

## FOUR NEW *ASTRAGALUS* SPECIES (LEGUMINOSAE) FROM CHINA AND BHUTAN

DIETER PODLECH

Ludwig-Maximilians-University, Department of Biology I, Biodiversitätsforschung,  
Menzinger Str. 67, München, Germany

### Abstract

Four new species of *Astragalus* (Leguminosae) from China and Bhutan are described and illustrated.

During the preparation of a revision of all Old World *Astragalus*-species, four new species could be detected. They are described here. The paper is dedicated to Prof. Dr. S. I. Ali who has contributed considerably to our knowledge of *Astragalus* in Pakistan and neighbouring countries.

#### 1. *Astragalus yidunensis* Podlech (sect. *Cenantrum*). **Sp.nov.** (Fig. 1)

**Holotypus:** China, Prov. Sichuan, Litang - Batang, Jinsha (Yangtse) tributary E of Yidun / Yarwa, below pass to Litang plateau, 30°17' N, 99°30' E, 4400 m, 27.6.1994, B. Dickoré 8496 (MSB; iso: MSB).

**Diagnosis:** Affinis *A. xitaibaicus* (K.T.Fu) Podlech & L.-R.Xu sed differt planta ca. 60 cm (nec 12–22 cm alta, pedunculis ca. 12 cm (nec 4–7.5 cm) longis, vexillo ca. 15 mm longo, lamina late elliptica, ca. 9 mm lata, basi breviter unguiculata (nec ca. 11 mm longo, lamina obovata, 5–6 mm lata, basi longe unguiculata), tubo staminale diadelpho (nec monadelpho).

Plants ca. 50–60 cm tall, in most parts completely glabrous. Stem erect, up to 4 mm thick, angular-striate, hollow. Stipules greenish with very narrowly hyaline margins, ovate, obtuse, 15–20 mm long and up to 8 mm wide, free from the petiole and from each other, at the margins very sparsely ciliate with white hairs ca. 0.2 mm long. Leaves 7–12 cm long, sessile; rachis at the base of the leaflets sometimes with distinctly stalked minute glands. Leaflets in 6–7 pairs, narrowly ovate to narrowly elliptic, 15–25 x 4–10 mm, obtuse to subacute, sometimes minutely mucronulate, glabrous. Peduncle ca. 12 cm long, glabrous. Raceme ca. 18-flowered. Bracts narrowly ovate, acute, ca. 8–10 mm long, at the margins sparsely ciliate with short black hairs. Pedicels 2–3 mm long, loosely black hairy. Calyx shortly tubular, 9–10 mm long, glabrous; teeth narrowly triangular, 2.5–3 mm long, black hairy on inner side. Petals yellow. Standard ca. 15 mm long; blade widely elliptic, ca. 9 mm wide, emarginate, at the base abruptly contracted into the very short claw. Wings ca. 12 mm long; blades narrowly oblong, obtuse, ca. 5 x 2 mm; auricle 1 mm, claw 7 mm. Keel ca. 12 mm long; blades obliquely obovate, with widely curved lower edge and ± straight upper edge, obtuse, ca. 5 x 3 mm; auricle 0.5 mm, claw ca. 7 mm. Stamen-tube diadelphous, obliquely cut at the mouth. Ovary with a style ca. 3 mm long, white hairy. Legumes unknown.

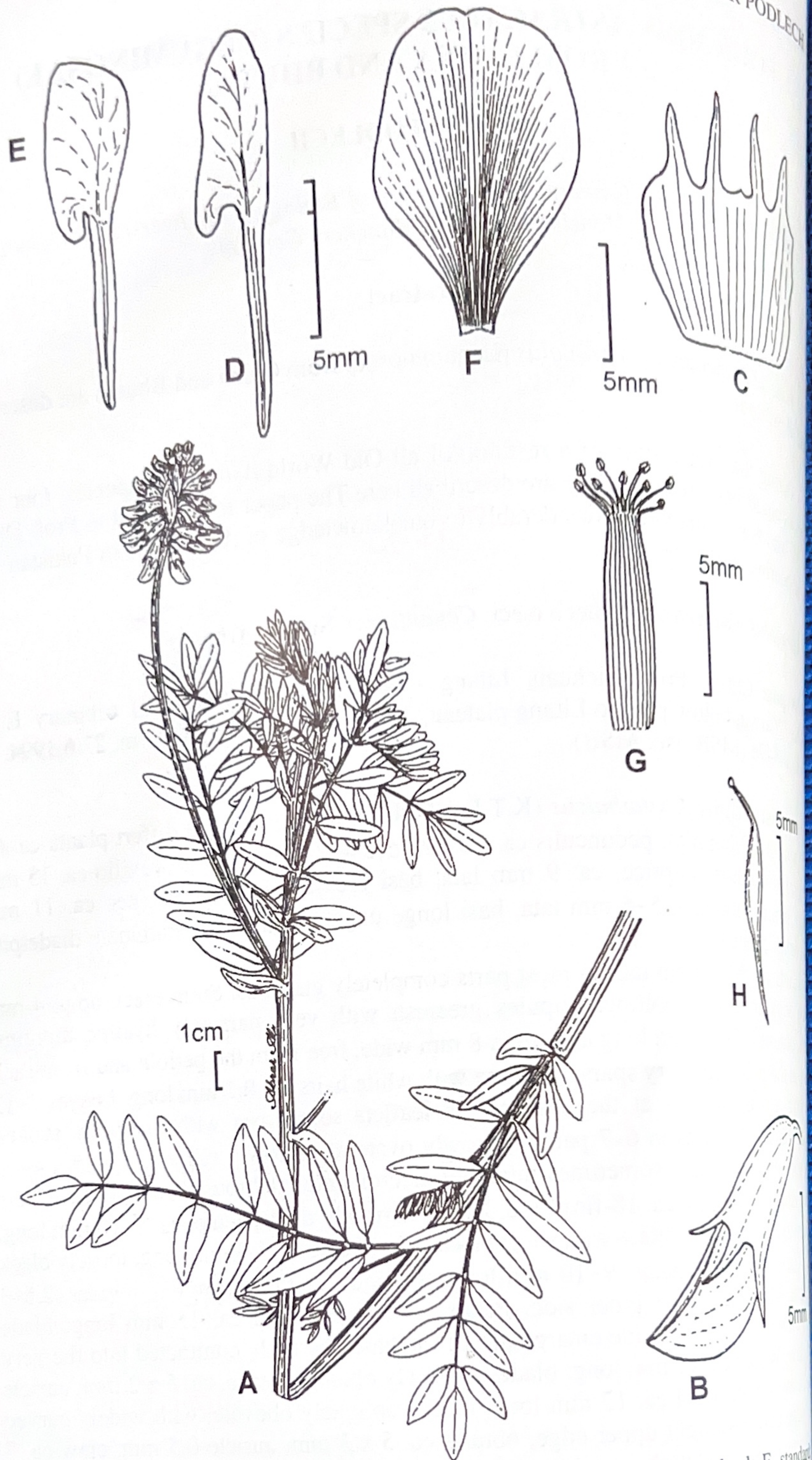


Fig. 1. *Astragalus yidunensis*: A, habit; B, flower; C, calyx; D, wing; E, keel; F, standard; G, androecium; H, Carpel.

**Distribution:** The species is hitherto known from the type only.

**Etymology:** Named after the locality where it was collected.

**2. *Astragalus paroensis* Podlech (Sect. *Chlorostachys*). sp.nov. (Fig. 2)**

**Holotypus:** Bhutan, Upper Mo Chu, Distr. Paro, Chomolhari Base Camp, 27°47' N, 89°20' E, 4200–4350 m, 7.7.2000, G. & S. Miehe 00-170-07 (MSB).

**Diagnosis:** Similis *A. concreto* Benth. sed differt caule densiuscule pilis nigris albisque subappressis ad ascendentes vel partim patentibus, implexis 0,3–1 mm longis (nec pilis 0,1–0,3 mm longis) obtecto, stipulis persistentibus, 4–5 mm longis (nec mox deciduis, 7–20 mm longis), bracteis persistentibus, angustissime triangularibus, ca. 4 mm longis (nec deciduis, anguste triangularibus, 4–10(–17) mm longis), bracteolis nullis (nec evolutis, 1–4 mm longis), ovario dense piloso (nec glabro).

Plants at least 35 cm tall (basal parts missing). Stem ca. 2.5 mm in diameter, erect, straight, branched with non-flowering side-branches, loosely to rather densely covered with subappressed to ascending or partly spreading white and black hairs 0.3–1 mm long. Stipules greenish to whitish, persistent, 4–5 mm long, narrowly triangular-to triangular, free from the petiole and from each other, white and black hairy, especially at the margins. Leaves 5–7 cm long, in side-branches shorter, all sessile; rachis distinctly grooved adaxially, rather densely hairy like the stem, but sometimes with predominantly black hairs. Leaflets in 8–15 pairs, in older leaves elliptic to narrowly elliptic, 7–12 x 3–4.5 mm, in upper leaves narrower, ca. 9–13 x 2–2.5 mm, obtuse to slightly retuse, on upper side glabrous or sparsely to loosely hairy, on underside covered rather densely covered with subappressed to slightly ascending white hairs 0.5–0.7 mm long. Peduncles several in one stem, 6–11 cm long, sulcate, predominantly blackish hairy like the stem. Racemes 3–3.5 cm long, densely 15–20-flowered. Bracts whitish, persistent, very narrowly triangular, ca. 4 mm long, predominantly black hairy. Pedicels 2 mm long, densely black hairy. Bracteoles absent. Calyx campanulate, 6–7 mm long, obliquely cut at the mouth, densely covered with appressed, blackish hairs 0.3–0.5 mm long with slightly ascending white hairs up to 1 mm long mixed in; teeth narrowly triangular, slightly unequal, 1–2 mm long, black hairy on inner side. Petals yellow. Standard ca. 13 mm long; blade obovate, 5–7 mm wide, slightly emarginate, subabruptly contracted into the short claw. Wings ca. 12 mm long; blades narrowly oblong, obtuse, ca. 7 x 2 mm; auricle ca. 1.2 mm, claw 5–6 mm. Keel ca. 12 mm long; blades obliquely triangular, with widely curved lower edge and  $\pm$  straight to slightly concave upper edge, obtuse, ca. 7 x 2.5–3 mm; auricle 1–1.5 mm, claw 5–6 mm. Stamen-tube obliquely cut at the mouth. Ovary with a stipe 3–5 mm long, densely covered with ascending white and black hairy; stigma glabrous. Legumes unknown.

**Distribution:** Bhutan, known only from the type.

**Etymology:** The species epithet recognizes the district of Bhutan where it was found.

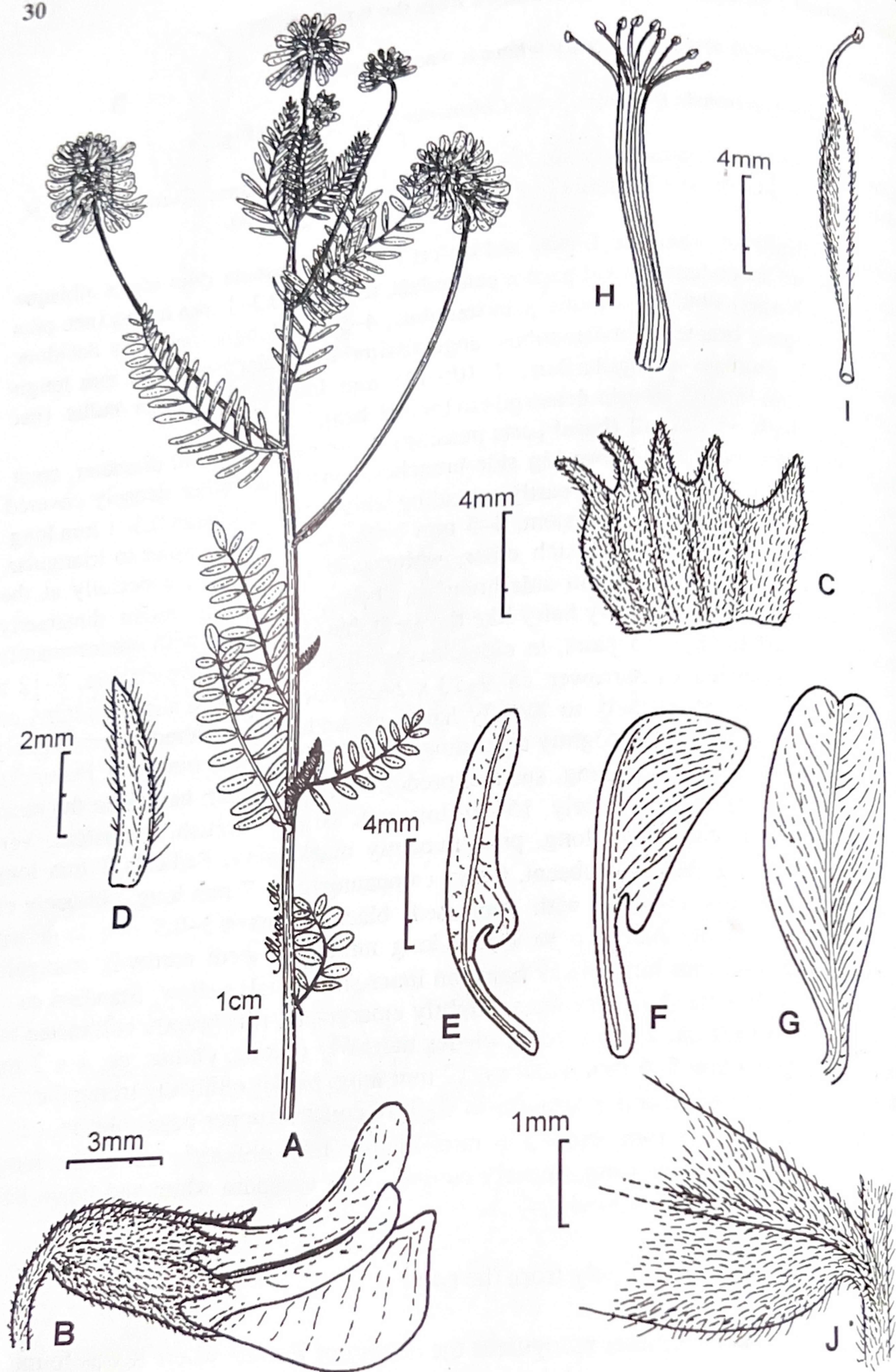


Fig. 2. *Astroagalus paronsis*: A, habit; B, flower; C, calyx; D, bract; E, wing; F, keel; G, standard; H, androecium; I, carpel; J, a portion of leaf.

3. *A. kongurensis* Podlech (Section *Oroboidei*). Sp.nov. (Fig. 3)

**Holotypus:** China, Prov. Xinjiang, West Kuen-Lun, Kongur, Oitagh N, 3000 m, 4.7.1996, M. Richter U20 (MSB!).

**Diagnosis:** Differt ab *A. dabanshanicus* Y.H.Wu partibus vegetativis glabris (nec sparse pilosis), stipulis 5–6 mm (nec 2–3 mm), foliolis saepissime late ovatis, 5–10 x 4–7 mm, subtus appresse pilosis (nec anguste ellipticis, 5–18 x 3–6 mm, omnino glabris), pedunculis parte sub racemo excepto glabris (nec nigro-pilosis) calyce 3–3,5 mm (nec 2,5–3 mm), petalis flavidis (nec purpureis), vexillo c. 6 x 6 mm, orbiculari (nec 6,5–7 x 4 mm, elliptico).

Plants 20–30 cm tall, in vegetative parts glabrous. Stems erect or ascending, 12–22 cm. Stipules ovate, 5–6 mm, free from the petiole and from each other, glabrous or rarely shortly white ciliate at margins and tip. Leaves 5–7 cm; petiole of lower leaves 2–4 cm, very slender, upper leaves subsessile. Leaflets in 5–6 pairs, elliptic to widely ovate, 5–15 x 4–7 mm, obtuse to rounded. Peduncles 5–10 cm, glabrous, only toward the raceme sparsely covered with subappressed white and black hairs 0.2–0.3 mm. Racemes short, ovoid, densely many-flowered. Bracts whitish-membranous, 2–3 x 0.5 mm, sparsely white and black ciliate, at the base sometimes with minute sessile glands. Pedicels c. 0.5 mm, black hairy. Calyx campanulate, 3–3.5 mm, rather densely covered with appressed black hairs 0.2–0.3 mm, with some white hairs mixed in; teeth subulate, c. 1 mm, densely black hairs on inner side. Standard 6 x 6 mm, orbicular, widely and deeply emarginate, without distinct claw. Wings c. 5 mm; blades narrowly obovate, rounded, c. 4 x 2 mm; auricle minute, claw c. 1 mm. Keel c. 4 mm; blades c. 3 x 1.5 mm. Stamen-tube truncate at the mouth. Ovary glabrous. Legumes unknown.

**Distribution:** W. China, known only from the type.

**Etymology:** The species epithet recognizes the district of the most western Kuen-Lun range where it was found.

4. *A. subansiriensis* Podlech (Section *Poliothrix*). sp.nov. (Fig. 4)

**Holotypus:** China, Xizang, Upper Subansiri, Lhünze to Qayü, 15 km NNW of Qayü, 28°23' N, 92°42' E, 3800 m, 31.7.1994, B. Dickoré 10268 (MSB; iso: MSB).

**Diagnosis:** Differt ab *A. tibeticola* Podlech & L.R.Xu, stipulis 4–5 mm (nec 6–9 mm), foliis 3–4 cm, inferioribus petiolo c. 2 cm longo suffultis, superioribus sessilibus vel subsessilibus (nec 6–12 cm, omnibus petiolo 1–3 cm longo suffultis), foliolis 5–8 x 2–3,5 mm, subtus densiuscule pilis 0,3–0,5 mm obtectis (nec 7–17 x 3–6 mm, subtus sparse ad laxe et imprimis in nervo mediano pilis 0,5–1 mm obtectis), pedunculis 1–3 cm (nec 5–6 cm), calyce 3 mm, pilis nigris tantum obtecto, dentibus 1–1,5 mm (nec 4–5 mm, pilis nigris albisque obtecto, dentibus 1,5–2,5 mm).

Plants 10–15 cm tall. Rootstock with a pluricipital root-crown. Stems several, erect to ascending, 5–10 cm, striate-sulcate, rather densely to densely covered with appressed to subappressed white hairs 0.2–0.5 mm, at the nodes with few black hairs mixed in. Stipules green, 4–5 mm, triangular-ovate, free from the petiole, behind the stem high up

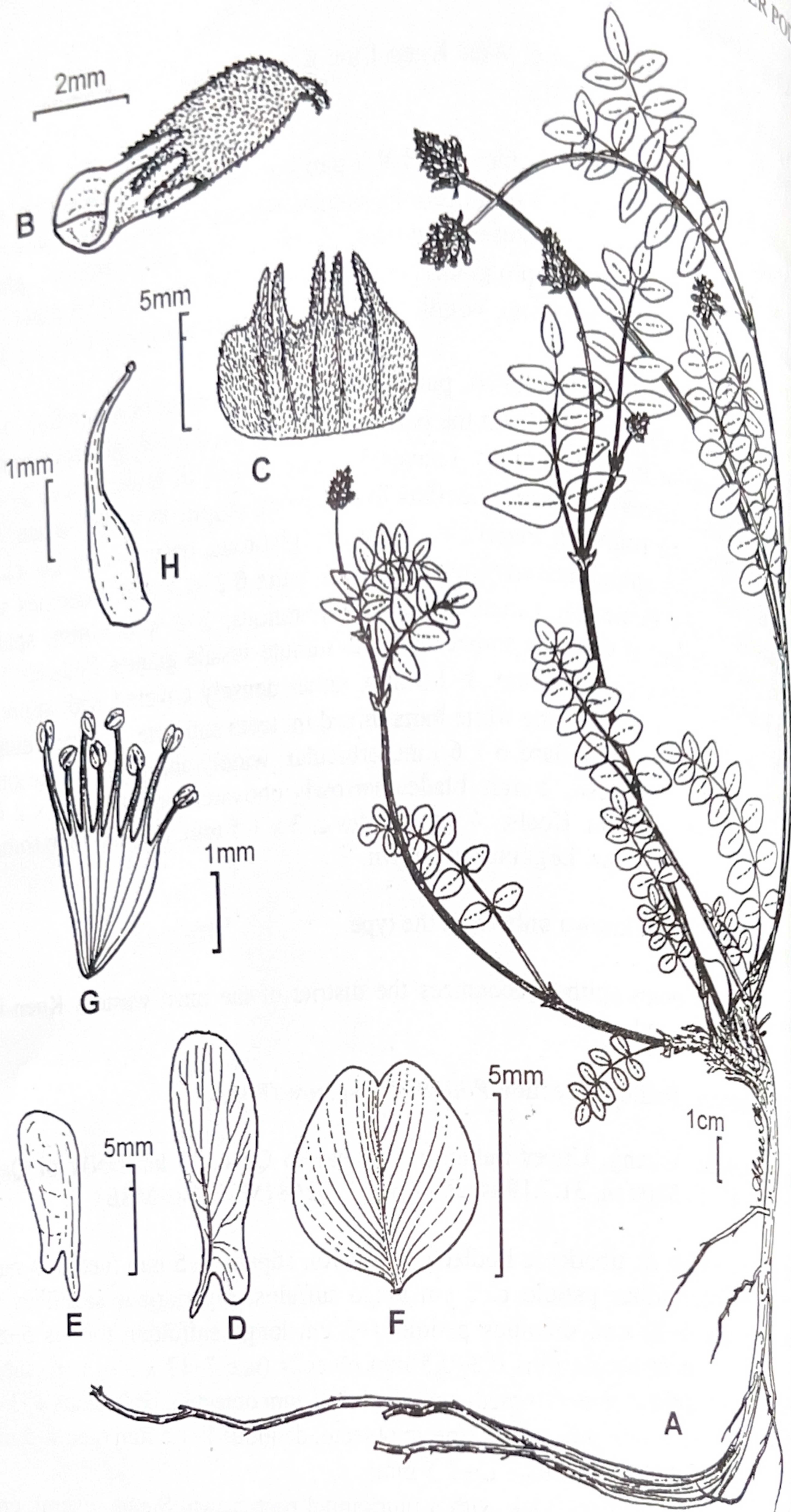


Fig. 3. *Astragalus kongurensis*: A, habit; B, flower; C, calyx; D, wing; E, Keel; F, standard androecium; H, carpel.

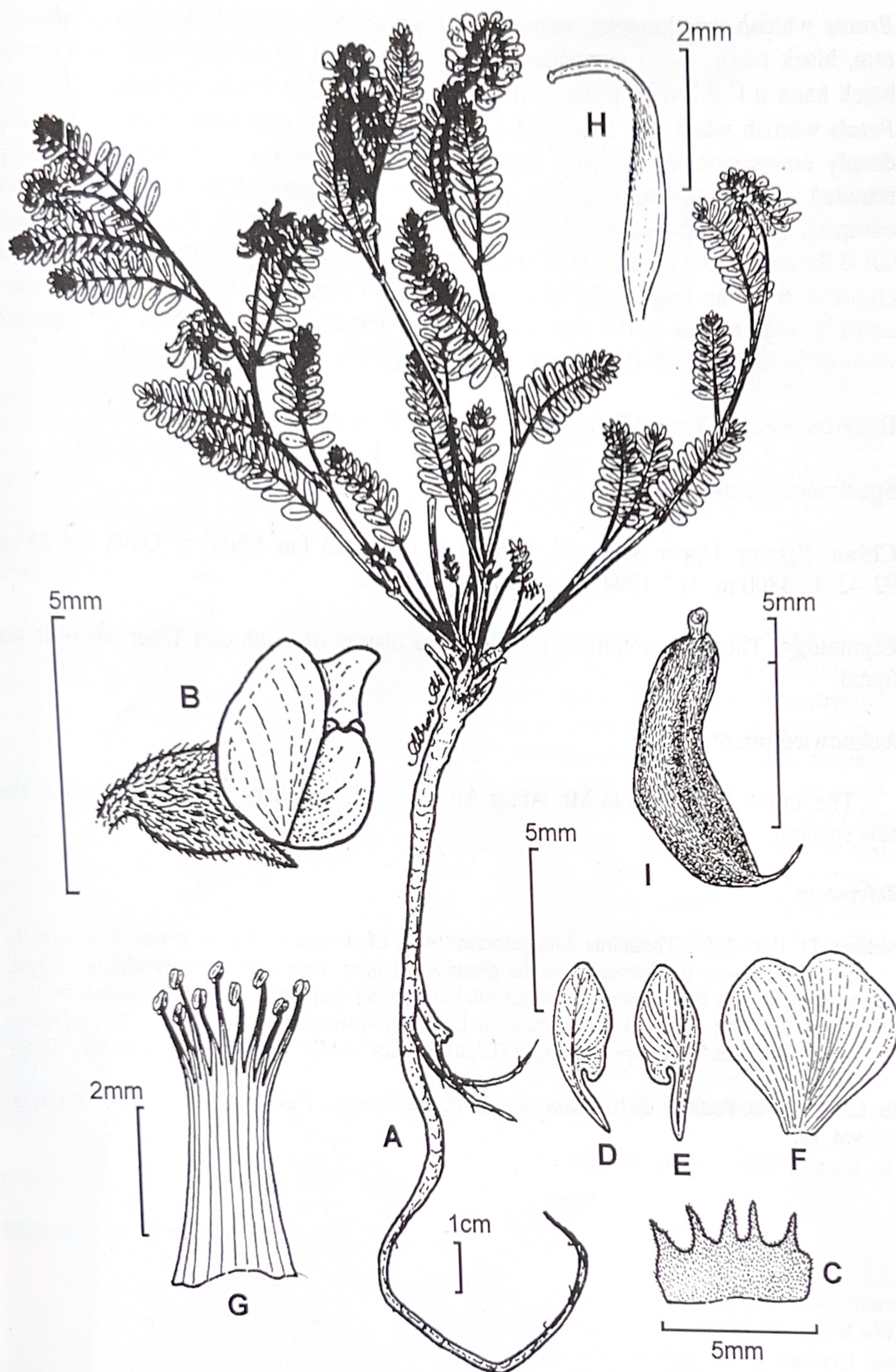


Fig. 4. *Astragalus subansiriensis*: A, habit; B, flower; C, calyx; D, wing; E, keel; F, standard; G, androecium; H, carpel; I, fruit.

*Bracts* whitish-membranous, narrowly triangular, 1–2 mm, black hairy. *Pedicels* c. 1 mm, black hairy. *Calyx* campanulate, c. 3 mm, rather densely covered with appressed black hairs 0.1–0.2 mm; teeth narrowly triangular, 1.2–1.5 mm. subulate, 1.5–2.5 mm. *Petals* whitish when dry. *Standard* 6 mm; blade 5–5.5 mm wide, transversely elliptic, deeply emarginate, at the base cuneately narrowed. *Wings* c. 5 mm; blades elliptic, rounded, c. 2.5 x 1.8 mm; auricle wide, c. 0.3 mm, claw 2 mm. *Keel* 4.5 mm; blades obliquely elliptic, obtuse, 3 x 2 mm; auricle minute, claw 2 mm. *Stamen-tube* obliquely cut at the mouth. *Ovary* subsessile, white hairy; style glabrous. *Legumes* sessile, obliquely ellipsoid, 6–7 mm long, 2–2.5 mm high and 2.5–3 mm wide, keeled ventrally, grooved dorsally, with a beak c. 0.5 mm; valves rather densely loosely covered with appressed white or black hairs 0.4–0.5 mm, becoming completely black hairy with age.

**Distribution:** S. China (SE. Tibet), known only from the type.

### Specimens examined

**China.** Xizang: Upper Subansiri, Lhünze to Qayü, 15 km NNW of Qayü, 28°23' N, 92°42' E, 3800 m, 31.7.1994, *Dickoré* 10268 (MSB).

**Etymology:** The species epithet recognizes the district of south-east Tibet where it was found.

### Acknowledgment

The author is grateful to Mr. Abrar Ali (Karachi) who drew the illustrations of the new species.

### References

- Podlech, D. 1999-2008: Thesaurus Astragalorum: Index of all taxa within the genus *Astragalus* L. and other genera but belonging to the genus *Astragalus*. Taxa of the Old World and related taxa of the New World. <http://www.botanik.biologie.uni-muenchen.de/botsyst/theslit.html>.
- Wenninger, J. 1991: Revision von *Astragalus* L. sect. *Chlorostachys* Bunge, sect. *Phyllobium* Bunge und sect. *Skythopos* Simpson (Leguminosae). – Mitt. Bot. Staatss. München 30: 1–196.
- Xu, L.- R. and D. Podlech. 2010. *Astragalus* L. (Leguminosae - Papilionoideae). – in Fl. of China vol. 10.