

## *Astragalus zoshkensis* (Fabaceae), a new species from Iran

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*Astragalus zoshkensis* (Fabaceae) from Khorassan province of Iran is described as a new species and illustrated. It is characterized by a long (2.5–5 cm) beak of pod, free stipules, long woody marcescent petioles, and short stems. The new species belongs to *Astragalus* section *Dissitiflora* and is related to *A. sumbari* and *A. tolgoensis*.

**Key words:** *Astragalus*, *Cercidothrix*, *Dissitiflora*, Fabaceae, new species, taxonomy

*Astragalus*, with nearly 3000 species, is probably the largest genus of flowering plants (Lock & Simpson 1991). Iran alone has more than 700 species and is one of the centers of diversity of the genus (Ghahremani-nejad 2000). There are some old monographs and books (Bunge 1868, Boissier 1872) and some local flora treatments (e.g. Gontcharov *et al.* 1946, Chamberlain & Matthews 1969) of Asian *Astragalus*, and they are suitable and helpful for identifying the Iranian species. *Flora Iranica* volumes 174 and 175 (Podlech 1999a, Podlech *et al.* 2001) are certainly useful references, but they treat only sections with simple trichomes. The species with bifurcating trichomes are still very inadequately studied.

Species with bifurcating trichomes belong in subgenus *Cercidothrix* Bunge (Bunge 1868). It has nearly 820 species in the Old World, nearly 160 (or 20%) of which occur in Iran (Ghahremani-nejad 2000).

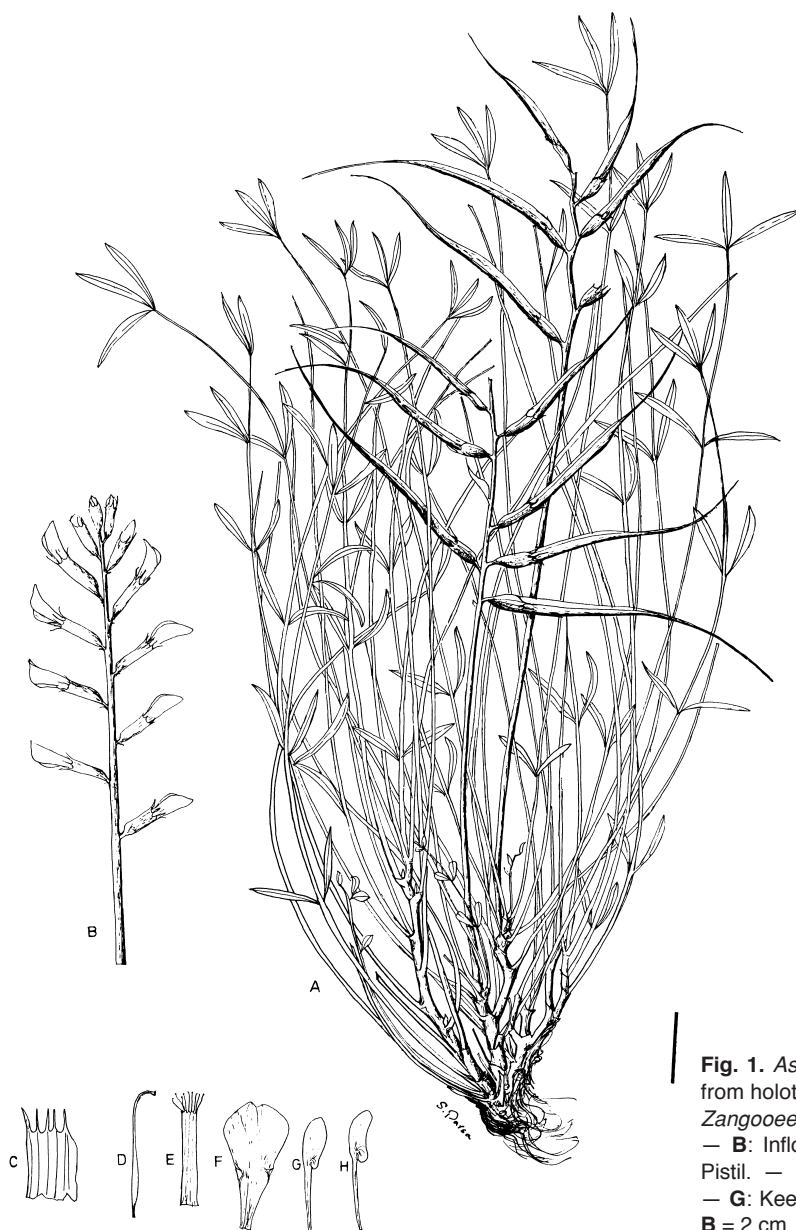
Like the species with simple trichomes, those with bifurcating ones are distributed in many sections. Some of the sections are taxonomically

very difficult and contain numerous species. Examples include the sections *Incani* DC. and *Dissitiflora* DC., which need to be thoroughly revised.

Here I describe a new species with bifurcating trichomes in section *Dissitiflora* from Khorassan province, Iran. This section comprises nearly 190 species (Yakovlev *et al.* 1996, Maassoumi *et al.* 2000, Podlech 2001). The section belongs to *Astragalus* subgenus *Cercidothrix* Bunge, which is characterized by perennial growth and presence of bifurcating trichomes (Bunge 1868). The subgenus has its main center of diversity in Middle Asia (cf. Yakovlev *et al.* 1996).

***Astragalus zoshkensis* F. Ghahremani, *sp. nova*** (Figs. 1 and 2)

*Species A. sumbari* Popov *et A. tolgoensis* Sirj. *et Rech. f. affinis, sed differt leguminibus 3–11 (nec 4–6) cm longis, foliis 3–5-jugis (nec 5–9), calyce 14–16 (nec 10–14) mm longo.*

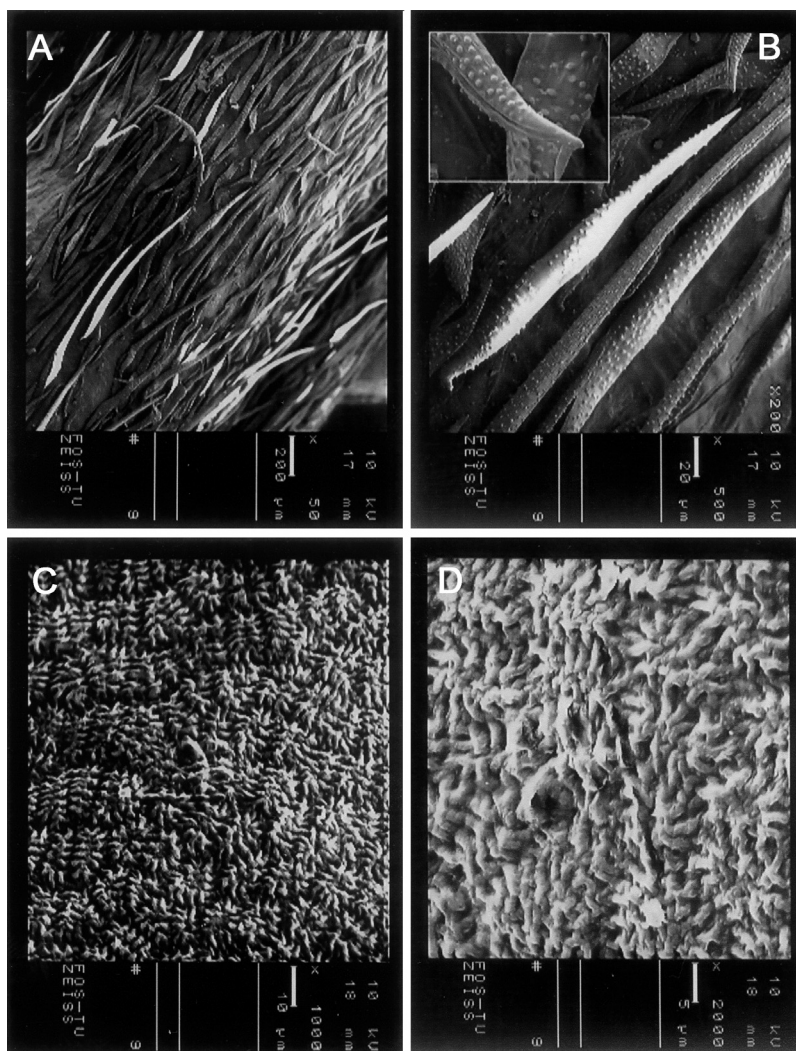


**Fig. 1.** *Astragalus zoshkensis* (A and C from holotype, B and D–H from Rafeie & Zangooee 26970). — A: Habit (with fruit). — B: Inflorescence. — C: Calyx. — D: Pistil. — E: Stamens. — F: Standard. — G: Keel. — H: Wing. — Scale: A and B = 2 cm, C–H = 1 cm.

TYPE: Iran. Khorassan province: Mashhad, after Zoshk village, along the river on the mountain, 36°16'70"N, 59°06'63"E, 2359 m, 23.VI.2001, *Ghahremani-nejad 284* (holotype and isotypes FAR).

Perennial, from a woody caudex clothed in permanent parts of old leaves, 22–32 cm tall including inflorescence. Stems 3–5 cm long, white-gray due to a very dense indumentum of short, appressed, white hairs. Stipules 1–1.5 mm

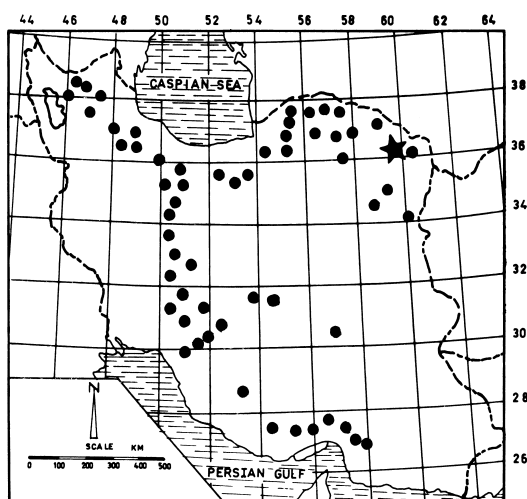
long, 0.6–1(–1.5) mm broad and adnate to petiole at base, free (non-connate), triangular, abaxially usually densely covered with appressed, white (or with few interspersed black) hairs at the base. Leaves with 3–5 pairs of leaflets, (5–)9–24 cm long, petiole and rachis densely to moderately covered with appressed, white hairs; petioles from 2/3 to about as long as rachis, woody marcescent; leaflets remote, shortly



**Fig. 2.** SEM micrographs of *Astragalus zoshkensis* (from holotype). — **A** and **B**: Pod (epidermis with hairs). — **C** and **D**: Seed surface.

(0.1–0.5(–0.8) mm) petiolulate, linear, oblong-linear to elliptic, acute to obtuse [sometimes (probably in young leaves) lower ones consisting of obovate leaflets ( $4\text{--}7 \times 2\text{--}3$  mm), obtuse to retuse], 1–3.3 cm long, 1.2–3.3 mm wide, densely to moderately covered with appressed, white hairs. Peduncles 6–15 cm long, usually shorter than leaves, densely to loosely covered with white hairs. Inflorescence rather compact, 9–15-flowered, ovate-oblong, 3–4 cm long, rapidly elongating to 12 cm, becoming very loose and remotely spaced, fruits spreading. Bracts ovate-lanceolate, membranous, 1.5–2.2 mm long, 0.7–1 mm wide, covered with appressed white, black or black and white hairs, adaxially

yellowish. Bracteoles wanting. Pedicel 1.5–2.2 mm long, with appressed black or black and white hairs. Calyx cylindric, 14–16 mm long, non-inflated in fruit, finally usually ruptured by fruit, covered with appressed black and sparsely longer white hairs; calyx teeth linear-subulate, 2.7–3.5 mm long,  $1/4$  as long as tube. Corolla (dry) yellow, yellow-green or rarely dark violet, glabrous; standard 17.5–23 mm long, limb ovate-elliptic, 7–10 mm wide, retuse; wing 17–22 mm long, limb oblong, obtuse,  $3/4$  as long as claw, 2–2.5 mm wide, ligule 0.6–1 mm long; keel 16–19 mm long, limb 6–7 mm long, 3 mm wide, ligule 0.2–0.4 mm long, the claw 8–12 mm long. Stamens 17–19 mm long, free portion 3.4–5 mm,



**Fig. 3.** Distribution of species of *Astragalus* sect. *Dissitiflora* in Iran. Based on data in Maassoumi *et al.* (2000) and herbarium material in FUMH and FAR. Star: Locality of *A. zoshkensis*.

anther 0.6–0.7 mm long. Pistil 18–22 mm long; ovary 6–7 mm long, linear 0.8–1 mm wide, subsessile, covered with loosely appressed white hairs, 16-ovulate; ovules reniform, 0.25 × 0.2 mm; style 12–15 mm long, hairy at base. Pod sessile, erect, usually horizontally spreading, 3–11 cm long, 2.5–3.5 mm broad, bilocular, carinate dorsally, carinate or rounded ventrally, coriaceous, terminating in a long, straight to nearly straight, woody beak (2.5–5 cm long), ca. 1/3–1/2 as long as fruit body, fairly densely covered with appressed black and slightly longer white hairs. Seeds reniform to oblong, 4–4.5 mm long, 2–2.2 mm wide, smooth, olive-green. Flowering and fruiting May–June.

**ADDITIONAL SPECIMENS EXAMINED** (paratypes). **Iran.** Khorassan Province: Esfarayen, Sarigol Mt., Baba-Ghodrat neck, 16.VI.1998, 1700 m, Rafeie & Zangooee 31669 (FAR, FUMH; in fruit); E of Neishabur, km 12 of Dizabad-e-Olia road, 19.V.1996, 1700–1800 m, Rafeie & Zangooee 26970 (FAR, FUMH; in flower); Mashhad, 12 km S of Zoshk village, 2.VI.1991, 2100–2500 m, Joharchi & Zangooee 20604 (FAR, FUMH; with young flowers).

*Astragalus zoshkensis* is endemic to Iran and known from the four collections cited above. They all are from northern part of Khorassan province at

an altitude between 1700 and 2500 m (Fig. 3).

*Astragalus zoshkensis* is well distinguished from all other species of the section by the combination of a longer beak of pod and a shorter stem. It is closely related to *A. sumbari* and *A. tolgorensis* but differs from them in calyx length (14–16 vs. 10–14 mm), fruit length (3–11 vs. 4–6 cm), beak length (2.5–5 cm vs. 1.5–4 mm), and in having 3–5 (vs. 5–9) pairs of leaflets.

*Astragalus* section *Dissitiflora* has its center of diversity in the Turkestanian and Armeno-Iranian floristic provinces (Takhtajan 1986) of the Irano-Turanian region. The species of the section are listed below; the list is based on Ghahremani *et al.* (1996), Maassoumi *et al.* (2000), Podlech (1999b, 2001), and Rechinger (1941). An asterisk means that the species is endemic to the region.

1. *A. alamliensis* Rech. f.\*
2. *A. argyroides* Beck
3. *A. aucheri* Boiss.
4. *A. binaludensis* Maassoumi, Ghahremani & Pakravan\*
5. *A. brachylobus* Fischer
6. *A. eburneus* Bornm. & Gauba\*
7. *A. juratzkanus* Freyn & Sint.
8. *A. khadjouicus* Parsa\*
9. *A. melanocalyx* Boiss. & Buhse\*
10. *A. montis-karkasii* Podlech\*
11. *A. moussavii* Maassoumi, F. Ghahremani & Ghahremani\*
12. *A. nitens* Boiss. & Heldr.
13. *A. pravitzii* Podlech\*
14. *A. recurvatus* Podlech\*
15. *A. ruscifolius* Boiss.\*
16. *A. saadatabadensis* Podlech\*
17. *A. sitiens* Bunge\*
18. *A. sumbari* Popov\*
19. *A. tolgorensis* Sirj. & Rech. f. \*
20. *A. viridis* Bunge
21. *A. xiphidium* Bunge
22. *A. zoshkensis* F. Ghahremani

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