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Section *Neurocentrae* BUNGE from genus *Cousinia* CASS. (Asteraceae) in Iran

With 3 Figures

Summary

This paper is based on experience from field studies, herbarium materials and images of type specimens belonging to sect. *Neurocentrae* BUNGE from genus *Cousinia* CASS. Section *Leucocaulon* TSCHERNEVA is considered as synonym of sect. *Neurocentrae* BUNGE, according to the morphological characters of *C. turcomanica* C.WINKL. (the type specimen of sect. *Leucocaulon*) and close affinities that shows with the species of sect. *Neurocentrae*. Section *Ramosissimae* is described as a section new to science. Differences between sect. *Neurocentrae* and sect. *Ramosissimae* are discussed and a key to the species of the two sections are provided separately. Besides, *C. deserti* var. *longispinosa* is described as a new member for the sect. *Neurocentrae* BUNGE.

Introduction

Section *Neurocentrae* BUNGE from genus *Cousinia* CASS., represented with seven species in Flora Iranica area (RECHINGER 1972, 1979). The distributional areas of these species are limited to margins of deserts or arid mountains in Iran and Afghanistan. Five out of seven species namely: *C. neurocentra* BUNGE, *C. fabrorum* RECH.f., *C. hololeuca* BUNGE, *C. lignosissima* RECH.f. and *C. arenaria* BUNGE are entirely endemic to Iran. Two other species, *C. deserti* BUNGE and *C. arida* C.WINKL., are endemic to Iran and Afghanistan. Therefore, all

Zusammenfassung

Die Sektion *Neurocentrae* BUNGE der Gattung *Cousinia* CASS. (Asteraceae) in Iran

Diese Arbeit basiert auf Erfahrungen aus Geländearbeit, Studien an Herbar-Material und Untersuchungen an Typus-Material der Sektion *Neurocentrae* BUNGE der Gattung *Cousinia* CASS. Die Sektion *Leucocaulon* TSCHERNEVA wird als Synonym zur Sekt. *Neurocentrae* betrachtet und zwar auf Grund der morphologischen Merkmale von *C. turcomanica* C.WINKL. (Typus-Art der Sekt. *Leucocaulon*) und der engen Verwandtschaft dieser Art zur Sektion *Neurocentrae*. Die Sekt. *Ramosissimae* wird hier als neue Sektion beschrieben. Die Unterschiede zwischen der Sekt. *Neurocentrae* und der Sekt. *Ramosissimae* werden betrachtet und ein Schlüssel für beide Sektionen beigefügt. Außerdem wird *Cousinia deserti* var. *longispinosa* als neue Art in der Sektion *Neurocentrae* beschrieben.

the seven species of this section are found in Iran and mainly spread in Khorasan province. *Cousinia lignosissima* RECH.f., was collected for the first time after the type specimen. Our collections for *C. fabrorum* RECH.f. are the first after RECHINGER's gatherings. According to Flora Iranica (RECHINGER 1972), the only specimens of *C. hololeuca* and *C. arenaria* are confined to the type specimens, collected by BUNGE & BIENERT from between Bidashat and Mayamey and between Golvardeh and Shourab respectively. Referring to Flore de l'Iran (PARSA 1943) and Flora Orientalis (BOISSIER 1875), *C. arenaria* BUNGE is only mentioned

from between Tabas (Iran) and Harat (Afghanistan). However, none of the two last species have been collected in Iran yet. Therefore, the description available in Flora Iranica (RECHINGER 1972) and photos of type specimens of *C. arenaria* and *C. hololeuca* have been used in the presented key for this section.

The small section *Leucocaulon* TSCHERNEVA is represented by four species in Flora Iranica (RECHINGER 1972, 1979); *C. turcomanica* C.WINKL. and *C. linczewskii* JUZ. (endemic to Iran and Turkmenistan), *C. freitagii* RECH.f. (endemic to Afghanistan) and *C. shorlughensis* RECH.f. (endemic to Iran, Shorlugh, it has been erroneously mentioned from Afghanistan).

On the basis of type specimens description of *C. turcomanica* (sect. *Leucocaulon*) and *C. neurocentra* (sect. *Neurocentrae*) and just as new studies show, the characteristics of *Cousinia* sect. *Leucocaulon* (in terms of plant habit, leaves form, florets number per each capitula, bracts form and achenes form, size and ornamentation) were identical to those of *Cousinia* sect. *Neurocentrae*, therefore, the sect. *Leucocaulon* must be synonym of sect. *Neurocentrae*, which is older.

Sect. *Neurocentrae* BUNGE, Mém. Acad. Sci. Petersbg. 7 Sér., 9(2): 28 (1865)

Synonym: sect. *Leucocaulon* TSCHERNEVA, Bot. Mat. Herb. Acad. Nauk Uzbek. SSR 17: 77 (1962).

Suffruticose. Leaves leather like, plane, prickly along edge, not decurrent, midrib of basal and lower stem leaves usually persistent, remaining in a form of long rigid spine when parenchyma tissues dying off. Heads solitary, terminally, medium size, 12–35-flowered; involucre bracts 40–60, ovate or lanceolate, turning into short erect or long reflexed spines. Achenes usually inversely pyramidal, costate, dentate above.

Cousinia turcomanica C.WINKL, characterized by these morphological characters: suffruticose-caespitose. Stem 20–40 cm high, white, shining, leafy, slightly branched in upper half, branches one-headed. Leaves leathery, plane, not decurrent, with a net of protruding nerves, smooth-edged or fine spiny-toothed,

upper surface green with fine dotted glands or loosely arachnoid, lower surface white arachnoid-tomentose, sometimes loosely arachnoid, ±glabrous; petioles white, thick, widened at the base; uppermost leaves sessile, much diminished. Heads solitary, ±20-flowered. Involucre rotundate at base, constricted above, glabrous; involucre bracts imbricate, ovate, with short upright spines. Bristles of receptacles smooth. Corolla yellow (not pink as described by RECHINGER 1972), anther tube purple. Achenes narrow pyramidal, striate, dentate above.

Since all three other species which were formerly belonged to sect. *Leucocaulon*, *C. linczewskii* JUZ., *C. freitagii* RECH.f. and *C. shorlughensis* RECH.f. are totally tall plants, nearly 100 cm high, with completely bare stems (leaves extremely diminished so, stems seem with no leaves), intricately long corymb branches at the third superior portion and with having rosette leaves, they differ habitly with *C. turcomanica* and all other members of sect. *Neurocentrae* BUNGE. Therefore, they should be concluded in a distinctly separated section.

Sect. *Ramosissimae* DJAVADI & ATTAR, sect. nova

Suffruticosae. Caules elati, eburnei, glabri, superne aphylli, copiose iteratim tenuiter divaricate-corymbose ramosi, paniculam amplam formantes. Folia basalia rosularia coriacea. Capitula numerosa, singula, terminalia, pauciflora. Involucra phylla arcte imbricata. Achaeia obpyramidata, apice denticulata.

Typus sectionis: *C. linczewskii* JUZ.

Perennial. Rootstocks woody. Stem upright, tall, whitish, shining, in upper part completely bare, intricately branched, branches forming wide loose corymb-shaped inflorescences. Leaves leathery, rosette. Heads numerous, solitary at apex of branches, ovoid, few-flowered. Involucre bracts imbricate. Achenes inversely pyramidal, fine-toothed above.

Note: Although the type specimen of *C. linczewskii* (LINCZEWSKI 1032, “LE” herbarium) are not seen by the authors, but according to the oldness of *C. linczewskii*, it has been considered as “type” specimen of sect. *Ramosissimae*.

Key to the species of the section *Ramosissimae* DJAVADI & ATTAR

1. Basal leaves smooth-edged *C. freitagii*
Basal leaves curly-lobed along margins, distinctly prickly along edge 2
2. Involucral bracts ± 35 , glabrous, completely imbricate, with very short thin spine above. *C. linczewskii*
Involucral bracts ± 60 , imbricate, tomentose, sharp-pointed in 3 mm spine almost arched-unbent to out side *C. shorlughensis*

***Cousinia linczewskii* JUZ., Acad. Sci. URSS, Act. Inst. Bot., Ser. 1, 3 (1936)**

Type: Badghiz: Pul-i Khvatun, *LINCZEWSKI* 1032.
Endemic of Iran and Turkmenistan.

Observed specimens: IRAN: Khorasan: 40 mile W. Sarakhs, 600 m, 14. 07. 1972, *IRANSHAHR* 9079-IRAN (33851); Mashad to Sarakhs, 80 km to Sarakhs, June 2000, *ATTAR & GHAREMAN* 21909-TUH; Mozdavand (Mozdouran) to Sarakhs, 300–800 m, 18. 06. 2002, *DJAVADI & SADEGHI* 34277-IRAN; Mashhad to Sarakhs, 5 km after Mozdavand, 970 m, 14. 06. 2005, *DJAVADI, ESKANDARI & TORABI* 43496-IRAN.

Fig. 3 C, D

Ghardash, 1100 m, 25. 07. 1972, *IRANSHAHR & ZARGANI* 9312-IRAN (33953-E); Shahpasand to Bojnourd, 120 km Bojnourd, Behkadeh, 08. 06. 1975, *TERMEH* 32232-IRAN (34056-E); Esfarayen to Sabzevar, Shah Jahan Protected Region, Hesari, 1400–1750 m, 17. 06. 1975, *TERMEH* 9313-IRAN (33956-E); Khaf to Taybad, 50 km to Taybad, 1200 m, 03. 06. 2006, *DJAVADI, ESKANDARI & TORABI* 43518-IRAN; Torbat-e Jam, Malou, 1200 m, 04. 06. 2007, *ESKANDARI & TORABI*; Gorgan: Park-e Golestan, Sulgerd, 1350 m, 05. 06. 1987, *GHAREMAN & MOZAFARIAN* 5900-TUH.

Key to the species of the section *Neurocentrae* BUNGE

Figs. 1–3

1. Midrib of basal and lower stem leaves not persistent in a form of long rigid spine, bracts all erect, imbricate; medians distinctly brownish 2
Midrib of basal and lower stem leaves persistent, remaining in a form of long rigid spine when parenchyma tissues dying off 3
2. Leaves pale green, \pm araneose on both sides, loosely glandulose papillose *C. lignosissima*
Leaves usually green with fine dotted glands or loosely arachnoid above, loosely-densely white araneose-tomentose below. *C. turcomanica*
3. Stem and leaves densely floccose-tomentose, grey or white 4
Stem ivory white, leaves glabrous green and shining on both sides, sometimes lower surface loosely arachnoid and sparsely glandulose-papillose \pm glabrescent 5
4. Stem simple. Leaves attenuate-rotundate at the base. Involucre tomentose, innermost bracts pungent *C. arenaria*
Stem \pm branched. Upper leaves cordate at the base. Involucre araneose, glabrescent, greenish-straw yellow, innermost bracts not pungent. *C. hololeuca*
5. Involucre glabrous, bracts all erect, imbricate, or \pm patent 6
Involucre araneose-tomentose, outer and median bracts attenuate towards apex turning into 2–5 mm reflexed spine 7
6. Involucre 12(–14) mm in diam., outer bracts 3–3.5 mm wide at the base *C. arida*
Involucre 6–8 mm in diam., outer bracts 2–2.5 mm wide at the base *C. deserti*
7. Involucre densely dark yellow tomentose *C. fabrorum*
Involucre loosely araneose, sometimes \pm glabrous *C. neurocentra*

***Cousinia turcomanica* C.WINKL., Acta Horti Petrop. 11: 133 (1889)**

Type: Kopet Dagh, near Germab and Göktepe, *ANTONOW*.

Endemic of Iran and Turkmanistan.

Observed specimens: IRAN: Khorasan: Torbat-e Jam, Kuh-e Bezg, 1300 m, 11. 06. 1972, *IRANSHAHR* 9311-IRAN (33850-E); Bojnourd, Besh

***Cousinia neurocentra* BUNGE, Mém. Acad. Sci. Petersbg. 7 Sér., 9(2): 28 (1865)**

Type: in arid mountains near Shahroud, *BUNGE & BIENERT*.

Endemic of Iran.

Observed specimens: IRAN: Khorasan: N Robat-e Qareh Bil ad viam versus Almeah decentem, 1200 m, 06. 06. 1975, *TERMEH* 9150-IRAN (34060-



Fig. 1
Cousinia deserti var. *longispinosa*
 A — habit; B — capitulum; C — corolla; D — bracts; E — achene

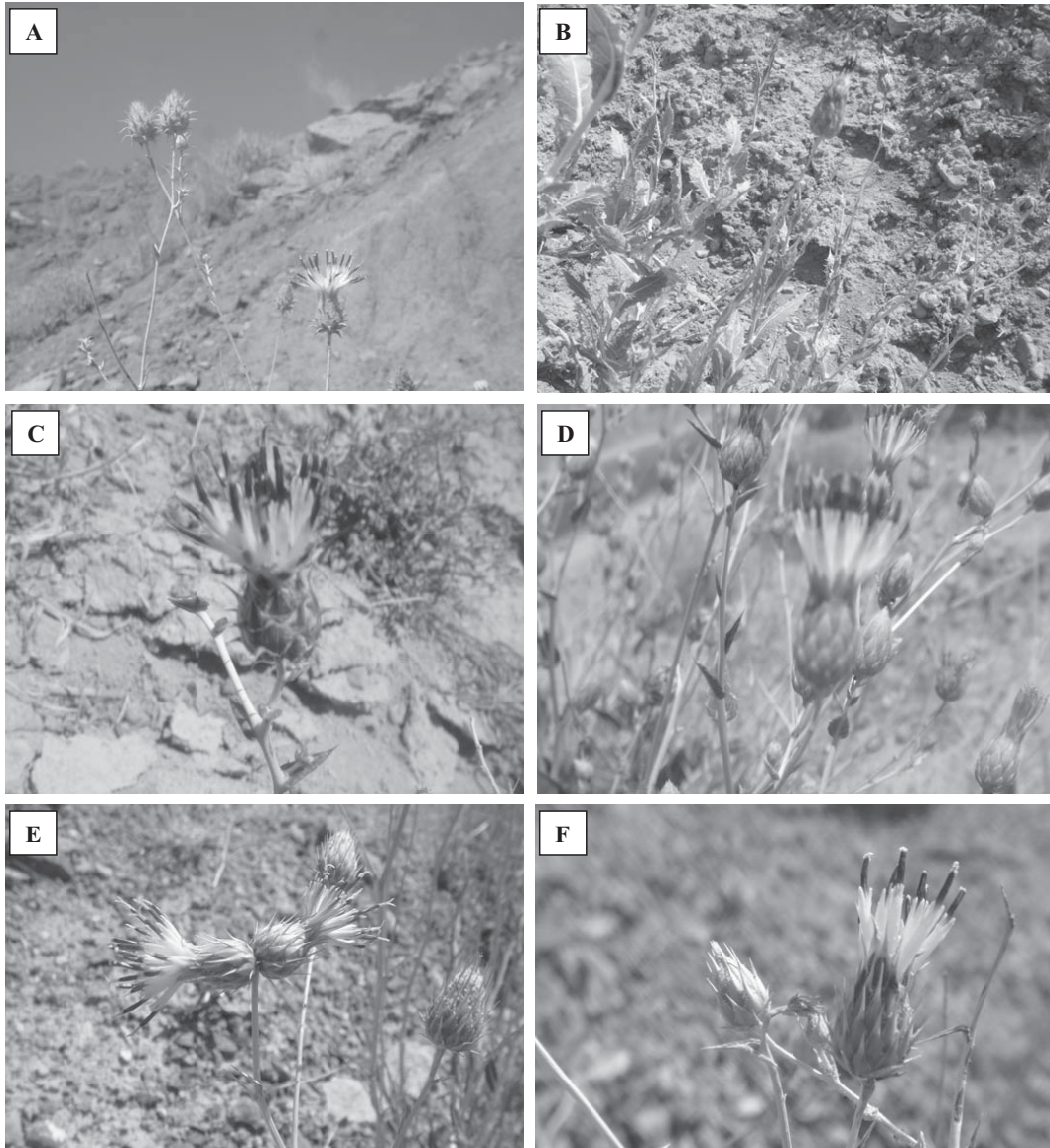


Fig. 2

A — *Cousinia fabrorum*; B — *C. lignosissima*; C — *C. neurocentra*; D — *C. deserti* var. *deserti*; E, F — *C. deserti*

E); Sabzevar, 15. 06. 1977, *J. SOJAK*, 48748-IRAN; Semnan: Shahroud, 1948, *RECHINGER, ESFANDIARI & AELLEN* 9149-IRAN; (5403-E); Shahroud, Tchehel dokhtar, 30. 07. 1968, *ERSHAD* 8955-IRAN; Shahroud, Mojen road, 25. 06. 1986, *GHAFFARI* 9148-IRAN; Shahroud, 10 km toward Azad-Shahr, 1600 m, 02. 06. 1998, *GHAHREMAN & ATTAR* 21899-TUH; Shahroud, 35 km toward Semnan, 2000 m,

06. 07. 1998, *ATTAR* 21929-TUH; Shahroud to Mayamey, Biarjomand road, 1200 m, 01. 06. 2006, *DJAVADI, ESKANDARI & TORABI* 43539; Shahroud, 30 km Shahroud to Tash, 2050 m, 10. 06. 2006, *DJAVADI, ESKANDARI & TORABI* 43540-IRAN; 25 km Shahroud to Tash, Ghatar Zereschk, 1500 m, 27. 06. 2006, *ESKANDARI & AMINI RAD* 43541-IRAN.



Fig. 3
A — *C. arida*; B — *C. turcomania*; C, D — *C. linoczewskii*

***Cousinia fabrorum* RECH.f, Flora Iranica. 139 A: 112 (1979)**

Type: Khorasan: Kuh-e Ahangaran, Qaleh Ahangaran, RECH.f. 56129.

Observed specimens: IRAN: Khorasan: Ghayen, Haji-abad, Ahangaran, Dezak, 1250 m, 29. 05. 2007, *ESKANDARI & TORABI 48004-IRAN*; Ahangaran, 1150 m, 29. 05. 2007, *ESKANDARI & TORABI 48005-IRAN*; Birjand, Mansour-abad, Takhtejan, Roud Robat, 1890 m, 01. 06. 2007, *ESKANDARI & TORABI 48003-IRAN*.

***Cousinia lignosissima* RECH.f, Flora Iranica. 139 A: 113 (1979)**

Type: Khorasan: between Jannat-abad and Malu, RECH.f. 55857

Observed specimens: IRAN: Khorasan: Torbat-e Jam, Malu, Golbanou, 1200 m, 04. 06. 2007, *ESKANDARI & TORABI 48002-IRAN*.

***Cousinia arida* C.WINKL., Acta Horti Petrop. 12: 190 (1893)**

Type: Khorasan: Karez, AITCHISON 621 = 740

Endemic of Iran.

Observed specimens: IRAN: Khorasan: Gazik, Olang, 1950 m, 04. 06. 1998, *GHAHREMAN & ATTAR 21752, TUH*.

***Cousinia deserti* BUNGE var. *deserti*, Mém. Acad. Sci. Petersbg. 7 Sér., 9(2): 29 (1865)**

Type: in arid deserts between Beedasht and Mayamey, BUNGE & BIENERT.

Endemic of Iran and Afghanistan.

Observed specimens: IRAN: Tehran: Hableroud Tal, Simin dasht to Kaboutar darreh, 01. 09. 1948, *AELLEN & MANUCHEHRI 8953-IRAN* (5570-E); Karaj, Eshtehard, Halghedar mountains, 10. 06. 1978, *TERMEH 9078-IRAN*; Karaj, SW of Mashtgerd, Halgh-e Dar mountains, 12. 06. 1991, *GHAHREMAN & MOZAFFARIAN 9893-TUH*; Semnan: Mayamey to Shahroud, 1948, *RECHINGER, ESFANDIARI & AELLEN 8954-IRAN* (5335-E); East of

2005, *DJAVADI, ESKANDARI & TORABI 43534-IRAN*; Mashhad, Robat Sang to Robat Sefid (old road), 10 km to Robat Sefid, 1850 m, 04. 06. 2006, *DJAVADI, ESKANDARI & TORABI 43533-IRAN*.

***Cousinia deserti* BUNGE var. *longispinosa* DJAVADI & ATTAR, var. nov.**

Holotype: Iran: Khorasan: Mashhad, Robat Sefid, 1750 m, 4 June 2006, *DJAVADI, ESKANDARI & TORABI 43535-IRAN*. Figs. 1, 2E, F.

Differ ab *C. deserti* var. *deserti*: Involucric phylla intermedia in spinam terminalem 4–5 mm longam attenuata (non 0.5–1 mm), Plumque usque ad laciniam attingens.

This variety is similar to *Cousinia deserti* in general habit and not decurrent leathery leaves with thick midrib which remaining in a form of long rigid spine when parenchyma tissues dying off. But, in “Typical” *C. deserti* the median rib of middle involucral bracts terminating to a 0.5–1 mm long spine (not 4–5 mm), not ever reaching to the lobes of corolla (not distinctly reaching to the lobes of corolla).

This specimen which was treated here as a new taxa, is definitely the specimen collected by RECHINGER (*RECH. 1524*) from the same locality (RECHINGER 1972). But, as the structure of involucral bracts including indumentum, form of bracts (imbricate, spread or reflex), and the length of terminal spine, are very worthy for distinguishing of the species of sect. *Neurocentrae* BUNGE, moreover the material of population of *C. deserti* does not exactly fit the specimen comes from Mashhad, Robat Sefid, therefore, we recognize this population as sufficiently distinct to be described at the rank of a variety.

The distinguishing characters of the two varieties of *Cousinia deserti* can be as follows:

1. The median rib of middle involucral bracts terminating to a 0.5–1 mm spine, not ever reaching to the lobes of corolla var. *deserti*
The median rib of middle involucral bracts terminating to a 4–5 mm long spine, distinctly reaching to the lobes of corolla var. *longispinosa*

Shahroud, May–June 1966, *REMAUDIERI 8952-IRAN*; 33 km NE Semnan versus Damghan, 1800 m, 25. 04. 1975, *IRANSHAHR 8951-IRAN* (33977-E); Shahroud to Mayamey, 30 km W Abbasabad, 1250 m, 01. 06. 2006, *DJAVADI, ESKANDARI & TORABI 43542-IRAN*.

Additional specimen observed: IRAN: Khorasan: Mashhad, Robat Sefid, 1750 m, 19. 06.

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