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Abstract

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The population of a wild artichoke discovered in 1997 in the western part of Cyprus proved to be a new species, *Cynara makrisii*. Morphologically it is similar to *C. cyrenaica,* known to occur in Libya and Crete.

Additional key words: *Compositae, Cynara cyrenaica,* taxonomy, endemism, East Mediterranean

Introduction

Two species of wild artichoke were known to occur in Cyprus, *Cynara cardunculus* L. and *C. cornigera* Lindl. (Meikle 1985; Wiklund 1992). Since the publication of Meikle's standard flora for the island and Wiklund's monograph, the situation has become somewhat more complicated. A paper by Robba & al. (2005), which discusses the phylogeny of the genus, mentions the occurrence of *C. cyrenaica* Maire & Weiller in Cyprus but gives no specific details. This proved to be an error (L. Robba, pers. comm. to R. Hand; see also Makris 2007).

On 16 June 1997, Christodoulos Makris asked G. Hadjikyriakou to examine a specimen of a *Cynara* species from the Vretsia area (western Cyprus). Although it appeared at first to be *C. cardunculus*, Makris was unconvinced. Indeed, further studies revealed that the specimen differed considerably from the two indigenous taxa mentioned above, and the finding was published as a first record of *C. syriaca* Boiss. in Cyprus (Makris & Hadjikyriakou 2006). However, further examination and comparison led to the conclusion that the plants are not conspecific with *C. syriaca,* but are morphologically much closer to *C. cyrenaica*. Consequently, it was recommended that the plant be included in the Cypriot Red Data Book under that name (Makris 2007).

When more samples of the rarely collected *"Cynara cyrenaica"* from Cyprus became available, examination revealed that the plants actually differ from all known *Cynara* taxa through a combination of characters, some of which are discontinuous. In our opinion this variation merits recognition of a new taxon at species rank.

Material and methods

In addition to studies in the field, the investigation is based on herbarium specimens preserved at the B, K and MPU (abbreviations after Holmgren & Holmgren 1998+) as well as on the material of the new taxon cited below. Material of the Cypriot plant has been compared to specimens of all accepted *Cynara* species (i.e., the specimens at K cited by Wiklund 1992 and the complete material at B). Plants have been raised from fruits collected at the type locality and cultivated at both the Botanic Garden Berlin-Dahlem and at the Athalassa Environmental Centre in Cyprus.

Chromosomes were counted in root-tip metaphases following the technique described by Vogt & Aparicio (2000).

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Fig. 1. *Cynara makrisii* – A: capitula; B: upper part of the corolla; C: lower stem leaf; D: wilted corolla surrounded by pappus; E: root-tip metaphase, showing $2n = 34$. – Scale bars: B = 2 mm, D = 4 mm, E = 10 µm. – Photographs by G. Hadjikyriakou from the type locality (A, C), and by M. Lüchow (B, E) and C. Makris (D) of material from the type locality.

Results and discussion

Cynara makrisii Hand & Hadjik., **sp. nov.**
Holotype: Cyprus, Divison 3 (sensu Meikle 1977), Pafos district, Argaki tou Kourellou southeast of Vretsia, slope with *Sarcopoterium spinosum* phrygana, c. 350 m, 24.5.2007, *Hadjikyriakou 6969* (CYP; isotypes: B, STU, herb. Hadjikyriakou).
[– *Cynara cyrenaica* auct. cypr. non Maire & Weiller]
[– *Cynara syriaca* auct. cypr. non Boiss.]

Cynara cyrenaicae aemulans, praecipue differt rhachidibus foliorum et lobulorum latioribus (5.5-9 mm, non 1.5-5 mm) et antheris longioribus (8.5-10 mm, non 6.7-7.7 mm).

Perennial up to 80 cm high. *Taproot* unbranched, occasionally 2-3-branched apically, more than 50 cm long. *Stems* 5-12 mm wide at base, sulcate, 14-21 ribbed, thinly to densely floccose-woolly, glandular, branched in the upper part, flashed purple upwards. *Juvenile leaves* (leaves of seedlings) undivided; lamina ovate, dark green above and marbled with white venation, densely woolly beneath, with reticulate venation; margins dentate to obscurely serrate; apex acute, base wedge-shaped; petiole not spiny, flashed purple. *Leaves* of mature plants basally rosulate, usually sparsely set along stem, almost to the capitulum, green and glabrescent above, slightly glandular, sometimes slightly scabrid, thinly to densely woolly and glandular below,

Table 1. Selected characters of *Cynara makrisii* and *C. cyrenaica*.

Characters	***C. makrisii***	***C. cyrenaica***
Leaf rachis width [mm]*	5.5-9	1.5-4
Leaf segment rachis width [mm]*	6-9	1.5-5
Leaf segments	12-20, apically acuminate, rarely shortly caudate	14-33, apically caudate
Petiole of basal leaves	the lower part not spiny, the upper with few spine clusters or small spiny lobules	the base with marginal fringes of small spines
Involucre	ovoid to conical, constricted at apex	broadly ovoid
Corolla length [mm]	36-46	29.3-38.6
Anther length [mm]	8.5-10	6.7-7.7
Style length [mm]	40-56, incl. branches 7.5-9.5	37.7-40.9, incl. branches 6.6-8.2

*Measurements taken equidistantly between segments and lobes resp.; often representing the narrowest part of rachis. A different approach by Wiklund (1992) dealing with nearly identical material may be responsible for higher maxima in her description of *Cynara cyrenaica*.

triangular-lanceolate in outline, 15-60 × 10-30 cm, deeply pinnatisect, slightly folded along the midrib and along the main vein of the segments, rachis of leaves 5.5-9 mm wide; segments 12-20, lanceolate (ovate to broadly lanceolate in outline), 2-15 × 1-1.5 cm, apex acuminate, rarely shortly caudate, spine 3-6 mm long, yellow, rachis of segments 6-9 mm wide; margins with deltoid, yellow spine-tipped lobes, the margins of the lobes entire or with a single basal spine-tipped lobulus at one side of the base, very rarely on both sides. *Basal leaves* petiolate, the lower part of the petiole not spiny, the upper with few-spined clusters or spine-tipped lobules. *Cauline leaves* not decurrent; the lower part of the petiole in the lower cauline leaves usually not spiny, the upper part with few-spined clusters or spine-tipped lobules, or occasionally spiny to base; the middle and uppermost cauline leaves progressively smaller upwards, the lower part of the petiole in the middle cauline leaves spiny to the base, or occasionally not spiny, the upper part with few-spined clusters or spine-tipped lobules; the uppermost cauline leaves usually sessile or obscurely petiolate, spiny to the base. *Capitula* terminal, solitary or by few in sparsely branched corymbs, pedunculate to subsessile. *Involucre* ovoid to conical, constricted above, 30-60 × 20-35 mm, the middle involucral bracts protruding 6-30 mm on either side. *Involucral bracts* greenish purple, closely imbricate, in 9-12 series; the outer 2 series small, triangular to ovate, with acuminate, spine-tipped apex; the median 4-5 series progressively larger, up to 55 mm long, the lower part broad, incurved and somewhat concave, ovate to broadly ovate, 8-21 × 8-20 mm, abruptly constricted above into a rigid terminal reflexed spine, 6-37 mm long; the inner 2-3 series up to 50 mm long, the lower part oblong to narrowly ovate, 16-20 × 10-16 mm, incurved, flattish, with a broadly ovate to circular apical appendage up to 13 mm long, which is constricted apically into an acuminate suberect spine, 5-20 mm long, glabrous internally, the outer surface glabrous below, subglabrous above, the appendage with short glands; the innermost 2-3 series up to 41 mm long, the lower part nearly oblong to linear, 25-30 × 2.5-8 mm, incurved, flattish, with a nearly distinct to distinct, lanceolate, oblong or narrowly ovate to ovate, acute, mucronate to spinose apical appendage, 7-12 mm long, tinged pink or purple, the inner surface glabrous, the outer surface glabrous below and somewhat appressed pilose above, the appendage with short glands. *Receptacle* pitted, the walls densely setose, bristles white, unequal, 6-20(-30) mm long. *Florets* violet-purple, conspicuously exceeding the involucre. *Corolla* 36-46 mm long, tube slender, glabrous, 21-33 mm long, limb 12-15 × 1.1-1.6 mm, lobes linear, erect, 7-9.5 × 0.4-0.7 mm. *Stamina* with *filaments* 3-3.5 × 0.3-0.7, free, papillose; *anthers* subequal, linear, 8.5-10 × 0.4-0.7 mm, included, apical appendage blunt to subacute, base sagittate. *Style* 40-56 mm long, exserted; branches erect, 7.5-9.5 mm long, united almost to the blunt, bifid apex; basal annulus hairy-papillose, longitudinally furrowed. *Achenes* 5-6.5 × 3.5- 4 mm, somewhat laterally compressed, nearly obovoid, oblique, straw coloured to brown, with black to dark brown blotches and longitudinal lines, sometimes grooved. *Pappus* copious, white at first, slightly tinged brown towards the base with age; bristles free, unequal, up to 37 × 0.1-0.5 mm, somewhat rigid, marginally plumose below for about $^{2}/_{5}$ to $^{3}/_{5}$ or more with long or short lateral hairs, barbellate-scabridulous above, occasionally all bristles or many of the inner almost totally barbellate-scabridulous.

Flowering period. — May to July.

Chromosome number. — $2n = 34$ (two different plants counted, germinated at the Botanic Garden Berlin-Dahlem from achenes collected at the type locality in 2008 by *Hadjikyriakou s.n.,* Fig. 1E). All other species

of the genus counted so far have the same number (see Goldblatt & Johnson 1979+).

Illustrations. — Fig. 1; Makris 2007: 192, 193 sub *Cynara cyrenaica*.

Eponymy. — The new species is dedicated to Christodoulos Makris (Lemesos, Cyprus), investigator of the flora and insect fauna of Cyprus, who discovered the plant.

Relationship. — The new taxon is morphologically close to *Cynara cyrenaica* but differs in several characters (Table 1). Two other taxa can be superficially similar: (1) delicate, relatively tall specimens of the E Mediterranean *C. cornigera* (see Wiklund 1992: 103) but differing clearly by, e.g., leaf colouration and cyathiform involucres; (2) plants of the W Mediterranean *C. algarbiensis* Mariz, which have, e.g., shorter florets and a differing leaf structure. Consequently, comparative studies concentrated on *C. cyrenaica* (see Table 1), which is only rarely found in European collections (search at G, JE, Z without success; one specimen from FI could be that taxon). Our analysis is based on few but additional specimens compared to Wiklund's (1992) monograph. Her measurements could be confirmed; only in a few cases new maxima or minima could be added. It is significant that measurements of plants from the isolated Cretan population do not differ from those of Libyan occurrences of *C. cyrenaica*. Even considering the somewhat broader base of data, the *Cynara* population from Cyprus does not represent merely an extreme of the variation of *C. cyrenaica* but a different taxon. Because of the existing discontinuities (see Table 1) the rank of species seems appropriate.

Both taxa, *Cynara makrisii* and *C. cyrenaica,* may have had a common ancestor. There are certain floristic affinities between Libya, especially the Cyrenaica, and Cyprus. The situation is characterized by several disjunctions either at population level or concerning closely related taxa (e.g., *Erica sicula* Guss., *Ononis reclinata* var. *monophylla, Teucrium* sect. *Polium,* see Meikle 1977, 1985, Hadjikyriakou & Hand 2008).

Further phylogenetic studies using molecular techniques to clarify the position of *Cynara makrisii* are under way (Gemeinholzer & al., in prep.).

Distribution and ecology. — *Cynara makrisii* was first located at Argaki tou Kourellou, about 2 km SE of Vretsia village (western slopes of Xeros River) at an altitude of about 350 m. Later on, a smaller patch has been located on the eastern slopes of the river. The whole population covers an area of about six hectares. The surrounding area is characterized by even ground to steep slopes, dissected by streams. The geological substratum belongs in part to Kathikas formation (variably coloured, poorly sorted debris with angular clasts up to boulder size in a sand and clay matrix; most clasts are derived from the Mamonia Complex but some are of Troodos ophiolite lithologies), and in part to Kannaviou formation (Bentonitic clays interbedded with off-white volcaniclastic sandstones; see Xenophontos 1997). During the dry period the soil of the area is characterized by deep cracks, whereas in winter and spring small-scale landslides occur on the steep slopes. Due to these latter characteristics the land is treeless, covered with phrygana or herbaceous vegetation. The dominant plants are: *Sarcopoterium spinosum* Spach., *Asphodelus aestivus* Rchb., *Eryngium creticum* Lam., *Vicia bithynica* L., *Hordeum bulbosum* L., *Dactylis glomerata* L., *Piptatherum miliaceum* (L.) Cass., *Avena* sp., *Daucus carota* L., *Serapias* sp.

The unique geological situation that prevents the colonisation of trees may be the reason that *Cynara makrisii* is one of the few Cypriot micro-endemics that is not found on cliffs or in rocky habitats. The search for additional sites in Cyprus has not been successful so far.

Conservation. — The species is included in the Red Data Book of the Flora of Cyprus (Makris 2007, sub *Cynara cyrenaica*). Potential threats are fires, overgrazing and land reclamation. The plant is possibly also affected by landslides, particularly in periods with prolonged rainfall and large soil cracks in prolonged drought. *C. makrisii* seems to be a rare endemic species of Cyprus and according to the IUCN criteria it is categorized as "vulnerable" (VU D2, see Makris 2007 for further details). It should be noted that only a small percentage of achenes may reach maturity (only 2-5 per head, often none). They are destroyed by an unknown insect species, which attacks the capitula as soon as the florets start to wither.

Specimens seen. — *Cynara makrisii* (additional material from the type locality): 16.6.1997, Makris in Hadjikyriakou 2743; 31.5.2004, Hadjikyriakou 6092 & Makris; 28.4.2007, Hadjikyriakou 6955 & Hand; 31.5. 2004, Hadjikyriakou 6092 (all B, herb. Hadjikyriakou); 16.1.2007, Hadjikyriakou 6947 (plant raised from seeds collected by C. Christodoulou at the type locality and cultivated at the Athalassa Environmental Centre).

Cynara cyrenaica (* = digital image): LIBYA: CYRENAICA: Road to Talonota, 1500', 24.5. 1958, *B. C. Park 572* (K); 20 km west of Benghazi, 25 m, 8.4.1961, *Khalifa el Karamanli 889* (K); el-Ghegab a sud est di Cirene, steppa a *Poterium,* 28.4.1934, *R. Pampanini & R. Pichi-Sermolli* (K); in humosis supra Appoloniam, 200-300 m, solo calcareo, 22.4.1938, *Maire & Weiller*, *Iter Libycum 1938, no. 908* (lectotype of *C. cyrenaica,* designated by Wiklund 1992: 94; MPU*); prope Bir Gariba, solo calcareo, 400 m, 23.4.1938, *Maire & Weiller, Iter Libycum 1938, no. 909* (MPU*); in humosis inter Tauchiram [sic?; Maire & Weiller 1939: "Tocra"] et Barcem, solo calcareo, 350 m,

20.4.1938, *Maire & Weiller, Iter Libycum 1938, no. 906* (MPU*); in dumetis supra Barcem, 21.4.1938, *Maire & Weiller, Iter Libycum 1938, no. 907* (MPU*).
Greece: Crete: Prov. Lassithi about 22 km from Ag Nick [Agios Nikolaos] near Meseleri on Kalamafka road, 1000', 24.6.1974, *C. Barclay 3208* (K); Eparchía Ierapétras, Shinavria Ko [label cut] (Mesa Kefala), 35°05'N 25°43'E, phrygana, 520 m, 25.6.1994, *R. Jahn* (B).

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References

Goldblatt P. & Johnson D. E. 1979+ (continuously updated): Index to plant chromosome numbers (IPCN). – Published at http://mobot.mobot.org/W3T/Search/ipcn.html.

Hadjikyriakou G. & Hand R. 2008: Notes on *Teucrium* sect. *Polium (Lamiaceae)* in Cyprus. – Willdenowia **38:** 111-125. [CrossRef]

Holmgren P. K. & Holmgren N. H. 1998+ (continuously updated): Index herbariorum. – Published at http://sweetgum.nybg.org/ih/

Maire R. & Weiller M. 1939: Contributions à l'étude de la flore de la Libye. – Bull. Soc. Hist. Nat. Afrique N. **3:** 255-314.

Makris C. 2007: *Cynara cyrenaica* Maire & Weiller. – Pp. 192-193 in: Tsintides T., Christodoulou C. S., Delipetrou P. & Georghiou K. (ed.), The Red Data Book of the flora of Cyprus. – Lefkosia.

Makris C. & Hadjikyriakou G. 2006: *Cynara syriaca* Boiss. – P. 779-780 in: Hand R. (ed.), Supplementary notes to the flora of Cyprus V. – Willdenowia **36:** 761-809.

Meikle R. D. 1977, 1985: Flora of Cyprus **1-2.** – Kew.

Robba L., Carine M. A., Russell S. J. & Raimondo F. M. 2005: The morphology and evolution of *Cynara* L. *(Asteraceae)* sensu lato: evidence from the Internal Transcribed Spacer region of nrDNA. – Pl. Syst. Evol. **253:** 53-64. [CrossRef]

Vogt R. & Aparicio A. 2000 ["1999"]: Chromosome numbers of plants collected during Iter Mediterraneum IV in Cyprus. – Bocconea **11:** 117-169.

Wiklund A. 1992: The genus *Cynara* L. *(Asteraceae – Cardueae).* – Bot. J. Linn. Soc. **109:** 75-123. [CrossRef]

Xenophontos C. 1997: Geniki geologia [general geology]. – In: Konstantinou G. (ed.), I geologia tis Kyprou 10 [The geology of Cyprus, Bulletin 10]. – Lefkosia.