

# REVISION OF THE GENUS *ASTRAGALUS* L. SECT. *LEUCOCERCIS* BUNGE (LEGUMINOSAE) FROM IRAN

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Revision of the genus *Astragalus* (sect. *Leucocercis* Bunge) from Iran. -*Iran. Journ. Bot.* 7 (2): 239-248. Tehran.

*Astragalus* species of the sect. *Leucocercis* Bge. from Iran are revised, the existing species are compared with their closest relatives. Full descriptions, ecological adaptations and geographical distributions are given. *A. crassispinus* Bge. is excluded as a doubtful species from this section and transferred to sect. *Acantherioceras* Rech. f.

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مروری بر بخش *Leucocercis* از جنس *Astragalus* در ایران

علی اصغر معصومی و مسعود رنجبر

گونه‌های بخش *Leucocercis* Bge. از جنس گون در ایران مرور می‌شوند، گونه‌های موجود با نزدیک‌ترین خویشاوندان خود مقایسه می‌گردند، شرح کامل و سازش اکولوژیک همراه با پراکنش جغرافیایی ارائه می‌گردد، گونه *A. crassispinus* به عنوان گونه مشکوک از این بخش خارج و به بخش *Acantherioceras* انتقال می‌یابد.

## Introduction

Identification of *Astragalus* species of three medifixed haired sections started sometime ago. Section *Xiphidium* is distributed in western part, section *Ammodendron*, penetrates to the eastern part and the section *Leucocercis* Bge. with distinct species forming a natural group within the medifixed haired Astragali, and they are distributed in the central part of the Iranian territory around the central kavr, in some cases penetrate to the saline parts and show a higher adaptation with another halophytic taxa. The section *Leucocercis* is one of the endemic sections of the genus *Astragalus* with the total species exclusively adapted to the Iranian ecological conditions.

## Ecological adaptation

The section *Leucocercis* with seven distinct species distributed in the central part of the country surrounding the central desert of Iran; around Esfahan, Yazd, Fars, Kerman, Baluchestan and south of Semnan, in few cases extend to 2200 m. but never penetrate to higher elevations. The species of this section in some parts are mixed with the

elements of the sections *Eremophysa*, *Poterion*, *Microphysa* and the annual Astragali. This aspect more or less shows that these sections are positively correlated with the low altitude and high temperature with little annual precipitation which is clearly, the ideal ecological condition, for the annual Astragali. In this reason the phenological diversity of these sections with a spring flowering time show a tendency toward the annual Astragali strategy.

## Treatment

*Astragalus* (Sect. *Leucocercis* Bunge) Mem. Acad. Imp. Sci S. Petersburg, 11/16: 132 (1868); Lectotype: *A. mucronifolius* Boiss. (D. Podlech, in Mitt. Bot. Staatssamml. München 29: 480 (1990).

Perennial, suffrutescent. Caespitose or herbaceous. Leaves paripinnate, spiny, terminal leaflets change to spine, densely covered with appressed or villous mediofixed hairs. Stipules chartaceous, at the base adnate to the petiole. Inflorescence axillar with many flowers, pedunculate. Calyx tubular, the teeth triangular or linear. Standard longer than the wing-petals and keels. Ovary covered



rounded at the apex. Wing-petals 14-15 mm long; limb 7-8 mm long, oblong; auricle ca. 1 mm long, rounded; claw 7-8 mm long, filiform. Keel 10-12 mm long; limb 5-6 mm long, subtriangular, slightly auriculate at the base, acute. Ovary 3-4 mm long, oblong, covered with dense appressed hairs. Pods crescent, 12-17 mm long and 4-6 mm broad, purplish-brown, covered by dense appressed hairs, unilocular. Seed ca. 3 mm long and ca. 2 mm broad, reniform, brown. *Specimens seen.* Esfahan: Road from Natanz to Ardestan, near Emamzadeh Abyazan, 1380 m, 15. 5. 1974, Wendelbo & Foroughi 11462; Delijan protected area, 1500 m, 5. 7. 1985, Nowroozi 3920; Kashan-Natanz, 1600 m, 4. 5. 1978, Amin & Rajamand, 32873; 60 km. Delijan to Ghom, 1140 m, 24. 5. 1972, Amin & Mousavi 16119.

**2. *Astragalus curviflorus*** Boiss., *Diagn. Pl. Or. Nov. ser. 1/2: 67* (1843).

*Type.* Persia australis, Aucher-Eloy, 4388 (W.).

Perennial, suffrutescent-caespitose, subshrub, spiny, ca. 15 cm tall. Stem 4-7 cm long, ca. 5 mm in diameter, divided from the base, covered by stipules and petioles. Stipules ca. 2 mm long and 2-3 mm broad,

chartaceous, triangular-subulate, at free portion acute to acuminate, at base 0.5-1 mm of their length adnate to the petiole. Leaves 3-5 cm long, paripinnate, thick, spiny, covered by short appressed white hairs; petiole 1.5-2 mm long; leaflets ca. 5 pairs, elliptic-oblong, symmetric, ca. 10 mm long and 2-3 mm broad, mucronate; mucro ca. 0.5 mm long, both surfaces densely covered with very short appressed hairs. Inflorescence axillar, elongate, 5-flowered; peduncle slender 0.5-1 cm long, shorter than the leaves, covered by sparse appressed hairs. Bracts membranaceous, 1-2 mm long, triangular-subulate, acute, covered by sparse appressed white hairs. Calyx tubular, 5-6 mm long; covered by densely short appressed hairs, teeth subulate, ca. 2 mm long. Corolla yellowish. Standard 10-12 mm long and 5-6 mm broad, the limb suborbicular, rounded at the apex. Wing-petals 10-12 mm long; limb oblong; auricle ca. 1 mm long; claw 4-5 mm long, filiform. Keel 9-11 mm long; limb 5-6 mm long, slightly auriculate at the base. Ovary 2-3 mm long, oblong, densely appressed hairy. Pods ovaloid, 8-9 mm long and 4-5 mm broad, yellowish, unilocular, covered by dense short appressed hairs. Seed ca. 3 mm long and ca. 2 mm broad.

reniform, brown.

*Specimens seen.* Fars: 25 km S E. of Salou village, Kuh-e Raz, 1600-2200 m, 5. 6. 1983, V. Mozaffarian 46805; 13 km from Zarghand toward Band-e Amir, 1450 m, 1. 7. 1989, Zehzad et al. 66937.

**3. *Astragalus mucronifolius* Boiss.,**  
Diagn. Pl. Or. Nov. 1/2: 68 (1843).

*Type.* inter Yazd et Isfahan, Aucher-Eloy, 4400 (W.)

= *A. taftanicus* Parsa, Kew. Bull. 1947: 195. Perennial, suffrutescent-caespitose, subshrub, spiny, 15-20cm tall. Stem 7-8 cm long and 10-20 mm in diameter, divided from the base, covered by stipules and petioles. Stipules 5-7 mm long and ca. 2 mm broad, chartaceous, triangular, at free portion acute, at base 1-2 mm of their length adnate to the petiole, covered with scattered white hairs, ciliate at margins. Leaves 6-15 cm long, paripinnate; thick, covered by dense appressed hairs; petiole 2-4 cm long; leaflets ca. 5 pairs, elliptic to orbicular, 8-9 mm long and 3-5 mm broad, mucronate, mucro 2-3 mm long, covered by dense, short appressed hairs on both sides. Inflorescence axillar, elongate, 12-19 flowered. Peduncle 5-8 cm long, shorter than the leaves, covered by sparse to dense

appressed and subappressed hairs. Bracts membranaceous, ca. 1 mm long, shorter than the pedicel, ovate-lanceolate, acute at the apex, covered by sparse appressed white hairs. Calyx tubular, 6-7 mm long; covered with scattered long appressed hairs, teeth triangular-linear to subulate, 2-3 mm long. Corolla pale-violet. Standard 11-12 mm long and 5-8 mm broad, the limb cordate-elliptic, rounded at the apex. Wing-petals 11-13 mm long; limb 2-3 mm broad, oblong; auricle ca. 1 mm long, claw 4-5 mm long, filiform. Keel 8-9 mm long; limb 4-5 mm long, subtriangular, slightly auriculate at base, acute. Ovary 2-3 mm long, oblong, densely appressed hairy. Pods spherical, 8-10 mm long and 4-6 mm broad, purplish-brown, covered by lax to dense short and long appressed hairs, unilocular. Seed ca. 3 mm long and ca. 2 mm broad, reniform, greenish-brown.

*Specimens seen.* Baluchestan: Taftan region, between Chou Kalaki, between Jonabad and Kharestan, 2200 m, 27. 5. 1985, V. Mozaffarian 52973; Taftan Mt. s-slope above the village of Torshab, 1900-2300 m, 11. 3. 1977, Runemark, Assadi & Sardabi 22627; Sarbaz. 74 km Zaboli road, 1280 m, 11 March 1974, Foroughi 10789; 25 km on road from Bazman to Bam, 1200 m, 10. 3.

1977, Runemark, Assadi & Sardabi 22621. Bandar Abbas: 55 km from Sirjan to Bandar-Abbas, above the tunnel, 1700-1900 m, 26. 4. 1984, V. Mozaffarian 49473. Fars: Fasa, Gharebeigon, 1200 m, 12. 5. 1992, Mozaffarian 71287; Jiroft, 750 m, 3 Apr. 1972, M. Riazi 6012; 75 km SE. Shiaz, 1450 m, H. Pabot 6240; 30 km SE. Abadeh, 1810 m, 26. 4. 1961, H. Pabot 5814; 35 km from Izadkhast, toward Abadeh, 1950 m, 29. 6. 1989, Zehzad & Taheri 66896.

**4. *Astragalus ovoideus*** Sirj. & Rech. f., *Ann. Naturhist. Mus. Wien*, 58: 72 (1951). *Type*. Persia austro-orientalis: Kerman: In montibus Djamal (Jebal) Bariz, inter Bam et Djiroft, in declivibus borealibus infra Deh Bakri, 1800 m, Rechinger, Aellen & Esfandiari 3565 (W).

Perennial, suffrutescent-caespitose, subshrub, 7-15 cm tall. Stem 3-7 cm long and 7-10 mm in diameter, divided from the base, covered by stipules and petioles. Stipules 4-6 mm long and 1-2 mm broad, chartaceous, linear-lanceolate, at free portion acute or acuminate, 1-2 mm of their length adnate to the petiole, covered by scattered white hairs. Leaves 4-6 cm long, paripinnate; straight or more or less curved, thick, covered by dense appressed

hairs, petiole 2-3 mm long; leaflets ca. 4 pairs, 5-7 mm long, elliptic to obovate, ca. 2 mm broad, symmetric, mucronate, mucro ca. 2 mm long, covered by dense, soft, short appressed hairs on both sides. Inflorescence, elongate, 3 flowered. Peduncle slender, 2-3 cm long, shorter than the leaves, covered by dense, soft appressed and subappressed hairs. Bracts membranaceous, 1-1.5 mm long, subulate, acute, hairy or ciliate at the margins. Calyx tubular, ca. 6 mm long, purplish, covered by short appressed hairs; teeth linear-lanceolate, ca. 2 mm long. Corolla pale violet. Standard 12-13 mm long and ca. 7 mm broad; the limb orbicular, slightly emarginate at the apex. Wing-petals 12-13 mm long; limb 6-7 mm long, oblong; auricle ca. 1 mm; claw 5-6 mm long, filiform. Keel 9-11 mm long; limb 5-6 mm long, subtriangular, slightly auriculate at base. Ovary 3-4 mm long, oblong, dense appressed hairy. Pods ovaloid, 8-9 mm long and 3.5-4 mm broad, purplish, covered by dense short appressed hairs, unilocular. Seed ca. 3 mm long and ca. 2 mm broad oblong-elliptic or reniform, brown.

*Specimens seen*. Baluchestan: 80 km from Zahedan on the road to Khash, 1750 m, 25. 4. 1977, M. Assadi 22782; ca. 40 km N. of

Khash, Torsh-Ab at Taftan mountain, 2000-2300 m, 26. 4. 1977, Assadi 22857; Kerman: Sirjan et Hadjiabad, 2 June 1960, H. Pabot 2862.

**5. *Astragalus phyllokentrous*** Hausskn. & Bornm., Mitt. Thur. Bot. ver. N. S. 23: 20 (1908).

*Type.* Persia occidentalis: In monte Latetar, Strauss, (JE).  
Perennial, suffrutescent-caespitose, subshrub, 10-15 cm tall. Stem 3-5 cm long and 8-10 mm in diameter, much divided, covered by stipules and petioles. Stipules 4-6 mm long and 2-3 mm broad, chartaceous, linear-lanceolate at the free portion, acute or acuminate at the apex, 1-2 mm of their length adnate to the petiole, covered by sparse appressed and subappressed hairs. Leaves 5-10 cm long, paripinnate, spiny, thick, covered by dense appressed hairs; petiole 2-4 cm long; leaflets 4-5 pairs, 8-10 mm long and 5-6 mm broad, elliptic to obovate, covered by soft and short appressed hairs on both sides, mucronate; mucro 2-3 mm long. Inflorescence, axillary, lax, elongate, 9-11 flowered. Peduncle slender, 2-3 cm long, 1/2-1/3 as long as the leaves, covered by dense, soft appressed or subappressed

hairs. Bracts membranaceous, 1-1.5 mm long, subulate, acute at the apex, covered by sparse appressed white hairs; ciliate at the margins. Calyx tubular, 9-11 mm long, covered by short appressed hairs, teeth setaceous, 3-4 mm long. Corolla pale violet. Standard 10-12 mm long and 6-7 mm broad, the limb orbicular-ovate, slightly emarginate at the apex. Wing-petals 11-13 mm long; limb oblong, 6-7 mm long; auricle ca. 1 mm long; claw 5-6 mm long, filiform. Keel 9-11 mm long; limb 4-5 mm long, triangular, slightly auriculate at the base. Ovary 3-4 mm long, oblong, densely appressed hairy. Pods oblong, purplish, covered by densely, short appressed hairs, unilocular.

*Specimens seen.* Esfahan: Kashan, 850 m, 28. 4. 1974, Dini & Bazargan 7972; Muteh protected area, 1000 m, 20. 10. 1981, V. Mozaffarian & Karimi 37818; 55 km. of Delijan to Khomaen, 1600 m, 18. 5. 1974, Babakhanlou & Amin 8769; Ardestan to Nain, Zafarghand, 1550 m, 8. 5. 91, M. Nowroozi & M. T. Feyzi 8003; 54 to Nain on the road from Ardestan, 28. 5. 1986, Assadi & Bazgosha 55973; 14 km Natanz, 1480 m, 12. 5. 61, H. Pabot 7175; Nadjafabad, Janatabad, 1600 m, 28. 5. 1981, Nowroozi 489; 10 km to Natanz-Ardestan,



1550 m, 6. 6. 1986, Assadi & Bazgosha 56571.

**6. *Astragalus semnanensis*** Bornm. & Rech. f., Fedde Repert. 48: 123 (1940).

*Type.* Persia boreali-orientali: Damghan-Semnan, in desertis ad Sorcheh, prope Semnan, 1600 m, Rechinger 1249 (W).

Perennial, suffrutescent-caespitose, subshrub, 20-25 cm tall. Stem 8-10 cm long and 7-8 mm in diameter, much branched, covered by stipules and petioles. Stipules 4-6 mm long and 3-4 mm broad, chartaceous, triangular-lanceolate at free portion, acute or acuminate at the apex, 1-2 mm of their length adnate to the petiole, covered by long and soft hairs. Leaves 7-12 cm long, paripinnate, spiny, thick, covered by dense appressed hairs; petiole 1.5-2.5 mm long; leaflets ca. 6 pairs, 9-11 mm long and 5-7 mm broad, orbicular to obovate, mucronate, mucro 2-3 mm long, covered by dense short appressed hairs on both sides. Inflorescence axillary, lax, elongate, 12-15 flowered. Peduncle slender, 2-3.5 cm long, shorter than the leaves, covered by dense, long, soft, appressed or subappressed hairs. Bracts membranaceous, 1-1.5 mm long,

linear-lanceolate, acute at the apex, covered by sparse appressed white hairs or ciliate at the margins. Calyx tubular-campanulate, 10-12 mm long, densely covered by long hairs, teeth linear-lanceolate, ca. 6 mm long. Corolla yellowish-red. Standard 13-15 mm long and 6-8 mm broad, the limb orbicular, rounded at the apex. Wing-petals 12-14 mm long; limb 6-7 mm long, oblong; auricle ca. 1 mm long; claw 6-7 mm long, filiform. Keel 11-12 mm long; limb 4-5 mm long, subtriangular, slightly auriculate at the base. Ovary 3-4 mm long, oblong densely appressed hairy.

*Specimens seen.* Semnan, beginning of the road Firouzkuh, 1500 m, 26. 6. 1986, M. Assadi 56644; Semnan, 1120 m. 20. 5. 1987, V. Mozaffaian 58865.

**7. *Astragalus talimansurensis*** Sirj. & Rech. f. Ann. Math. Naturw. Kl. Osterr. Akad. Wiss. 180 (1953).

*Type.* Persia australis Tali-Mansur, in montibus Bakhtiaricis in rupestribus, Koelz 15090 (W).

Perennial, suffrutescent-caespitose, 11-13 cm tall. Stem 3-6 cm long and 5-7 mm in diameter, divided from the base, covered by stipules and petioles. Stipules 3-4 mm long and 2-3 mm broad, chartaceous,



linear-lanceolate, at free portion acute or acuminate, 1-1.5 mm of their length adnate to the petiole, covered by long subappressed hairs. Leaves 4-6 cm long, paripinnate spiny, thick, covered by dense appressed hairs; petiole 2-3 mm long; leaflets 7-8 pairs, 6-7 mm long and ca. 2 mm broad, obovate or elliptic to oblong, terminating in a long arista, covered by dense, short appressed hairs on both sides. Inflorescence axillary 5 flowered. Peduncle slender, 2-3 cm long, shorter than the leaves, covered by dense, subappressed hairs. Bracts membranaceous, 1-2 mm long, filiform, covered by sparse, short appressed white hairs and ciliate at the margins. Calyx tubular, 5-6 mm long, covered by short appressed hairs, teeth triangular-linear to subulate, 2-3 mm long. Corolla violet. Standard 11-13 mm long and ca. 9 mm broad; the limb orbicular, slightly emarginate at the apex. Wing-petals 12-13 mm long; limb 7-8 mm long, panduriform; auricle ca. 1 mm long, rounded; claw ca. 5 mm long, filiform. Keel 11-12 mm long equal or shorter than wing; limb 5-6 mm long, subtriangular, slightly auriculate at the base. Ovary oblong, densely appressed hairy. Pods ovaloid, 12-14 mm long and 5-7 mm broad, purplish to brown, covered by

dense short appressed hairs, unilocular. Seed ca. 3 mm long and ca. 2 mm broad, orbicular to reniform.

*Specimens seen.* Fars: ca. 40 km W. of Nurabad, near Babamonir, 1300-1500 m, 14. 4. 1982, Assadi and Aboohamzeh 38378; ca. 15 km S. of Nurabad, near Deh-shur, 1000 m, 13. 4. 1982, Assadi & Aboohamzeh 38338; Kazerun, Chenarshahijan, 920 m, 22 April 1972, Foroughi 3234; Nurabad, Babamounir, 960 m, 2. 3. 1987, V. Mozaffarian 63413. Lorestan: Khorramabad, Tange Malavi, 880 m, 18 March 1972, Foroughi 3247. Khuzestan: Baghmalek, 750 m, V. Mozaffarian 53619; Masjedsoleyman, Lali, Tugah, 480 m, 16 March 1972, Foroughi 3216; Between Behbahan and Pol-e Kheirabad, ca. 300 m, 13. 5. 1986, V. Mozaffarian 63273; Behbahan, 400 m, Foroughi 8881; Ramhormoz, 450 m, 30 April 1973, Z. Rowshan 9447; Haftgel, 450 m, 5 March 1972, Foroughi 3230; 58 km Behbahan on the road to Ramhormoz, 240 m, 6. 3. 1978, Runemark & Mozaffarian 30929. Koughilouyeh and Boirahmad: Between Dehdasht and Lende, around Dezak, 950 m, 28. 4. 1992, V. Mozaffarian 71221; Dehdasht on the road from Basht, 800 m, 17. 4. 1982, Assadi & Aboohamzeh

38636. Near Dehdasht, 500 m, 18. 4. 1982, Assadi & Aboohamzeh 38672. Between Behbahan and Dehdasht, Kuh-e Kheiz, near Kushk village, 300 m, 18. 4. 1982 Assadi & Aboohamzeh; Bushar: Soveirch. 70 km SE Gonaveh road, 320 m, 29 Feb. 1972, Foroughi 3255.

### Excluded species

#### *A. crassispinus* Bge.

*A. crassispinus* Bge. with the imperfect diagnosis (Bunge 1869) described on the the basis of the specimen Griff. 1592 from Afghanistan. The imperfect description and the unusual distribution show the uncertain position of this species. For this reasons, this taxon is excluded from the section *Leucocercis* Bge. It is worthy to notice that the relative section namely: sect. *Acantherioceras* Rech. f. with two species is

distributed in the same area in Afghanistan (Rechinger, 1959). So at the moment the mentioned species is suggested to be transferred to the Sect. *Acantherioceras*.

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