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MOHAMMAD SOLTANI & AHMAD REZA KHOSRAVI

A new species of *Haplophyllum* (Rutaceae) from SW Iran**Abstract**

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Haplophyllum bakhteganicum from SW Iran is described as a species new to science and illustrated, and its affinities are discussed. A map showing the distribution of the new species and related species is given.

The genus *Haplophyllum* A. Juss. includes c. 70 species, which occur mainly in the warm temperate and subtropical regions of the northern hemisphere of the Old World (Townsend 1986: 14). The majority of the species are known from a limited range. Iran is an important autochthonous region for *Haplophyllum*, where 25 species are found (Townsend 1986: 16).

During our work on the flora of Fars province, a *Haplophyllum* specimen was collected by A. Diba from Kuh-e Khoon, north of Tashk lake, that differs from other known species in the genus. Comparison with the material in the herbaria of IRAN, TARI, TUH (abbreviations according to Holmgren & Holmgren 1998-) and the Shiraz University Herbarium as well as consultation of the literature (Townsend 1986, Vvdensky 1943) revealed that the material represents a hitherto undescribed species. During further field work in Bakhtegan National Park in 2004, more populations were discovered and more material collected by the second author.

***Haplophyllum bakhteganicum* Soltani & Khosravi, sp. nov.**

Holotypus: Iran, Fars province, Abadeh Tashk, Kuh-e Khoon, 1800 m, 2.6.1994, A. Diba (herbarium of Shiraz University no. 20204) – Fig. 1.

Herba perennis, caules complures, erecti, simplices. *Folia* glabra, inferiora ovata, late oblanceolata vel linearia, superiora oblanceolata vel linearia. *Inflorescentia* dense multiflora, ± plana. *Sepala* basi coalita. *Petala* late ovata, virida vel viridi-flava. *Filamenta* libera, basi dilatata, inferne dense ciliato-barbata. *Ovaria* 5, loculi biovulati, glabri. *Capsula* matura dehiscens.

Perennial herb, 13-35 cm high with several stems arising from a branched base and a few sterile shoots. *Stems* usually simple, unbranched below the inflorescence or with one leafy branch in the upper two third, green to pale greenish, usually becoming almost white towards the base, gla-



Fig. 1. *Haplophyllum bakhteganicum* – A: habit; B: flower; C: petal; D: stamen; E: filament, side view; F: gynoecium with lateral rather than apical tubercles of the ovary segments; G: dehiscent capsule. – Drawings by Kourosh Nozadian after the holotype.

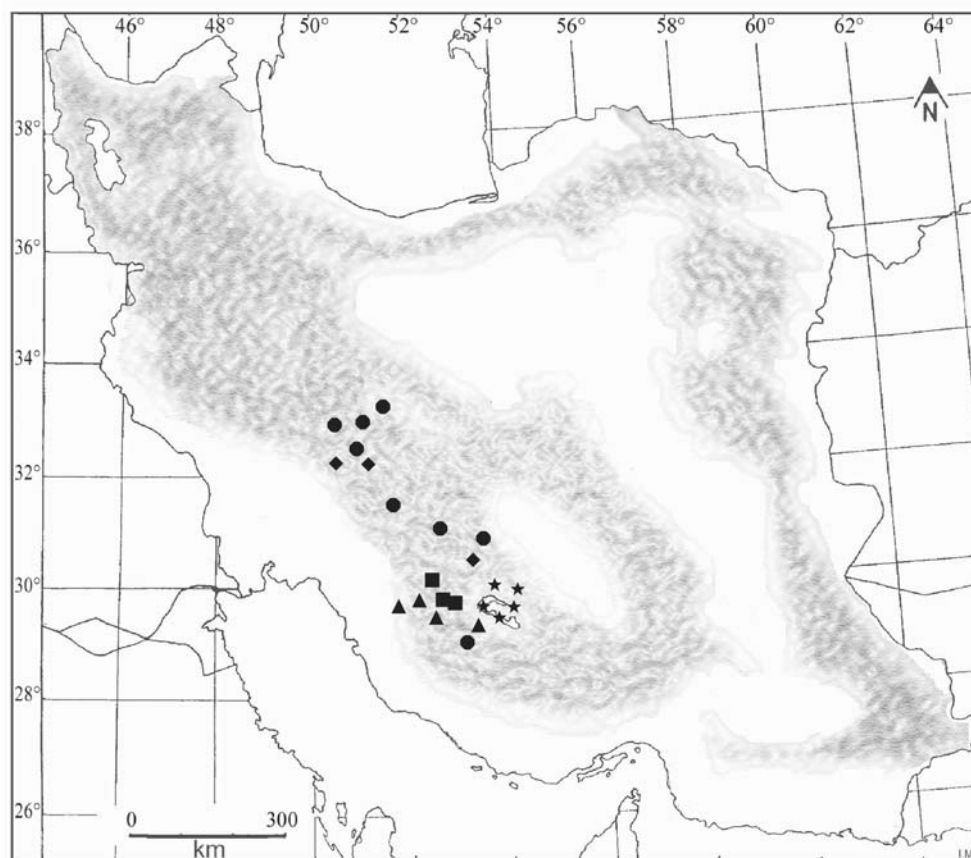


Fig. 2. Distribution of *Haplophyllum bakhteganicum* (★), *H. lissonotum* C. C. Towns. (●), *H. rechingeri* C. C. Towns. (◆), *H. stapfianum* Hand.-Mazz. (■) and *H. viridulum* Sojak (▲).

brous, with flat or slightly convex, yellow sessile glands. *Leaves* in lower part of the stem obovate to oblanceolate or lanceolate to linear, 3.35×1.13 mm, in the upper stem portions oblanceolate to linear, 2.25×0.54 mm, acute or subacute, attenuate below, all glabrous but densely furnished with dark, conspicuous, sessile, slightly convex glands. *Inflorescence* dense, \pm flat-topped, 1.5–8 cm long, many-flowered, with pale glands; bracts few, linear, 0.53×0.25 –1 mm, glabrous or sparsely pilose. *Sepals* deltoid-ovate to lanceolate-oblong, 1.2×0.5 – 1.25 mm long, subacute to obtuse, slightly fused at the base, with a few conspicuous glands centrally, glabrous or sparsely pilose on the dorsal surface, sometimes ciliate at margin, persistent in fruit. *Petals* broadly ovate, 4.7×3.5 mm, subacute to obtuse, distinctly concave and carinate on back, abruptly contracted to a short claw, green to greenish yellow with paler, usually white margin, tips sometimes becoming reddish, glabrous or with a few dorsal hairs, sometimes with a few inconspicuous glands around the centre. *Stamens* with *filaments* free, usually equal, rarely unequal, 3.5–5 mm, expanded in the basal $1/2$ – $2/3$ and usually abruptly (sometimes gradually) attenuate from apical $1/2$ – $1/3$ to the tip, bearded (ciliate-barbate) in the basal $1/2$ – $2/3$, eglandular or \pm with 2–4 slightly convex glands around the vein in the lower half; *anthers* oblong, 2–2.5 mm, creamy yellow to orange. *Gynoecium* with 5-locular, deeply segmented ovary, segments usually unequal (one or more often abortive), each usually with tubercles situated lateral (rather than apical, rarely absent), glabrous or sparsely pilose and covered with sessile, plane or slightly convex

Table 1. Morphological comparison of *Haplophyllum bakhteganicum*, its four putative allies and the widespread *H. tuberculatum*.

| Characters | <i>H. bakhteganicum</i> | <i>H. stapfianum</i> | <i>H. lissonotum</i> | <i>H. viridulum</i> | <i>H. rechingeri</i> | <i>H. tuberculatum</i> |
|---------------------|--|----------------------------------|--------------------------------|--|------------------------------------|---------------------------------|
| Life form | perennial | perennial | suffrutescent | perennial | perennial | perennial |
| Leaves shape | obovate to oblanceolate or linear | elliptic-lanceolate | linear | elliptic-lanceolate to elliptic-oblong | narrowly to linear-elliptic | very variable |
| size [mm] | 3-35 × 1-13 | 4-25 × 1-8 | 8-55 × 1-5 | 10-40 × 2-8 mm | 5-23 × 1-5 | 3-60 × 1-15 |
| Inflorescence | dense corymb, ± flat. topped | dense corymb, ± flat. topped | dense corymb, ± flat. topped | dense corymb, ± flat. topped | dense corymb, rounded top | usually lax corymb |
| Sepals fusion | slightly fused at the base | ± free | slightly fused at the base | ± free | free | ± free |
| size [mm] | 1-2 × 0.5-1.25 | 0.5-1 × 0.5-1 | 1-1.5 × 1-1.25 | 0.5-1.5 × 1-1.25 | 1-2 × 0.5-0.75 | 0.5-1.5 × 0.5-1.25 |
| Petals shape | broadly ovate | oblong-elliptic | broadly ovate | broadly ovate | broadly ovate | elliptic-oblong to oblong-ovate |
| colour | green to greenish yellow | bright yellow | yellow | white, suffused greenish | yellow | bright yellow |
| size [mm] | 4-7 × 3-5 | 4-5 × 2-3 | 5-6 × 3.5-5 | 4-6 × 3-4 | 4-5 × 2.5-3 | 3.5-5 × 1.5-3 |
| Filaments expansion | usually abruptly expanded in lower 2/3 | ± abruptly expanded in lower 1/2 | abruptly expanded in lower 1/2 | gradually expanded toward the base | gradually expanded toward the base | abruptly expanded in lower 1/2 |
| indument | densely ciliate-bearded in lower 2/3 | bearded in basal 1/2 | bearded in basal 1/2 | densely white-bearded in lower 2/3 | bearded in the central 1/2 | bearded in basal 1/2 |
| length [mm] | 3.5-5 | 4-4.5 | 4-4.5 | 5-6 | 3-4 | 2.5-5 |
| Ovary tubercle | lateral usually, rarely absent | appendiculate | exappendiculate | exappendiculate | exappendiculate | exappendiculate |
| Seed surface ridges | transverse | transverse | longitudinal | transverse | – | interrupted transverse |
| size | c. 1.5 mm | c. 1.5 mm | c. 2 mm | c. 1.5 mm | – | c. 1.5 mm |

glands, loculi biovulate; *style* sparsely pilose or glabrous, slender, 3.5-5 mm long. *Mature* capsule 4.5-5 × 2-2.5 mm, segments dehiscent, densely covered by slightly convex glands and ± conspicuous lateral tubercles. *Seeds* reniform, c. 1.5 mm in diam., grey to blackish, with densely set transverse ridges.

Etymology. – The specific epithet refers to the Bakhtegan Lake National Park, in the Fars province, where the species is distributed.

Phenology. – Flowering and fruiting from (April) May to June (July).

Distribution and habitat. – *Haplophyllum bakhteganicum* seems to be restricted to the mountains around Bakhtegan and Tashk lakes, in SW Iran (Fig. 2), and represents one of the narrow endemics of the Irano-Turanian region in Iran (Hedge & Wendelbo 1987). In this area four other endemic species of *Haplophyllum*, i.e. *H. stapfianum* Hand.-Mazz., *H. rechingeri* C. C. Towns., *H. viridulum* Sojak and *H. lissonotum* C. C. Towns. occur.

Haplophyllum bakhteganicum grows in open xeromorphic scrub dominated by *Pistacia mutica* Boiss., *P. khinjuk* Stocks, *Acer monspessulanum* subsp. *persicum* (Pojark.) Rech. f., *Ephedra pachyclada* Boiss. Other characteristic species associated are *Dianthus subaphyllus* (Lempert) Rech. f., *Artemisia sieberi* Boiss., *Ebenus stellata* Boiss., *Convolvulus acanthocladus* Boiss. & Kotschy and *Ferula ovina* Boiss. No other species of *Haplophyllum* was found in co-occurrence.

Further specimens examined (all deposited in the Shiraz University Herbarium, accession numbers in brackets, duplicates in the herbaria as cited). – IRAN: FARS: Abadeh Tashk, Khajeh Jamali, Madan Cromit, 29°48'27.48"N, 53°51'38.34"E, 1850 m, 14.6.2004, A. R. Khosravi, A. Mousavi & M. Soltani (31104, FUMH); *ibid.*, 4.6 km north of Khajeh Jamali, 29°51'18.24"N, 53°48' 50.76"E, 1950 m, 14.6.2004, A. R. Khosravi, A. Mousavi & M. Soltani (31111); north of Bakhtegan Lake, Kuh-e Gonbad, 29°27'57.48"N, 53°50'18.6"E, 2000 m, 27.6.2004, A. R. Khosravi & A. Biglari (31126); *ibid.*, Kuh-e Gonbad, 29°27'52.86"N, 53°50'18.84"E, 2020 m, 27.6.2004, A. R. Khosravi & A. Biglari (31130); Kharameh, Kuh-e Khanekateh, 29°26'36"N, 53°33'41"E, 2050 m, 6.6.2004, A. R. Khosravi & A. Biglari (31011, B); Kharameh, road of Halalabad to Khanekateh, Pasgah Rizab, 29°29'02"N, 53°34'09"E, 1530 m, 7.6.2004, A. R. Khosravi & A. Biglari (31020).

Distinction. – *Haplophyllum bakhteganicum* differs from the other species of the genus in SW Iran (i.e. *H. canaliculatum*, *H. lissonotum*, *H. stapfianum*, *H. rechingeri*, *H. tuberculatum* and *H. viridulum*) mainly by its green to greenish yellow petals, the filaments ciliate-bearded for most of their length and the ovary segments with, unusual in the genus, lateral rather than apical tubercles. Concerning the two widespread species, *H. canaliculatum* is particularly distant to *H. bakhteganicum*, and differs from the polymorphic *H. tuberculatum* by relatively compact (instead of lax) inflorescences, broadly ovate (instead of elliptic-oblong to oblong ovate) and green to greenish yellow (instead of bright yellow) petals, densely and for most of their length ciliated-bearded (instead of in their basal half bearded) filaments, and seeds with continuous (instead of interrupted) transverse ridges (Table 1). The other four *Haplophyllum* species, which are endemic to the mountainous SW Iran, were placed by Townsend (1986) in two different group, one including *H. stapfianum*, *H. rechingeri* and being related to *H. viridulum*, the second including *H. lissonotum*. *H. bakhteganicum* differs from these species mainly by its green or greenish yellow petals, the ciliate-bearded filaments and the lateral appendages of the ovary segments (Table 1). From the shape of inflorescence and most characters of flower, the new species seems to be closely related to *H. lissonotum*, which differs mainly in habit and leaf shape. Habit and branching pattern of *H. bakhteganicum* are similar to *H. stapfianum*, which its geographically nearest to the new species (Fig. 2).

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