

***Helianthemum kahiricum*, a new addition to the flora of Cyprus**

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Abstract. – *Helianthemum kahiricum* is recorded in Cyprus for the first time. A morphological description and information on its distribution and habitats are given. It should be classified as 'Critically Endangered'.

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Introduction

The genus *Helianthemum* Mill. comprises c. 110 taxa (at species and subspecies level) which are mainly distributed in N Africa, Europe, W & C Asia (Stevanović & al. 2009). So far, it is represented in Cyprus by 7 species and 2 subspecies, namely: *H. syriacum* (Sect. *Argyrolepis*), *H. chamaecistus* and *H. obtusifolium* –the latter endemic (Sect. *Helianthemum*), *H. stipulatum* (Sect. *Eriocarpum*), *H. salicifolium*, *H. ledifolium* subsp. *ledifolium*, *H. ledifolium* subsp. *lasiocarpum*, and *H. aegyptiacum* (Sect. *Brachypetalum*), *H. sanguineum* (Sect. *Atlanthemum*; see Meikle 1977, López González 1995).

In addition to the above cited taxa, another plant belonging to the genus *Helianthemum* (Sect. *Eriocarpum*) has been discovered in an open dry, almost bare ground in the Akrotiri Peninsula (fenced area of the UK military base area), phytogeographical division 3 (sensu Meikle 1977, 1985). After the preparation of a detailed description, a comparison with related species in literature (e. g. Boulos 2000, Zohary 1987) followed, which showed that the new plant matches to a large degree with *H. kahiricum* Delile. Also, specimens and seeds were sent to the Botanic Garden and Botanical Museum Berlin-Dahlem. Ralf Hand made further comparisons with specimens deposited in the Botanical Museum and, at the same time, he promoted the cultivation of the plant in the Botanic Garden. Although the cultivated plants are only less than two years old they already show the characteristics of *H. kahiricum*. The same results have been obtained from comparison with specimens from several countries. In this respect it is more appropriate to publish the detailed description based on the Cypriot material.

Description based on Cypriot material

Lax, dwarf, **subshrub**, branching from the base, 1–4(–15) cm high. Branches terete, usually sprawling, occasionally ascending (in most cultivated plants ascending-erect), up to 18(–20) cm long; old wood open to dark grey, fissured; current year's shoots simple, occasionally branched, straight, lengthening up to 8(–10) cm, with dense, appressed, simple, short, white hairs, often with scattered stellate or longer forked ones;

lowermost part of the shoots remains alive throughout the year, the upper dries out; sterile short shoots with tufts of reduced leaves present in the leaf axils. Leaves somewhat succulent, bluish-green in general appearance, the lowermost opposite, the upper alternate, elliptical, 3–11.5 × 2–5 mm when fully unfolded, with dense, appressed, short, simple, white hairs on both sides, often with stellate and longer forked hairs above and along midrib below; midrib prominent below, impressed above, lateral nerves absent above, prominent only below the larger leaves, less prominent in the smaller; apex acute with a tuft of few longer, simple or forked hairs; margins entire, strongly revolute; base narrowed to a short petiole 0.5–1 mm long. Stipules deltoid, 0.5–0.6 × 0.5–0.6 mm, with dense, appressed, short, white hairs, on both sides, tipped with a tuft of longer, simple or forked hairs. **Inflorescence** an unbranched, spreading parallel to the ground or ascending, bracteate, one-sided cincinnus on top of the current year's shoots, with 5–10 approximate flowers; rachis with dense, simple, appressed, short, white hairs; bracts deltoid, 1.8 × 0.7–1 mm, occasionally 2-lobed, sometimes 2 together below the uppermost flower, with dense, appressed, short, white hairs, on both sides; pedicels 3–5 mm long, slightly upward pointing or horizontal in flower, recurved in fruit due to a slight twist at the base of the pedicel; rachis, bracts and pedicels green flashed red-brown, becoming red-brown in fruit. **Flowers** twisted in bud, directed towards the ground or laterally, never upwards, chasmogamous, mostly opening in the morning hours, c. 12–15 mm diameter. **Calyx** green, flashed red-brown, becoming red-brown in fruit; the 2 outer sepals linear-lanceolate, 1.7–2.3 × 0.5–0.6 mm, with dense, appressed, short, white hairs, often with stellate as well as with longer simple or forked hairs on both sides; 3 inner sepals imbricate in bud, ovate, boat-shaped, 4.5–5.5 × 2.5–3 mm when fully opened, apex rounded to subacute; nerves 3, one-sided, green to reddish-brown, prominent, the areas between and outside the nerves reticulately veined; indumentum dense, appressed, short, white hairs externally and longer simple or forked hairs along the nerves and the part of each sepal, which is covered by the previous one, sepals glabrous internally. **Corolla** yellow; petals glabrous, slightly exceeding sepals or equal, obovate, 5.8–6 × 3.3–4 mm (4.2–4.8 × 1.9–2.5 mm in cultivated plants), 5-nerved; **stamens** numerous, filaments 2–2.5 × 0.1 mm, glabrous, anthers oblong, (0.4–)0.5 × 0.3 mm. **Ovary** ovoid, subtrigonal, 1.2–1.5 × 0.9 mm, appressed hairy, chiefly above the middle, with glabrous patches below, sometimes hairy all over; **style** straight, conspicuously protruding above stamens, 2.5–2.7 × 0.2–0.3 mm, glabrous, stigma capitate. **Capsule** entirely and tightly enclosed within the persistent, crescent calyx when immature, released from the calyx at maturity, brownish, 3.5–4.3 mm (4.4–4.8 mm in cultivated plants) × 1.8–2.2 mm, ellipsoid, subtrigonal to rounded in transverse section, glabrous or thinly hairy in the lower half, with thin to dense, longer, appressed hairs above (in the upper third in cultivated plants), the dried stamens attached at the upper half; **seeds** 1–1.3 × 0.8–1 mm, flattened, regularly or irregularly ovate, occasionally bluntly angular, subacute at apex; testa brown to dark brown, smooth.

Flowering period: May–June.

Illustrations: Fig. 1, 2; a more comprehensive photo documentation is to be found in the online checklist for Cyprus (Hand & al. 2011-).



Fig. 1: *Helianthemum kahiricum*, flowers and young capsules, Akrotiri, 25.5.2015. – G. N. Hadjikyriakou.

Distribution and ecology

H. kahiricum is chiefly a plant of deserts. In Cyprus, it has been located so far at Akrotiri Peninsula, Akrotiri Forest, only in one locality, in an area of about 12 hectares (phytogeographical division 3, sensu (Meikle 1977, 1985). The altitude ranges between 33 and 50 m above sea level, whereas the geological substrate is mainly composed of Alluvium (Holocene Period). The habitat of the newly discovered plant is an open dry, almost bare ground, with very scattered sickly plants, usually up to 5(–10) cm high, such as *Thymbra capitata*, *Helianthemum syriacum*, *Odontites linkii* subsp. *cyprius*, *Fumana thymifolia*, *Schoenus nigricans*, *Herniaria hemistemon* and a few plants of *Taraxacum aphrogenes*. On the other hand, the surrounding vegetation consists of maquis (i. e. habitat types 5210 – *Juniperus phoenicea* arborescent matorral) and phrygana (habitat type 5420 – *Sarcopoterium spinosum* phrygana (*Cisto-Micromerietea*)). The main species of habitat type 5210 are: *Juniperus phoenicea*, *Pistacia lentiscus*, *Olea europaea* subsp. *oleaster*, *Cistus parviflorus*, *Rhamnus lycioides* subsp. *graeca*, *Calycotome villosa*, *Thymbra capitata*, *Lithodora hispidula* subsp. *versicolor* and *Convolvulus oleifolius*, whereas the main plants in habitat type 5420 are: *Cistus parviflorus*, *Thymbra capitata*, *Fumana thymifolia*, *Helianthemum syriacum*, *Thymelaea tartonraira* subsp. *argentea*, *Odontites linkii* subsp. *cyprius*, *Schoenus nigricans*,

Lotus cytisoides and scattered *Pterocephalus multiflorus* subsp. *obtusifolius*. The location is characterized by extreme wind exposure which obviously causes the sprawling habit of the plants.

Outside Cyprus, *H. kahiricum* is known to occur in N Africa (Maghreb countries, Libya, Egypt; Boulos 2000, Conservatoire et Jardin botaniques de la Ville de Genève & South African National Biodiversity Institute Pretoria 2017, Jafri 1977, Täckholm 1974) and the Arabian peninsula N to Palestine and E to Iraq (Alizzi 1980, Chaudhary 1999, Daoud 1985, Zohary 1987). It is a remarkable addition to the flora of Cyprus and belongs to the group of taxa with Saharo-Arabian (or -Sindian) distribution patterns. This group is represented in Cyprus by species such as *Crucianella aegyptiaca*, *Filago mareotica*, *Neurada procumbens* and *Suaeda aegyptiaca*.

Conservation status

H. kahiricum is characterized as Critically Endangered [CR; IUCN criteria: C2a(ii)]. Potential threats are military exercises, trampling, vehicle movement and possible erection of infrastructure. Its population is about 500 plants. The species has been cultivated successfully at the Berlin Botanic Garden. Seeds will be stored at various institutions.



Fig. 2: *Helianthemum kahiricum*, typical habitat at Akrotiri, 20.5.2015. – G. N. Hadjikyriakou.

Specimens seen

Cyprus: Division 3 (sensu Meikle 1977, 1985): Akrotiri Peninsula Sovereign Base Area (SBA), open dry, almost bare ground, alt. c. 42 m, E 501298.99, N 3825473.62, 26.5.2015, *G. Hadjikyriakou* 7372 (herb. Hadjikyriakou, B); *ibid.*, *G. Hadjikyriakou* 7373 (herb. Hadjikyriakou); furthermore, plants cultivated from seeds at the Botanic Garden Berlin, accession number 060-01-16-10: 20.10.2016, *M. Cubr* 50746, 5.1.2017, 31.5.2017, 20.6.2017, *Hand s. n.* (all B).

Selected specimens from outside Cyprus:

Algeria: Ghardaïa, in rupestribus circa palmetum, 14.02/05.03.1902, *L. Chevallier* (B); Biskra, sur les coteaux pierreux, 20.4.1853, *B. Balansa*, *Pl. Algerie* 865 (B).

Tunisia: In collibus aridi deserti ad Sidi-Boul-Baba, prope Gabes, 7.3.1854, *L. Kralik*, *Pl. Tunetanae* 13 (B).

Egypt: bei Heluan, Wadi Hof, 27.2.1960, *H. Walter & E. Walter* (B).

Israel: Southern Negev, 8 km SE of Mizpe Ramon, Nahal Gevanim, Magmatic rocks (Nordmarkite), slopes, rock outcrops and wadi beds, 520 m, 29.3.1989, *A. Danin & al.*, *Iter Med. II*, 26.004 (B); Negev Highlands, 8 km SW of Yerokham, Loessial soil and stony slopes, 500 m, 27.3.1989, *A. Danin & al.*, *Iter Med. II*, 24.004 (B).

Acknowledgements

The author would like to thank Ralf Hand (Botanic Garden and Botanical Museum, Berlin) for his overall contribution in identifying the plant and Michael Meyer and his team of gardeners (B) for the cultivation of the new species. Also, I would like to thank Pantelis Charilaou (Lemesos, SBA) for his support and Kyriakos Demetriades (Gerani and Lefkosia) who was kind enough to make the linguistic editing of the manuscript.

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