

A TAXONOMIC REVISION OF COUSINIA CASS., SECT. ALBIDAE BUNGE (ASTERACEAE) IN THE FLORA OF IRAN

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Description of sect. *Albidae* Bunge (*Cousinia* Cass., *Asteraceae*) is completed based on new data. Five new endemic species belonging to sect. *Albidae* Bunge are described and photographed. *Cousinia bazoftensis*, *C. assadii*, *C. yasujensis*, and *C. oshtorankuhensis* are allied to *C. archibaldii*, *C. oligocephala*, *C. bachtiarica*, and *C. albida* respectively. Among new taxa *C. atrobracteata* from Azerbaijan province seems to be an isolated species, based on the morphological characters and geographical distribution, and does not have any distinct related species. *Cousinia ottonis* Bornm. is considered as a new synonym of *C. eburnea* Bornm. Description of sect. *Albidae* is completed. A diagnostic key is provided for the section. The species of sect. *Albidae* have very restricted distribution "exception *C. bakhtiarica*, *C. oligocephala* and *C. albescens*" and can be regarded as vulnerable and endangered species.

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Key words. Sect. *Albidae*, *Cousinia*, new species, Iran.

مروری تاکسونومیک بر بخش آلبیده، جنس کوزینیا (خانواده کاسنی) از ایران

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شرح بخش آلبیده (جنس کوزینیا، خانواده کاسنی) بر اساس اطلاعات جدید کامل می‌شود. پنج گونه جدید اندمیک از این بخش شرح داده شده و عکسهای آنها ارائه می‌گردد. گونه‌های *C. oshtorankuhensis* و *C. bazoftica*, *C. assadii*, *C. yasujensis*, *C. archibaldii*, *C. oligocephala*, *C. bachtiarica*, *C. albidae* در بین تاکسون‌های جدید، گونه *C. atrobracteata* با توجه به صفات ریخت‌شناسی و پراکنش جغرافیایی، گونه‌ای جدا بوده و دارای خویشاوند مشخصی نیست. شرح بخش آلبیده کامل می‌شود. همچنین کلید شناسایی برای بخش آلبیده ارائه می‌گردد. با توجه به اینکه از ۱۳ گونه فقط گونه‌های *C. bachtiarica*, *C. oligocephala*, *C. albescens* دارای چند جمع‌آوری بوده‌اند می‌توان بقیه گونه‌ها را که فقط دارای یک یا دو جمع‌آوری از محل‌های نزدیک به هم و پراکنش محدودی هستند، به عنوان گونه‌های آسیب‌پذیر و در معرض خطر در نظر گرفت.

INTRODUCTION

Cousinia Cass. is a large genus, including over 700 species (Attar & Ghahreman, 2007; Attar & Djavadi 2010). A large majority of species occurs in Iran, mainly in Elburz and Zagros mountains. With considering the newly records and described species, the number of *Cousinia* species in Iran is increased to over 250.

Most species of *Cousinia* have special ecological requirements, for example *C. jacobsonii* and *C. phyllocephala* are distributed at the margin of oak forests, *C. kotschyi* in semidesert steppes, *C. iranishahriana* in subalpine regions, and *C. khorramabadensis*, *C. albida*, *C. yasujensis*, *C. oshtorankuhensis*, *C. archibaldii* and *C. albescens* in alpine areas.

Recently, some of the *Cousinia* species are known as medicinal plants such *Cousinia shulabadensis* (sect. *Cynaroides*) Attar & Ghahreman based on the recent researches (Shahverdi et al., 2007a & 2007b).

Cousinia Cass. is divided into 57 sections in the Flora Iranica of which 40 sections occur in Iran (Rechinger 1972 & 1979). However this number has been increased to 43 for Flora of Iran (Attar, 2000) and 59 for Flora Iranica (Mehragan & Assadi 2009, Assadi 2010). These three new sections for Iran include *Coronophora* (Juz.) Rech. f., *Pseudoactinia* Tcherneva and *Hoplophylla* Tcherneva which their representative species consist of *C. radians* (Attar & Ghahreman, 2002), *C. raddeana* C. Winkl and *C. apiculata* (Attar & Joharchi, 2002) respectively. There are many species which are not placed in any sections.

Table 1. Morphological differences among three sections *Albidae*, *Stenocephalae* and *Cousinia*

	Color	Number of flowers	Number of bracts	Color of corolla	Geographical distribution
Sect. <i>Albidae</i>	Mostly white-canescens, rarely green	15-58	40-150	Yellow or pink	Bakhtiari, Lorestan, rarely in W Azerbaijan
Sect. <i>Stenocephalae</i>	Mostly green or dark green, rarely whitish	3-30	Up to 50, rarely 90	White, pink, yellow, rarely two-colored	In most regions, very rare in E Azerbaijan (only one species)
Sect. <i>Cousinia</i>	Always green	12-40	40-75 (rarely more than 100)	Yellow, rarely pink	Azerbaijan, rarely Zanjan and Qazvin

The sect. *Albidae* is close to two sections: sect. *Cousinia* and sect. *Stenocephalae* Bunge. The sect. *Albidae* is separated from two mentioned sections by its color that is mostly white- canescens, number of flowers (up to 58), number of bracts (up to 115) and geographical distribution (Table 1).

The endemic sect. *Albidae* Bunge is represented so far by eight species in the Flora Iranica (Rechinger 1972 & 1979) and is a small section among other sections. Sect. *Albidae* is mainly characterized by the canescens habit, number of flowers per head (15-45), color of corolla and smooth bristles. In addition, sect. *Albidae* has a limited distribution and occurs only in Lorestan and Bakhtiari provinces except *C. iranshahriana* and *C. atrobracteata* that are found in Kurdistan and west Azerbaijan respectively. All species of this sect. are grown on rocky mountains. Also based on herbarium data, all species are endangered taxa. In the course of a revision of the section by the author to prepare draft of Flora of Iran (Assadi 1989) six new species were found (*C. iranshahriana* was described in a separate paper) that are described in the present study.

MATERIAL AND METHODS

Digital photos of type specimens of Vienna and Kew herbaria and general collections from the TARI & TUH Herbaria were studied. Among them five taxa were determined as new. For determination, Flora Iranica, Flora of Turkey, Flora USSR were used. All type specimens are preserve in TARI.

RESULTS

Description of Sect. *Albidae* Bunge

Perennial, almost woody at the base, covered by dense gray arachnoid hairs, tomentose. Stem up to 45 cm high, with few branches and heads. Leaves more or less coriaceous, concolored, sometimes discolored; median and upper leaves shortly or long decurrent, rarely not decurrent, cuneate or cordate at the base; uppermost leaves remote from capitula or involucre. Capitula 15-58-flowered; involucre campanulate, gray, white or brownish-yellow arachnoid. Phyllaries 40-115,

exappendiculate, subulate or lanceolate, imbricate, spreading, rarely recurved. Receptacle bristles smooth. Corolla yellow, 10-24 mm long; anther tube yellow or pink, glabrous. Pappus caducous.

Type species. Cousinia albdia DC.

Key to the species

1. Phyllaries regularly recurved 2
- Phyllaries imbricate, spreading or irregularly recurved 3
2. Phyllaries \pm 80, on the outside dark green. Leaves discolored. Plant up to 35 cm high. Corolla ca. 16 mm long. Distributed in west Azerbaijan

1. *C. atrobracteata*

- Phyllaries 40-60, on the outside green. Leaves concolored. Plant up to 20 cm high. Corolla 13-14 mm. Plant distributed in Hamadan and Bakhtiari provinces

10. *C. eriorrhiza*

3. Involucre densely ochraceous-arachnoid. Phyllaries irregularly spreading. Leaves shortly decurrent

8. *C. archibaldii*

- Involucre white-arachnoid. Phyllaries imbricate or rarely spreading-recurved 4
- 4. Stem glabrous; other parts of plant glabrescent. Capitula numerous, congested at the end of branches

12. *C. eburnea*

- Plant entirely white-arachnoid. Capitula single, rarely 2-3 at the end of branches 5

5. Phyllaries 110-115. Flowers 20-25. Plant dwarf 6
- Phyllaries fewer, rarely up to 110 7

6. Corolla \pm 10 mm long. Nervation white, distinctly prominent on both sides.

9. *C. bazoftensis*

- Corolla \pm 14 mm long. Nervation indistinct. Plant dwarf, saxicolous

3. *C. iranshahriana*

7. Phyllaries 80-85, rarely up to 110 8
- Phyllaries fewer, 45-75 10

8. Flowers 20

13. *C. oshtorankuhensis*

- Flowers more than 30 9

9. Flowers 35-58. Outer and median phyllaries spreading

2. *C. bachtiarica*

- Flowers 30-35. Phyllaries entirely imbricate

7. *C. assadii*

10. Median stem leaves not decurrent; upper stem leaves rarely indistinctly decurrent **11. C. albida**

-Median stem leaves shortly or long decurrent, forming wide wings on the stem 11

11. Median stem leaves shortly decurrent

6. C. oligocephala

-Median stem leaves long decurrent, forming wide wings on the stem 12

12. Bract tip recurved or hamate

4. C. albescens

-Bract tip not recurved or hamate

5. C. yasujensis

Description of species

1. C. atrobacteata Attar, *sp. nov.* (Plate A: photos 1, 2).

Typus. W Azerbaijan: between Shahin-Dezh and Takab, mt. Ghareh Dash (Agh Dash) from Ghez – Ghapan and Auch Darreh, 2500-2800 m, Mozaffarian, 69875 (holotypus TARI).

Perennis, basi indurata, usque 35 cm alta, cinereo-canescens. Folia discoloria; basalia spinis inclusis 5-7x2-3 cm, lanceolata, pinnatisecta or pinnatifida; caulina subdecurrentia; superiora decurrentia. Capitula spinis inclusis 2-2.5 cm diam., \pm 25-flora; involucre araneoso-tomentosum; phylla c. 80, atro-viridia, patentia vel reflexa. Receptaculi setae laeves. Corolla \pm 16 mm longa, flava, tubus limbo circiter aequilongus, laciniis c. 2 mm longis. Antherarum tubus roseus, glaber. Achaenia immatura 5x1.5-1.6 mm, atro-brunnea, rugoso-reticulata, apice denticulata.

Perennial, woody at the base, many stemmed, grayish-canescens, except outside of phyllaries, up to 35 cm high. Stem with short branches. Leaves discolored, lower surface white, upper surface dark green, arachnoid-tomentose; basals with ca. 2.5 cm long petiole; limb lanceolate, 5-7x2-3 cm, pinnatisect or pinnatifid; teeth terminating to a \pm 3 mm long spine; median leaves indistinctly decurrent, amplexicaule; upper leaves decurrent (up to 1 cm long), rarely not decurrent; uppermost leaves approximate to capitula. Capitula 2-2.5 cm in diam (including spines), \pm 25-flowered; involucre oblong-campanulate, densely arachnoid, 1-1.5 cm wide (excluding spines); phyllaries \pm 80, dark green on dorsal surface, spreading to recurved; outer phyllaries short; median phyllaries longer, lanceolate-subulate, acuminate; uppermost phyllaries erect, exceeding the involucre, membranous. Receptacle bristles smooth. Corolla yellow, ca. 16 mm long; limb as long as tube; lobes 2-2.5 mm long; anther tube pink, glabrous. Achene immature 5x1.5-1.6, dark brown, rugose-reticulate, denticulate above.

Relationships. *Cousinia atrobacteata* is an isolated species, distinguished from the other species of the section by having falcate dark green phyllaries and its distribution. The presence of this species in Azerbaijan

province makes the range of distribution of the section to be extended.

2. C. bachtiarica Boiss. & Hausskn., Fl. Or. 3: 475 (1875). (Plate A: photos 3, 4).

Perennial, up to 40 cm high, arachnoid-tomentose. Stem from the lower part or median part branched, with wide wings. Leaves indistinctly discolored; upper surface loosely arachnoid; lower surface more densely; median leaves long decurrent; limb lanceolate to oblong. Capitula 2-3 at the end of branches, 1.5-1.8 cm in diam., 35-58-flowered; involucre 15-17x19 mm, oblong, arachnoid. Phyllaries 80-110, subulate to triangular, erect; outers short; medians longer, 10-13 mm long; innermosts membranous, acuminate. Receptacle bristles smooth. Corolla yellow, 13-14 mm long; tube shorter than limb; anther tube pink, glabrous. Achene 5x2 mm, linear, brown.

Specimens seen. Lorestan: between Sefid dasht and Shulabad, Attar & Mirtazhadini 24911-TUH; Kuhgiluyeh and Boyer-Ahmad: 3 km after Sisakht to Bijan pass, 2850 m, Ghahreman, Attar & Mahdigholi, 22498-TUH; Bakhtiari: Shahr-e Kord, Naghan, between Dupalan and Gandomkar, 2350-2950 m, Mozaffarian, 54862-TARI; Fars: Eghlid, northern slopes of Mt. Bul, 2700-3000 m, Assadi & Ranjbar, 83036-TARI.

3. C. iranshahriana Attar & Maroufi, Iran. J. Bot. 16 (2): 197. (Plate A: photos 5, 6).

Suffruticose, up to 20 cm high, saxicolous, grayish-arachnoid-tomentose. Stem white, leafy, with few short branches. Leaves concolored, coriaceous; basal leaves shortly petiolate; limb oblong-rhombic, lobed; stem leaves long decurrent (1.5-2.5 cm long); uppermost leaves approximate to capitula. Capitula ca. 2 cm in diam, \pm 20-flowered; involucre 1-1.5 cm wide (excluding spines), arachnoid; Phyllaries \pm 115; outers and medians erect-spreading, serrulate at the margin, acute, triquetrous; inners wider, oblong, white, gradually tapering towards the apex, lacerate at the margin, innermosts linear. Receptacle bristles smooth. Corolla yellow, \pm 14 mm long; limb as long as tube; lobes 3-4 mm long; anther tube yellow, glabrous. Mature achene unknown.

Specimen seen: Kurdistan: road of Baneh to Marivan, Maroufi; road of Baneh to Marivan, South, 2050 m, Mozaffarian, 70054-TARI.

4. C. albescens C. Winkl. & Strauss, Acta. Horti. Petrop. 14: 223 (1896). (Plate A: Photos 7, 8).

Perennial, with fibrous collar dried petioles at the base. Stem up to 35 cm high, arachnoid-tomentose. Leaves up to 24 cm long and 6 cm wide, coriaceous, discolored; upper surface loosely arachnoid; lower surface densely arachnoid-tomentose, gray; basal leaves shortly petiolate,

lanceolate, pinnatilobed; median leaves decurrent. Capitula 2-2.5 cm in diam., \pm 35-flowered; involucre ca. 20x1.5 mm, arachnoid; Phyllaries \pm 75; outers recurved; medians subulate, longer than outers, ca. 2.5 mm long, spreading, with falcate tip; inners lanceolate, acute, erect, membranous; innermosts yellowish, membranous, lingulate. Receptacle bristles smooth. Corolla \pm 9 mm, yellow; tube shorter than limb; anther tube pink, glabrous. Achene compressed, longitudinally striate.

Specimens seen. Lorestan: Oshtoran-Kuh, above Tihun village, 2500-3200 m, Assadi & Mozaffarian, 37180-TARI; Durud, Oshtoran-Kuh, 2200-3200 m, Mozaffarian & Sardabi, 42447-TARI; Bakhtiari: Kuhrang, Sefid Divan, 2470 m, Riazi 10257.

5. *C. yasujensis* Attar, sp. nov. (Plate A: Photo 9 and Plate B: photo10).

Typus. 26 km from Yassuj to Ardakan, 2200 m, Assadi & Abuhameh, 46292 (holotypus TARI).

Perennis, 30 cm alta. Caulis striatus. Folia concoloria; basalia sessilia, 6.5x4 cm; caulina decurrentia, lanceolato-obovata; superiora reducta. Capitula singula, 8 mm diametro, floribus \pm 15; involucrem 12x8 mm, araneosum; phylla 55-60, triangulatio-obovata, imbricata; intima membranacea, prominentia. Receptaculi setae laeves. Corolla 11 mm longa, tubo 3, limbo 8 et laciniis 1-1.5 mm longis; antherarum tubus roseus. Achaenia matura ignota.

Perennial, almost 30 cm high, canescent. Stem white, striate. Leaves concolored; basal leaves sessile, long obovate; limb ca. 6.5x4 cm, lobed, spines up to 12 mm long; midrib white, wide; median leaves decurrent (up to 1 cm long), lanceolate-obovate; venation reticulate-pinnate; upper leaves gradually diminished. Capitula solitary at the end of branches, ca. 8 mm in diam., \pm 15-flowered; involucre ca. 12x8 mm, arachnoid; Phyllaries 55-60, triangular-ovate, imbricate; inners oblong, acute, green above; innermosts slightly exceeding from involucre, membranous. Receptacle bristles smooth. Corolla \pm 11 mm, tube 3, limb 8 and lobes 1-1.5 mm long; anther tube pink. Mature achene unknown.

Other specimens seen. Kuhgiluyeh and Boyerahmad: Yassuj: Mt. Dena, Bijan pass, 2500 m, Assadi & Mozaffarian, 31151; Kuhgiluyeh and Boyer Ahmad: mt. Dena, Bijan pass, 2800 m, Assadi & Abuhameh, 46150-TARI.

Relationships. *Cousinia yasujensis* closely resembles *C. bachtiarica* Boiss. & Hausskn. It is distinguished by the habit, number of phyllaries (55-60) and number of flowers per head (ca. 15) (not 80-110 and 35-58).

6. *C. oligocephala* Boiss., Diagn. Pl. Or. Nov. Ser. 1, 6: 116 (1845). (Plate B: 11, 12).

Perennial, canescent. Stem 30-40 cm high, brownish, arachnoid, glabrescent, with corymbose branches from

the base. Leaves coriaceous, discolored; lower surface arachnoid; upper surface loosely arachnoid, glabrescent; basal leaves lanceolate, lobed; stem leaves shortly decurrent. Capitula 9-12 mm in diam., single, 25-35-flowered; involucre 9-10 mm wide, ovate, arachnoid, glabrescent; Phyllaries 50-60, lanceolate, imbricate; innermosts membranous, erect, yellow. Receptacle bristles smooth. Corolla yellow, 11-13 mm long; tube 4-6, limb 7-9 and lobes 2-3 mm long; anther tube pink, glabrous. Mature achene unknown.

Specimens seen. Kuhgiluyeh & Boyer Ahmad, 10 km road of Kakan to Yassuj, 2700 m, Assadi & Abu Hamzeh, 31202-TARI; Esfahan: 15 km from Semirom to Shahreza, Mozaffarian, 58220-TARI; Lorestan: Durud, between Saravand and Gahar lake, 2300-3500 m, Mozaffarian & Sardabi 42369; 55 km from Aligudarz to Shulabad, 2500 m, Assadi & Karimi, 43480-TARI.

7. *C. assadii* Attar, sp. nov. (Plate B: photo 13, 14).

Typus. Kuhgiluyeh and Boyerahmad: Yassuj: Sisakht, Bijan pass, 3000 m, Assadi, 72449 (holotypus TARI).

Perennis, usque ad 35 cm alta, canescentia. Folia basalia ignota; caulina decurrentia, ovata, lobata; summa decurrentia, basi cordata. Capitula 1.5 cm diametro, oblonga, c. 35 flora; involucrem 1.5 x 1 cm, araneosum; phylla c. 80, imbricata; exteriora et intermedia lanceolato-triangularia, apiculata; intima attenuata, acuta. Receptaculi setae laeves. Corolla flava, c. 13 mm longa, tubo 5, limbo 8 et laciniis 1.5-2 mm longis; antherarum tubus concolor, glaber. Achaenia ignota.

Perennial, up to 35 cm high, canescent. Stem white, striate, branches monocephalous. Basal leaves unknown; lower and median leaves decurrent (1-2 cm long); limb ovate, lobed; spines up to 5 mm long; venation pinnate-reticulate; upper leaves decurrent, cordate at the base, close to capitula. Capitula ca. 1.5 cm in diam., oblong, \pm 35-flowered; involucre ca. 1.5 x 1 cm, arachnoid; phyllaries \pm 80, imbricate-adpressed; outers and medians triangular-lanceolate, gradually tapering towards apex, suddenly apiculate, green in upper half; inner oblong, attenuate into a sharp tip. Receptacle bristles smooth. Corolla yellow, \pm 13 mm long; tube 5, limb 8 and lobes 1.5-2 mm long; anther tube yellow, glabrous. Achene unknown.

Other specimens seen. Kogiluyeh and Boyer -Ahmad: Khafir, mt. Dena, 3100 m, Riazi, 6770-TARI; mt. Dena, Bijan pass, 3550 m, E slope, 10267-TARI.

Relationships. *Cousinia assadii* is related to *C. oligocephala* Boiss. and *C. yasujensis* Attar by having median decurrent leaves and their habits. It is close to the *C. oligocephala* by the decurrent median leaves.

8. *C. archibaldii* Rech. f., Flora Iranica, 90: 147 (1972). (Plate B: Photos 15, 16).

Syn.: *C. albescens* C. Winkl & Strauss var. *adpressa* Bornm., Bieh. Bot. Centrbl. 1. 32, 2: 402 (1914).

Perennial, nearly woody at the base, densely araneose-tomentose, up to 40 cm high. Stem glabrescent, with few branches from the middle. Leaves coriaceous, concolored, arachnoid-tomentose; basal leaves with ca. 2.5 cm long petiole; limb oblong; stem leaves indistinctly decurrent; upper leaves long decurrent. Capitula single, 15-17 mm in diam., 30-45-flowered; involucre ovate to campanulate, yellowish-brown-arachnoid; phyllaries 60-90, lanceolate to subulate or triangular; outers and medians almost recurved; inners membranous, linear, erect. Receptacle bristles smooth. Corolla yellow, 14-15 mm long; tube 4-5, limb 9-10 and lobes 3-4 mm long; anther tube yellow, glabrous. Achene unknown.

Specimen seen: Bakhtiari: Zardkuh: Mt. Haft Tanan, 3550 m, Riazi, 10256-TARI.

9. *C. bazoftensis* Attar, sp. nov. (Plate B: Photos 17, 18).

Typus. Bakhtiari, Shahr-e Kord, Chelgerd, around Tunnel Kuhrang, 2350-2500 m, Mozaffarian 57711 (holotypus TARI).

Perennis, usque 40 cm alta, araneoso-albida. Folia basalia sessilia, 10 x 4 cm, lanceolata, pinnatifida; folia caulina 8-10 x 6 cm, pinnatifida, decurrentia; folia summa approximata. Capitula 2 cm diametro, c. 25-flora; involucre oblongum, superne constrictum, araneosum, absque spinis 1.5 x 1 cm; phylla c. 110; exteriora et intermedia subulata, patentia, margine serrulata; intima linearia, erecta. Receptaculi setae laeves. Corolla flava, \pm 10 mm longa, tubo limbum brevior; Antherarum tubus concoloria, glaber. Achaenia ignota.

Perennial, up to 40 cm high, white-arachnoid. Stem arachnoid. Basal leaves sessile, ca. 10 x 4 cm, lanceolate, pinnatifid to lobed; lobes terminating to a ca. 1 mm long spine; midrib white, wide; venation pinnate-reticulate; median leaves slightly decurrent, 8-10 x 6 cm, pinnatifid to lobed; upper leaves gradually diminished; uppermost leaves close to capitula. Capitula ca. 2 cm in diam., \pm 25-flowered; involucre oblong, slightly constricted above, arachnoid, ca. 1.5 x 1 cm (excluding spines); phyllaries \pm 110; outers and medians subulate, spreading; outers shorter than medians, with sharp tip, serrulate at the margin, triquetrous; inners oblong, acute, membranous; innermosts linear, erect. Receptacle bristles smooth. Corolla yellow, \pm 10 mm long, tube shorter than limb, lobes 2.5-3 mm long; anther tube yellow. Mature achene unknown.

Specimens seen. Shahr-e Kord, Doab-e Samsami, Mt. Mili, 2850 m, Mozaffarian, 58070-TARI; Bazoft, Mt.

Kino, near Lebdi, 2150-2400 m, Mozaffarian 58016-TARI.

Relationships. *Cousinia bazoftensis* is recognized from *C. archibaldii* by having white-arachnoid involucre (not brownish-yellow), number of flowers per head 25 (not 30-45), length of corolla 10 mm (not 14-15 mm) and median leaves distinctly decurrent (not indistinctly decurrent).

10. *C. eriorrhiza* Bornm., Beih. Bot. Centrbl. 28, 2: 251 (1911).

Caespitose, covered with dried petiole at the base. Stem up to 18 cm high, leafy, brownish, arachnoid, glabrescent. Leaves coriaceous, pinnatifid, almost discolored; basal leaves with ca. 4 cm long petiole; limb 10-13x4-6 cm; stem leaves sessile, shortly decurrent; uppermost leaves diminished, close to the capitula. Capitula single, rarely 2-3 at the end of branches, 15-17 mm in diam., 20-36-flowered; involucre arachnoid, constricted above, glabrescent; phyllaries 40-60, green, subulate, falcate-reflexed, with long terminal spine; Receptacle bristles smooth. Corolla yellow, 13-14 mm long; tube 4-6 mm, limb 8-10 mm and lobes 2-3 mm long; anther tube purple, glabrous. Mature achene unknown.

Specimens seen. Hamadan: Assadabad pass to Mt. Gharavol Khaneh, 2500 – 2700 m, Mozaffarian, 64983-TARI; Bakhtiari: Shahr-e Kord, Tunnel Kuhrang, 2400 m, Pabot, 2207; 7 km SW Borujen, 2180 m, Pabot 2327 – TARI.

11. *C. albida* DC., Prodr. 6: 552 (1838).

Perennial, densely canescent-tomentose, grayish, up to 40 cm high. Stem white, arachnoid-tomentose, glabrescent, with few corymbose branches. Leaves coriaceous, concolored; stem leaves not decurrent, oblong-lanceolate; upper leaves gradually diminished, not close to capitula. Capitula single, ca. 12 mm in diam., \pm 20-flowered; involucre ca. 15 x 10 mm, campanulate-oblong, arachnoid, whitish; phyllaries 45-50, triangular-lanceolate; medians erect; inners erect, membranous, linear. Receptacle bristles smooth. Corolla \pm 11 mm.; limb 7, tube 4 and lobes 1-2.5 mm long; anther tube with pink tip, glabrous.

Specimens seen. Esfahan: northern slope of Mt. Dena, Noghol, Assadi & Abuhameh 46067-TARI; Bakhtiari: between Gandoman & Ardal, Mt. Kallar 2400-2600 m, Assadi, 72400.

12. *C. eburnea* Bornm., Österr. Bot. Zeitschr. 62: 105 (1912).

Perennial, apparently long. Stem glabrous, brown. Basal leaves with ca. 7 cm long petiole, lanceolate to linear; stem leaves remote, indistinctly decurrent, coriaceous, punctuate-glandulose, pinnatilobed, with 4-8 mm long

spines. Capitula numerous, congested, 45-55-flowered; involucre 30 x 10-15 mm, ovate to oblong, slightly arachnoid, glabrescent; phyllaries 40-60, lanceolate, coriaceous, glandulose, serrate-dentate at the margin, erect; inners membranous, yellowish, wider in upper half, acute, slightly exceeding. Receptacle bristles smooth. Corolla pink or purple, 17-24 mm long; tube shorter than limb; lobes \pm 3-4 mm long; anther tube pink or purple, glabrous. Achene 6 x 1.5 mm, oblong to obpyramidale, compressed, longitudinally striate.

Cousinia eburnea was not collected during expeditions. (Description from Flora Iranica). The species *Cousinia ottonis* Bornm., Österr. Bot. Zeitschr. 62: 106 (1912) was described from the type locality of *C. eburnea* with very similar descriptions. They may be conspecific.

13. *C. oshtorankuhensis* Attar, **sp. nov.**

Typus. Lorestan: Aligudarz, Shulabad, Ghali Kuh, 2200-3500 m, Mozaffarian & Sardabi 42545 (holotypus TARI).

Perennis, usque ad 35 cm alta, canescentia. Caulis albus, iteratim divaricato-ramosus. Folia basalia petiolata, lanceolata, pinnatifida; folia caulina non decurrentia, basi cordato-cuneata; folia summa reducta. Capitula singula, spinis inclusis 12 mm diametro, \pm 20 flora; involucrem absque spinis 2.5x2 cm, araneosum; phylla \pm 85, subulata, acuta; exteriora et intermedia patentia; interiora et intima erecta, paulo prominentia. Receptaculi setae laeves. Corolla flava, \pm 12 mm longa, tubo 5, limbo 9 et laciniis 1.5-2 mm longis; antherarum tubus roseus, glaber. Achaenia ignota.

Perennial, up to 35 cm high, canescent. Stem white, paniculately branched. Basal leaves with ca. 4 cm long petiole, limb ca. 14 x 3 cm, lanceolate, pinnatifid; lobes with ca. 4 mm long spine; stem leaves not decurrent, rarely shortly decurrent (up to 1 cm long), cordate-cuneate at the base; upper leaves diminished. Capitula single, ca. 12 mm in diam., \pm 20-flowered; involucre ca. 12 x 10 mm (excluding spines), arachnoid; phyllaries \pm 85, subulate, with sharp tips; outers and medians phyllaries spreading; inners and innermosts erect, slightly exceeding from involucre. Receptacle bristles smooth. Corolla yellow, \pm 12 mm long; tube 5, limb 7 and lobes 1.5-2 mm long; anther tube pink. Achene unknown.

Other specimen seen. Durud, Oshtoran Kuh, southern slope of Oshtoran Kuh, opposite of Gahar lake, 2380-3200 m, Mozaffarian & Sardabi 42290-TARI.

Relationships. This plant is closely related to *C. albescence*. It differs from it by having 20 flowers (not 35) and spreading phyllaries (not irregularly recurved). Also decurrent leaves of *C. oshtorankuhensis* is the best character for distinguishing it.

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Plate A. 1, 2: *Cousinia atrobracteata*; 3, 4: *C. bachtiarica*; 5, 6: *C. iranshahriana*; 7, 8: *C. albescens*; 9: *C. yasujensis*.

