



Helianthemum marmoreum (Cistaceae), a new species from the Central Balkans

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ABSTRACT *Helianthemum marmoreum* is described as a new species from the central part of the Balkan peninsula (R. Macedonia). It inhabits rocky marble and limestone slopes and pastures at moderate altitudes of 240–1400 m. The closest relative is *H. hymettium* which is endemic to southern Greece.

KEY WORDS: *Helianthemum* (Cistaceae), new species, taxonomy, endemic, Balkan peninsula

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INTRODUCTION

The genus *Helianthemum* Miller comprises ca. 110 taxa (at species and subspecies level) which are mainly distributed in N Africa, Europe, W & C Asia. The greatest numbers occur in the W Mediterranean, particularly the Iberian Peninsula where 24 species and 20 subspecies have been recorded (LOPEZ-GONZALES, 2005). In comparison to the Iberian Peninsula, the Balkans has significantly fewer taxa with about half the number and only a few endemics.

According to PROCTOR & HEYWOOD (1968), GREUTER *et al.* (1984), PAPANICOLAOU & KOKKINI (1989) and TAN *w/* IATROU (2001), *H. hymettium* BOISS. & HELDR. is an endemic of southern Greece, occurring in Sterea Ellas (Attikis), Peloponnisos and Kriti. The *locus classicus* is Mt Hymettus (Imittos) above Athens. The first indication of an interesting *Helianthemum* in Macedonia in the central Balkans was provided by JURIŠIĆ (1923) in his statement “*Helianthemum spec. ?* (sub. *Helianthemum canum* Dunal., In Pletvar” where, as recorded later, grew only *H. hymettium*. The distribution of *H. hymettium* in Macedonia was reported on few occasions and by several

authors including BORNMÜLLER (1925), HAYEK (1925), SOŠKA (1933, 1938, 1939), MICEVSKI (1970, 1995) and MATEVSKI & KOSTADINOVSKI (2007). BORNMÜLLER (1925) even noted that the record of *H. hymettium* in the gorge of the river Raec in the vicinity of Drenovo (central part of R. Macedonia) represents the northernmost distribution of the species. Thus according to current taxonomic and floristic knowledge, *H. hymettium* has two disjunct distributions in the Balkans. One part of its range is in southern Greece (Attikis, Peloponnisos and Kriti), whilst the second is in Macedonia, there being no populations in between (see Fig. 1.3). However, in most publications the existence of *H. hymettium* in Macedonia is ignored and the species is reported as an endemic of Greece (PROCTOR & HEYWOOD 1968; GREUTER *et al.* 1984; PAPANICOLAOU & KOKKINI 1989; TAN *w/* IATROU 2001). This situation led us to question the status of *H. hymettium* in Macedonia and in this paper we examine chorological and taxonomical evidence with the view of determining whether the species also occurs in the central Balkans or whether the Macedonian populations have been erroneously identified.

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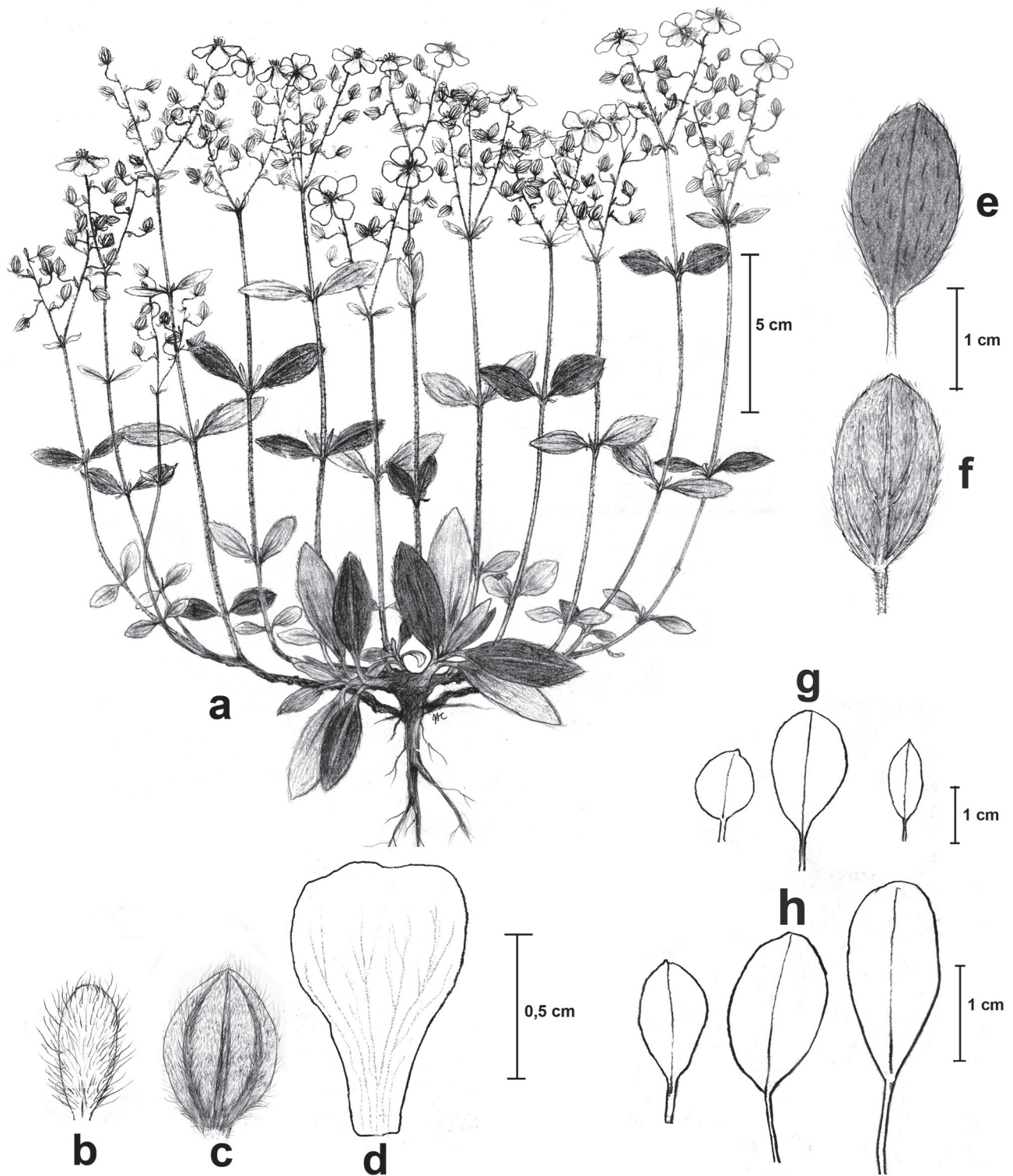


Fig. 1. *Helianthemum marmoreum* spec. nov. :
 a, habitus; b, outer sepal; c, inner sepal; d, petal; e, adaxial leaf surface; f, abaxial leaf surface; g, upper cauline leaves;
 h, lower and basal cauline leaves (drawn from holotype).

Numerous specimens from Macedonia identified as *H. hymettium* (deposited in SKO, BEO and BEOU) were examined and compared with material collected from southern Greece (ATH, ATHU, BEOU and C). Although the Macedonian specimens are morphologically variable there exist sufficient taxonomical differences to justify treatment as a separate species, distinct from the plants of southern Greece. (Fig.3). The great disjunction in distribution strengthens our conviction that the Macedonian populations represent a new taxon which is here described.

DESCRIPTION

Helianthemum marmoreum Stevanović, Matevski & Kit Tan, sp. nov. (Fig. 2). Syn.: *Helianthemum hymettium* Boiss & Heldr. sensu Bornmüller in Bot. Jahrb. Syst. 59: 374 (1925), sensu Soška in Bull. de l'Inst. et du Jard. Bot. de l'Univ. de Belgrade II (3):176-182 (1933), sensu Micevski in *Flora of the Republic of Macedonia* 1 (3): 551-559 (1995). Figs 1. & 2.

Planta suffruticosa, 5-20 (-35) cm alta. Caules procumbentes vel ascendentes dense albo stellato tomentosi et glanduloso-pilosi. Folia opposita, petiolata, oblongo-ovata, elliptica vel ovato-lanceolata, 5-20 × 4-8 (-10) mm, in margine pilis obtusa vel breviter acuminata, subtus

albo canotomentosa, supra viridia, raro canotomentosa. Folia inferiora maiora quam superiora. Stipula lanceolata vel linearis-lanceolata, 2-3 mm longa, caduca post florem. Inflorescentia racemosa, laxa, elongata, 7-15 flores, passim ad eandem partem versa. Pedicelli in fructu sigmoidei, infra spectantes. Sepala 5, villosa, pilis in stellas operta; interiora 2 ovata, c. 4 mm longa, accrescentia usque ad 5-6 mm in fructu, exteriora 3 oblanceolata, 2-3 mm longa, nervi subrubri vel virides. Petala fere duplici longitudine sepalorum, flava, glabra. Stamina numerosa. Ovarium oblongo-ovoideum, dense albotomentosum. Stigma 0.3 mm, in diametro scabridula, cum pilorum fasciculis solum in apice. Capsula calyce brevior. Semina glabra, cordiformia, triangularia, fuscato-flava. Florens IV-VI.

Perennial 5-20 (-35) cm tall, branched and woody at base. Branches slender, lower procumbent to ascending; upper erect, densely covered with white stellate hairs and reddish-maroon glandular hairs. Leaves opposite, petiolate, oblong-ovate, elliptic to ovate-lanceolate, 5-20 × 4-8 (-10) mm, obtuse to shortly apiculate, green, subglabrous or scattered white-pilose on upper surface, densely white to greyish-white stellate-hairy on lower surface or more rarely, both surfaces densely white stellate-hairy; lower leaves of sterile shoots flat and expanded, much longer than upper ones of flowering stems. Stipules lanceolate or linear-lanceolate, 2-3 mm long, acuminate, caducous soon after

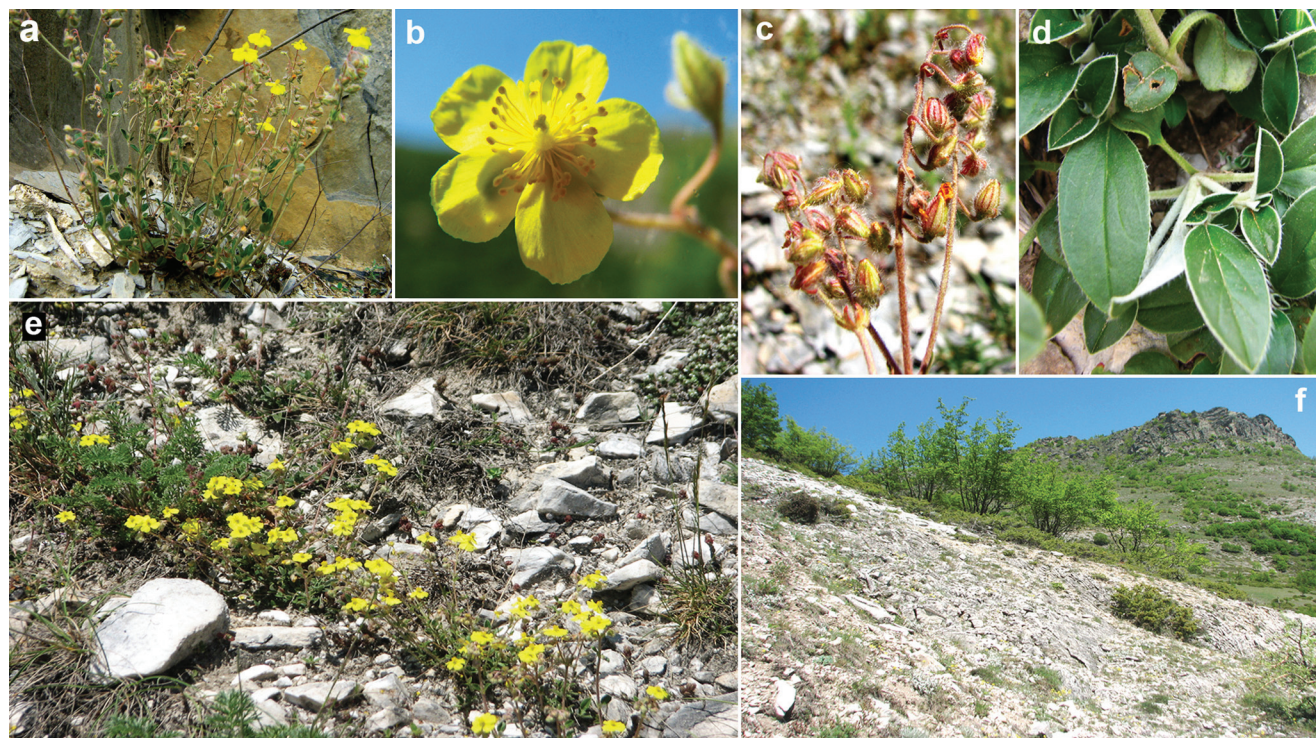


Fig. 2. a, habit; b, flower; c, inflorescence; d, lower leaves; e & f, marble habitat at Pletvar pass (type locality). Photos by V. Stevanović (a) and V. Matevski (b-f).

anthesis, absent from lower part of stem. Inflorescence lax, slender, elongate, sometimes secund, with 7-15 flowers in simple or branched raceme-like cymes; peduncles 6-10 mm long, patent-spreading, sigmoid-deflexed after anthesis; flowering stem and peduncles covered with dense white stellate, glandular and simple hairs. Sepals 5, veined green or reddish, simple and stellate-hairy; outer 3 oblanceolate, 2-3 mm long; inner 2 ovate, c. 4 mm long, accrescent to 5-6 mm in fruit. Petals almost twice as long as sepals, bright yellow, glabrous. Stamens numerous. Ovary oblong-ovoid, densely white hairy. Stigma 0.3 mm diam., scabridulous, with tufts of hair only at apex. Capsule 4-4.5 mm, shorter than sepals in fruit. Seeds triangular-cordate, brownish-yellow, glabrous. Flowering April to June.

R. Macedonia (central part): Pletvar pass, on marble, 41°22'03"N 21°39'31"E, 991 m, 12. May.2009, V. Matevski (holotype BEOU; isotypes SKO, C).

Other specimens examined in R. Macedonia (all previously determined as *H. hymettium*):

Northern part: Skopje: Breznica, 26.06.1925, P. Černjavski (BEOU); Poreče, gorge of river Treska, 08.1937. V. Lintner (BEO) No08013; Crnopest, prope Kapina, Poreč, 24.05.1935, T. Soska (BEO), No 8008, rev. O. Grebenscikov sub, *H. hymettium* f. *discolor* Hal.; Nova Breznica - Kozjak. limestone, alt.1100-1150 m, 14.06.1988, leg./det. K. Micevski, (SKO); 41°53'21"N; 21°13'24"E; alt. 1072 m, 8.07.2006, leg./det. V. Matevski & M. Kostadinovski (SKO)

Central part: Prilep: inter Sivec et Babuna, 21.05.1922, leg. D. Simonović, det. T. Soška (BEOU); Mt Sivec prope Prilep, solo marmoreo, 16.06.1930. V. Lindtner (BEO) No 08011; 03.06.1936. V. Lindtner (BEO) No 08014; Pletvar, in marmoreis copiosae, 19.06.1921. leg. D. Simonović, det. T. Soška (BEOU); in saxosis marmoreis copiosa, 05.06.1933. T. Soska (BEO) No 08012; marble, alt. 950 m, 11.06.1997 (leg./det. V. Matevski & M. Kostadinovski) (SKO); marble, alt. 980 m, 16.06.1962, leg./det. K. Micevski (SKO); 41°22'21"N; 21°39'18"E; alt.1073 m, 16.06.2004, leg./det. V. Matevski & M. Kostadinovski (SKO); 41°22'21"N; 21°39'20"E; alt.1083 m, 16.06.2004, leg./det. V. Matevski & M. Kostadinovski (SKO); 41°22'22"N; 21°39'23"E; alt. 1131 m, 16.06.2004, leg./det. V. Matevski & M. Kostadinovski (SKO); 41°22'24"N; 21°39'25"E; alt. 1152 m, 16.06.2004 (leg./det. V. Matevski & M. Kostadinovski (SKO); 41°22'20"N; 21°39'16"E; alt. 1094 m, 16.06.2004, leg./det. V. Matevski & M. Kostadinovski (SKO); above village Pletvar, marble, 41°22'06"N; 21°40'22"E; alt. 1003 m, 16.06.2004 (leg./det. V. Matevski & M. Kostadinovski) (SKO); 41°22'07"N; 21°40'21"E; alt.1017 m, 16.06.2004 (leg./det. V. Matevski & M. Kostadinovski) (SKO); 41°22'07"N; 21°40'17"E; alt.1031 m, 16.06.2004, 41°22'25"N; 21°39'08"E; alt. 1063 m, 28.06.2004; 41°22'26"N; 21°39'05"E; alt. 1077 m, 28.06.2004, leg./det. V. Matevski (SKO); Kozjak, avove village Trojaci, limestone,

alt. 1122-1205 m, 17.06.2004, leg./det. V. Matevski & M. Kostadinovski (SKO); alt. 1120-1200 m, 10.06.1984, leg./det. K. Micevski (SKO); alt. 1000 m, 4.06.1976, leg./det. K. Micevski (SKO); alt. 1100-1360 m, 9.08.1984, leg./det. K. Micevski (SKO); Mt. Kozjak, 11.06.1922, leg. D. Simonović, det. T. Soška (BEOU); Mt Mal Kozjak, above village Trojaci, limestone, alt. 930-950 m, 8.06.1984, leg./det. K. Micevski (SKO); 41°24'55"N; 21°35'55"E; alt. 964 m, 9.06.2005, leg./det. V. Matevski & M. Kostadinovski (SKO); 41°24'51"N; 21°35'32"E; alt. 1010 m, 8.06.2005 leg./det. V. Matevski & M. Kostadinovski (SKO); 41°24'55"N; 21°35'43"E; alt. 1063 m, 9.06.2005, leg./det. V. Matevski & M. Kostadinovski (SKO); 41°24'58"N; 21°35'41"E; alt. 1067 m, 9.06.2005, leg./det. V. Matevski & M. Kostadinovski, (SKO); 41°25'02"N; 21°35'40"E; alt. 1051 m, 9.06.2005, leg./det. V. Matevski & M. Kostadinovski (SKO); 41°25'07"N; 21°35'55"E; alt. 1022 m, 9.06.2005, leg./det. V. Matevski & M. Kostadinovski (SKO); 41°24'57"N; 21°35'24"E; alt.1014 m, 8.06.2005, leg./det. V. Matevski & M. Kostadinovski (SKO); 41°24'59"N; 21°35'27"E; alt.1031 m, 8.06.2005 leg./det. V. Matevski & M. Kostadinovski (SKO); Gorge of river Raec, near water fountain, 6.06.1991, leg./det. V. Matevski (SKO); alt. 250 m.n.v., 22.04.1975 leg./det. K. Micevski (SKO) left bank of the river, limestone rocky slopes, alt. 240-300 m, 29.05.2002, leg./det. V. Matevski (SKO); 11.06.1921, leg. unknown, det. V. Stevanović (BEOU); Debriška Skrka, limestone rocky slopes, alt. 510-560 m, 11.06.2002, leg./det. V. Matevski (SKO);

Southern part: Kavadarci: Crna reka river, village Galište, limestone rocks above river, 23.06.1928. P. Černjavski (BEO) No08009; Tikveško lake – between Vrapče and village Galište, limestone rocks, 24.06.2000, leg./det. V. Matevski & M. Kostadinovski (SKO); village Mrzen, limestone rocky slopes, 41°29'51"N; 21°52'38"E; alt. 503 m, 10.06.2005. leg./det. V. Matevski & M. Kostadinovski (SKO); Mariovo: -village Vitolište, Gola Skrka, limestone, alt. 940 m., 21.06.1986, leg./det. K. Micevski (SKO); limestone, alt. 870 m, 12.06.1992. leg./det. V. Matevski & M. Kostadinovski (SKO); limestone, alt. 860 m, 11.06.1992, leg./det. V. Matevski (SKO); village Melnica, limestone rocky slopes, alt. 700 m., 11.06.1992 (leg./det. V. Matevski) (SKO);

Literature sources in R. Macedonia (all published as *H. hymettium*):

Northern part: Kapina, Oča, Poreč (T. Soška, 1938:224); Raduša (P. Černjavski in T. Soška, 1938:234), Rogachevo (Soška, 1938:234);

Central part: Drenovo (Bornmuller in T. Soška, 1939:52); Trojaci (Nikoloff in T. Soška, 1939: 52), Mt Klepa near Gradsko (Micevski, 1995: 559);

South Central part: Pološki Manastir (Černjavski in T. Soška, 1939:170); Lubenica = Labinica (T. Soška, 1933).

Table 1. Morphological differences of *Helianthemum marmoreum* and *H. hymettium*.

	<i>H. marmoreum</i>	<i>H. hymettium</i>
Stem height	5-30(-35) cm	5-20 cm
Stem indumentum	appressed white stellate-hairy; reddish or green glandular hairs numerous	appressed greyish-white tomentose; reddish glandular hairs numerous, few or absent
Leaf size and shape	5-20 × 4-8 (-10) mm, oblong-ovate, ovate-lanceolate, rarely spatulate, obtuse to shortly apiculate, rarely rounded, lower ones larger than upper	3-10(=24) × 2-6 (-8) mm, broadly ovate to elliptic, acute to shortly apiculate
Leaf indumentum	upper surface green, scattered white-pilose; lower surface densely white stellate-hairy or both surfaces densely white stellate-hairy	upper surface green to dark green, subglabrous to white stellate-hairy; lower surface densely greyish-white stellate-tomentose or both leaf surfaces densely white stellate-tomentose
Stipules	lanceolate to linear-lanceolate, 2-3 mm long, acuminate, caducous after anthesis, absent from lower part of stem	linear-lanceolate, 2-3.5 mm long, subacute to acuminate, and caducous in fruiting stage, absent from lower part of stem
Inflorescence	lax, greatly to moderately elongate	dense, subumbellate at anthesis, moderately elongating after anthesis
Number of flowers	7-15	5-10
Sepals	outer oblanceolate, 2-3 mm; inner ovate, c. 4 mm, 5-6 mm in fruit	outer linear-lanceolate, 3-4 mm; inner ovate, 4 mm, c. 5 mm in fruit
Sepal indumentum and venation	simple pilose, villous and stellate-hairy; veins usually reddish	long white simple or bifurcate hairs along veins and margins and white stellate-pubescent between veins; veins green or reddish-purple
Petal size, color and indumentum	almost twice as long as sepals, bright yellow, glabrous	equalling or c. 1.5 times as long as sepals, bright yellow, glabrous
Capsule	4-4.5 mm, enclosed in calyx	c. 3.5 × 2.5 mm, enclosed in calyx
Seed	triangular-cordate, brownish-yellow, glabrous	ovoid-triquetrous, up to 1.8 × 1.2 mm, yellowish-brown, rugose-papillate, glabrous

ETYMOLOGY

The specific epithet is derived from the habitat of the plant which favours and is most commonly found on rocky marble and limestone slopes and pastures overlying calcareous bedrock in Macedonia.

TAXONOMY

H. marmoreum belongs to subgen. *Plectolobium* Willk. and sect. *Pseudocytisus* Dunal (syn. sect. *Chamaecistus* Willk.). It is closely related to *H. hymettium* and differs as indicated by the following characters (see Tab.1).

H. hymettium is, however, also an extremely variable species. Plants from Attikis (Mts Hymettus, Pendeli and Parnis) correspond most closely to the original circumscription of Boissier and Heldreich (cited in BOISSIER 1853 and HALACSY 1901) and are characterized by persistent stipules, a dense subumbellate inflorescence which elongates moderately after anthesis and by numerous cauline leaves. Plants from the Peloponnese are more similar to *H. marmoreum*, while those from Crete, by virtue of their dense silvery indumentum are quite distinct from the Peloponnese and Attikis plants. *H. hymettium* in southern Greece obviously represents a polymorphic complex which requires systematic revision supported perhaps by molecular study.

DISTRIBUTION

H. marmoreum is endemic to Macedonia (Fig. 3). A record of *H. hymettium* from the vicinity of Lake Prespa in northern Greece (PAVLIDIS, 1997) is erroneous and refers instead to *H. canum* (TAN W/ IATROU 2001). It has been recorded from the following localities: gorge of the river Crna Reka (Tikveško lake, between Vrapče and village Galište, Mariovo (villages Melnica and Vitolište), gorge of river Raec in vicinity of Kavadaraci (village Raec-Debriška Krasta), village Mrzen, vicinity of Prilep (Mt Kozjak above village Trojaci, Pletvar pass and Mt Sivec). The northernmost localities are in the gorge of the river Treska near Skopje (village Nova Breznica-Kozjak, Kapina, Oča, Poreče). However, SOŠKA (1938) cited the northernmost record of *H. hymettium* as in the limestone gorge of the river Vardar, northwards from Skopje near the villages of Raduša and Rogačevo. Material from this locality has not been examined but may possibly refer to *H. marmoreum*.

ECOLOGY

H. marmoreum is an obligate calciphile of hilly to mountainous rocky slopes and pastures in R. Macedonia. It grows both on limestone and marble bedrock with shallow, often eroded soils. The habitats are often dry

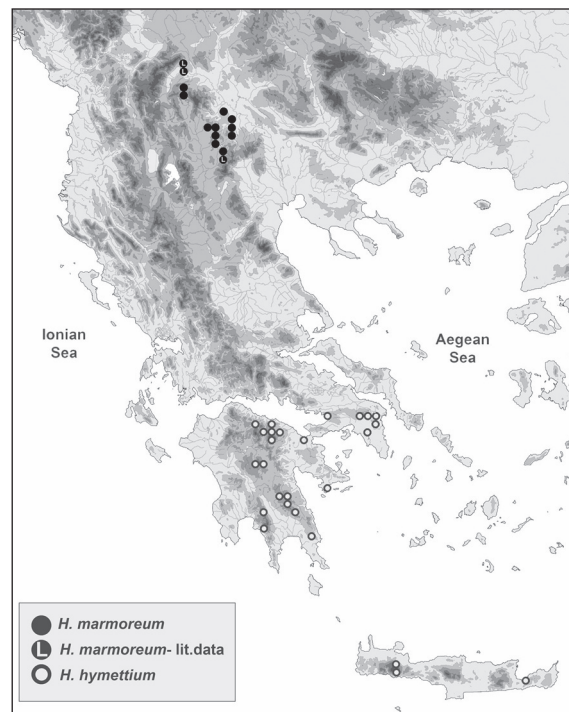


Fig.3. Distribution of *H. marmoreum* and *H. hymettium*.

and sunny south-facing, SE- or SW-exposed slopes with inclinations of 5-40°. The lowest altitude recorded is 240 m in the gorge of the river Raec, while the highest altitudes are on Mt Kozjak above the village of Trojaci at 1400 m. It is a member of the order *Saturejo-Thymion* Micevski 1970, which includes pasture communities on limestone in Macedonia (MICEVSKI 1970). *H. marmoreum* is an extremely abundant species on limestone and marble rocky slopes in the central part of R. Macedonia, possessing high values of cover and frequency in the community *Anthyllido-Centauretum grbavacensis* Matevski & Kostadinovski (MATEVSKI & KOSTADINOVSKI 2007). Numerous Balkan endemics such as *Centaurea grbavacensis*, *Anthyllis aurea* var. *multifoliolata*, *Viola herzogii*, *Veronica kindlii*, *Cytisus petrovicii*, *Astragalus sericophyllus*, *Hippocrepis glauca*, *Hyssopus officinalis* subsp. *pilifer*, *Galium oreophilum*, *Fumana procumbens*, *Matthiola fruticulosa* subsp. *vallesiaca*, *Thesium macedonicum*, *Phelypaea boissieri*, *Stachys iva*, *Dianthus kapinaensis*, *Dianthus haematocalyx*, *Achillea fraasii* and *Verbascum herzogii* grow in association.

Threat status: *H. marmoreum* populations were studied at several localities (limestone gorge of river Raec in the vicinity of village Drenovo, marble habitats at the Pletvar pass and Mt Sivec). The populations in all localities proved to be in excellent condition, in dense and great abundance and flourishing. We can report there appears no threat to its present existence or long-time survival, not even grazing. According to the IUCN 2001 Criteria it is regarded as LRnt (IUCN 2001).

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REZIME

Helianthemum marmoreum (Cistaceae), nova vrsta sa centralnog Balkana

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Helianthemum marmoreum opisan je kao nova vrsta sa centralnog dela Balkanskog poluostrva (severna Makedonija). Naseljava stenovite mermerne i krečnjačke padine i pašnjake na umerenim nadmorskim visinama između 240 i 1400 m. Najbliži srodnik je *H. hymettium* koji je endemičan za južnu Grčku.

KLJUČNE REČI: *Helianthemum* (Cistaceae), nova vrsta, taksonomija, endemit, Balkansko poluostrvo