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دو گونه جدید از سرده کوزینیا (تیره کاسنیان) از غرب و شمال شرق ایران

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چکیده. دو گونه جدید از سرده کوزینیا شرح داده می شود. کوزینیا برنمولریانا از غرب ایران که بر اساس بعضی صفات کلیدی مانند تعداد گل و برگک و شکل گل‌آذین در بخشه هاوسکنختی قرار می گیرد. این گونه با گونه نزدیکش یعنی کوزینیا هاوسکنختی و کوزینیا کرکسنسیس مقایسه می شود. دومین گونه جدید به نام کوزینیا سمنانسیس از شمال شرق ایران شرح داده می شود که بر اساس صفاتی چون تعداد گل، ساقه بالدار و شکل برگک در بخشه استنوسفاله قرار می گیرد و با نزدیکترین خویشاوندان خود یعنی گونه های کوزینیا الکسینکوانا و کوزینیا گلوکوپسیس مورد مقایسه قرار می گیرد. عکس های این گونه ها و نقشه های پراکنش ارایه می شوند.

واژه‌های کلیدی. کوزینیا، آرایه شناسی، ریخت شناسی، بورنمولر، فلور ایران

Two new species of genus *Cousinia* (Asteraceae, Cardueae) from W and NE Iran

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Abstract. Two new species of *Cousinia* are described from Iran. *Cousinia bornmulleriana* from the west that can be placed in sect. *Haussknechtii* based on some key characters such as flower numbers, phyllary numbers and the inflorescence form traits. This species can be also compared with its closest relative *C. haussknechtii*. and *C. karkasensis*. The second new species, *C. semnanensis*, from North East of Iran, belongs to the sect. *Stenocephalae* for its flower numbers, winged stem, and phyllaries shape, and is compared to *C. alexeenkoana* and *C. glaucopsis* as its close relative. Natural photos and distribution maps are presented.

Keywords. *Cousinia*, taxonomy, morphology, Bornmüller, flora of Iran

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INTRODUCTION

The genus *Cousinia* Cassini is one of the largest genera of flowering plants, with 600–700 species distributed in central and western Asia (López-Vinyallonga et al., 2009; Rechinger, 1972, 1979, 1986; Sennikov, 2013; Tscherneva, 1962; Atazadeh et al., 2020).

In Iran the Kopet Dagh, Alborz Mts., Zagros Mts., and NW regions are the main distribution centers of this genus. Most species have a limited distribution range and occupy small isolated habitats (Attar & Djavadi, 2010). In the desertic area of Central Iran, members of *Cousinia* are completely absent except for some such as *C. piptocephala* Bunge and *C. deserti* Bunge.

Despite the Irano-Turanian nature of most taxa, a few ones are presented in the transition areas between Hyrcanian and Irano-Turanian phytogeographical regions. Some of these species include *C. pterocaulos* (C.A.Mey.) Rech.f., (Sect. *Serratuloides* Bunge), *C. chamaepeuce* Boiss. (Sect. *Sphaerocephalae* Bunge). A few species grow near the Sahara–Sindian and Sudanian regions, some of them are *C. stocksii* C.Winkl. (Sect. *Stocksianae* Rech.f.) and *C. gedrosiaca* Bornm. & Gauba (sect. *Lachnosphaerae* Rech.f.).

Based on Flora Iranica (Rechinger, 1972, 1979), there are about 220 taxa for the flora of Iran. In recent years many species described or recorded for the first time for the flora of Iran (Tscherneva et al., 2005; Djavadi & Attar, 2006; Attar et al., 2007, 2016; Assadi, 2009, 2010, 2011; Attar & Mirtadzadini, 2009; Attar & Djavadi, 2010; Mehregan & Assadi, 2010; Mehregan et al., 2010; Attar, 2011; Mirtadzadini & Attar, 2014; Rastegar et al., 2018; Attar & Amini Rad, 2019).

Also, according to Flora Iranica (Rechinger, 1972, 1979), *Cousinia* is divided into 71 sections of which 42 sections are present in Iran. Recently, three sections including *Ramosissimae* Djavadi & Attar (Djavadi & Attar, 2006), *Argenteae* Mehregan & Assadi (Mehregan & Assadi, 2010), and *Chaetocephalae* Assadi (Assadi, 2010) have been described or validated.

Some useful characters for delimiting different sections of *Cousinia* taxa are including being annual or perennial, glabrous or hairy anthers, ± decurrent stem leaves, leaves segments, corolla color, number of flowers in each capitulum, number of flowers, synflorescence, appendiculate or exappendiculate phyllaries, and a smooth or spinulose margin of phyllaries.

Among collected *Cousinia* materials from Kordestan and Semnan provinces, we found two interesting specimens that were different from the other taxa by some distinct characters. Therefore, we visited the same localities again in the year after, and more materials were collected. Among the examined herbarium specimens, we also noticed that the specimen from Herbarium Haussknecht (JE), accompanied by an identification note by Bornmüller, has been identified as a form of *C. haussknechtii* f. *ramosa* in one herbarium sheet, and *C. haussknechtii* f. *subspicata* in the other sheet (Fig. 1). After studying and comparing our specimens with different herbarium specimens and related literature, they are recognized as new species.

MATERIAL AND METHODS

During the study of the genus *Cousinia* and several travels by the authors to the different regions of Iran, two new *Cousinia* species were found. The collected specimens were accurately examined and compared with their related species in different herbaria mostly in TUH, TARI, MIR, G, and JE. In addition, all the type specimens were compared with these two new species. We also used Flora Iranica (Rechinger, 1972, 1979), Flora of Turkey (Huber-Morath, 1975), Flora of the U.S.S.R. (Tscherneva, 1962), and recent related publications as literature sources.

TAXONOMY

Sect. *Haussknechtianae* Rech.f.

Updated and completed description.

Perennial, tall, cauline leaves leathery, not decurrent, almost amplexicaul, discolored, or concolored. Synflorescence a large panicle. Capitula ca. 20–60-flowered; phyllaries 60–160, exappendiculate, acicular, imbricate or recurved; bristles smooth.

Cousinia bornmulleriana

Attar & Maroofi, **sp. nov.** (Fig. 2)

Diagnosis. — *Cousinia bornmulleriana* is related to sect. *Haussknechtianae* by its capitulum shape and discolored lanceolate leathery leaves. (Table 1). We also noticed in the specimen of JE herbarium that Bornmüller recognized the differences between this specimen and *C. haussknechtii*, so he identified this specimen as *C. haussknechtii* f. *ramosa* (Fig. 1).

TYPE: Iran, Kordestan Province: 30 km from Sanandaj to Kamyaran, Dulab pass, Avallan mountain, 1950 m, 27.7.2009, Attar, Maroofi & Zamani FA60001 (Holotype, TARI; Isotype, IRAN).

Perennial, rootstock woody. Stem more or less 80 cm long, erect, ivory white, at first arachnoid, then gradually glabrescent, leafy in the lower half, divaricately branched in the upper half, forming a long corymbose synflorescence. Leaves rigid, leathery,



Figure 1. Left and middle: *Cousinia haussknechtii* f. *ramosa* and Right: *C. haussknechtii* f. *subspicata*; identified as different forma by Bornmüller (images from herbarium Haussknecht, JE).



Figure 2. Left: *Cousinia bornmulleriana* Attar & Maroofi, sp. nov. (Holotype, Attar, Maroofi & Zamani FA60001); Right: Holotype specimen of *C. haussknechtii*, Haussknecht 569, from Genève Herbarium.

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discolored, green, loosely arachnoid on the upper surface, white densely arachnoid beneath, venation pinnate-reticulate, distinctly prominent on the upper surface; basal leaves, including petiole and spines 30–33 × 6–7 cm (petiole 10 cm long), lamina lanceolate-oblong in outline, attenuate towards the base, sinuate-lobate, lobes triangular, alternately large and small, with 4–7 mm long, rigid spines at the margin, midrib thick; lower stem leaves similar to the basal leaves but smaller; middle stem leaves sessile, cordate-auriculate at the base, not decurrent, sub-amplexicaul; upper leaves gradually reduced, shallowly lobed, spinulose along the margin, the uppermost much diminished, bract-like. Capitula solitary, more or less 20-flowered; peduncle 4–10 mm long. Involucre densely arachnoid, oblong, after flowering time campanulate, rounded and rarely cuneate at base, c. 15 long, 7–14 mm wide; phyllaries ca. 60, 7–8 seriate, erect, regularly imbricate, all similar, acicular; outers and median bracts shorter than the inner phyllaries; innermost linear-oblong, acuminate, slightly exceeding, outside papillose, sometimes purple; receptacle bristles smooth; corolla pink, c. 15 mm long, limb 8 mm, tube 7 mm and lobes 2 mm long; anther tube pink, glabrous. Mature achenes light brown, obovoid, attenuate toward the base, truncate above, almost compressed, longitudinally striate, indistinctly scabrous, dark maculate, 5–6 x 3–4 mm; pappus caducous (Fig. 3).

Etymology. — The specific epithet refers to the German botanist, Joseph Friedrich Nicolaus Bornmüller (1862-1948).

Distribution. — *Cousinia bornmulleriana* is known from a small area in the Avallan Mountains of Kamyaran road to Sanandaj in Kordestan province. It was found at altitudes above 1950 m (Fig. 4).

Habitat and ecology. — The area of the type specimen is about 1 km^2 and mountainous. The species that are associated with this species in the area are including *Scutellaria condensata* Rech.f., *Parietaria lusitanica* L., *Phyllocara aucheri* (DC.) Gusuleac, and *Cerasus* sp.

Diagnostic key of the new species and its relatives

1. Capitula sessile; synflorescence spike-like ……. *C. haussknechtii* C.Winkl.
-Capitula peduncled; synflorescence a large corymbose …….. 2
2. Phyllaries ±60, erect-imbricate; flowers ±20 ……..... *C. bornmulleriana* Attar & Maroofi
- Phyllaries ±160, erect-imbricate; flowers ±60 ……... *C. karkasensis* Mehregan & Djavadi

Examined specimens

C. haussknechtii C.Winkl.: **Iran.** Kordestan [Kordestan Province]: Shahu and Ovraman Mt., 2100-2400 m, *Haussknecht* 569 (Holotype, G, image! G00223447); Kordestan [Kordestan Province], mont. Kuh-i-Gerru, 2.8.1909, *Strausss* (JE, image! JE00034787); [Kordestan Province] Garrin (Gerru) Mount., 2.8.1908, *Strauss* (JE, image! JE00034788); [Kordestan Province] Garrin (Gerru) Mount., 2.8.1908, *Strauss* (JE, image! JE00034789); [Kordestan Province]: 40 km from Marivan to Paveh, Zhalaneh passage, 1800-2300 m, *Attar, Maroufi, Hamzeh* 46002 (TUH).

C. karkasensis Mehregan & Djavadi: **Iran.** [Esfahan Province]: Natanz, Tameh village, Mt. Karkas, 2300 m, 10.08.2003, *Mehregan* 96022 (TARI, image!).

Cousinia semnanensis
Attar, Mirtadzadini & Sotoodeh, **sp. nov.** (Fig. 5)

Diagnosis. — *Cousinia semnanensis* belongs to sect. *Stenocephalae* and related to *C. lucida*, *C. cylindracea*, *C. glaucopsis*, and *C. alexeenkoana* (as shown in the diagnostic key and table 2), but differs from them based on the characters such as habit, capitulum shape, flower and bract numbers, and leaves' position on the stem.

TYPE: Iran. Semnan Province: 12 km after Shahmirzad to Chashm, near the stream, 31.7.2014, 2471 m, *Attar, Mirtadzadini, Rastegar* 48707 (Holotype, TUH; Isotype, TARI).

Perennial, 40–50 cm height, branched from the base. Stems grayish, younger branches arachnoid, then glabrescent, with the remnants of old petioles at the base, interrupted winged, ending in 2–3 capitula. Basal leaves up to 10 cm long (petiole ca. 5 mm long) and 5 cm broad (with spines), elliptic, pinnatifid-pinnatisect, grayish, densely arachnoid on both surfaces; midrib prominent; lobes ending to 3–5 mm long spines; stem leaves sessile, amplexicaul, elliptic, unequally cordate at base, lobed-pinnatifid, terminal lobe long spiny, gradually reduced in the upper part of the stem; uppermost ones close the capitula. Synflorescence racemose-corymbose; capitulum 2 or 3 in each branch, ca. 20-flowered; involucre 15–25 mm in diam., ca. 15 mm long, campanulate, loosely arachnoid; phyllaries 35–40; outers leaf-like, irregular at the margin, equal or longer than capitulum, 20 x 4 mm, lanceolate, long acuminate; medians narrower, lanceolate-subulate, ca. 20 x 2.5 mm; inners white-membranous, oblong-apiculate, 20 x 2 mm; innermost linear, white-membranous; corolla ca. 12 mm long, pale pink; tube ca. 4 mm long; limb ca. 8 mm; anther tube glabrous, concolered. Mature achene 5–6 x 2.5 mm long, obovate, compressed, attenuate toward the base, brown.

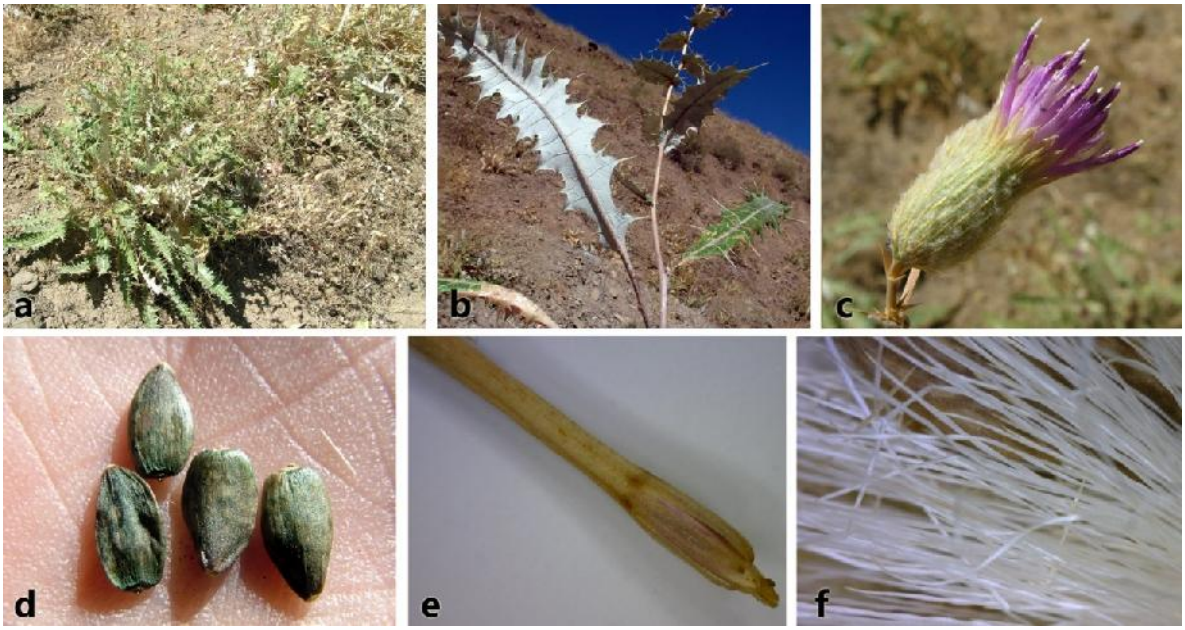


Figure 3. Floral parts of *Cousinia bornmulleriana* Attar & Maroofi. **a.** habit; **b.** a part of branch; **c.** capitula; **d.** achenes; **e.** corolla; **f.** bristles.

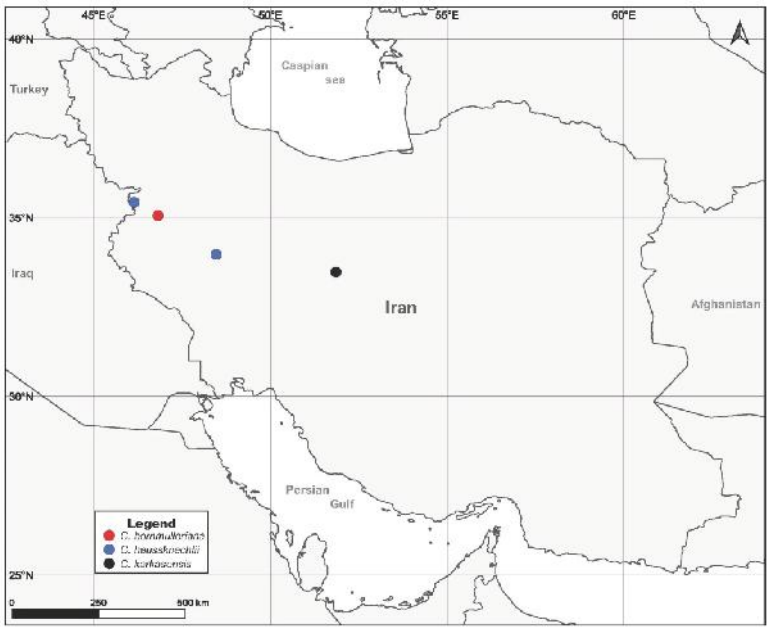


Figure 4. Distribution map of *Cousinia bornmulleriana* Attar & Maroofi, sp. nov. (red), *C. karkasensis* (black) and *C. haussknechtii* (blue) in Iran.

Paratype: Semnan Province: Chashm road, Hey-Kuh, 3108 m, 31.7.2014, *Attar, Mirtadzadini & Rastegar* s.n. (Paratype, IRAN).

Etymology. — The specific epithet refers to the Semnan province in North-East Iran.

Distribution. — This endemic species is distributed as a solitary individual in the Hey-Kuh region of Semnan province at an altitude of ca. 2500 meters above sea level (Fig. 6).

Habitat and ecology. — This species is distributed in mountainous regions at altitudes ranging from 2400 to 3000 m, and sometimes beside rivers.

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Table 1. Morphological comparison of *Cousinia bornmulleriana* and *C. haussknechtii*.

	Cousinia bornmulleriana	***Cousinia Haussknechtii***
Inflorescence	large panicle	Racemose
Peduncle length	thin, 4–10 mm	thick, 1–3 mm, subsessile
Capitula, capitula base	7–14 mm, connate	20–25 mm, rounded
Phyllaries no.	±60	±100
Flowers no.	±20	±30
Corolla length	±15 mm, pink or purple	12–15 mm, purple
Limb and tube length	7 mm, 8 mm	9 mm, 6 mm
Corolla lobes	2 mm	4–6 mm
Matured achene	5–6 x 3–4 mm, light brown, almost compressed, obovoid, dark-maculate, longitudinally striate, indistinctly scabrous	5.5 x 3 mm, gray-brown, compressed, gray-brown, irregular dark-maculate, indistinctly longitudinally striate



Figure 5. Left: *Cousinia semnanensis* Attar, Mirtadzadini & Sotoodeh, sp. nov. (Holotype, *Attar*, *Mirtadzadini*, *Rastegar* 48707); middle and Right: capitula and habit.

Diagnostic key of new species and its relatives

1. Capitula narrow cylindric, 3–10-flowered, 2–4.5 mm in diam ……..…… ……. 2
- Capitula broad campanulate, ca. 20-flowered, 15-25 mm in diam ..... ……..*C. semnanensis* Attar, Mirtadz. & Sotoodeh
2. Capitula up to 10-flowered ..…….... 3
- Capitula 10-20-flowered ……..…….……4
3. Uppermost leaves surrounding heads, usually exceeding capitula, with a long spine at the apex ……..…. *C. lucida* DC.
-Uppermost leaves remote the capitula, not as above ……...… *C. cylindracea* Boiss.
4. Phyllaries all subequal; flowers 12-14 …….. *C. alexeenkoana* C.Winkl. & Bornm.
-Phyllaries unequal; flowers 12-16 ……..…...…… *C. glaucopsis* Bornm. & Rech.f.

Examined specimens:

Cousinia glaucopsis Bornm. & Rech.f.: **Iran.** Tehran [Tehran Province]: Firouz-Kuh, 17 km Firouz-Kuh to Semnan, 2050 m, *Djavadi*, *Ghaffari & Bakhsheshi* 9015 (IRAN); 20-35 km Firouz-Kuh to Semnan, 1800-2200 m, *Mousavi & Karavar* 9017 (IRAN, 33866-E); 31 km Firouz-Kuh to Semnan, Bashm pass, 2600 m, *Assadi & Mozaffarain* 40330 (TARI); 25 km Firouz-Kuh to Semnan, Gur-Sefid, 2200 m, *Eskandari & Amini Rad* 43479 (IRAN); Firouz-Kuh, Saran-Za village, 2030 m, *Attar, Zare & Saber* 34400 (TUH); Semnan: 13 km Chashm, Chashm pass, 2173 m, 34398 (TUH); Chashm pass, 2300 m, *Mozaffarian* 78038 (TARI); 35 km Shahmirzad to Foulad Mahalleh, 2300 m, *Assadi & Mozaffarian* 40442 (TARI); Semnan, After to Emamzadeh Abdollah, Eij, 2200-2700 m, *Mozaffarian* 72685 (TARI).

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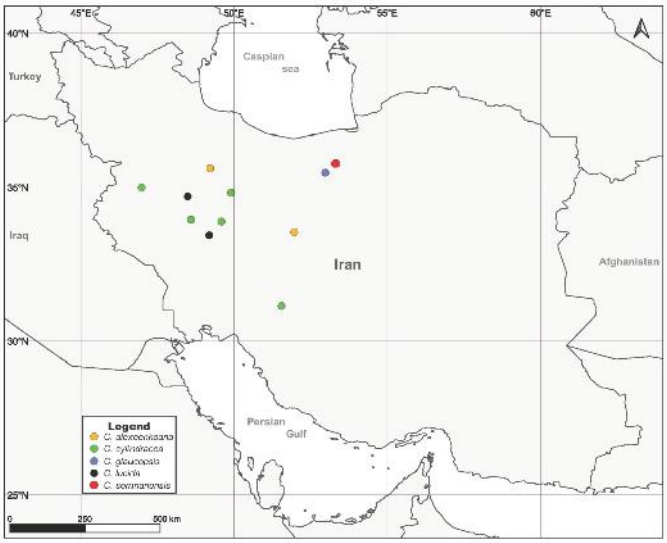


Figure 6. Distribution map of *Cousinia semnanensis* Attar, Mirtadzadini & Sotoodeh (red), *C. alexeenkoana* (yellow), *C. glaucopsis* (blue), *C. cylindrica* (green), and *C. lucida* (black).

Table 2. Morphological comparison of *Cousinia semnanensis*, *C. alexeenkoana*, *C. glaucopsis*, *C. cylindrica*, and *C. lucida*.

	***C. semnanensis* Attar, Mirtadzadini & Sotoodeh**	***C. alexeenkoana* Bornm.**	***C. glaucopsis* Bornm. & Rech.f.**	***C. cylindrica* Boiss.**	***C. lucida* DC.**
Plant height (cm)	ca. 50	ca. 35	25–35	15–40	15–50
Leaves color and indumentum	grayish, densely araneose, concoleous	green, glabrous	green-bluish, araneose-tomentose on both sides, with yellow glands, glabrescent	yellowish-green, glabrous	green on both sides, covered with glandular hairs, punctate
Uppermost leaves	closed and surrounding capitula	closed and surrounding capitula	remote the capitula	remote the capitula	closed and surrounding capitula
Involucre size (mm)	15–25 x 15	14–16 (-20) x 5–6 (–7)	14–16 x 5–6	11–13 x 3–5	12–13 x 2.5–3
Involucre shape	broad campanulate	broad cylindric, narrower at the base	cylindric, narrower at the base	narrow cylindric	narrow cylindric
Phyllaries no.	35-40	16–35	35-40	22–35	22–30
Phyllaries size	all subequal or outer slightly longer	all subequal	outers shorter than the others	outers shorter than the others	outers shorter than the others, recurved at tip
Phyllaries outside and margin	leaf-like, irregular at the margin	ciliate-serrulate	ciliate along the margin, outside in upper half glandular-papillose	ciliate along the margin, outside especially in upper half glandular-papillose,	covering with glandular and papillae hairs in outside and along the margin, ciliate along the margin
Innermost phyllaries	Linear	under apex ciliated, cuspidate	widened toward apex, acuminate	apiculate, cartilaginous along the margin	widened toward apex, acuminate, cartilaginous along the margin
Corolla color	pale pink	yellow	golden yellow	yellow	yellow
Corolla no.	ca. 20	12–14	11–16	5–7	4–5
Corolla, limb, and tube length (mm)	12, limb 8, tube 4	10–13, limb 8, two times longer than the tube, tube 4	11–13.5, limb 7.5–8.5, tube 3.5–5	9.5-10.5, limb 7.5, tube 2–3	ca. 9, limb ca. 7, tube 1.5–2
Achene (mm)	5–6 x 2.5	5 x 3	4 x 1.5	4 x 1.8	2–2.5 x 1–1.5
Achene ornamentation	obovate, compressed, attenuate toward the base, brown	5-costate	truncate-shortly dentate above, brown	linear, costate, almost dentate above, brown-maculate	costate, rugose, distinctly dentate above, dark brown

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Cousinia cylindracea Boiss.: **Iran.** [Markazi Province]: Saveh, Nobaran to Tafresh, between Kahlou and Fark, 1800 m, *Mozaffarian* 72081 (TARI); Arak, Anjadan, 2000-2400 m, *Mozaffarian* 63808 (TARI); Arak, Khan-e Miran, Sefid Khani mountain, 2100-2600 m, *Mozaffarian* 48216 (TARI); Arak, Toureh, Besri, NE slopes of Alandagh mountain, 2100-3100 m, *Mozaffarian* s.n. (TARI); 6 km S Arak, Senejan, Farajollah, *Akhani* 242 (HSBU); Arak, Latedar, 2100-2600 m, *Assadi* 75065 (TARI); Arak, Shahzand, Hafteh-o Emarat, Alim-abad, Alvand mountain, 2100-2800 m, *Mozaffarian* 63892 (TARI); Arak, Moudar, *Djavadi* 53183 (IRAN); Hamedan [Hamedan Province]: Boroujerd, Ghahreman & Sheykhol-Eslam 11660 (TUH); Boroujerd, Garrin mountain, 2060-2500 m, *Assadi & Mehregan* 89090 (TARI); 40 km Boroujerd via Arak road, Safar-Ali village, 2200 m, *Mozaffarian & Sardabi* 42169 (TARI); Alvand, 1500 m, *Mirdamadi* 001376 (UTFH); Silvar, *Gauba & Sabeti* 111379 (UTFH); Kaboutar Ahang, Shirinsou, 1400 m, *Djavadi & Ghanbari* 20379 (IRAN); Asad-abad pass, Gharavol Khani mountain, 2500-2600 m, *Mozaffarian* 64982 (TARI); *Asad-abad, Sabeti* 8919 (IRAN, 34014-E); Asad-abad, 1780 m, *Djavadi & Ghanbari* 20378 (IRAN); Asad-abad, *Abaei & Mojib* 8921 (IRAN); Asad-abad to Gharavol Khaneh mountain, 2500-2700 m, *Mozaffarian* 6498 (TARI); Hamedan, Shahnaz dam, Yalfan, 1980-2200 m, *8756* (IRAN, 33888-E); Lorestan [Lorestan Province]: Khorram-abad, Sefid Dasht to Shoulabad, 2200 m, *Attar & Mirtaj* 24907 (TUH); Bisheh, 1948, *Rechinger & Manouchehri* 8925 (IRAN, 5745-E); Kuh-e Rig, Rechinger & Mousavi *8925* (IRAN); Kuh-e Rig, opposite to Kohian, 2000-24000 m, *Mozaffarian* s.n. (TARI); Alastar, Dartang, Garrin mountain, 2130-2800 m, *Assadi & Mehregan* 88907 (TARI); 5 km W Azna, 1930 m, *Pabot* 2078 (TARI); Oshtoran Kuh, Tihoun village, 2000-2500 m, *Assadi & Mozaffarian* 37052 (TARI); Kordestan [Kordestan Province]: Kamiaran, Bavaneh village, 1720-1900 m, *Assadi* 78814 (TARI); 17 km Sanandaj to Kamiaran, 1500 m, *Assadi* s.n. (TARI); Sanandaj, Chehel Cheshmeh, Saral, 2000-2350 m, *Mozaffarian* s.n. (TARI); Saral, *Mozaffarian* 71573 (TARI); 25 km Sanandaj to Dehgolan, 2040 m, *Mozaffarian* 83778 (TARI); Sanandaj to Qorveh, Salavat-abad pass, 2000-2400 m, *Assadi* s.n. (TARI); 22 km Sanandaj to Marivan, Tijtij, 2070 m, *Mozaffarian* 87373 (TARI); Esfahan: Samirom, 2500 m, *Ghahreman, Attar & Mehdigholi* 25116 (TUH); Semirom, 12 km Hanna to Komme, 2350 m, *Mozaffarian & Maassoumi* s.n. (TARI); Kashan, Qamsar toward Ghahroud road to Esfahan, after Reza-abad, 3100 m, *Assadi, Jamzad & Azizian* 80047 (TARI); Kashan, between Qamsar and Reza-abad, 2450 m, *Assadi, Jamzad & Azizian* 80053 (TARI).

Cousinia lucida DC.: **Iran.** Lorestan [Lorestan Province]: Doroud to Azna, 25 km Azna, Ghahreman & Attar 21850 (TUH); Doroud, Saravand village, 2100 m, *Mozaffarian & Sardabi* 42398 (TARI); Aligoudarz to Shoul-abad, 2300 m, *Runemark & Lazari* 26521 (TARI); Hamadan [Hamedan Province]: Alvand Mountain, Babaei 9080 (IRAN); Hamadan to Toyserkan, 12 km Ganj Nameh, 2400 m, *Termeh, Mousavi & Tehrani* 9083 (IRAN); Esfahan [Esfahan Province]: Ghamishlou protected region, Hazarmani, 2100 m, *Yousefi* 1702 (TARI).

Cousinia alexeenkoana Bornm.: **Iran.** Qazvin [Qazvin Province]: Qazvin to Hamedan, Avaj, 2100 m, *Assadi & Mozaffarian* 36697 (TARI); 48 km Qazvin to Zanjan, *Foroughian & Hariri* 4173 (TARI); Hamedan: after Kaboutar-Ahang, Ghondouz, 1860 m, *Ghahreman & Attar* TUH-20555; Kaboutar-Ahang toward Shirnsou, 1400 m, 27-30.6.1998, *Djavadi & Ghanbari* IRAN-20377; Hamedan, Soltan-Boulagh, between Avaj and Razan, Kharaghan mountains, 1750 m, 27-30.6.1998, *Djavadi & Ghanbari* IRAN-20376; Razan to Avaj, 7-8 km to Avaj, 2000-2100 m, Termeh, *Eskandari & Falsavi* IRAN-43527; Zanjan [Zanjan Province]: Zanjan to Hamedan, Takht Mountains, 2150-2250 m, 5.7.1974, *Termeh & Mousavi* IRAN-8757 (33894-E); Esfahan [Esfahan Province]: Natanz, Karkas mountain, 2700 m, *Foroughi* 4047 (TARI); Karkas mountain, 2600 m, *Mozaffarian & Maassoumi* 78351 (TARI).

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