

FOUR NEW SPECIES OF THE GENUS ACANTHOLIMON (PLUMBAGINACEAE) FROM IRAN

M. Assadi

Assadi, M. 2005 07 01: Four new species of the genus *Acantholimon* from Iran. -*Iran. Journ. Bot.* 11 (1): 31-39. Tehran.

Acantholimon densiflorum is described from Azerbaijan province. It is related to *A. caryophyllaceum*, *A. araxanuum* and *A. armenum*, but well characterized with much denser inflorescence. *A. flabellum* is described from NE. Iran. It seems to be related to *A. haesarense*, a species from Kerman province. *A. glabratum* is described from Arak area. It is compared with its relatives *A. wendelboi* and *A. petuniflorum*. *A. moradii* is described from Kurdistan province. It is from *A. acerosum* and *A. halophilum* complex which is compared with.

Mostafa Assadi, Research Institute of Forests and Rangelands, P. O. Box 13185-116. Tehran, Iran.

Keywords. *Acantholimon*, *Plumbaginaceae*, new species, Iran.

چهار گونه جدید *Acantholimon* از ایران

مصطفی اسدی

گونه *Acantholimon densiflorum* از استان آذربایجان شرح داده می‌شود. این گونه با گونه‌های *A. araxanum*، *A. armenum* و *A. caryophyllaceum* قرابت نزدیکی دارد، ولی با همه آنها با داشتن گل‌آذین خیلی متراکم بخوبی تمیز داده می‌شود.

گونه *A. flabellum* از شمال شرق ایران شرح داده می‌شود، بنظر می‌رسد این گونه با گونه *A. haesarense* از استان کرمان قرابت داشته باشد. گونه *A. glabratum* از منطقه اراک شرح داده می‌شود. این گونه نیز با خویشاوندانش *A. wendelboi* و *A. petuniflorum* مقایسه می‌شود.

گونه *A. moradii* از استان کردستان شرح داده می‌شود. این گونه متعلق به گروه گونه‌های *A. acerosum* و *A. halophilum* است و بدین جهت با آنها مقایسه می‌شود.

***Acantholimon densiflorum* Assadi, sp. nov.**

(Sect. *Staticopsis* Boiss.)

Planta caespitosa, partim pilosa. Folia vernalia 20 mm longa, 2 mm lata, linearia, persistentia, mox languescientia; folia aestivalia 50 mm longa, 2 mm lata, linearia, mollia, basem membranacea et ciliata, pilosa. Caules 9 cm longi, dense pilosi. Folia caulina 2, 10 mm longa, subulata, viridia, marginibus membranaceis, amplexicaulia. Inflorescentia usque ad 4 cm longa, caespitem aequans vel breviter superans, dense spicata; internodia ca. 1 mm longa. Spiculae 13 mm longae, dense imbricatae, uniflorae. Bractea 9 mm longa, tubo calycis longiora, ovato-lanceolata, acute spinosa, viridis, ad marginem membranacea. Bracteolae 7 mm longae, a bractea breviores, oblongo-obovatae, apice rotundatae vel interdum breviter retusae, membranaceae, nervis viridibus. Calyx 13.5 mm longus; tubus extus pilosus; limbus albus, nervis purpureis marginem attingentibus, undulatus vel breviter 10-lobatus. Petala 15 mm longa, spatulata, rosea. Stamina 10 mm longa; filamenta appanata; antherae 2 mm longae. Gynoecium 10 mm longum. Fructus 4 mm longus, cylindraceus, jugis 5. Semina 3 mm longa, fere clavata.

Typus. Azerbaijan, Urmia, Mavana, Hakki, mountains W. of the village, Kuh-e Dare Rash, 2100-2700 m, 31.7.1995, V. Mozaffarian 74869 (holotypus TARI).

Plant caespitose, partly hairy. Spring leaves 20 mm long and 2 mm broad, linear, persistent, soon wilting. Summer leaves 50 mm long and 2 mm broad, linear, soft, membranous and ciliate at base, hairy. Stem 9 cm long, densely hairy. Stem leaves 2, 10 mm long, subulate, green with membranous margin, amplexicaul. Inflorescence up to 4 cm long, equaling or shortly exceeding the cushion, densely spicate; internodes ca. 1 mm long. Spikelets 13 mm

long densely imbricate, 1-flowered. Bract 9 mm long, longer than the calyx tube, ovate-lanceolate, spiny acute at the apex, green with membranous margin, tinged with purple. Bracteoles 7 mm long, shorter than the bract, oblong-obovate, rounded at the apex or sometimes shortly retuse, membranous with green nerve. Calyx 13.5 mm long, infundibular, tube hairy outside, limb white with purple veins running to the margin, undulate or shortly 10-lobed. Petals 15 mm long, spatulate, rose. Stamens 10 mm long, filaments flat; anthers 2 mm long. Gynoecium 10 mm long. Fruit 4 mm long, cylindrical, with 5 ridges. Seeds 3 mm long, nearly clavate.

The new species is closely related to *A. caryophyllaceum* Boiss., *A. araxanum* Bge. and *A. armenum* Boiss. & Huet in Boiss. It differs from all by having much denser inflorescence, with densely imbricate spikelets. Moreover, it differs from *A. caryophyllaceum* by having bracts much longer than bracteoles and flat summer leaves. In *A. caryophyllaceum* bracts clearly shorter than bracteoles and summer leaves acicular. It differs from *A. araxanum* by having hairy stems and inflorescence which shortly exceeding the cushion. In *A. araxanum* stem glabrous and inflorescence much exceeding the cushion. It differs from *A. armenum* by having much longer leaves up to 5 cm, bracts much longer than the bracteoles. In *A. armenum* leaves up to 2.5 cm and bracts equaling the bracteoles.

***Acantholimon flabellum* Assadi, sp. nov.**

(Sect. *Staticopsis* Boiss.)

Planta caespitosa, calyce extus et folio basem excepto glabra. Folia precedentia brunnea vel brunneo-flavescentia, reflexa; folia vernalia 20 mm longa, 2 mm lata, persistentia; folia aestivalia 30 mm longa, 2 mm lata, linearia, ad apicem acicularia, basem dilatata et ciliata.

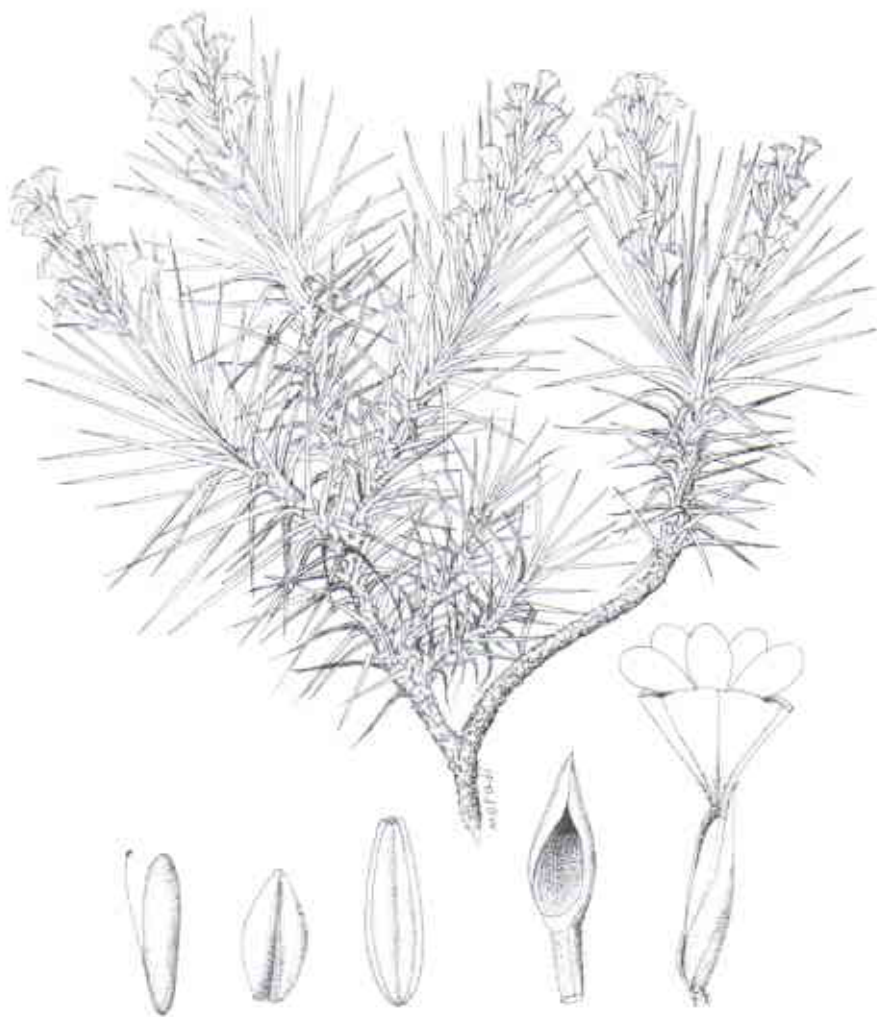


Fig. 1. *Acantholimon densiflorum* ($\times 0.7$); left to right, seed ($\times 7$); bracteole ($\times 2.8$); fruit ($\times 7$); bract ($\times 2.2$); spikelet ($\times 4.2$).

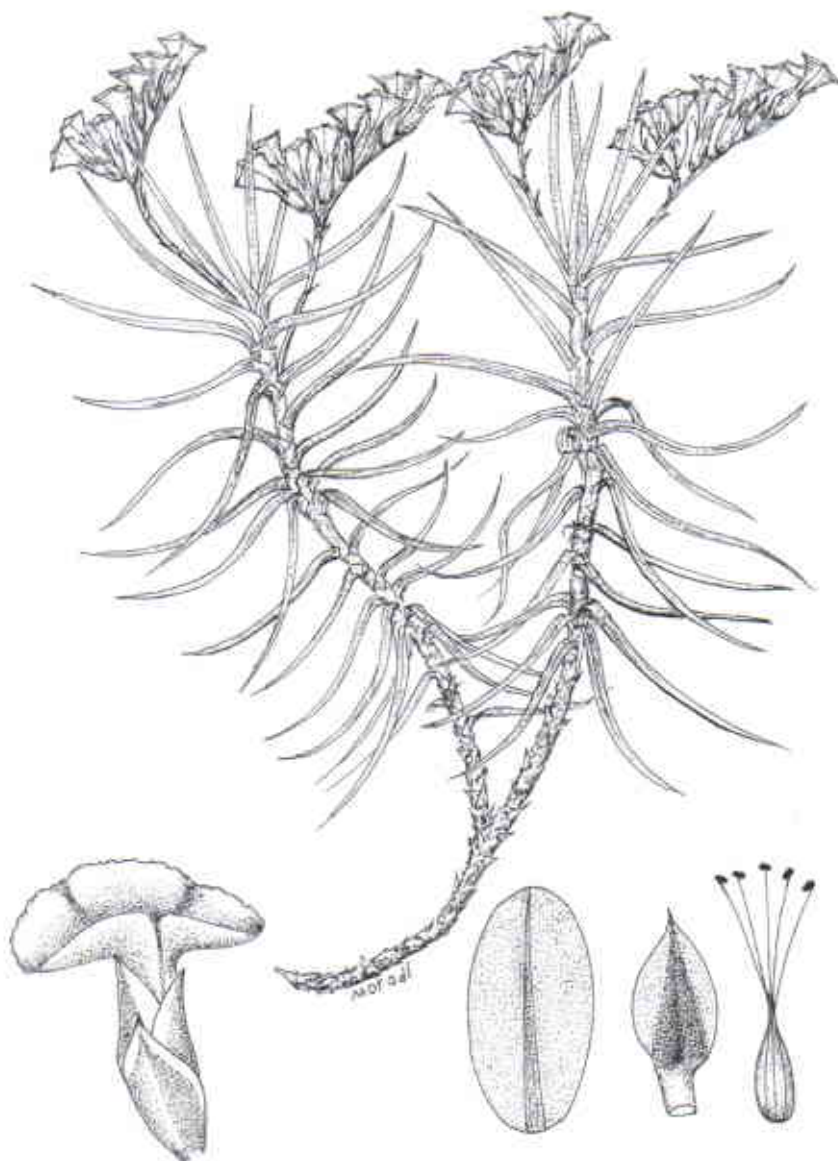


Fig. 2. *Acantholimon flabellatum* ($\times 1.5$); spikelet ($\times 5$); bracteole ($\times 5.5$); bract ($\times 5$); gynoecium ($\times 6$).

Caules 1 cm longi; folia caulina singula, 6 mm longa, lanceolata, amplexicaulia. Inflorescentia bi-ramosa, congesta, 2-3 mm longa, 3 cm lata, flabelliformis, a caespitem aequantis. Spiculae ca. 10, 13 mm longae, uniflorae. Bractea 5 mm longa, ovata, acuta, mucronata, ad marginem membranacea. Bracteolae inequales, 8-9 mm longae, calyce vix longiora, oblongae, basem versus attenuatae, apicem rotundatae, viridiae vel ad apicem purpurascens, margine late membranaceae. Calyx 12 mm longus; tubus extus pilosus; limbus albus, undulatus, nervis marginem attingentibus. Petala ca. 16 mm longa, spathulata, rosea. Stamina 8 mm longa; antherae 1 mm longae; filamenta applanata. Stigma antheras aequales, capitata.

Typus. Khorasan, Bajgiran to Namanlou, 1500-2500 m, 21.7.2003, A. A. Maassoumi, A. Jalili & M. B. Rezai 84215.

Plant caespitose, except outside of the calyx and leaf base glabrous. Leaves of the former years brown or yellow brown, reflexed; vernal leaves 20 mm long and 2 mm broad, flat, persistent; summer leaves 30 mm long and 2 mm broad, flat, linear, spiny at the apex, broadened and ciliate at base. Stems 1 cm long (inflorescence excluded). Stem leaf 1 in number, 6 mm long, lanceolate, amplexicaul at base. Inflorescence 2-branched, dense, 2-3 cm long, 3 cm broad, flabelliform, equaling the tuft. Spikelets ca. 10, 13 mm long, 1-flowered. Bract 5 mm long, ovate, acute, mucronate, membranous at the margin. Bracteoles unequal, 8-9 mm long, somewhat longer than the calyx, oblong, attenuate toward the base, rotundate at the apex, green or purplish toward the apex, broadly membranous at the margin. Calyx 12 mm long, funnel-shaped above; tube hairy outside; limb white, undulate at the apex, with nerves reaching to the apex. Petals ca. 16 mm long, spathulate, pink. Stamens 8 mm long; anthers 1 mm long; filaments flat. Stigmas as long as the anthers, capitata.

The new species seems to be related to *Acantholimon haesarense* Bornm. ex Rech. f. & Schiman-Czeika, but differs from it in following characters. Inflorescence 2-branched, flabelliform, spikelets ca. 10 in number, 1-flowered, 13 mm long, calyx 12 mm long. In *A. haesarense* inflorescence not branched, capitata, spikelet up to 5, one or rarely two flowered, 9-11 mm long, calyx 9-11 mm long. *A. mirtadzadinii* with similar habit also differs from the new species by having not branched inflorescence, 2-3 flowered spikelets.

Acantholimon glabratum Assadi, sp. nov.

(Sect. *Acantholimon*)

Planta caespitosa, caespitose dense ca. 20-30 cm latis, glabra, viridia, vel virido-flava. Folia vernalia 7-13 mm longa, 1.5 mm lata, linearia, plana, apicem spinosa, reflexa, mox languescens; folia aestivalia usque ad 25 mm longa, 1 mm lata, spinosa, triangularia, ad basin dilatata et membranacea, erecta vel patula. Caules usque ad 3 cm longa (inflorescentia incluso). Folia caulina 1-2, 3 mm longa, subulata, ad basin bene dilatata. Inflorescentia usque ad 2 cm longa et lata, flabellata, densa, spicis usque ad 8. Spiculae ca. 17 mm longae, uni- vel biflorae. Bractea 2.5 mm longa, ovata, acuta, viridia, ad marginem anguste alba. Bracteolae 3 vel numerosae, 5.5-8 mm longae, lanceolatae, apices rotundatae sed interdum breviter mucronatae, membranaceae, nervis brunneis. Calyx 16 mm longus; tubus extus et intus glaber, a bracteolis bene exsertus, nervis alternatim viridibus et purpureis; limbus albus, nervis purpureis marginem attingentibus, marginem undulatus. Petala calycem breviter excedentia, spathulata, rosea. Stamina 10 mm longa; antherae 1 mm longae; filamenta plana. Gynoecium 11 mm longum. Capsula cylindracea, ad apicem rostro longo praedito.

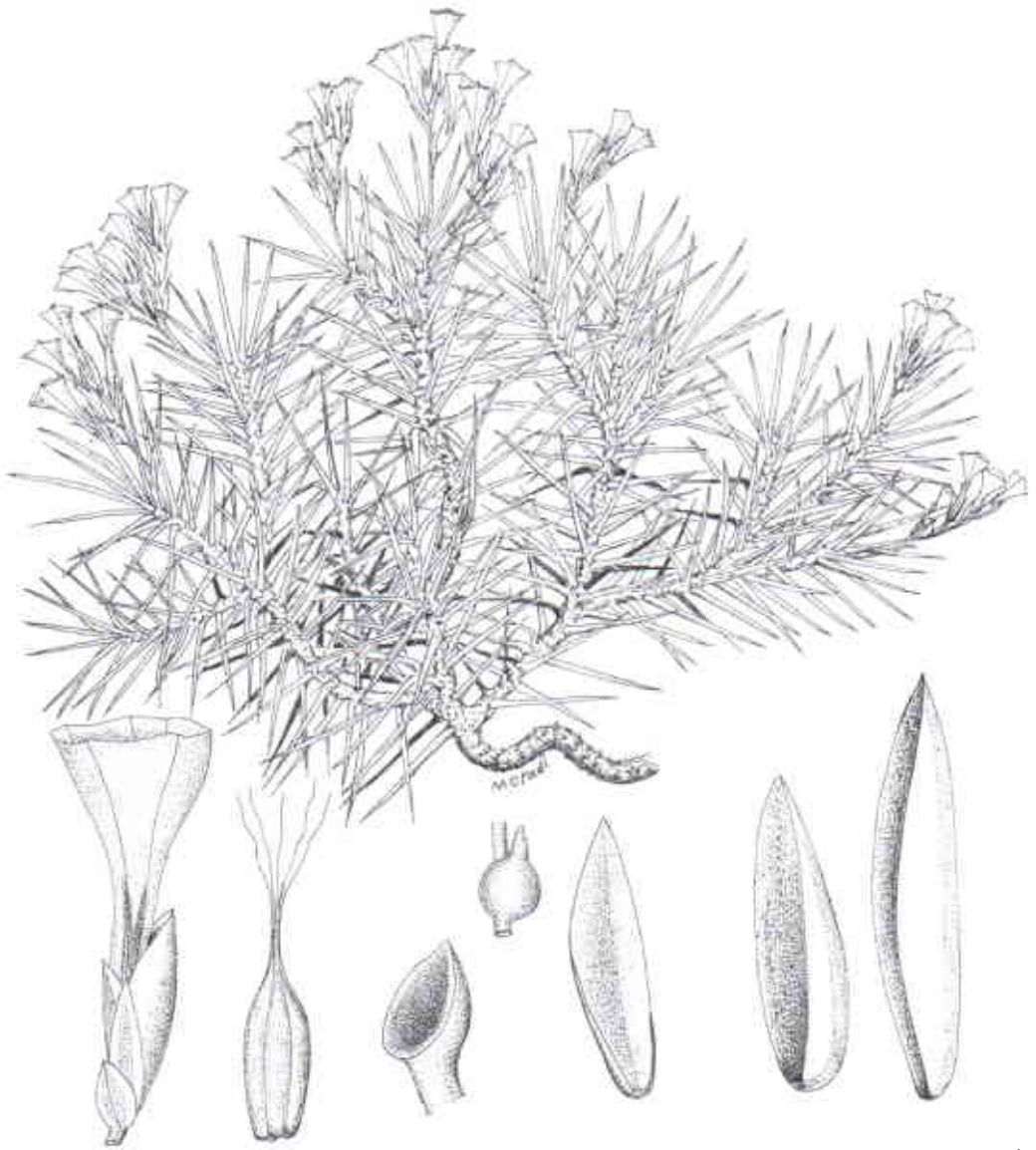


Fig. 3. *Acantholimon glabratum* ($\times 0.7$); left to right, spikelet ($\times 3.15$); gynoecium ($\times 3.5$); bract and stem leaf ($\times 7$); bracteoles ($\times 4.5$).

Typus. Tehran: Arak, mountains above the village Latedar, 2100-2600 m, 26.7.1995, Assadi 75066 (holotypus TARI); Arak, Latedar village, E. slope of Absard, 2150 m, 27.6.1995, A. Mottaghi 384; Arak, Kuh-e Latedar, 2200-2650 m, Mozaffarian 63836; Arak, Anjadan, 2000-2400 m, Mozaffarian 63787.

Plant caespitose with a dense tuft, ca. 20-30 cm broad, totally glabrous, green or greenish yellow. Spring leaves 7-13 mm long, 1.5 mm broad, linear, flat, spiny at the tip, reflexed, soon wilting; summer leaves up to 25 mm long, 1 mm broad, spiny, triangular at cross section, broadened and membranous at the base margin, erect or spreading. Stems up to 3 cm long (inflorescence included). Leaves 1-2 in number, 3 mm long, subulate, well broadened at lower base. Inflorescence up to 2 cm long and broad, flabellate, dense, with up to 8 spikelets. Spikelets ca. 17 mm long, 1- or 2- flowered, with 3 or more bracteoles. Bract 2.5 mm long, ovate, acute, green with narrow white margin. Bracteoles unequal, 5.5-8 mm long, lanceolate, rounded at the apex, sometimes with a short mucron, membranous with green band at the middle. Calyx 16 mm long, funnel-shaped; tube glabrous, well exceeding from the bracteoles, with alternatively greenish and purplish nerves; limb white with purple nerves running to the margin, undulate at the margin. Petals shortly exceeding the calyx, spatulate, pink. Stamens 10 mm long; anthers 1 mm long; filaments flat. Gynoecium 11 mm long. Fruit cylindrical with a long beak at the apex.

Acantholimon glabratum is characterized by being totally glabrous. The species differs from its close relatives *A. wendelboi* Rech. f. & Schiman-Czeika and *A. petuniflorum* Mobayen in following characters. Plant totally glabrous, nerves narrowed toward the apex of calyx limb, inflorescence equaling or shortly

exceeding the cushion, calyx 16 mm long, and leaves up to 25 mm long. In *A. wendelboi* and *A. petuniflorum* leaves, stems and calyx tube densely hairy, nerves at the apex of calyx limb narrowed, inflorescence often well exceeding the cushion, calyx shorter and leaves especially spring leaves much longer.

Acantholimon moradii Assadi, sp. nov.

(Sect. *Staticopsis* Boiss.)

Planta caespitosa, caespitose ca. 30 cm latis. Folia homomorpha, usque ad 13 mm long et 2 mm lata, linearo-lanceolata, apicem spinosa, dense puberulenta; folia vernalia mox languescentia, reflexa, plana; folia aestivalia grisea, patula vel erecta, canaliculata. Caules usque ad 18 cm longa (inflorescentio incluso), glabri. Folia caulina 1-2, 6-7 mm longa, subulata, abrupte acuminata, bases fere vaginata, brunnea, margines alba. Inflorescentia 11 cm longa, a caespitose multo excedens, laxe spicata. Spiculae 5-8, 12 mm longae, uniflorae. Bractea 5.5 mm longa, ovata, acuta, mucronata, brunnea, late membranacea. Bracteolae inaequales, 8-8.5 mm longae, a tubis calyces aequales, late elliptico-ovatae apicem rotundatae, breviter mucronatae, membranaceae; nervi brunnei. Calyx 11 mm longus; tubus extus pilosus; nervi olivaceo-brunnei; limbus albus, nervis purpureis margines attingentes, apices undulati. Petala 15 mm longa, spatulata, pallide rosea. Stamina 10 mm longa; filamenta versus bases applanata; antherae 1.5 mm longae. Gynoecium 9 mm longum; stigmata capitata a antheris inferna.

Typus. Kurdistan: Beginning of the road Sanandaj to Marivan (N: 35 20; E: 47 08; PE2), 1750 m, 24.06.2003, dominated by *Bromus tomentellus* Boiss. and *Festuca ovina* L., M. Assadi & M. Ranjbar 84925.

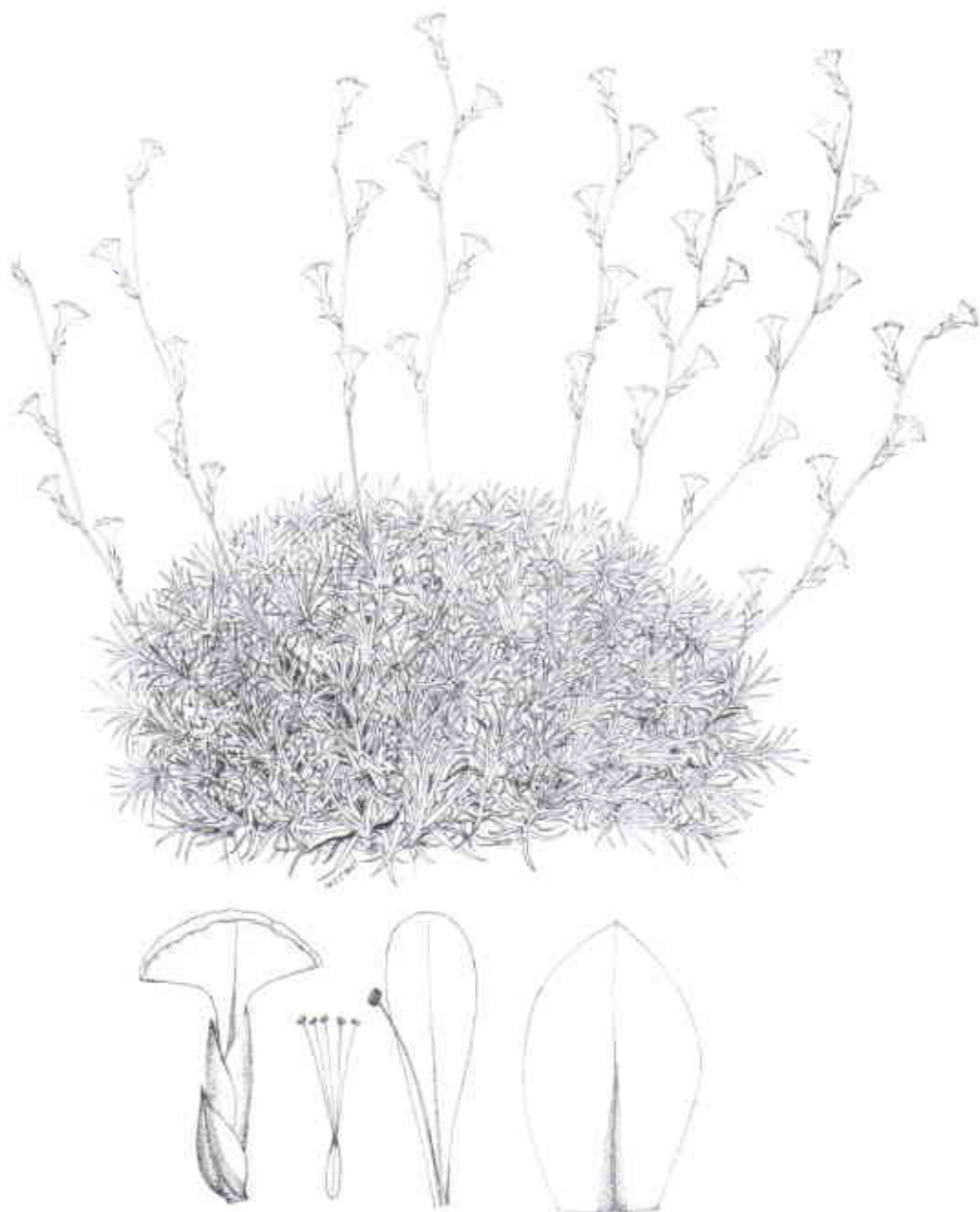


Fig. 4. *Acantholimon moradii* ($\times 0.54$); left to right, spikelet ($\times 3$); gynoecium ($\times 2.7$); petal and stamen ($\times 2.8$); bracteole ($\times 4.2$).

Plant caespitose with a dense tuft ca. 30 cm broad. Leaves homomorph, up to 13 mm long and 2 mm broad, linear-lanceolate, spiny at the tip, densely puberulent; spring leaves soon wilting, reflexed, flat; summer leaves gray, spreading or erect, canaliculated. Stems up to 18 cm long (inflorescence included), glabrous. Stem leaves 1-2, 6-7 mm long, subulate, suddenly acuminate, nearly vaginate at the base, brown with white margin. Inflorescence 11 cm long, much exceeding the cushion, laxly spicate. Spikelets 5-8, 12 mm long, 1-flowered. Bract 5.5 mm long, ovate, acute, mucronate, brown, broadly membranous. Bracteoles unequal, 8-8.5 mm long, as long as the calyx tube, broadly elliptic-obovate rounded at the apex with a short mucron, membranous with brownish midrib. Calyx 11 mm long, funnel shaped above; tube hairy with olive-brown nerves; limb white with purple nerves running to the apex. Petals 15 mm long, spatulate, pale pink. Stamens 10 mm long; filaments flat in lower two third; anthers 1.5 mm long. Gynoecium 9 mm long; stigmata capitate, lower than the anthers.

The species is from the *A. acerosum* (Willd.) Boiss. and *A. halophilum* Bokhari group. It is morphologically very similar to *A. halophilum*, but differs from it in the following characters. Leaves densely puberulent (not glabrous), up to 13 mm long (not 10-25 mm). Calyx with shortly undulate margin (not distinctly 5-lobed). Moreover, *A. halophilum* is a central Anatolian endemic growing on Salty soils (Bokhari & Edmondson 1982),

whereas *A. moradii* grows on a steppe grassland. The new species also differs from *A. acerosum* in following characters. Leaves up to 13 mm long (not 50-70 mm), densely puberulent (not glabrous). Bract distinctly shorter than the bracteoles (not somewhat shorter). Bracteoles elliptic-obovate (not lanceolate). Calyx 11 mm long (not 14-16 mm). *A. moradii* is also similar to the Caucasian endemic *A. lepturoides* (Jaub. & Spach) Boiss., but differs in the following characters. Leaves puberulent (not glabrous) up to 13 mm long (not 15-25 mm), stem simple (not rarely 1-branched), Bract much shorter than the bracteoles (not scarcely shorter to markedly longer (see Linchevskii 1952).

Acknowledgment

I wish to thank Mr. E. Moradi the artist in TARI herbarium for preparing the illustrations.

References

- Assadi, M. 1989: Plan of the Flora of Iran. - Tehran.
- Bokhari, M. H. & Edmondson, J. R. 1982: *Acantholimon* in P. H. Davis Flora of Turkey vol. 7: 478-502. -Edinburgh.
- Linchevskii, I. A. 1952: *Acantholimon* in B. K. Shishkin & E. G. Bobrov Flora of the USSR vol. 18: 301-372. -Moskva & Leningrad.
- Rechinger, K. H. & Schiman-Czeika, H. 1974: *Plumbaginaceae* in K. H. Rechinger Flora Iranica no.108. -Graz.