

# FOUR NEW SPECIES OF THE GENUS *COUSINIA* CASS. (ASTERACEAE) FROM IRAN

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Four new species of the genus *Cousinia* are described from Iran. *C. barezica* is based on a specimen collected from Barez mountain chains. The species belongs to the section *Spinuliferae* and related to *C. longifolia* and *C. sicigera*. It however, differs from both by having discolored leaves. *C. isfahanica* another new species from the section *Rigidissimae* is related *C. rigidissima* and *C. auranti* both from Afghanistan. This species has been based on a specimen collected from Isfahan, Semirom. *C. maassoumii* is described from adjacent localities of Delijan and Arak cities. It is from the section *Pugioniferae* and most closely related to *C. macroptera* but having different leaf and indumentum characters. *C. pseudocandolleana* is described based on specimen from Khorasan province. It is closely related to *C. candolleana* an endemic of Hamadan province, but differs from it by having stem and stem leaf characters.

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Key words. *Cousinia*, Asteraceae, new species, Flora, Taxonomy, Iran.

## *Cousinia* (Asteraceae)

چهار گونه جدید جنس *Cousinia* Cass. از ایران شرح داده می‌شود. گونه *C. barezica* بر اساس نمونه‌ای که از سلسله جبال بارز در استان کرمان جمع آوری شده شرح داده می‌شود. این گونه متعلق به بخش *Spinuliferae* است و با گونه‌های *C. longifolia* و *C. sicigera* نزدیکی دارد ولی با هر دو گونه در داشتن برگهای دورنگ در مقابل برگهای یک رنگ تفاوت دارد. گونه *C. isfahanica* بر اساس نمونه‌ای که از اصفهان، سمیرم، ونک جمع آوری شده معرفی می‌گردد. این گونه با گونه‌های *C. rigidissima* و *C. auranti* که هر دو در افغانستان انتشار دارند نزدیکی دارد. گونه جدید با ویژگیهای برگ و کپه با هر دو گونه تفاوت دارد. گونه *C. maassoumii* بر اساس نمونه‌هایی از اراک و دلیمان شرح داده می‌شود و با گونه *C. macroptera* خویشاوندی دارد. در گونه جدید برگهای قاعده‌ای نیزه‌ای باریک اند و گیاه به رنگ سبز گرایش دارد، در صورتیکه در گونه *C. macroptera* که فقط در استان آذربایجان انتشار دارد، برگها نیزه‌ای و یا بیضوی پهن اند و رنگ گیاه خاکستری است. گونه *C. pseudocandolleana* بر اساس نمونه‌ای از استان خراسان شرح داده می‌شود و با گونه *C. candolleana* که انحصاری استان همدان است نزدیکی دارد. گونه جدید ارتفاع تا حدود ۳۰ سانتیمتر دارد و چند ساقه‌ای است. در صورتی که گونه *C. candolleana* ارتفاع حدود یک متر را دارد و تک ساقه‌ای است. گونه جدید همچنین با گونه *C. myriotoma* خویشاوندی دارد و با آن در داشتن برگهای شانه‌بخش ساده، جام گل کرم و برگه‌های گریبانی قلابی تفاوت دارد. در گونه *C. myriotoma* برگها دو تا سه بار شانه‌ای بخش اند، جام گل گلی معرفی شده است و برگه‌های گریبانی افراشته و غیرقلاب‌مانند اند.

## Introduction

The genus *Cousinia* Cass. has been subject to taxonomic studies for the preparation of the treatment for the Flora of Iran (Assadi 1989) by the author, F. Attar (Tehran University) and I. Mehregan (Institut fuer Spezielle Botanik, Johannes Gutenberg-Universitat Mainz, Germany). The author has revised several sections of the genus in Iran including sections *Spinuliferae* Rech. f., *Rigidissimae* Rech. f.,

*Myriotomae* Rech. f. and *Pugioniferae* Bunge In this project several localities in Iran have been visited and herbarium specimens of TARI and TUH have been studied and named. In many cases images of type specimens were observed. Flora Iranica (Rechinger 1972 & 1979) was the main reference for the identification of the specimens. However, local Floras suitable for the identification of Iranian materials were studied (Cherneva 1962 and Huber-Morath 1975).

Also, original descriptions in many cases were used in identifications. The new species are referred to relevant sections based mainly on Flora Iranica account (Rechinger l. c.). However, delimitation of the sections seems to be somewhat artificial, therefore in this paper less attention is paid to the sectional circumscription of the new taxa based on the characters of the sections but rather to compare them with the closest affinities.

Attar (2000), Attar & Ghahreman (2006), Attar, Ghahreman, Mahdigholi & Sheidai (2007), Mehregan (2008) and Mehregan & Kadereit (2008) have recently revised parts of the genus. The herbarium specimens are preserved in TARI and TUH.

The aim of this paper is to describe four new species of the genus *Cousinia* in Iran.

***Cousinia barezica* Assadi, sp. nov.** (Fig. 1).

Sect. *Spinuliferae* Rech. f.

Planta perennis, ca. 80 cm alta, foliis discoloribus. Caulis a medio ramosus, albus, nitidus, synflorescentia paniculato-ramoso. Folia basalia ca. 20 cm longa, spinis inclusis 4 cm latis, anguste lineari-lanceolata, margine lobis alternatim magno et parvo usque ad 2/3 divisa, subtus arachnoideo-tomentosa, grisea, supra glabra, virideo-flava; lorum spinarum 5-10 cm longae. Folia caulina infima foliis basibus similia sed breviora, amplexicaulia, sursum apicem gradatim decrescentia. Capitula spinis inclusis 2.5-3 cm diametro; stipites capitula aequantes vel longiores. Involucrum ca. 1.5 cm longum, spinis exclusis 1 cm diametro, cylindricum, sursum apicem vix attenuatum, arachnoideum. Phylla 47, inaequalia; exteriora breviora, patentia: phylla intermedia ca. 1.5 cm longa, subulata, margine late membranacea, ciliata, apice spinis patentibus, spinis marginalibus 3-5 jugis; phylla intima 1.2 cm longa, lanceolata vel anguste oblanceolata, apice spinosa, margine late membranacea et pubescentia, interdum purpurea. Flores ca. 20. Corolla 13 mm longa, pallescentia vel dilute violacea; tubi 7-8 mm longi; lacinae c. 3 mm longae. Achaenia ca. 7 mm longa, obpyramidata, crema maculis brunneis immixtis, compressa, nervis lateralibus indistinctis; pappi setae inaequales, scabrae. Receptaculi setae glabrae.

*Typus.* Kerman: Jiroft road, Dehbakri, ca. 2150 m, 02.08.1998, Mozaffarian & Maassoumi 78325 (holotypus TARI).

Plant perennial, ca. 80 cm high, with discolor leaves. Stem branched from the middle, whitish, shiny, with paniculate synflorescence. Basal leaves ca. 20 cm long, including spines 4 cm wide, narrowly linear-lanceolate, lobed at the margin up to 2/3 of the blade to alternatively large and small lobes, grey arachnoid-tomentose below, glabrous greenish-yellow above;

spines at the tip of the marginal lobes 0.5-1 cm long. Lower stem leaves similar to the basal leaves but smaller, amplexicaule, gradually decreased toward the apex. Capitula including spines 2.5-3 cm in diam., with stipe equaling or longer than the capitula. Involucrum ca. 1.5 cm long, excluding spines ca. 1 cm in diam., cylindrical, somewhat narrowed toward the apex, arachnoid. Involucral bracts 47, unequal; outer bracts shorter, spreading; middle bracts ca. 1.5 cm long, subulate, at the margin broadly membranous, ciliate, with terminal spines curved outside; lateral spines 3-5 pairs; inner bracts 1.2 cm long, lanceolate or narrow lanceolate, spiny at the apex, at the margin broadly membranous and hairy, sometimes purple. Flowers ca. 20. Corolla 13 mm long, pale or pale violet; tube 7-8 mm long; lobes ca. 3 mm long. Anther tube glabrous. Achene ca. 7 mm long, obpyramidal, cream with dark brown blotches, compressed, with indistinct lateral nerves; seta of pappus unequal, scabrous. Receptacular seta glabrous.

The new species belongs to the sect. *Spinuliferae* and most closely related to *C. longifolia* and *C. sicigera*, but it differs from both of them by having leaves discolor, glabrous above and densely arachnoid-tomentose below (not glabrous on both sides). It also differs from *C. longifolia* by having capitula ca. 3 cm in diam. (not 6-9 cm), middle bracts ca. 1 cm long (not 3-4 cm) and amplexicaule stem leaves (not shortly decurrent), from *C. sicigera* by having spinulose involucral bracts (not spineless bracts).

***Cousinia isfahanica* Assadi, sp. nov.** (Fig. 2).

Sect. *Rigidissimae* Rech. f.

Planta perennis, monocarpica, ca. 1.6 m alta, basi petiolis et rachidibus vetis emarcidis, parte arachnoideo-tomentosa. Caulis singulis, supra medium ramosus, glabrous, infra medium pilosus, synflorescentia paniculata. Folia basalia ca. 15 cm longa, 8 cm lata, pinnata; segmenta 40, ca. 20-50 cm longa, 1-2 mm lata, anguste linearia, apice spinosa, margine revoluta, subtus arachnoideo-tomentosa alba, nervis distinctis, supra laxe arachnoideo-tomentosa, viridia. Folia caulina basalibus similia sed minora, gradatim decrescentia. Capitula 10 mm diametro. Involucrum absque spinis 1.5 cm diametro, ovatum, sparsim arachnoideo-tomentosum. Phylla ca. 37, inaequalia; exteriora ca. 3.5 mm longa, ovata, apice spinosa; phylla intermedia ca. 12 mm longa, oblongo-ovata vel obovata, apice abrupte spinis ca. 3 mm longis terminata, patentia, recurvata, margine scabra; phylla intima ca. 12 mm longa, truncata, margine scabra vel ciliata, apice ligulata, brunnea. Floris 20. Corolla 9 mm longa, crema; tubus 2 mm longus; lobi 2.5 mm longi.

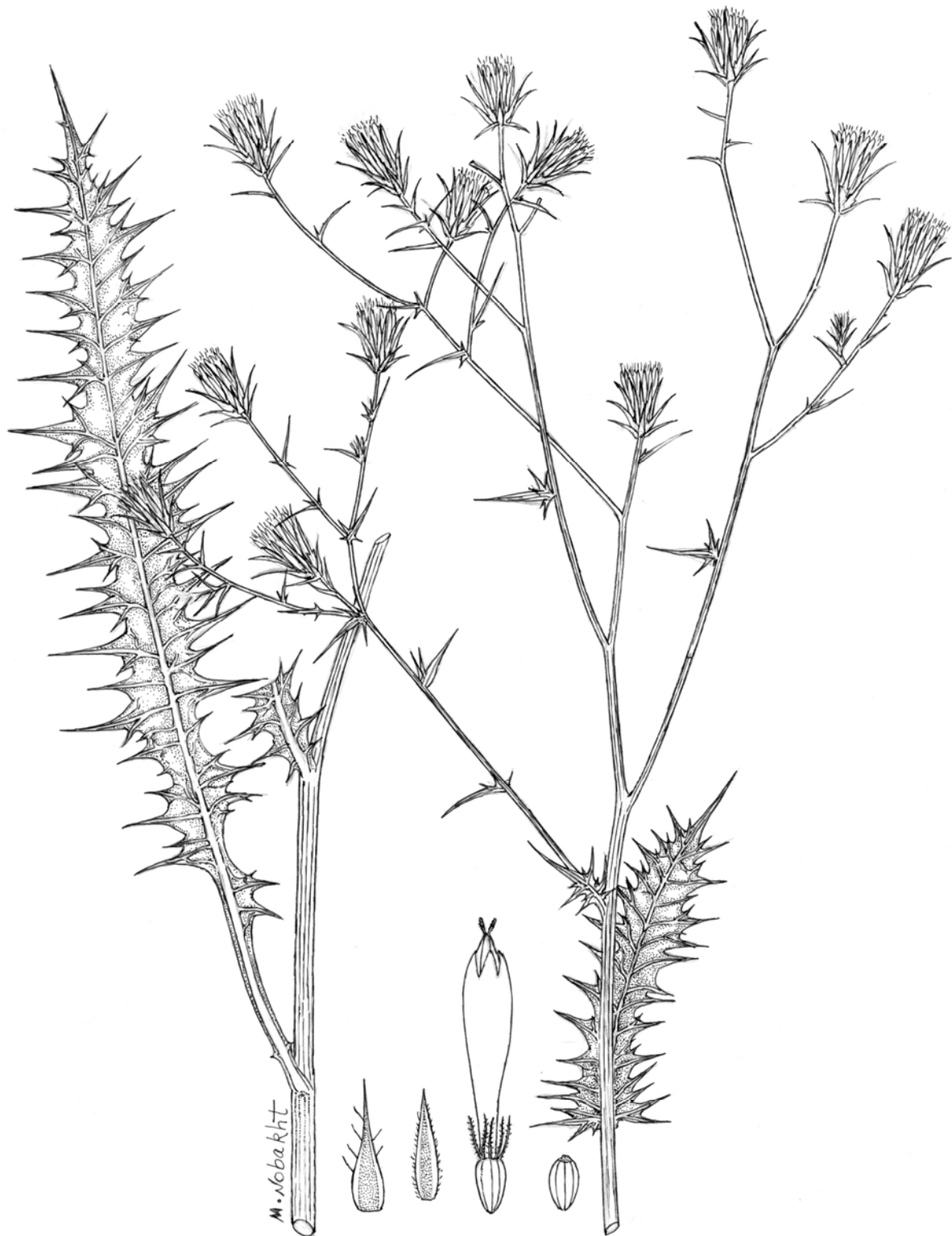


Fig. 1. *Cousinia barezica* ( $\times 0.8$ ). Bracts ( $\times 1.6$ ); flower ( $\times 2.4$ ); achene ( $\times 1.1$ ).



Fig. 2. *Cousinia isfahanica* ( $\times 0.58$ ). Details ( $\times 2.3$ ).

Antherarum tubus dilute violaceous, glaber. Achaenia immatura 3 mm longa, obpyriformia, leviter compressa, nervis indistinctis; pappi setae achaenium aequantes, scabrae. Receptaculi setae glabrae.

*Typus.* Isfahan: Semirom, Vanak. 2250 m. 12.08.1987, Mozaffarian 62147 (holotypus TARI).

Plant perennial, monocarpic. ca. 1.6 m high, covered at base with old remnants of petiole and leaf rachis of basal leaves, partly covered by arachnoid hairs. Stem single, branched from the middle, making a broadly paniculate synflorescence, hairy below, glabrous above. Basal leaves ca. 15 cm long, 8 cm wide, pinnate; segments up to 20 in each side, ca. 20-50 cm long and 1-2 mm wide, narrowly linear, spiny at the apex, revolute at the margin, white arachnoid-tomentose below with a distinct nerve, green arachnoid-tomentose above, rachis revolute at the margin, with similar indumentum of segments. Stem leaves similar to the basal leaves, but smaller, gradually decrease in size, bract-like below the capitula. Capitula ca. 10 mm in diameter, often with long stalk much longer than the capitula length. Involucre ca. 1.5 cm long, ca. 1 cm in diam., ovate, sparsely arachnoid tomentose, Involucral bracts ca. 37, unequal; lower bracts ca. 3-5 mm long, ovate, spiny at the apex; middle bracts ca 12 mm long, oblong ovate or obovate, turned outwards, abruptly terminate to a 3 mm long spine at the apex, yellow green below, green above, scabrous at the margin; inner bracts ca. 12 mm long, oblong, truncate at the apex, scabrous to ciliate at the margin, pale with ligulate brown apex. Flowers 20. Corolla 9 mm long, cream in dry state; tube 2 mm long; terminal lobes 2.5 mm long. Anther tube pale violet, glabrous. Immature achene 3 mm long, obpyriform, nearly compressed, with indistinct nerves; pappus as long as the achene, scabrous. Receptacular bristles smooth.

The new species is closely related to *C. auranti* C. Winkl. and *C. rigidissima* Rech. f. both from Afghanistan. It differs from *C. auranti* by having narrower leaf segments ca. 2 mm wide (not 5-8 mm), larger involucre ca. 1.5 cm long and 1 cm in diam. (not 1-1.3 cm long and 0.6 cm in diam.), ovate and slightly narrowed at base involucre (not ovate-cylindric manifestly narrowed at base); from *C. rigidissima* by having much smaller capitula ca. 1 cm in diam. (not 2.5-3 cm), spine of involucral bracts ca. 3 mm long (not 3-10 mm) and tube of corolla ca. 2 mm long (not 5 mm). The new species is also similar to *C. candolleana* Jaub. & Spach from the section *Myriotomae* Rech. f. but, differs from it by having spiny leaf segments (not soft and no spiny leaf segments) and also having crowded old leaf petioles at the base of stem, a character is not observed in *C. candolleana*. Worth

mentioning, is that the clear difference between the two sections *Rigidissimae* and *Candolleana* is spiny leaves in the former versus not spiny leaves in the latter. Further studies might reveal that the two sections are not distinct.

***Cousinia maassoumii* Assadi, sp. nov.** (Fig. 3).

Sect. *Pugioniferae* Bunge

Planta perennis, monocarpica, 32-35 cm alta, arachnoideo-tomentosa vel villosa, cinerescens. Caulis singulis, basi ramosus, synflorescentiis paniculato-corymbosis, arachnoideo-tomentosa vel basi villosa, cremeo-flava. Folia basalia usque ad 20 cm longa et 2 cm lata, anguste lanceolata, petiolata, margine usque ad medium lobata; lobi inaequales, lobiis secundariis 1-3, minutis, spinis usque ad 5 mm longis terminatis, subtus cinerascens, dense arachnoideo-tomentosi, supra sparsim arachnoidea, griseo-viridia. Folia caulina sursum apicem decrescentia, ad capitulum attingentes, continue decurrentia, margine lobata spinis 5 mm longis terminata. Capitula spinis inclusis 1.5 cm diametro. Involucrum 10-13 mm longum, spinis inclusis 7 mm diametro. Phylla 36, inaequalia; phylla exterior breviora, recurvata; phylla intermedia 1.5-1.8 cm longa, absque spinis lateralibus; phylla intima lineario-oblancheolata, ca. 1 cm longa, membranacea vel coriacea, apice breviter spinosa, hirsuta, erecta. Flores 33. Corolla 11 mm longa, violacea; tubus 3.5 mm longus; limbus 7.5 mm longus; laciniae 2.5 mm longae. Antherarum tubus violaceus, glaber. Achaenia 4 mm longa, oblique obpyramidata, compressa, venis marginalibus 2 distinctis, venis lateralibus 2 indistinctis, basi attenuata, apice dentibus 4, transversaliter asperata; pappi setae achaenio vix breviora, scabrae. Receptaculi setae glabrae.

*Typus.* Isfahan: Delijan, ca. 1400 m, 01.07.1998, V. Mozaffarian & A. A. Maassoumi 77932 (holotypus TARI). –Tehran: Arak, Haftad-Gholleh, Checkab, (UT3), rocky western and eastern slopes, 2100-2500 m, 12.06.1984, V. Mozaffarian & A. A. Maassoumi 47868.

Plant perennial, monocarpic, 32-35 cm high, hairy, arachnoid or villose, greyish, with single stem. Stem branched from the base, with paniculate-corymbose synflorescence, arachnoid or villous at lower base, creamish-yellow. Basal leaves up to 20 cm long and 2 cm broad, narrowly lanceolate, petiolate, whitish densely arachnoid-tomentose below, less dense above, petiolate, lobed at the margin; lobes unequal, often with 1-3 secondary small lobes, terminated to 5 mm long spines. Stem leaves decreasing toward the apex, reaching to the capitula, continuously decurrent; wings

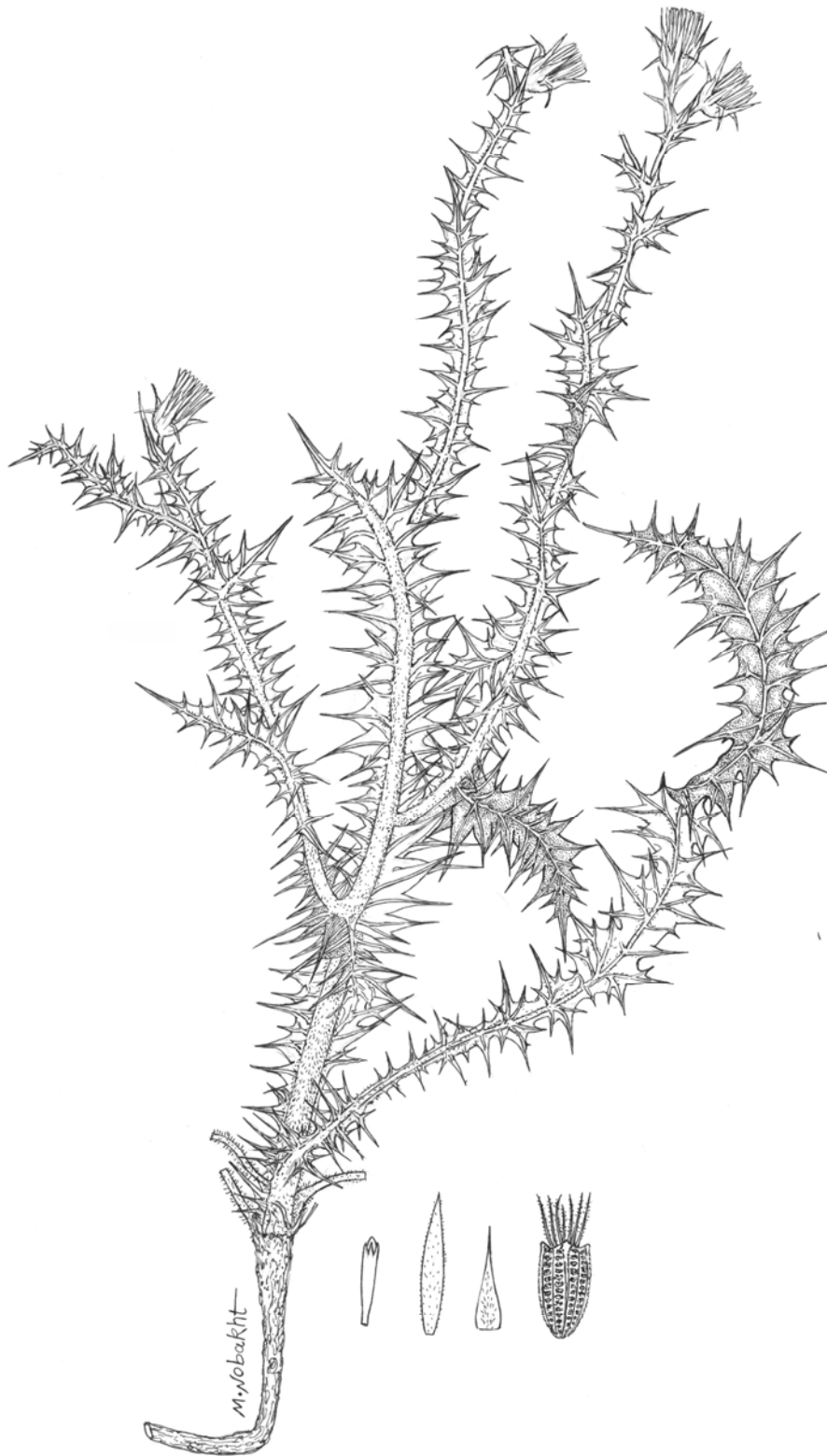


Fig. 3. *Cousinia maassoumii* ( $\times 0.62$ ). From left to right flower ( $\times 1$ ), inner bract ( $\times 1.8$ ), middle bract ( $\times 1$ ) and achene ( $\times 3$ ).

of stem ca. 5 mm wide, lobed at the margin; lobes terminating to 5 mm long spines. Capitula including spines 1.5 cm in diam. Involucre 1-1.3 cm long and excluding spines 0.7 cm wide, ovate, arachnoid. Involucral bracts ca. 36, unequal; outer bracts smaller and curved; middle bracts 1.5-1.8 cm long, subulate, ovate at the lower third, spiny above, without marginal spines; inner bracts 1 cm long, linear-ob lanceolate, membranous to coriaceous, shortly spiny at the tip, covered by short hairs, erect. Flowers 33. Corolla 11 mm long, violet; tube 3.5 mm long; limb 7.5 mm long; lobes 2 mm long. Anther tube violet, glabrous. Achene 4 mm long, oblique obpyramidal, compressed, with 2 marginal and 2 indistinct lateral veins, transversally rugose, attenuate at base, with 4 teeth at the apex; bristles of pappus somewhat shorter than the achene, scabrous. Receptacular bristles smooth.

The new species with the following characters is included in the section *Pugioniferae* Bunge. Capitula small, middle bracts without marginal spines, flowers few, corolla 10 mm long, violet, receptacular bristles smooth, achenes small with longitudinal veins and bristles of pappus scabrous. It is most closely related to *C. macroptera* C. A. Mey. occurring only in Azerbaijan province, but differs from it by having narrow lanceolate leaves and greenish habit. In *C. macroptera* leaves are obovate or broadly elliptic and the habit of plant is grayish white.

***Cousinia pseudocandolleana* Assadi, sp. nov.** (Fig. 4).  
Sect. *Myriotomae* Rech. f.

Planta perennis, 27 cm alta, multicaulis, radice crasso stricto, partim dense vel sparse pubescens. Caulis supra medium ramosus, ae basem 3 mm diametro, glaber, albo-cremea. Synflorescentia corymboso-paniculata. Folia basalia numerosa, usque ad 7 cm longa, 3-4 cm lata, pinnatisecta; segmenta usque ad 6 –juga, 10-20 mm longa, 2 mm lata, linearia, apice breviter spinosa, margine revoluta, subtus albo-tomentosa, supra sparsim pilosa, viridia; rachis secus marginem alata, indumento segmentis similis; alae ca. 2 mm latae. Folia caulina versus apices gradatim decrescentia, inferiora pinnatisecta, superiora simplicia spinis 1-2 jugis. Capitula 8 mm diametro, ovata. Involucrum 10 mm longum, 8 mm diametro, glabrescens vel vix arachnoideum. Phylla 30-35, inaequalia, imbricata, apice spinoso-hamata; phylla intermedia ca. 7 mm longa, ovato-lanceolata, lanceolata vel oblanceolata; phylla exteriora breviora, ovata; phylla intima ca. 10 mm longa, lineari-lanceolata, apice spinosa, straminea. Flores 15-25. Corolla 13 m longa, cremea; tubus 5 mm longus; limbus 8 mm longus; lacinae 2.5 mm longae. Antherarum tubus violaceus, 9 mm longus, basi caudis 2 mm longis. Achaenia 3 mm longa,

obpyramidata, leviter compressa, venis lateralibus 2, superne 4 dentata.

*Typus.* Khorasan: 41 km N. of Mashhad on the road to Kalate Naderi, 1700 m, 17.7.1976, M. Assadi & A. A. Maassoumi 21360 (holotypus TARI).

Perennial, 27 cm high, many stemmed, with upright thick root, partly covered with dense or somewhat scattered indumentum. Stem branched above the middle, 3 mm in diam. at the base, glabrous, creamish white, bearing corymbose synflorescence. Basal leaves numerous, up to 7 cm long, 3-4 cm wide, pinnatisect; segments up to 6 pairs, 10-20 mm long and 2 mm wide, linear, shortly spiny at the tip, revolute at the margin, densely white tomentose on the lower side, greenish and less densely hairy above; rachis with ca. 2 mm wing along the margin, with similar indumentum of the leaf segments. Stem leaves gradually decreasing in size upwards, pinnatisect below, simple above with 1-2 pairs of spines at the base, bract-like in the synflorescence, with similar indumentum of basal leaves. Capitula with 1-10 cm peduncle, 8 mm in diam., ovate. Involucre 10 mm long, 8 mm in diam., glabrescent or sparsely arachnoid. Bracts 30-35, unequal, imbricate, with spiny hooded apex; lower bracts short, ovate; middle bracts ca. 7 mm long, ovate lanceolate, lanceolate or oblanceolate, greenish; inner bracts ca. 10 m long, linear-lanceolate, spiny at the apex, straw-colored. Flowers 15-25. Corolla 13 mm long, cream; tube 5 mm long; limb 8 mm long; lobes 2.5 mm long. Anther tube violet, 9 mm long with 2 mm tails at the base. Achene 3 mm long, obpyramidal, nearly flat, with 2 marginal and 2 lateral longitudinal veins, with 4 teeth at the apex. Style ca. 13 mm long, divided to 2 hairy branches ca. 2 mm long.

The species belongs to the sect. *Myriotomae* Rech. f. and most closely related to *C. candolleana* Jaub. & Spach but differs from it by having many stems ca. 27 cm long and 3 mm in diam. at the base (not single stemmed more than 100 cm long and 7-10 mm in diam. at the base), middle stem leaves simple with 1-2 pairs of spines at the base (not without spines). Moreover, *C. candolleana* is an endemic of Hamadan area, whereas *C. pseudocandolleana* is from NE. Iran at Khorasan province. *C. myriotoma* Rech. f. & Koeie should be another relative from Afghanistan, Heart. In fact, the type specimen of the new species was named *C. myriotoma* by Rechinger (1979). However, the new species differs from *C. myriotoma* more to all what mentioned for *C. candolleana* by having pinnatisect leaves (not bi- or tripinnatisect), corolla cream (not rose), receptacular bristles glabrous (not scabrous), involucral bracts deflexed and hooked (not only turned outwards) and etc.

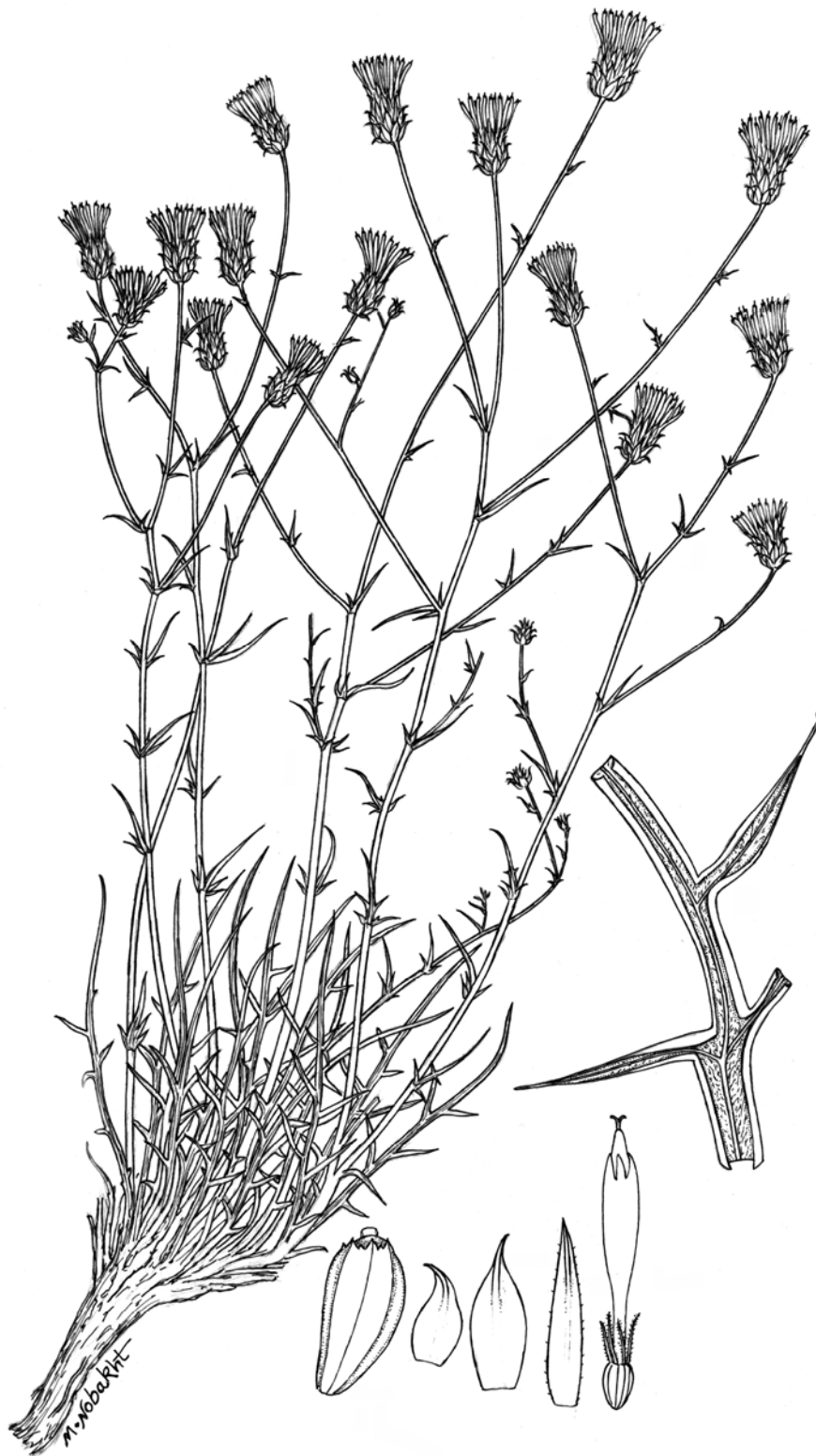
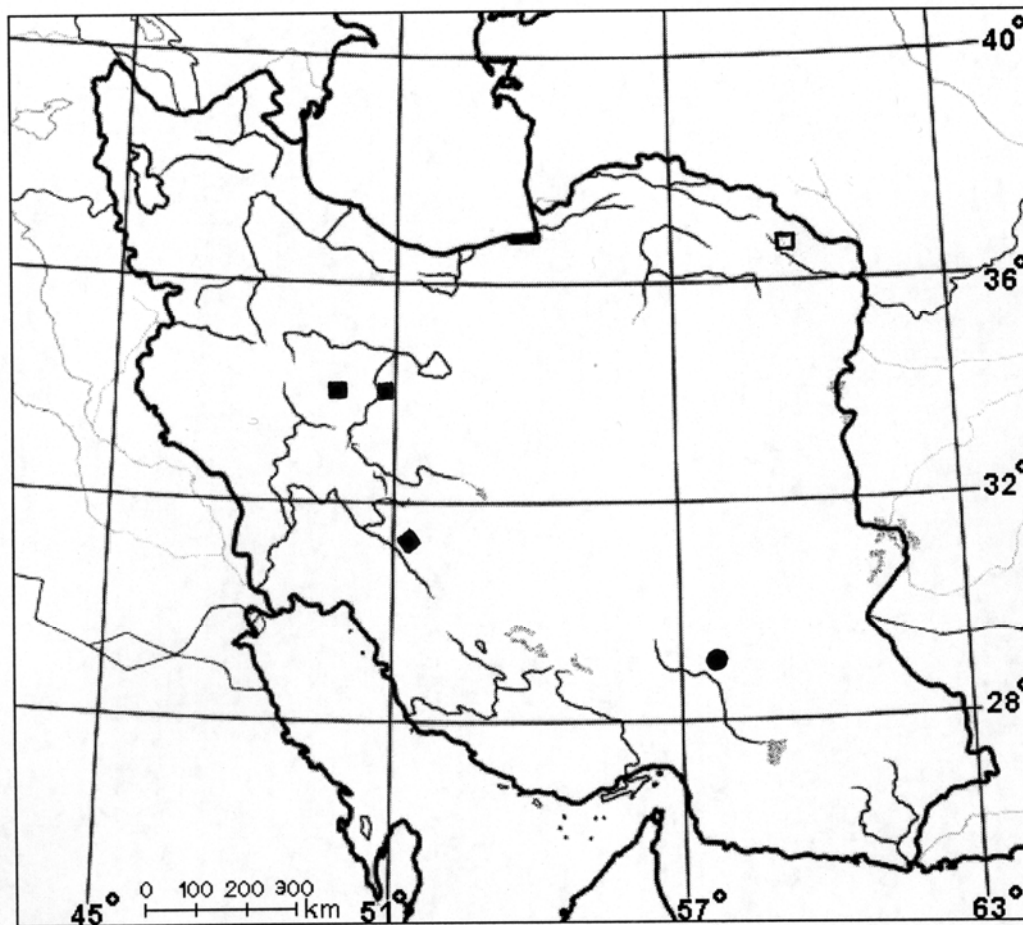


Fig. 4. *Cousinia pseudocandolleana* ( $\times 0.63$ ). Flower ( $\times 6$ ); bracts from right to left inner ( $\times 2.4$ ), middle and lower ( $\times 3$ ); achene ( $\times 6.5$ ).





Map 1. Distribution of new *Cousinia* species. *C. barezica* (●), *Cousinia isfahanica* (◆), *C. maassoumii* (■) and *C. pseudocandolleana* (□).

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