northern part of the Island, and *A. Ismelia* Lojac., localized on cliffs along the sea on Mount Gallo near Palermo.

Floristic investigations in South-western Sicily led to the discovery of a sizeable population of plants belonging to *Anthemis* sect. *Hiorthia* that show morphological differences as compared with all other species in Sicily and elsewhere in the Mediterranean area. An in-depth study allowed us

to define this population to a new species, here described as *Anthemis piagnattiorum*.

### Materials and methods

Morphological analyses were carried out on herbarium specimens and living plants cultivated in the Botanical Garden of Palermo from stock collected in the *locus classicus*. Descriptive terminology follows Oberprieler (1998). The nomenclature of the taxa cited in the text follows Raimondo et al. (2010).

### Results

*Anthemis piagnattiorum* Guarino, Raimondo & Domina, **sp. nov.** (Figures 1 and 2).

*Holotype:* Sicily, Cavagrande del Cassibile (Siracuse), 36°97'89"N, 15°07'95"E, 400 m a.s.l., on vertical calcarenite cliffs, 2.5.2012, Guarino & Raimondo (PAL; isotypes PAL, PAL-Gr, FI, B).

*Diagnosis:* Ab *Anthemis cupaniana* et *A. ismelia* foliis 2–3-pinnatisectis nec 1–2-pinnatifidis et acheniis corona destitutis differt.

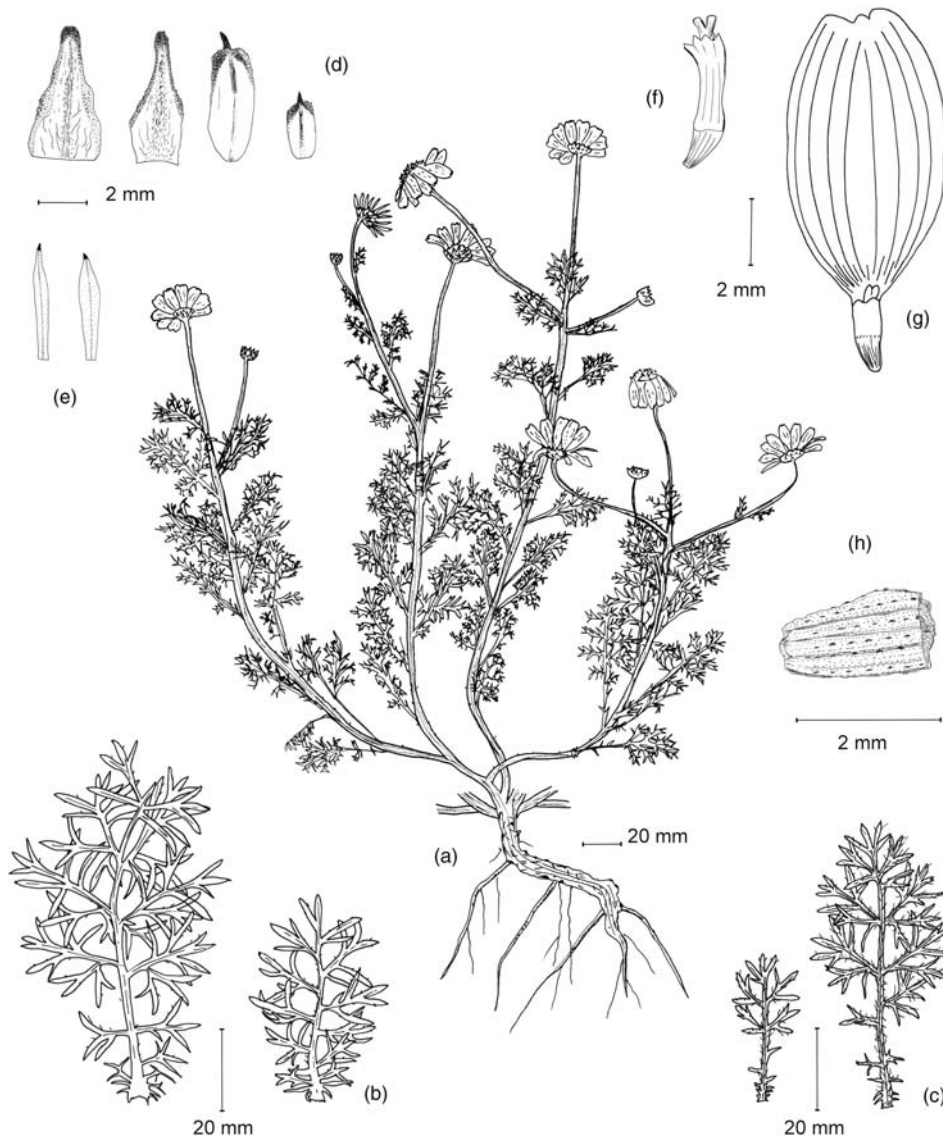


Figure 1. *Anthemis pignattiorum* Guarino, Raimondo & Domina: (a) habit; (b) leaves, adaxial view; (c) leaves, abaxial view; (d) involucral bracts; (e) pales; (f) disc floret; (g) ray floret and (h) achene of disc floret [drawn by G. Domina from the original material].

**Etymology:** the new species is dedicated to Sandro Pignatti and Erika Pignatti-Wikus, active botanists in Italy who dedicated their efforts to the study of the flora, particularly of the Italian species.

**Description:** Perennial. Rhizome up to 10 mm in diameter. Stems 20–50(90) cm long, basally 2–6 mm in diameter, branched in the distal half and with up to 5–6 capitula, sparsely to densely appressed-

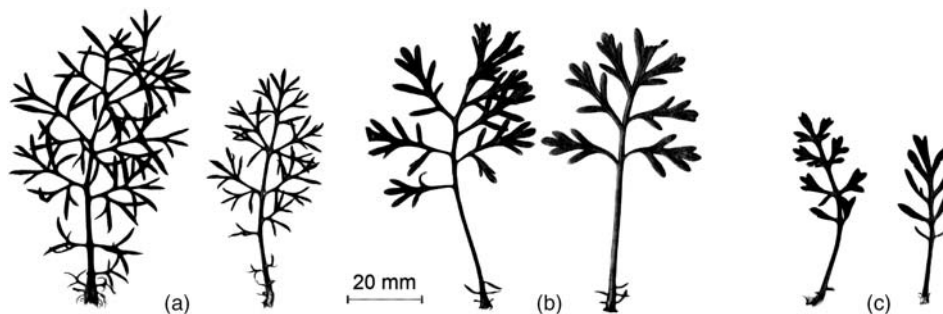


Figure 2. Basal leaves of (a) *Anthemis pignattiorum*, (b) *A. ismelia* and (c) *A. cupaniana*.



Figure 3. *Anthemis pignattiorum* Guarino, Raimondo & Domina in its secondary habitats colonized by semi-ruderal vegetation.

hairy with medifixed hairs and interspersed glands. Lower cauline leaves and leaves of non-flowering shoots 40–80 mm × 20–50 mm; petiole 7–15 mm long; base usually with two to four pairs of dissected teeth; blade 2–3-pinnatisect, with three to five pairs of ovate to elliptical primary lobes; ultimate segments elliptical to narrowly elliptical, 5.5–12.0 mm × 0.8–1.9 mm, sparsely to densely hairy. Middle and upper cauline leaves 25–45 mm × 10–30 mm, sessile or with an up to 15-mm long petiole; base with one to three pairs of dissected or entire teeth; blade 20–40 mm 1–2(3)-pinnatifid; ultimate segments 1–5 mm × 0.6–1.5 mm, elliptical to linear, sparsely to densely hairy. Peduncles 10–50 mm long and 1.4–2.5 mm in diameter. Capitula 20–30 mm in diameter. Involucre 10–20 mm in diameter. Involucral bracts in two to three rows, sparsely to densely hairy; the outermost ovate or triangular to narrowly triangular, 3.8–5.4 mm × 0.7–2.0 mm, acute, with dark brown membranous margins 0.2–0.5 mm wide laterally, 0.3–0.5 mm wide apically; the middle ones narrowly elliptical to narrowly obovate, 4.4–5.9 mm × 0.9–2.4 mm, acute to obtuse, with dark brown to pale membranous margins 0.3–0.5 mm wide laterally, 0.4–0.6 mm wide apically; the innermost narrowly obovate, 3.2–4.4 mm × 0.8–1.4 mm, apically abruptly acuminate, with brown to pale membranous margins 0.3–0.6 mm wide laterally. Ray florets (8–) 12–15 per capitulum, white, female, 15–16.8 mm long; limb elliptical to narrowly elliptical, 11–14 mm long and (3.5–)4.0 to 5.5(–6.2) mm wide; tube 2.6–3.0 mm long and 1.2–1.6 mm wide. Pales narrowly elliptical to linear, 3.6–3.9 mm × 0.2–0.4 mm, apically tapering gradually into an apex tinged with black, basally 0.1–0.2 mm wide. Disc florets 4.8–5.2 mm long; the basal part 0.9–1.3 mm × 0.7–0.8 mm. Achenes of ray florets 2.2–2.6 mm long and 1.3–1.6 mm in diameter; corona absent. Achenes of disc florets 2–2.2 mm long and 1.1–1.3 mm in diameter, *c.* 10-ribbed; ribs strongly tuberculate, tubercles topped with mucilage cells; furrows with yellow glands; corona absent, exceptionally a short and discontinuous rim due to the apically somewhat protruding ribs.

*Phenology*: The new species flowers from April to May and fruits in June and July.

*Distribution and habitat*: Endemic to the Hyblaean plateau (South-eastern Sicily). The south-eastern corner of Sicily is formed of a carbonate platform named “Hyblaean Plateau”, a succession of horizontal layers of Miocene marls and limestones crossed by a complex system of deep canyons. *Anthemis pignattiorum* is found in one of these canyons, Cava Grande del Cassibile, in the eastern sector of the Hyblaean Plateau. The lithostratigraphic succession of Cava Grande del Cassibile includes, at the bottom, an alternation of marly limestones with a thickness of about 150 m, upwards followed by multi-layered banks of whitish–yellowish calcarenites, also about 150 m thick, topped by more compact limestones ascribed to the Climiti Unit, 100 m thick (Campisi 1961).

*Anthemis pignattiorum* grows exclusively on the intermediate lithostratigraphic unit of the canyon, i.e. on the cliff-forming outcrops of whitish to yellowish calcarenites, in a very restricted area centred on the following coordinates: 36°97′06.85″N, 15°08′79.40″E. The area pertains to the Rivas Martínez’s Mediterranean pluvisessional oceanic bioclimate, with mesomediterranean thermotype and humid ombrotype (Scelsi & Spampinato 1998).

The only known population *Anthemis pignattiorum* counts a few hundred individuals, whose primary habitat is represented by north-exposed vertical cliffs, colonized by a chasmophytic vegetation known as *Putorio calabricae–Micromerietum microphyllae* (Brullo et al. 1998; Minissale et al. 2007). Frequent companions of *Anthemis pignattiorum* are *Erica multiflora* subsp. *hyblaea*, *Brassica incana*, *Cymbalaria pubescens*, *Dianthus rupicola*, *Silene fruticosa*, *Lomelosia cretica*, *Odontites bocconeii* subsp. *angustifolia*, *Hypochaeris laevigata*, *Ceterach officinarum*, *Helichrysum stoechas*, *Micromeria microphylla*, *Ficus carica*, *Phagnalon saxatile*, *Polypodium cambricum*, *Umbilicus rupestris*, *Putoria calabrica*, *Antirrhinum siculum* and *Sedum dasyphyllum*. On the whole, the accompanying flora includes many of the most representative endemics of the Hyblaean district (Brullo et al. 2011).

Following a calamitous wildfire that took place in summer 2009, some individuals of *Anthemis pignattiorum* were found in secondary habitats colonized by semi-ruderal vegetation (Figure 3), in which frequent species were *Calendula suffruticosa*, *Carduus corymbosus*, *Anthemis arvensis* subsp. *incrassata*, *Anisantha madritensis*, *Urtica membranacea*, *Scrophularia peregrina*, *Euphorbia ceratocarpa*, *Oryzopsis miliacea*, *Teucrium flavum*, *Urospermum picroides*, *Bituminaria bituminosa*, *Dittrichia viscosa*, *Lobularia maritima*, *Lathyrus clymenum*, *Vicia pseudocracca*, *Calamintha nepeta*, *Echium plantagineum*, *Hypochaeris achyro-*

*phorus*, *Reseda alba*, *Avena barbata* and *Allium subhirsutum*. However, *Anthemis pignattiorum* is disappearing rapidly from that secondary stand, being “smothered” by environmental pressures and interspecific competition.

**Conservation status:** The only known population of *Anthemis pignattiorum* falls into a regional wildlife preserve created by the D.G.R. nr. 88, issued on 14 March 1984. In the following years, the site was recognized as being of Community Importance, according to the EU Directive 92/43. In spite of being situated within a protected area, the small number of mature individuals, the extreme localization (extent of occurrence – 4 km<sup>2</sup>, area of occupancy – 4 km<sup>2</sup>, effectively occupied area – about 0.5 km<sup>2</sup>) and the extreme fluctuation in the number of mature individuals observed in the last years due to periodical wildfires suggest, according to the IUCN criteria for the conservation status assessment (IUCN 2010), to recognize *Anthemis pignattiorum* as Critically Endangered (CR) = B1, B2, a, cIV. As for other strictly endemic chasmophytic taxa (Raimondo et al. 2012a, b), this species requires special conservation measures. For *ex situ* conservation, seeds are stored in the PAL Seed Bank, and living specimens are grown in the Palermo Botanical Garden.

### Discussion and conclusions

The new species differs from *Anthemis cupaniana* and *A. ismelia* by basal leaves that are 2–3-pinnatisect instead of 1–2-pinnatifid and by achenes devoid of a proper corona such as occurs in the latter. In addition, the achenes of *A. cupaniana* are light brown, while in *A. pignattiorum* and *A. ismelia* they are dark brown. *A. pignattiorum* differs from *A. punctata* Vahl subsp. *punctata* by the tuberculate achenes without corona rather than smooth and auriculate achenes (cf. Oberprieler 1998).

The new taxon adds to the rates of endemics of the Sicilian flora. Indeed, the vascular flora of the Island has recently increased by the discovery of several new herbaceous (Raimondo & Spadaro 2006, 2008; Raimondo & Di Gristina 2007; Troia & Raimondo 2009; Cataldo et al. 2012; Troia et al. 2012; Gottschlich et al. 2013), suffruticose (Raimondo & Domina 2006) and woody taxa (Castellano et al. 2012; Marino et al. 2012; Raimondo et al. 2012a,b). The species here described is a suffruticose chasmophyte restricted to conservative habitats, same as *Anthemis cupaniana* and *A. ismelia* belonging to the same section. Although both *A. ismelia* and *A. pignattiorum* are CR, endangerment of the first named is extreme due to the low number of extant individuals. *A. pignattiorum*, in fact, occupies not only its primary rocky habitat but also mossy ledges and nitrophilous spots at the base of vertical cliffs.

Some other morphologically similar to North African taxa of *Anthemis* sect. *Hiorthia*, e.g. *A. punctata*, on the contrary, are mountain plants.

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