

# A synopsis of the Middle-eastern and Asian species of *Argyrolobium* (Genisteae–Fabaceae)

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## Abstract

The taxonomy of the previously understudied Middle-eastern and Asian species of *Argyrolobium* is reviewed. A total of 11 species (including two species which also occur in tropical Africa), four subspecies and five varieties are recorded from the region. All taxa, except for two poorly known local endemics, are described and the correct nomenclature, literature citation, typification, synonymy, as well as geographical distribution are given. A key to the taxa is also provided.

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**Keywords:** *Argyrolobium*; Asia; Middle East; Nomenclature

## 1. Introduction

*Argyrolobium* Eckl. & Zeyh. is a widely distributed legume genus with its centre of diversity in South Africa, extending to tropical Africa, Madagascar, the Mediterranean region and southern Europe, and eastwards to the Indian subcontinent (Polhill, 1968). As a result, taxonomic work on the genus has mainly been at regional level. The taxonomy and nomenclature of the southern African species was resolved by Edwards (2005) and the tropical African species were comprehensively dealt with by Polhill (1968). The Indian and West Pakistani species were revised by Chaudhary (1997) and Ali (1966) respectively. The Madagascan species were dealt with by Du Puy and Labat (2002). No similar studies are available for the *Argyrolobium* species from the Middle-east, Asia, western Europe and North Africa. This paper presents the taxonomic conclusions derived from studies of the Middle-eastern and Asian taxa. A total of 11 species, four subspecies and four varieties are recognised from the region. Two of these species also occur in tropical Africa.

All taxa, except for two poorly known local endemics, are described and the correct nomenclature, literature citation, typification, synonymy, as well as geographical distribution are

presented. Keys to the species and infraspecific taxa are also provided.

*Argyrolobium* Eckl. & Zeyh., Enum. (part 2): 184 (1836) (conserved name); Boiss., Fl. Orient. 2: 63 (1872); Baker in Hook. f., Fl. Br. Ind. 2: 63 (1876); Ali in S.U. Sci. Res. J. 2: 1 (1966); D.F.Chamb. in Fl. Turkey and East Aegean Islands: 37 (1969).

*Calispepla* Vved. in Not. Sys. Herb. Inst. Acad. Sci. Uzbekistan 13: 19 (1952), *synon. nov.*

Key to the Middle-eastern and Asian species of *Argyrolobium*

1. Plants with older branches thorny; leaves exstipulate	<i>A. aegacanthoides</i>
Plants with older branches not thorny; leaves stipulate	2
2. Leaflets obovate to broadly obovate	3
Leaflets elliptic, oblong or lanceolate	4
3. Leaflets 5–15 mm long, petioles up to 20 mm long; pods 3–9-seeded	<i>A. roseum</i>
Leaflets 3–4 mm long, petioles 2–5 mm long; pods 2-seeded	<i>A. pulvinatum</i>
4. Leaflets conduplicate, narrow ( $\pm 2$ mm wide)	10
Leaflets flat, broad (up to 13 mm wide)	5
5. Flowers 5 or more per raceme	6
Flowers solitary and leaf-opposed or 1–4 in terminal racemes	8
6. Peduncles up to 15 mm long or lacking	<i>A. confertum</i>
Peduncles more than 20 mm long	7

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7. Petioles 2–6 mm long	<i>A. flaccidum</i>
Petioles more than 6 mm long	<i>A. biebersteinii</i>
8. Staminal sheath open on upper side	<i>A. stenophyllum</i>
Staminal sheath closed on upper side	9
9. Stipules minute, deciduous	<i>A. arabicum</i>
Stipules ovate-lanceolate, 4–9 mm long, persistent	<i>A. rupestre</i>
10. Petioles 3–5 mm long; pods 2–3-seeded	<i>A. crotalarioides</i>
Petioles 2–9 mm long; pods 5–7-seeded	<i>A. barikotense</i>

### Enumeration of the species

**1. *Argyrolobium rupestre*** (E.Mey.) Walp. in Linnaea 13: 508 (1839); Benth. in Hook., Lond. J. Bot. 3: 345 (1844); Harv. in Harv. & Sond., Fl. Cap. 2: 73 (1962); Baker f., Leg. Trop. Afr. 1: 73 (1926); T.J. Edwards in S. Afr. J. Bot. 71: 404 (2005). *Chasmone rupestris* E.Mey., Comm.: 74 (1836). Type: South Africa [Eastern Cape], Stormberg, Drège s.n. (K!, lecto., designated by Edwards (2005); BM, K, isolecto.).

*Argyrolobium tysonii* Harms in Ber. Deutsch. Bot. Ges. 35: 181 (1917); T.J. Edwards in S. Afr. J. Bot. 71: 404 (2005). Type: South Africa [KwaZulu-Natal], Kokstad, Tyson 455 (BOL!, holo.; G, K, SAM!, UPS, W, iso.).

*Argyrolobium rogersii* N.E.Br. in Burtt Davy, A Manual of flowering plants and ferns of Transvaal with Swaziland: 394 (1926); T.J. Edwards in S. Afr. J. Bot. 71: 404 (2005). Type: South Africa [Limpopo], Pietersburg, Rogers 22061 (K!, lecto., designated by Edwards (2005); PRE!, isolecto.).

*Argyrolobium rhodesicum* Baker f., Leg. Trop. Afr.: 64 (1926). Type: Zimbabwe, Umtali, F.A. Rogers 4029 (K!, holo.; BM, iso.).

Low perennial with numerous prostrate to ascending pilose stems. *Leaflets* obovate-oblong, 10–34 × 5–14 mm, sparsely pilose to silky tomentose at least beneath, petiole 4–20 mm long, stipules ovate-lanceolate. *Inflorescences* in terminal, 1–4-flowered racemes, 10–60 (–90) mm long; bracts linear to lanceolate 3–6 × 1–2 mm; bracteoles linear, 2–4 × 0.5–1.0 mm. *Calyx* silky pubescent, upper lip slightly shorter than lower, upper lip 7–8 mm long, lower lip 8–9 mm long. *Corolla* bright yellow, 9–13 mm long; standard suborbicular, silky pubescent above, 10–12 × 8–10 mm, with well-developed, channelled claw 1–2 mm long; wings oblong, sculptured, 7–8 × 3–4 mm, with a linear claw ± 2 mm long; keel slightly shorter than wings, 6–7 × 3–4 mm, with linear claw ± 2 mm long. *Gynoecium* narrowly oblong, 5–7 × ± 1 mm. *Fruits* 18–30 (–45) × 3.5–5.0 mm, sparsely pilose to densely pubescent, 8–14-seeded (Fig. 1).

Key to subspecies of *A. rupestre* (adapted from Polhill, 1968)

Indumentum neither entirely obscuring surface of calyx nor standard outside, and standard subglabrous towards margins and lower half:

Stems straggling or weakly ascending, mostly up to 2–3 dm long, closely and ± densely appressed-pubescent; petioles mostly 8–17 mm long .....subsp. *remotum*  
 Stems mostly shorter and prostrate, indumentum spreading or sparsely subappressedly pilose; petioles 4–6 (–8) mm long .....subsp. *aberdaricum*

Indumentum very dense and obscuring surface of calyx or if sometimes scarcely so then standard at least extensively tomentose outside:

Stems shortly ascending; calyx sericeous-tomentose .....  
 .....subsp. *kilimandscharicum*  
 Stems long, procumbent or weakly ascending; calyx with spreading hairs .....subsp. *rupestre*

### *Argyrolobium rupestre* subsp. *remotum*

(Hochst. ex A.Rich.) Polhill in Kew Bull. 22: 159 (1968). *Argyrolobium remotum* Hochst. ex A.Rich., Tent. Fl. Abyss. 1: 162 (1847); Baker in Fl. Trop. Afr. 2: 45 (1871). Type: Ethiopia, Begemedir, Simen [Simien], Mt. Aber bar Djenausa, Schimper 1324 (P!, holo.; BM, iso.).

*Argyrolobium virgatum* Baker in Fl. Trop. Afr. 2: 46 (1871); Schweinf. in Bull. Herb. Boiss. 4, App. 2: 228 (1896); Chiov. in Pirota, Ann. Inst. Bot. Roma 8: 401 (1907); Baker f., Leg. Trop. Afr. 1: 63 (1926); Cufod. in Bull. Jard. Bot. Brux. 25, Suppl.: 243 (1955), non *Genista virgata* Willd. Type: Ethiopia, Tigre, Schimper 570 (K!, holo.; BM, iso.).

*Genista anabaptizata* Briq., Etudes Cytises Alpes Marit.: 121 (1894), *nom. nud.*

*Leaflets* obovate-oblong, 13–25 × (6–) 10–14 mm, petiole (3–) 8–17 mm long, stipules ovate-lanceolate, 6–8 × 2–3 mm. *Inflorescences* head-like racemes, 1–4-flowered, 20–22 (–58) mm long. *Flowers* 8–10 mm long. *Fruit* compressed, 25–35 × 3–5 mm, pubescent.

*Distribution and habitat*: Northern Somalia, Yemen, Eritrea, Ethiopia (Fig. 2). Frequent in short grassland and amongst rocks at altitudes of 1900 to 3000 m.

*Diagnostic characters*: The leaflets are pilose, with the margins fringed with long brown hairs. The petioles are much longer than those of subspp. *aberdaricum* and *kilimandscharicum*.

### Specimens examined

**Yemen.** Ibb District: ca. 1.5 air miles W of Ibb, near Ibb Secondary Agricultural Institute farm, R. Spellenberg 7399 (K); ca. 35 km N of Taiz around Dhisufal, F.N. Hepper & J.R.I. Wood 5904 (K); J. Shibam, above Menacha, A.G. Miller 355 (K).

**Ethiopia.** Aruss Province: Chilalo Awraja, 3 km S of Asella at livestock farm, Mats Thulin 1393 (K).

**Somalia.** Wogr near Sheikh, J.R. I. Wood S/73/111 (K).

**2. *Argyrolobium confertum*** Polhill in Kew Bull. 22: 45 (1968); Hedberg & Edwards, Fl. Ethiop. 3: 222 (1989). Type: Somali Republic, Northern Province, 35 km NW of Borama, Dunkasia, Bally 9982 (K!, holo.).

*Argyrolobium uniflorum sensu* Schweinf. in Bull. Herb. Boiss. 4, App. 2: 228 (1896); Cufod., Enum. Pl. Aeth. Spermat. in Bull. Jard. Bot. Brux. 25, supp.: 243 (1955), non *A. uniflorum* (Decne) Jaub. & Spach.

*Argyrolobium petitianum sensu* Chiov. in Pirota, Ann. Inst. Bot., Roma 8: 83 (1903); Baker f., Leg. Trop. Afr. 1: 63 (1926), non *A. petitianum* A.Rich.

*Argyrolobium ramosissimum sensu* Chiov. in Pirota, Ann. Inst. Bot., Roma 8: 407 (1907), non *A. ramosissimum* Baker.

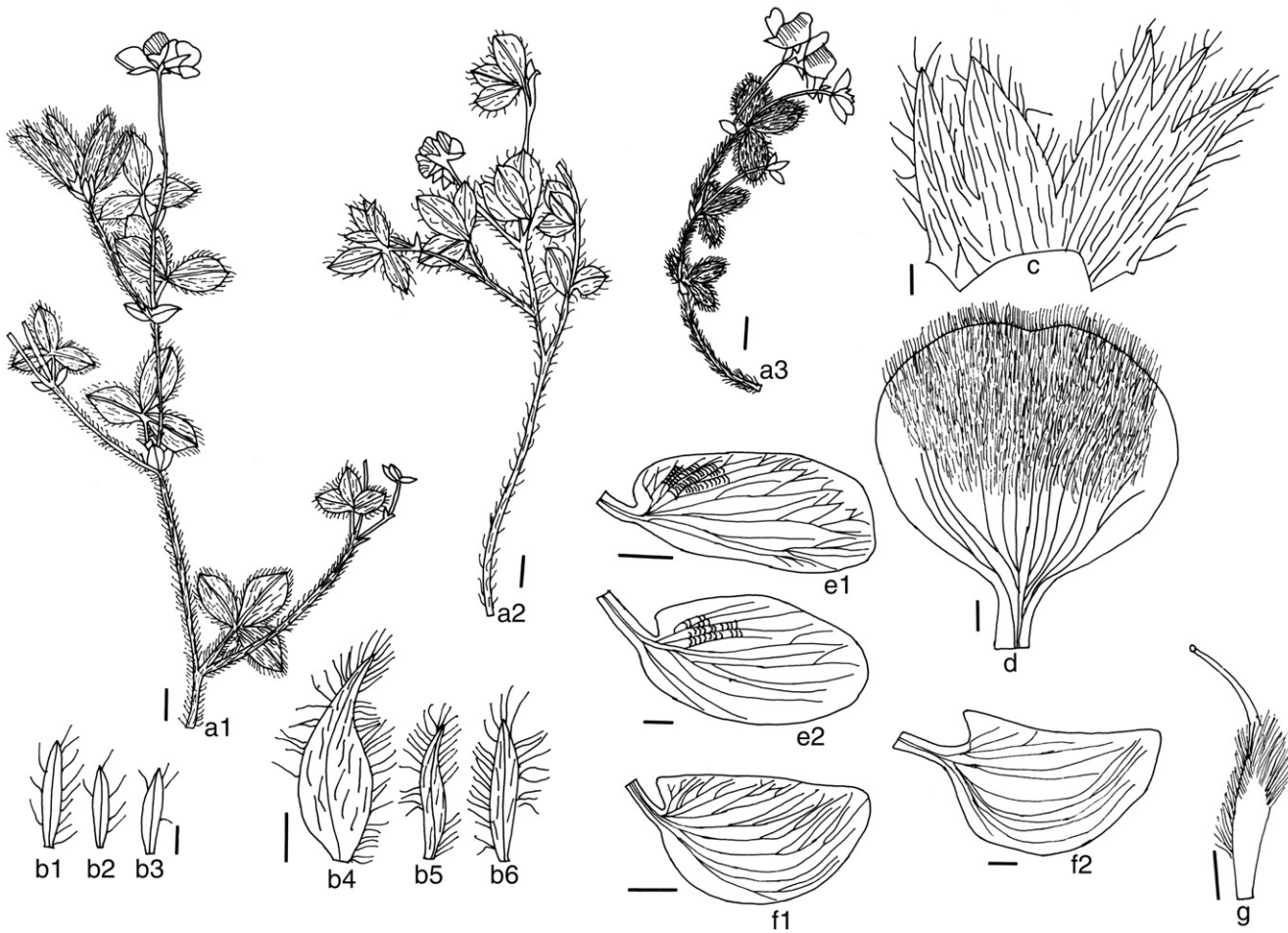


Fig. 1. Vegetative and floral morphology of *A. rupestre*: a, flowering branches (a1, ssp. *aberdaricum*; a2, ssp. *rupestre*; a3, ssp. *kilimandscharicum*); b1 and b4, abaxial view of bract (b1, ssp. *kilimandscharicum*; b4, ssp. *aberdaricum*); b2, b3, b5 and b6, abaxial view of bracteoles (b2 and b3, ssp. *kilimandscharicum*; b5 and b6, ssp. *aberdaricum*); c, calyx opened out with upper lobes to left (ssp. *kilimandscharicum*); d, standard (ssp. *kilimandscharicum*); e, wing petal (e1, ssp. *aberdaricum*; e2, ssp. *kilimandscharicum*); f, keel petal (f1, ssp. *aberdaricum*; f2, ssp. *kilimandscharicum*); g1, long, basifixed anther; g2, short, dorsifixed anther; h, pistil (all ssp. *aberdaricum*). [a1, b4–b6, e1, f, g and h from Mats Thulin 1462 (K); a2 from Mats Thulin 1393 (K); a3, b1–b3, c, d and e2 from *A. Bogdam* 3535 (K). Scale bars: a = 10 mm b–h = 1 mm.

Dwarf perennial herb with numerous procumbent or ascending stems up to 0.35 m long. *Leaflets* elliptic-obovate to obovate, (3–) 4–14 × 2–6 mm, petiole 1–4 mm long, stipules subulate, 1.0–1.5 × ±0.5 mm. *Inflorescences* solitary-flowered, leaf-opposed, with 1–4 flowers on a rachis 8–12 mm long; bracts linear, 1.0–2.5 × 0.3–0.6 mm; bracteoles linear-lanceolate, 1–2 × 0.3–0.6 mm. *Calyx* with upper lip 5–8 mm long, upper sinus 2–3 mm deep; lateral sinus 4–5 mm deep; lower lip 5–8 mm long, lower sinuses 0.5–1.5 mm deep. *Corolla* yellow, 5–7 mm long; standard elliptic to suborbicular, 6–8 × 3–6 mm, with well-developed, channelled claw 1–2 mm long; wings oblong, sculptured, oblong-elliptic, 5–7 × 2.0–3.5 mm, with linear claw 1.0–1.5 mm long; keel slightly longer than wings, 6.0–7.5 × 2–3 mm, apex obtuse, with linear claw 1.0–1.5 mm long. *Gynoecium* narrowly oblong, 5–8-ovuled, 2.5–3.5 × 0.5–0.7 mm. *Fruit* oblong, 15–25 × 3–4 mm, densely sericeous-pilose, 5–8-seeded (Fig. 3).

*Distribution and habitat*: Eritrea, Ethiopia, northern Somalia, Yemen and Saudi Arabia (Fig. 4). *Argyrolobium confertum* grows in heavily grazed grasslands and bare soil in cliffs or

rocky slopes and outcrops on red soil or on clay over trachyte and limestone hills at altitudes of 2400–3000 m.

*Diagnostic characters*: This dwarf perennial herb forms mats of up to 35 cm wide with tiny, pointed, silvery leaves of equal length. *Argyrolobium confertum* superficially resembles the Mediterranean *A. uniflorum* (Decne.) Jaub. & Spach, but in the latter the pod is narrower relative to its length, with the valves much more markedly constricted between the seeds.

#### Specimens examined

**Saudi Arabia.** Abha: Falcon center, 20 km NW of Abha, *J.S. Collett* 6268 (K).

**Yemen.** Shibam: ca. 40 km NE of Sanaa, *F.N. Hepper* 5800 (K). Al Andhar: Andhali escarpment, *J. Lavranos & A.R. Smith* 871 (K).

**Ethiopia.** Arussi Province: Chilalo Awraja, ca. 5 km N of Asella at Kulumsa farm, *Mats Thulin* 1509 (K). Shoa Province: ca. 15 km S of Mojo, *Mats Thulin* 1463 (K). Tigre Province: near Quaram, *H.F. Mooney* (K). Hararge; near Carsa, *S.A. Robertson* 1303 (K).

**Locality unknown:** *G. de Witte* 197 (P).



Fig. 2. Approximate geographical distribution of *A. rupestre*.

**3. *Argyrolobium arabicum*** (Decne.) Jaub. & Spach in Ann. Sci. Nat., ser. 2, 19: 46 (1843) and in Illustr. Pl. Orient. 1: 115 (1843); Schweinf. in Bull. Herb. Boiss. 4, App. 2: 228 (1896); Blatt. in Fl. Arab. 8 (2): 127 (1921); O.Schwartz in Fl. Trop. Arab.: 98 (1939); Polhill in Kew Bull. 22: 167–168 (1968); Parsa in Fl. de l’Iran (1948); Hedberg & Edwards, Fl. Ethiop. 3: 222 (1989). *Cytisus arabicus* Decne. in Ann. Sci. Nat. Ser. 2, 4: 78 (1835). Type:

Saudi Arabia, “in insulâ Neyman (oris Arabiae felicis finitimâ)”, Bové s.n. (K!, iso., 3 sheets).

*Argyrolobium abyssinicum* Jaub. & Spach in Ann. Sci. Nat., ser. 2, 19: 46 (1843) and in Illustr. Pl. Orient. 1: 115 (1843); A. Rich., Tent. Fl. Abyss. 1: 162 (1847); Baker in Fl. Trop. Afr. 2: 45 (1871); Chiov. in Pirota, Ann. Inst. Bot., Roma 8: 83 (1903); Baker f., Leg. Trop. Afr.: 62 (1926); F.W.Andr., Fl. Pl. A.-E.

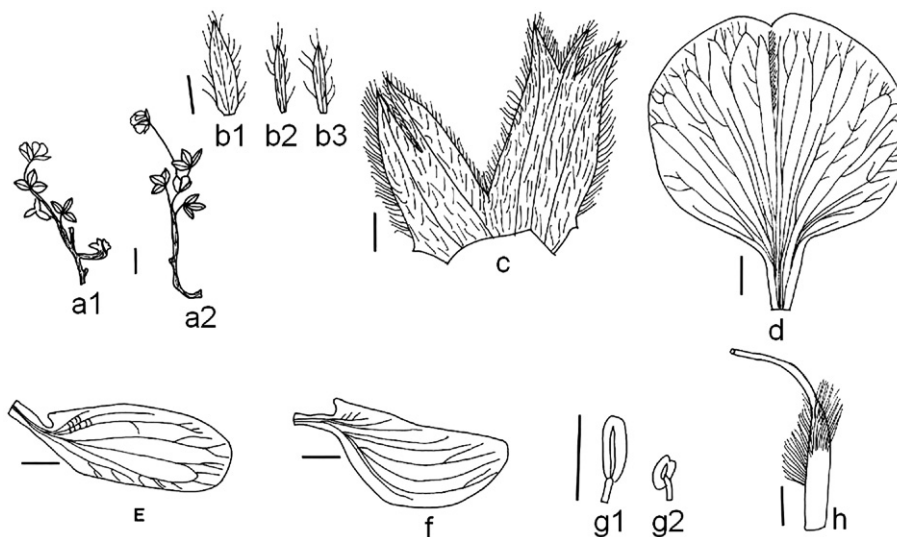


Fig. 3. Vegetative and floral morphology of *A. confertum*: a1 and a2, flowering branches; b1, abaxial view of bract; b2 and b3, abaxial view of bracteoles; c, calyx opened out with upper lobes to left; d, standard; e, wing petal; f, keel petal; g1, long, basifixed anther; g2, short, dorsifixed anther; h, pistil. [a–f from Mats Thulin 1509 (K); g and h from Hepper 5800 (K)]. Scale bars: a = 10 mm, b–h = 1 mm.

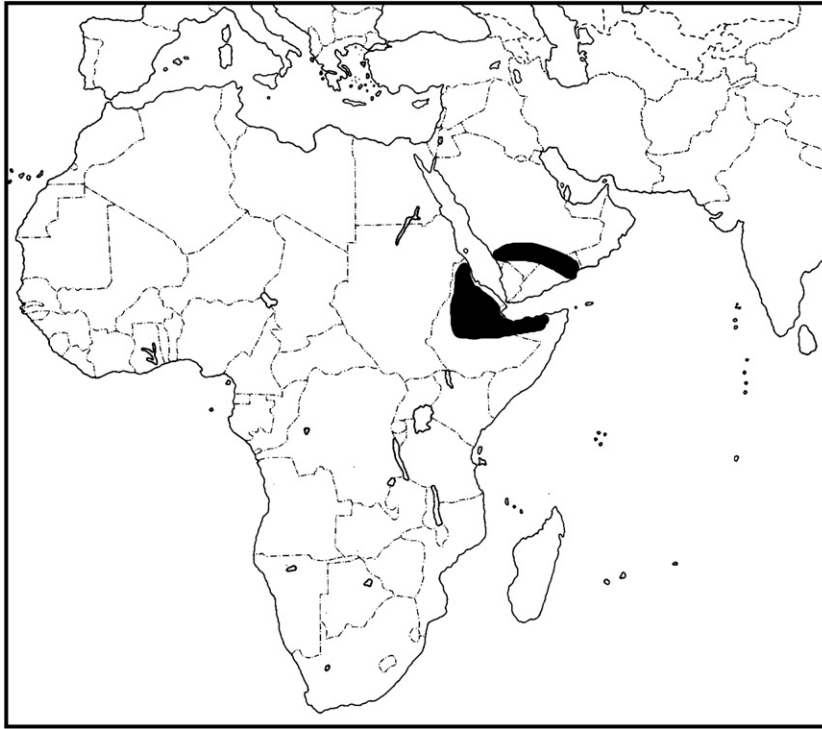


Fig. 4. Approximate geographical distribution of *A. confertum*.

Sudan 2: 175 (1952); O.Schwartz in Fl. Trop. Arab.: 97 (1939); Cufod. in Bull. Jard. Bot. Brux. 25, Suppl.: 243 (1955). Type: Ethiopia, Tigre, near Adua, *Quartin-Dillon s.n.* (P!, holo.).

*Argyrobium bottae* Jaub. & Spach in Ann. Sci. Nat. ser.2, 19:47 (1843) and in Illustr. Pl. Orient.: 115 (1843) Type: Saudi Arabia, near Djedda, *M. Botta s.n.* (P!, holo.).

*Argyrobium modestum* Hochst. in Flora 27, 1: 100 (1844). Type: Abyssinia [Ethiopia], without precise locality or date, *Schimper 1326* (P!, holo.).

*Genista abyssinica* Briq., Etud. Cyt. Alpes Marit.: 120 (1894), *superfluous name*. Type as above.

*Argyrobium abyssinicum* forma *caespitosum* Lanza in Fedde Repert. 9: 413 (1909) and in Boll., R. Ort. Bot. Palermo 8: 24 (1910). *Argyrobium abyssinicum* var. *caespitosum* (Lanza) Fiori in Nuov. Giorn. Bot. Ital., n.s., 19: 451 (1912). Types: Eritrea, Amasen, Adi-Nefas, *Senni 164* (syn.), and Asmara, *Senni 165* (PAL, syn.).

*Argyrobium abyssinicum* forma *diffusum* Lanza in Fedde Repert. 9: 413 (1909) and in Boll., R. Ort. Bot. Palermo 8: 24 (1910). *Argyrobium abyssinicum* Jaub. & Spach var. *diffusum* (Lanza) Fiori in Nuov. Giorn. Bot. Ital., n.s., 19: 451 (1912). Type: Eritrea, Bogos, Cheren–Ela–Bared, *Senni 166* (PAL, holo.).

*Genista arabica* Briq., Etud. Cyt. Alpes Marit.: 120 (1894), *nom. nud.*

Annual or short-lived perennial up to 0.5 m high. *Leaflets* linear-lanceolate to elliptic, 15–20 (–25) × (2–) 6–9 mm, petiole (6–) 10–15 mm long, stipules minute, deciduous. *Inflorescences* in lax, 1–4-flowered racemes, peduncles (18–) 20–30 (–35) mm long; bracts, 1.2–2.0 × 0.2–0.4 mm; bracteoles

linear-lanceolate, 0.9–1.6 × 0.1–0.2 mm. *Calyx* almost equal to corolla, upper lip 5.5–6.5 mm long, upper sinus 3–4 mm deep; lateral sinus 4–6 mm deep; lower lip 6.5–7.5 mm long, lower sinuses 1.5–2.5 mm deep. *Corolla* yellow with reddish mark at base of standard, 5–7 mm long; standard obovate-oblong, 5.5–7.5 × 4.5–5.5 mm, with well-developed, channelled claw 1.5–2.5 mm long; wings oblong, sculptured, 6–8 × 2–3 mm, with linear claw 2–3 mm long; keel more or less equal to wings, 6–8 × 3.5–4.5 mm, with linear claw 2–3 mm long. *Gynoecium* narrowly oblong, 4–5 × ±0.6 mm. *Fruit* 30–40 × 2–4 mm, torulose, 7–12-seeded (Fig. 5).

*Distribution and habitat*: Sudan, Ethiopia, Eritrea, Egypt, Saudi Arabia, Yemen and Iran (Fig. 6), in rocky places and hillsides at altitudes of 850–2700 m.

*Diagnostic characters*: an erect perennial herb with minute, deciduous stipules. It is reported to have two distinct forms (Wood, 1997). Form A is a weakly perennial herb with sparsely pubescent oblong leaves of about 20 × 7 mm, found between 1400–1900 m above sea level. Form B is a woody, much less leafy perennial with pubescent leaves of about 12 × 2 mm, found above 2000 m.

#### Specimens examined

**Sudan Republic.** Darfur: Jebel Marra, *I.J. Blair 267* (K); Wadi Bala, *G.G. Wickens 2569* (K).

**Saudi Arabia.** Ghabra: Hawtah Ibex Reserve, *S. Collette 8112* (K). Asir: Baha area, Rasba, near Mandag, *I. & O. Hedberg 92201* (K). 10 miles east of Hamdah camp, between Tatlith and Khamis Mushayt, *S. Collette 155* (K). Taip-Jeddah road, *S. Collette 2187* (K). Jabal Faypa, *S. Chandhary 3812* (K).

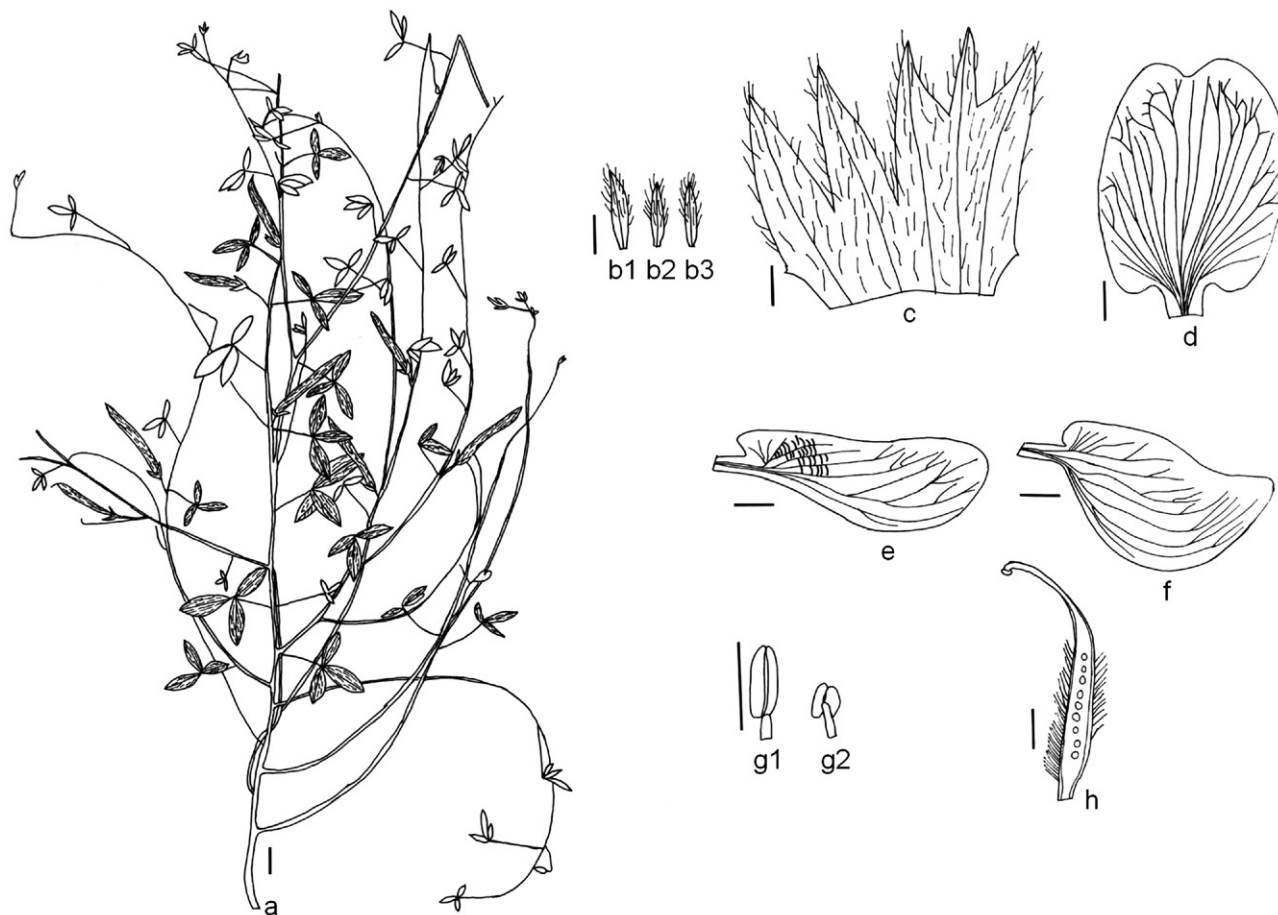


Fig. 5. Vegetative and floral morphology of *A. arabicum*: a, flowering branch; b1, abaxial view of bract; b2 and b3, abaxial view of bracteoles; c, calyx opened out with upper lobes to left; d, standard; e, wing petal; f, keel petal; g1, long, basifixed anther; g2, short, dorsifixed anther; h, pistil. [a from *S. Collette* 2187 (K); c–d from *I.J. Blair* 267 (K)]. Scale bars: a = 10 mm, b–h, 1 mm.

**Yemen.** Jebel Raynah: Beni Said, N of Hadia, *J.R.I. Wood* 2707 (K), *N. Bové* 235 (P), Ganâ: NE of Jebel Nugum, *Deflers* 469 (P).

**Iran.** 15–20 km E of Bandar Lengeh, *Davis & Bokhari* D 561232 (K).

**Locality unknown:** *Schimper* 923 (P).

**4. *Argyrolobium stenophyllum*** Boiss. in *Fl. Orient.* 2: 32 (1872); Ali in *Sind Univ. Sci. Res. J.* 2: 12 (1966) and in *Fl. W. Pakistan* 100: 34 (1977); L.B. Chaudhary in *Bull. Bot. Surv. India* 32: 186 (1992) and in *J. Econ. Tax. Bot.* 21(1): 221–222 (1997). Type: Afghanistan, without precise locality, *Griffith* 1179 (G!, holo.; K!, iso.).

*Genista afghanica* Briq., *Etud. Cyt. Alpes Marit.* : 121 (1894), *nom. nud.*

Perennial herb. *Leaflets* linear-lanceolate, 8–23 × 2.0–3.5 mm, glabrous above, pubescent below, petiole 3–8 mm long, stipules ovate-lanceolate, 2–4 × ± 0.5 mm. *Inflorescences* terminal, 1–4 flowered racemes, 30–40 mm long; bracts linear, 2.0–2.5 mm long. *Calyx* pilose, lower lip slightly shorter than upper lip, upper lip 2–3 mm long, lower lip 1–2 mm long. *Corolla* yellow, standard suborbicular, 4–6 × 2–3 mm, dorsal side sparsely hairy, with well-developed, channelled claw ± 1 mm long; wings shorter

than keel, narrowly ovate, sculptured, 4–5 × ± 1 mm, with linear claw ± 1 mm long; keel 5–6 × 2 mm, slightly curved, with linear claw ± 1 mm long. *Fruit* linear, 20–30 × 2–5 mm, pilose with brown hairs, 5–8-seeded.

*Distribution:* recorded from India (Himachal Pradesh), Pakistan (Punjab, N. W. F. Province), Afghanistan and Iraq (Fig. 7).

*Diagnostic characters:* close to *A. confertum* and possibly conspecific with it but with longer peduncles. It is similar to *A. arabicum* but differs from it in being much more hairy, in having persistent stipules (deciduous in the latter), and in its shorter pods. It can also be distinguished by the staminal sheath, which is open on its upper side.

#### Specimens examined

**Pakistan.** 20–30 km W of Kohat, *K.H. Rechinger* 30215 (K).

**5. *Argyrolobium roseum*** (Cambess.) Jaub. & Spach in *Ann. Sci. Nat. ser. 2*, 19: 51 (1843); Benth. in *Hook., Lond. J. Bot.* 3: 350 (1844); Boiss. in *Fl. Orient.* 2: 34 (1872); Baker in *Hook. f., Fl. Brit. India* 2: 64 (1876); Blatt. in *Rec. Bot. Surv. India* 7: 168 (1915) and in *Fl. Arab.* 8 (2): 128 (1921); O. Schwartz in *Fl. Trop. Arab.*: 97 (1939); Ali in *Sind Univ. Sci. Res. J.* 2: 13

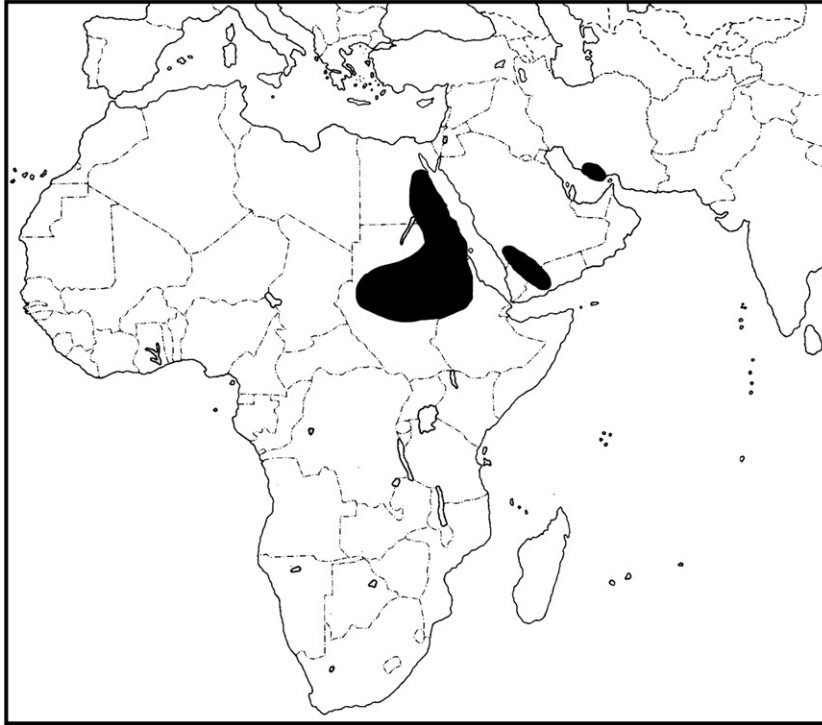


Fig. 6. Approximate geographical distribution of *A. arabicum*.

(1966); C.C.Towns. in Fl. Iraq 3: 63–66 (1974); Ali in Fl. W. Pakistan 100: 37 (1977); Rech.f. in Fl. Iranica 157: 34–35 (1984); L.B.Chaudhary in J. Econ. Tax. Bot. 21 (1): 217–221

(1997). *Cytisus roseus* Cambess. in Jacquem., Voy. Inde 4, Bot.: 35 (1842). Type: India, Mirpour, Jacquemont s.n. (P!, holo.).



Fig. 7. Approximate geographical distribution of *A. stenophyllum*.

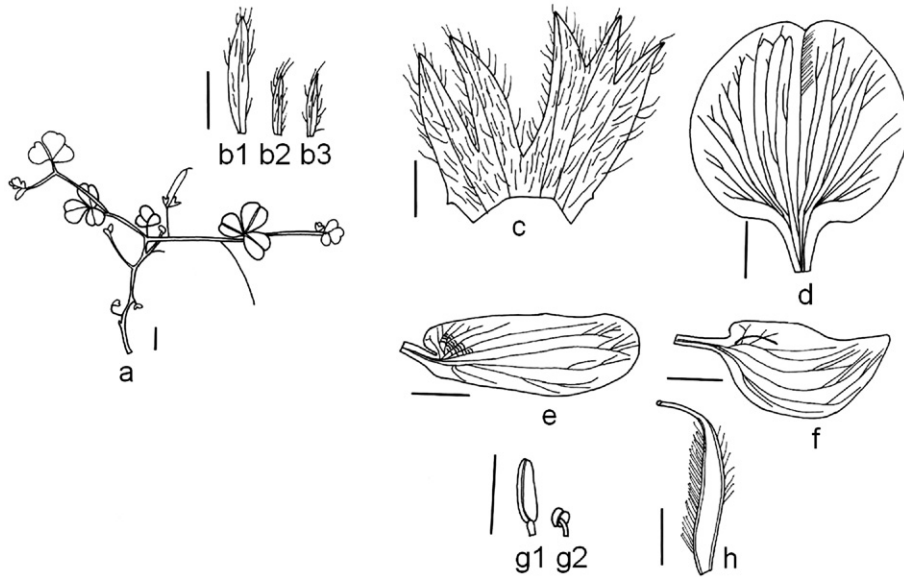


Fig. 8. Vegetative and floral morphology of *A. roseum*: a flowering branch; b1, abaxial view of bract; b2 and b3, abaxial view of bracteoles; c, calyx opened out with upper lobes to left; d, standard; e, wing petal; f, keel petal; g1, long, basifixed anther; g2, short, dorsifixed anther; h, pistil. [a–h from *Steward 28011* (K)]. Scale bars: a = 10 mm, b–h = 1 mm.

*Argyrolobium prostratum* Boiss. in *Diagn. Pl. Nov. ser.1*, 2: 13 (1843) and in *Fl. Orient. 2*: 33 (1872). Type: Syria, “in desertis Assyriæ” [Syrian desert], *Aucher 1043* (G!, holo.).

*Argyrolobium kotschyi* Boiss. in *Diagn. Pl. Nov. ser.1*, 6: 32 (1845) and in *Fl. Orient. 2*: 33 (1872); Nábilek in *Publ. Fac. Sci. Univ. Masaryk 35*: 65 (1923). Type: Iran, “in monte Kotel

*Kumaredj; Persiæ austro-occidentalis*” [on Kotel Kumaredj Mountain, south-western Iran], *Hausknecht s.n.* (G!, iso., 4 sheets).

*Genista rosea* Briq., *Etud. Cyt. Alpes Marit.*: 121 (1894), *nom. nud.*

*Genista kotschyi* Briq., *Etud. Cyt. Alpes Marit.*: 121 (1894), *nom. nud.*

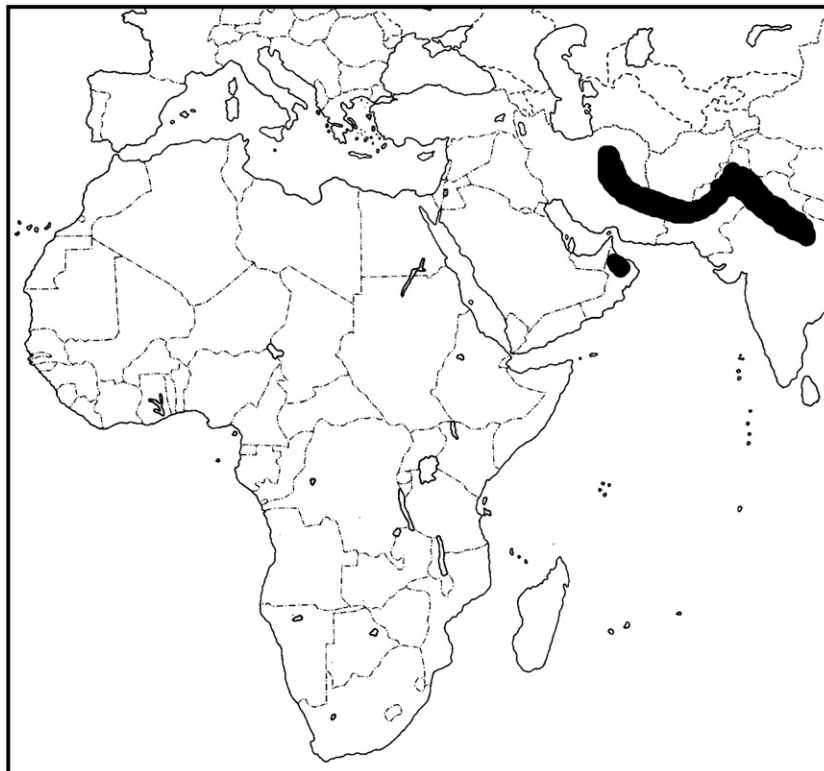


Fig. 9. Approximate geographical distribution of *A. roseum*.

*Genista aucheri* Briq., Etud. Cyt. Alpes Marit.: 121 (1894), *nom. nud.*

Low growing, prostrate herb with clover-like, pale green leaves. *Leaflets* broadly obovate, (3–) 5–15 × 4–10 mm, glabrous above, pilose beneath, ± as broad as long, petiole 2–20 mm long, stipules subulate to linear, 2–3 × 0.2–0.5 mm. *Inflorescences* leaf-opposed racemes, (1–) 2–5-flowered, peduncles 16–20 mm long; bracts acicular, 2–3 × 0.5–1.0 mm; bracteoles linear-lanceolate, 1–2 × ± 0.2 mm. *Calyx* adpressedly strigose, upper lip shorter than lower lip. *Corolla* yellow tinged red or white, 6–9 mm long; standard suborbicular, 6–8 × 3–7 mm, with well-developed, channelled claw 1.5–2.0 mm long; wings oblong, sculptured, 6–9 × 1–3 mm, with linear claw 1.0–1.5 mm long; keel shorter than wings, 5.5–7.0 × ± 2.5 mm, with linear claw ± 2 mm long. *Gynoecium* narrowly oblong, with 9–12 ovules, 3.5–5.0 × 0.6–0.8 mm. *Fruit* torulose or subtorulose, (12–) 18–35 × 2–3 mm, 3–9-seeded (Fig. 8).

*Distribution and habitat:* Afghanistan, India, Pakistan, Iraq, Iran and Oman. *A. roseum* grows on sandy roadsides, sandy flats, stony slopes, limestone hillocks, dry, gravelly or rocky places and grassy slopes at altitudes of 1000–2900 m.

*Diagnostic characters:* *A. roseum* is variable in fruit length and number of seeds. It has a habit similar to that of *A. flaccidum* but differs from it in having broadly obovate (vs. elliptic) leaflets and in being almost glabrous (*A. flaccidum* is pubescent).

Key to varieties of *A. roseum* (based on Chaudhary, 1997)

Petioles 5–20 mm long, usually longer than leaflets..... var. *album*

Petioles 2–10 mm long, distinctly shorter or more or less equal to leaflets:

Pods 20 mm long or shorter:

Racemes 1–3-flowered; fruit

6–9-seeded..... var. *ornithopodioides*

Racemes 2–5-flowered; fruit 3–6-seeded..... var. *trigonelloides*

Pods longer than 20 mm:

Pods 32–35 mm long, subtorulose..... var. *elongatum*

Pods 20–30 mm long, torulose..... var. *roseum*

**5a. *Argyrolobium roseum* var. *roseum*** Prostrate herb. *Leaflets* obovate, emarginate, 5–10 (–15) × 4–10 mm, petiole 2–9 mm long, stipules ovate-lanceolate, 2–3 × 0.2–0.5 mm. *Inflorescences* terminal racemes, 1–4-flowered, 20–45 mm long; bracts acicular, 1.5–3.0 mm long. *Calyx* upper lip slightly shorter than lower lip. *Corolla* 5–6 mm long. *Fruit* 20–30 × 3–15 mm, torulose.

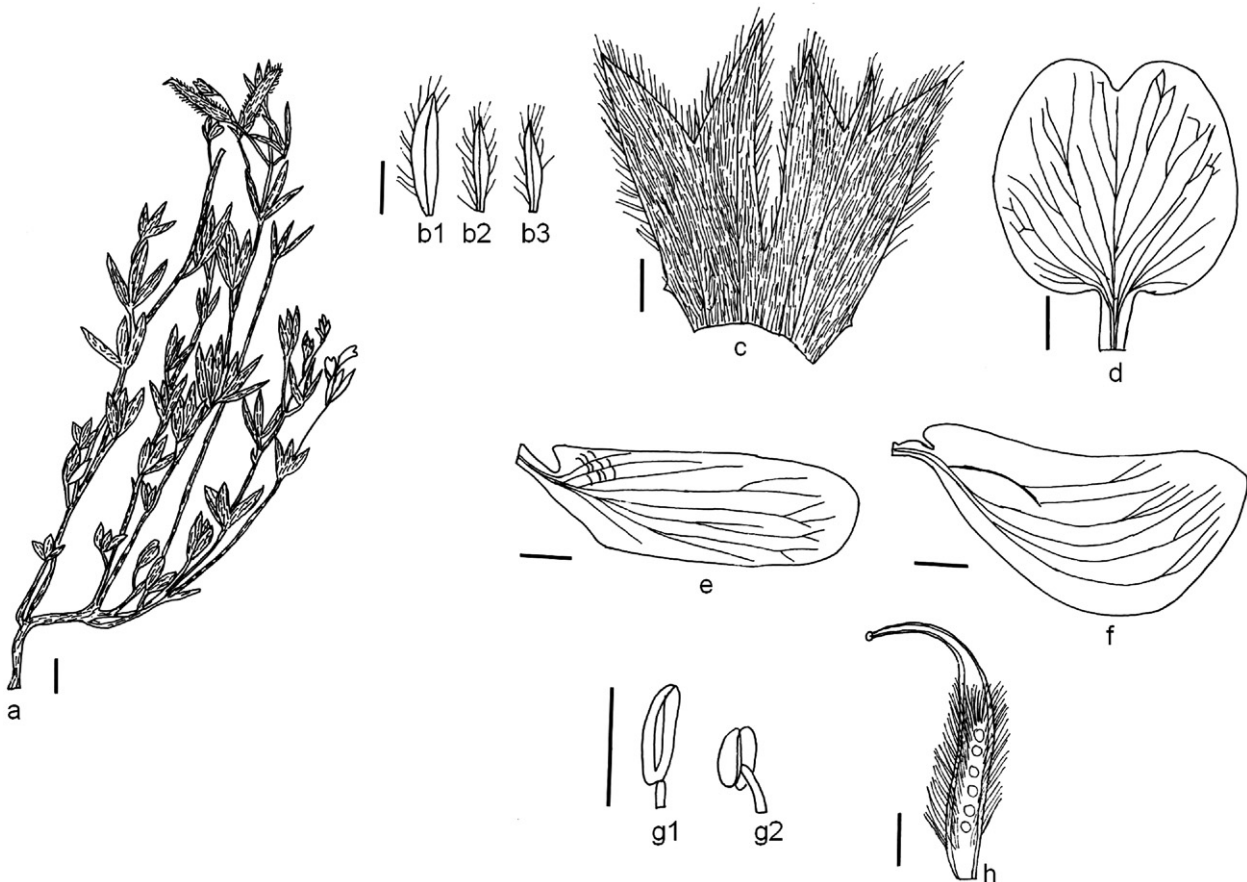


Fig. 10. Vegetative and floral morphology of *A. flaccidum*: a: fruiting branch; b1, abaxial view of bract; b2 and b3, abaxial view of bracteoles; c, calyx opened out with upper lobes to left; d, standard; e, wing petal; f, keel petal; g1, long, basifixed anther; g2, short, dorsifixed anther; h, pistil. [a–d from J.R. Drummond 14853 (K); e–h from R.R. Stewart 28217 (K)]. Scale bars: a = 10 mm, b–h = 1 mm.



Fig. 11. Approximate geographical distribution of *A. flaccidum*.

**Distribution and habitat:** India (tropical and temperate NW Himalaya), Pakistan (Baluchistan, Punjab; Kashmir); Afghanistan; Iraq and Oman (Fig. 9). This variety is found on gravelly and stony places along roadsides and grassy slopes at altitudes of 1000–2900 m.

#### Specimens examined

**Oman.** Ruwi: NW of Ruwi, *R. Radcliffe-Smith* 3678 (K). Rocky hills near Tanuf, *A. Radcliffe-Smith* 3826 (K). Qara: Ayoon pools N of fabal Qara, *R.M. Lawton* 2474 (K).

**Iran.** Zahedan Province: 26 miles S of Zaboli, new road to Sarbaz, *C. Grey-Wilson & T.F. Hewer* 226 (P).

**Locality unknown:** *Jacquemont* 69 (P).

**5b. *Argyrolobium roseum* var. *album*** (U.C.Bhattach.) L.B. Chaudhary in *J. Econ. Taxon. Bot.* 21 (1): 220 (1997). *Argyrolobium album* U.C.Bhattach. in *Bull. Bot. Surv. India* 14 (1–4): 175 (1975). Type: India, Gurdaspur district, Punjab, *Pinus* belt near Dhar along road to Dharamsala from Pathankote, *U.C. Bhattacharyya* 39416 (BSD, holo.; BSD, CAL, iso.).

Decumbent, perennial herb with long slender branches. *Leaflets* obovate, (4.5–) 8–15 × (2.5–) 5–9 mm, petiole longer than leaflets, 5–20 mm long, stipules linear. *Inflorescences* 2–5-flowered. *Calyx* upper lip slightly shorter than lower lip. *Corolla* white; standard 5–6 mm long. *Fruit* 20–25 × ±2 mm, 8–10-seeded.

**Distribution:** This variety is endemic to India. It is reported to occur in the hilly tracks of Gurdaspur district on Punjab near Dhar, along the road leading to Dharamsal from Pathankote.

**Diagnostic characters:** This variety is distinguishable from the closely related var. *trigonelloides* by the white flowers and much longer petioles (5–20 mm long in var. *album*). The upper lip of the calyx is slightly shorter than the lower one.

**5c. *Argyrolobium roseum* var. *elongatum*** (Ali) L.B. Chaudhary in *J. Econ. Taxon. Bot.* 21(1): 220–221 (1997). *A. roseum* subsp. *elongatum* Ali in *Sind Univ. Sci. Res. J.* 2: 14 (1966). Type: India, Kumaon, Nainital, *Strachey & J.E. Winterbottom* 2 (K!, holo.).

Perennial herb. *Leaflets* broadly obovate, 6–15 × 4–9 mm, petioles shorter or more or less equal to the leaflets, 2–9 mm long, stipules linear. *Inflorescences* terminal racemes, 2–5-flowered. *Calyx* lower lip slightly shorter than upper lip. *Corolla* yellow. *Fruit* 32–35 mm long, subtorulose, 10–12-seeded.

**Distribution:** Variety *elongatum* is endemic to the Kumaon area in the Uttar Pradesh region in India.

**Diagnostic characters:** This aptly named variety differs from the closely allied var. *roseum* in the longer pods (up to 35 mm long vs. up to 30 mm long).

**5d. *Argyrolobium roseum* var. *ornithopodioides*** (Jaub. & Spach) Motetee *stat. nov.* *Argyrolobium ornithopodioides* Jaub. and Spach in *Ann. Sci. Nat. ser. 2*, 19: 51 (1843). *A. roseum* subsp. *ornithopodioides* (Jaub. & Spach) Ali in *Sind Univ. Sci. Res. J.* 2: 14 (1966); *Rech.f. in Fl. Iranica* 157: 36–37 (1984). Type: India, Punjab, Mirpour near Kekki, *Jacquemont s.n.* (P!, holo.).

Prostrate herb. *Leaflets* broadly obovate, emarginate, (3–) 5–10 × 2–5 mm, petiole shorter or more or less equal to the leaflets, 3–7 mm long. *Inflorescences* terminal racemes, 1–3-

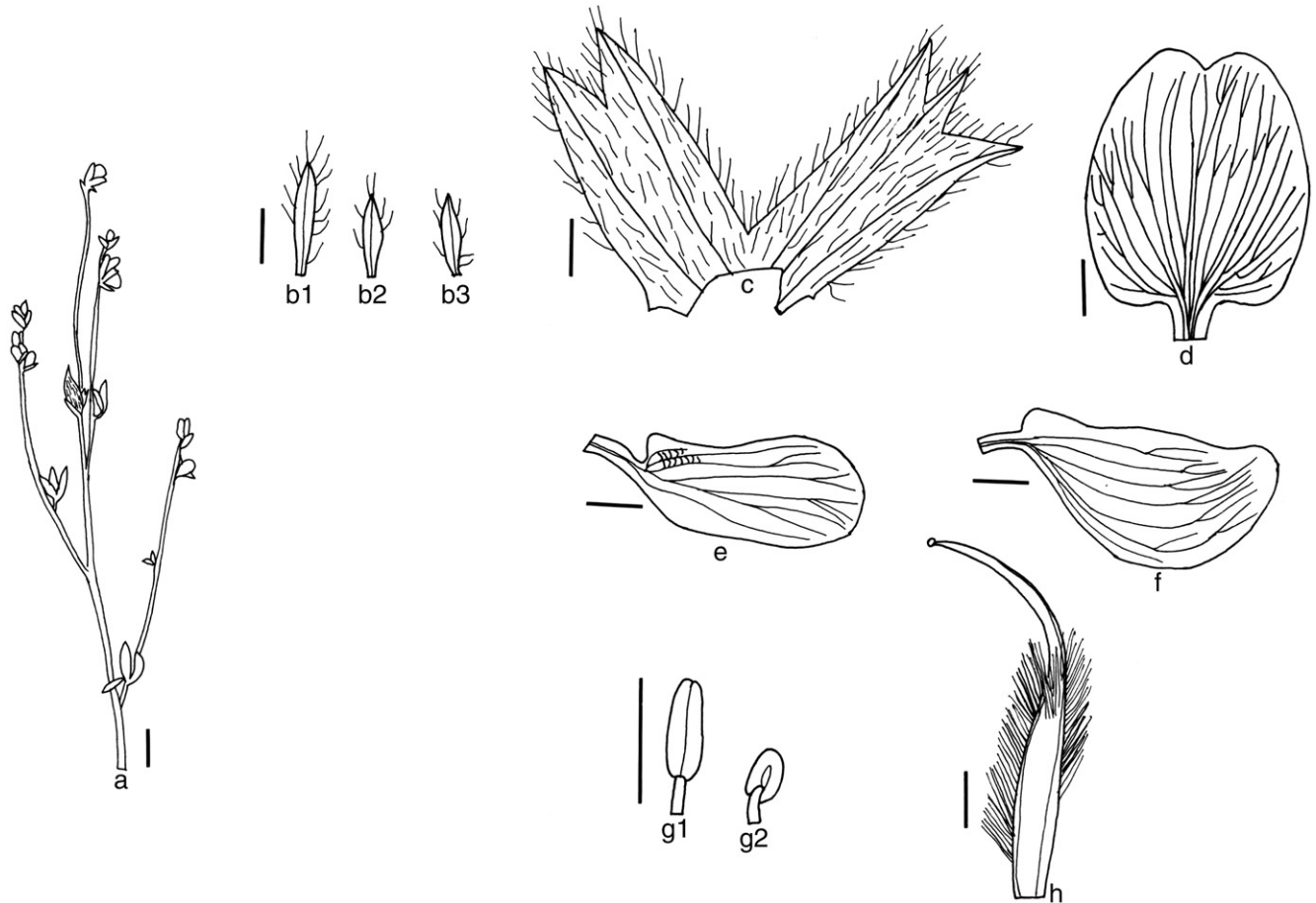


Fig. 12. Vegetative and floral morphology of *A. crotalarioides*: a, flowering branch; b1, abaxial view of bract; b2 and b3, abaxial view of bracteoles; c, calyx opened out with upper lobes to left; d, standard; e, wing petal; f, keel petal; g1, long, basifixed anther; g2, short, dorsifixed anther; h, pistil. [a–h from E. Boissier 1846 (K)]. Scale bars: a = 10 mm, b–h = 1 mm.

flowered. *Calyx* upper lip slightly longer than lower lip. *Corolla* pale pinkish or whitish. *Fruit* 10–19 mm long, 6–9-seeded.

*Distribution and habitat*: This variety is known from India (Punjab), West Pakistan (Sind, Baluchistan), Iran (Persian Baluchistan) and Yemen Arab Republic (Aden). It grows on sandy roadsides, sandy flats, stony slopes and limestone hillocks.

*Diagnostic characters*: *A. roseum* subsp. *ornithopodioides* is reduced to varietal rank because it differs from the other varieties merely in a combination of pod size, number of flowers and seeds. This is a more consistent treatment of the infraspecific variation in *A. roseum*.

#### Specimens examined

**Pakistan.** Baluchistan, R.R. Stewart 28011 (K).

**5e. *Argyrolobium roseum* var. *subuniflorum*** Boiss. in Fl. Orient. 2: 33 (1872). Type: Iran, “in Persia prope Kohrud” [in Iran next to Kohrud], Bode s.n.

*Argyrolobium trigonelloides* Jaub. & Spach in Illustr. Pl. Orient. 1: 116 (1843) and in Ann. Sci. Nat. ser 2, 19: 50 (1843); Benth. in Hook., Lond. J. Bot. 3: 354 (1844); Boiss. in Fl. Orient. 2: 33 (1872); Bunge ex Traut. in Act. Hort. Petrop. 2: 518–519 (1873); Rech.f. in Fl. Iranica 157: 34 (1984), *syn. nov.*

Type: Iran, “in collibus sterilibus es glareosis Persiae borealis ad Mendjil” [on gravely hills near Mendjil, northern Iraq, Aucher-Eloy 4358 (P!, 3 sheets, G!, 1 sheet, isotypes).

*Genista trigonelloides* Briq., Etud. Cyt. Alpes. Marit.: 121 (1894), *nom. nud.*

Perennial herb. *Leaflets* broadly obovate, emarginate, (3–) 7–12 × 4–10 mm, petiole shorter than the leaflets, 6–8 mm long, stipules ovate-lanceolate. *Inflorescences* terminal racemes, 2–5-flowered. *Calyx* upper lip slightly shorter than lower lip. *Corolla* yellow with a tinge of purple, 6–8 mm long. *Fruit* 12–20 mm long, 3–6-seeded.

*Distribution and habitat*: This variety is endemic to Iran and grows in dry, rocky places at altitudes of up to 1900 m.

*Diagnostic characters*: *A. trigonelloides* is similar in growth habit, leaflet shape, flower number, and fruit shape to *A. roseum*, and differs only in being more hairy. We therefore suggest that this taxon is merely an Iranian variety of a morphologically variable and widespread *A. roseum*, and it is accordingly synonymised under *A. roseum* var. *subuniflorum*. This variety can be distinguished from var. *ornithopodioides* by its fewer flowers and seeds. It differs from var. *album* in having shorter petioles and from var. *elongatum* and var. *roseum* by its shorter pods.



Fig. 13. Approximate geographical distribution of *A. crotalarioides*.

### Specimens examined

**Iran:** Persia, Prov. Khamseh, 20 km W of Manjil versus Gilvan, *J. Lamond & M. Iranshahr 40984* (G). Persia borealis, M. Elburs, dictionis Teheran in declivitatibus supra Ferasa, *J. et A. Bornmüller 6558* (G). Karaj, Kuhe Dashte, *H. sabeti 6347* (G). Ishabad, 20 km NW of Najaf-ahad, 45 km W of Esfahan, *G.F. Ledingham & Assefi 4143* (G). Varian near Ardestan, *Foroughi & Assadi 18053* (G). Transcaucasia, Prov. Erivan, Dist. Nachtshevan, prope st. viae ferr. Negram, in glareosis, *A. Grossheim & B. Schischkin 38* (G).

**6. *Argyrobium flaccidum*** (Royle) Jaub. & Spach in Ann. Sci. Nat. ser 2, 19: 48 (1843) and in Illustr. Pl. Orient. 1: 116 (1843); Baker in Hook. f., Fl. Brit. Ind. 2: 64 (1876); Ali in Sind Univ. Sci. Res. J. 2: 3 (1966) and in Fl. W. Pakistan: 37 (1977); L.B. Chaudhary in J. Econ. Tax. Bot. 21(1): 213–217 (1997). *Cytisus flaccidus* Royle in Illustr. Bot. Him. Mount.: 197 (1835). Type: India, Mussooree, *Royle s.n.* (K!, holo.).

*Argyrobium divaricatum* Jaub. & Spach in Ann. Sci. Nat. ser 2, 19: 48 (1843). Type: Kanaor, *Royle s.n.* (not located).

*Genista flaccida* Briq., Etud. Cyt. Alpes Marit.: 120 (1894), *nom. nud.*

Prostrate, rarely erect herb with slender diffuse branches. *Leaflets* broadly elliptical, (6–) 15–25 (–30) × (2–) 6–7 (–12) mm, petiole 2–6 mm long, stipules ovate-lanceolate, 2–5 × 0.5–1.0 mm. *Inflorescences* leaf-opposed racemes, 1–6-flowered, on peduncles (20–) 28–40 mm long; bracts acicular, 1.5–3.0 × 0.2–0.3 mm; bracteoles linear-lanceolate, 1.0–1.2 × 2.0–2.5 mm. *Calyx* with equal lips, upper lip 5–7 mm long, upper sinus 1.5–2.5 mm deep; lateral sinus 3–5 mm deep, lower lip

5–7 mm long, lower sinuses 1–2 mm deep. *Corolla* yellow, 6–10 mm long; standard broadly obovate, 5–7 × 3–5 mm, glabrous, with well-developed, channelled claw 1.5–2.5 mm long; wings obovate, sculptured, 4.5–6.5 × 1.5–2.5 mm, with linear claw 1–2 mm long; keel more or less equal to wings, 4.5–6.5 × 1.5–2.5 mm, with linear claw 1–2 mm long. *Gynoecium* narrowly oblong, with 6–8 ovules, 2.5–3.5 × 0.6–0.7 mm. *Fruit* linear, (18–) 20–35 × 3–4 mm, densely silky, 5–8-seeded (Fig. 10).

*Distribution and habitat:* Pakistan (Punjab), India (Punjab, Kumaun, Garhwal) and Afghanistan (Fig. 11). This species is common on roadsides at altitudes of approximately 1000–3000 m.

*Diagnostic characters:* *Argyrobium flaccidum* appears to have close affinity with *A. roseum* based on growth habit, but differs in having elliptic leaflets (obovate in the latter). The branches are velvety with brown hairs (not pubescent with white hairs as in *A. roseum*). The stipules are subulate and pilose while they are ovate-lanceolate and pubescent in *A. roseum*.

### Specimens examined

**India.** Punjab: Limila hills, Katog, *J.R. Drummond 14853* and *22392* (K). Gurhwal, Herbarium of the late East India Co. 410 (K).

**Pakistan.** Kohat Pass, *R.R. Stewart 28217* (K).

**Locality unknown:** V. Jacquemont 1099 (P).

**7. *Argyrobium crotalarioides*** Jaub. & Spach in Illustr. Pl. Orient. 1: 114 (1843) and in Ann. Sci. Nat. ser. 2, 19: 43 (1843); Boiss. in Fl. Orient. 2: 31 (1872); Benth. in Hook., Lond. J. Bot. 3: 339 (1844); D.F.Chamb. in Fl. Turkey and East Aegean

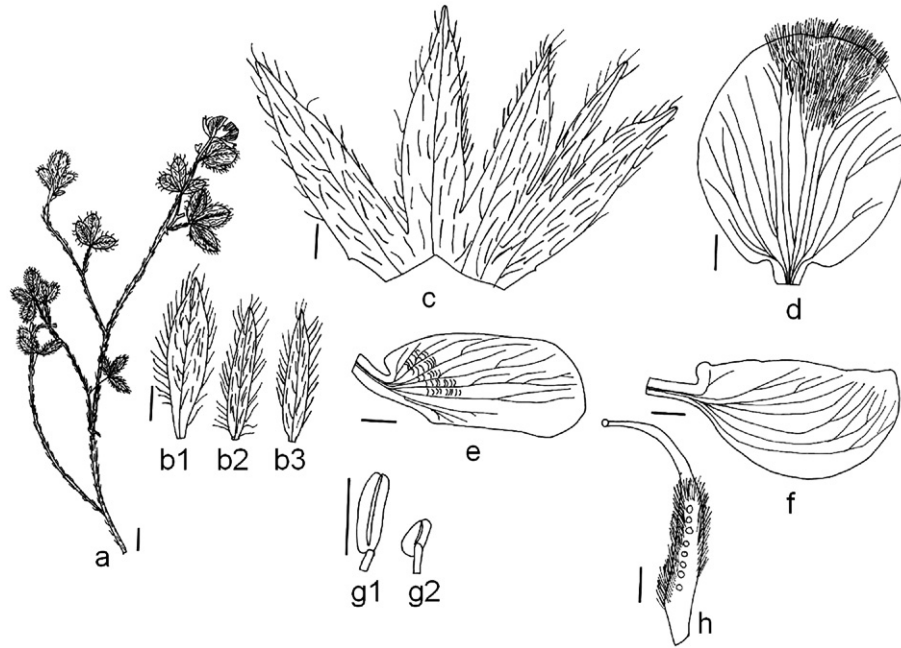


Fig. 14. Vegetative and floral morphology of *A. biebersteini*: a, flowering branch; b1, abaxial view of bract; b2 and b3, abaxial view of bracteoles; c, calyx opened out with upper lobes to left; d, standard; e, wing petal; f, keel petal; g1, long, basifixed anther; g2, short, dorsifixed anther; h, pistil. [a from *Maxted et al 6711* (K); b–h from *Dudley D. 36166* (K)]. Scale bars: a = 10 mm, b–h = 1 mm.

islands: 37 (1969); Zohary in *Fl. Palaestina* 1: 40 (1972); C.C. Towns. in *Fl. Iraq* 3: 63–66 (1974). Type: Syria, near Aintab, *Aucher-Eloy 1082* (G!, holo.).

*Argyrobium gracile* Fenzl in *Flora* 26: 394 (1843). Type: Syria, between Aleppo and Orfa, *Kotschy s.n.* (not located).

*Argyrobium syriacum* Boiss. in *Diagn. Pl. Nov. Orient.* ser 1, fascicle 2: 13 (1843), *superfluous* name. Type as for *A. crotalarioides*.

*Genista crotalarioides* Briq., *Etud. Cyt. Alpes Marit.*: 121 (1894), *nom. nud.*

Suffrutescent, silky dwarf shrub with numerous, erect stems up to 0.2 m tall. *Leaflets* oblong-lanceolate, conduplicate,  $7\text{--}12 \times \pm 2$  mm, petiole 2–9 mm long, stipules small, linear-lanceolate,  $1\text{--}2 \times \pm 0.5$  mm. *Inflorescences* terminal racemes, 30–90 (–150) mm long, with (4–) 8–18 flowers, flowers 4–7 mm long; bracts linear-subulate,  $1.5\text{--}2.5 \times 0.2\text{--}0.4$  mm; bracteoles linear-lanceolate,  $0.5\text{--}1.0 \times 0.2\text{--}0.4$  mm. *Calyx* with upper lip 5–6 mm long, upper sinus 1–3 mm deep; lateral sinus 3.5–4.5 mm deep; lower lip 5–6 mm long, lower sinuses 1–2 mm deep. *Corolla* yellow turning purplish pink, somewhat longer than calyx; standard almost as long as keel and wing, broadly obovate, notched, glabrous,  $5\text{--}7 \times 3\text{--}4$  mm, with a well-developed, channelled claw, 0.5–1.0 mm long; wings oblong, sculptured,  $5\text{--}7 \times 1.5\text{--}2.5$  mm, with a linear claw, 1–2 mm long; keel equal to the wings,  $5\text{--}7 \times 2\text{--}3$  mm, with a linear claw 1–2 mm long. *Gynoecium* narrowly oblong, 2–6-ovuled,  $2\text{--}4 \times 0.5\text{--}1.0$  mm. *Fruit* linear-oblong,  $10\text{--}20$  (–30)  $\times 4\text{--}7$  mm, silvery silky, (1–) 2–3 (–6)-seeded (Fig. 12).

*Distribution and habitat*: *A. crotalarioides* is mainly found in one district in NW Iraq and also occurs in Syria, Lebanon, Jordan and Oman (Fig. 13). It occurs on dry, rocky mountain

slopes, on limestone and in pine forests at altitudes between 800–1200 m.

*Diagnostic characters*: *A. crotalarioides* has a growth habit somewhat similar to that of *A. flaccidum* from which it differs in having conduplicate leaflets. The stems and leaves are woolly, and the leaflets are linear and pale green. The flowers are very small and yellowish turning purple pink. The fruits are relatively broad.

#### Specimens examined

**Jordan**. Yutum: on roadside 12 km N of Aqaba, *L. Boulos, W. Jallad, J. Lahham & M. Abu Hmaidan s.n.* (K).

**Oman**. Jebel Aswad: 45 km SW of Muscat, *Munton 23* (K).

**Iraq**. Kurdistan: *Kotschy s.n.* (K); Zawitah gorge, *Evanhlost 3726* (K); *K. H. Rechinger 11539* (K).

**Syria**: no locality details, *Boissier s.n.* (K).

**8. *Argyrobium aegacanthoides*** (Vved.) Moteetee *comb. nov.* *Calispepla aegacanthoides* Vved. in *Not. Sys. Herb. Inst. Acad. Sci. Uzbekistan*. 13: 19 (1952). Type: Uzbekistan “*brachia austro-occidentalia jugi Hissarici, trajectus Sary-Schato in cacuminibus schistosis*” [on mountain range south-west of Hissarici, on cleft of the summit of Sary-Schato], *L. Popova & V. Protopopov 6255* (K!, MAK!, syn.).

Suffrutescent shrub with erect stems, older branches thorny. *Leaves* exstipulate, *leaflets* elliptic  $8\text{--}12 \times 1\text{--}2$  mm. *Inflorescences* solitary-flowered,  $\pm 10$  mm long. *Fruit* oblong, (12–)  $15\text{--}20 \times 2\text{--}3$  mm, silky. See Fig. 20 in *Yakovlev (1991)*.

*Diagnostic characters*: This poorly known species from Uzbekistan resembles *A. crotalarioides* but differs from it in the absence of stipules and in the oblong fruits (short and broad in *A. crotalarioides*). *Yakovlev (1991)* proposed the transfer of



Fig. 15. Approximate geographical distributions of *A. biebersteini* (black area), *A. aegacanthoides* (diamond), *A. barikotense* (square), *A. pulvinatum* (solid circle).

*Calisepala* Vved. to *Argyrolobium* but did not formally make the new combination.

**9. *Argyrolobium biebersteini*** P.W.Ball in Feddes Repert. 79: 41 (1968); Tutin in Flora Europaea 2: 66 (1968); D.F.Chamb. in Fl. Turkey and East Aegean islands: 37 (1969); Rech.f. in Fl. Iranica 157: 37 (1984). Type: Iran, “in Persia boreali” [Northern Iran] (*B—Willd*, microfiche!).

*Argyrolobium pauciflorum* (M.Bieb. ex Willd.) Hayek in Fedde Repert. Beih. 30 (1): 894 (1926), *non* Eckl. & Zeyh. (1836), illegitimate name. *Cytisus pauciflorus* M.Bieb. ex Willd., Sp. Pl. 3: 1126 (1802), superfluous name. Type as for *A. biebersteinii*.

*Cytisus lotoides* Willd., Sp. Pl. 3: 1126 (1802), *non* Pourr., Mém. Acad. Toul. 3: 318. Type: “in Galatia” [Turkey, central Anatolia], (*B—Willd*, microfiche!).

*Argyrolobium calycinum* (M.Bieb.) Boiss. in Fl. Orient. 2: 32 (1872), illegitimate name. *Cytisus calycinus* M.Bieb. in Fl. Taur.-Caucas. 2: 166 (1808), superfluous name. Type: Ukraine, “in abruptis lapidosis Caucafi. In Tauriâ rarius occurrit” [Crimea].

*Cytisus nanus* Willd. in Enum. Hort. Berol. 769 (1809), *non* *Argyrolobium nanum* Schltr. ex Harms (1917). Type not seen. Listed as a synonym of *A. biebersteinii* by Ball (1968).

*Chasmone calycina* (M.Bieb.) E. Mey., Comm: 65–75 (1836). Type as for *Cytisus calycinus*.

*Trichasma calycinum* (M.Bieb.) Walp. in Linnaea 13: 449–543 (1839). Type as for *Cytisus calycinus*.

*Argyrolobium calycinum* Jaub. & Spach in Ann. Sci. Nat. ser. 2, 19: 44 (1843) and in Illustr. Pl. Orient.: 115 (1843),

superfluous name. Type: Iran, “Persia septentrionalis”, Aucher Eloy 1099 (not traced).

*Genista calycina* Briq., Etud. Cyt. Alpes Marit.: 120 (1894), *nom. nud.*

*Argyrolobium biebersteini* subsp. *maritimum* A.P. Khokhr. in Byull. Glavn. Bot. Sada (Moscow) 169: 28 (1994). Type: Georgia, “Adjaria, distr. Kobuletsensis, inter Kobuleti et Piczvnari” [Adjaria, Kobuleti district, between Kobuleti and Piczvnari], A.P. Khorkhrjakov s.n. (MHA!, holo.; MHA!, iso.).

Procumbent to ascending perennial herb up to 0.5 m long. *Leaflets* obovate-oblong (8–) 15–20 (–25) × 8–13 mm, petiole (7–) 10–18 (–20) mm long, stipules ovate-lanceolate, 3–4 (–7) × 1–2 (–4) mm. *Inflorescences* subumbelliform racemes, (2–) 4–8-flowered, (15–) 20–60 (–90) mm long; bracts elliptic-ovate, 4–6 × 0.5–1.5 mm; bracteoles linear-lanceolate, 3–5 × 0.5–0.7 mm. *Calyx* hirsute, upper lip 9–10 mm long, upper sinus ± 8.5 mm deep, lateral sinus 7–8 mm deep, lower lip 7–8 mm long, lower sinuses 6–7 mm deep. *Corolla* yellow, 8–10 mm long; standard suborbicular, 6–10 × 6–10 mm, with well-developed, channelled claw 0.5–1.0 mm long; wings oblong, sculptured, 6–10 × 3–4 mm, with linear claw 1.0–1.5 mm long; keel slightly shorter than the wings, 7–9 × 3–4 mm, with linear claw 1.0–1.5 mm long. *Gynoecium* narrowly oblong, 4–6 × 0.5–1.0 mm. *Fruit* 25–30 × 3–4 mm, hirsute, 6–10-seeded (Fig. 14).

*Distribution and habitat*: Georgia and Turkey. *A. biebersteinii* grows on rocky places, in deciduous woodlands and shady stream sides in at altitudes of 1200–1500 m (Fig. 15).

*Diagnostic characters*: A hirsute, diffuse perennial with a woody base. The flowers are borne in fascicles or short racemes.

The abaxial surface of the standard is sericeous only near the apex.

#### Specimens examined

**Georgia:** Sairme, behind the resort police station, *Maxted et al.* 7154 (K); Nakra, valley side opposite log cabin, *Maxted et al.* 6711 (K).

**Turkey.** Kütahya/Bursa Province: 30 miles from Tarsanlı to Inegöl, *Dudley D.* 36166 (K). Coruh Province: Artvin, *Davis & Hedge D* 30009 (K).

**Locality unknown:** *A. Callier* 248 (P).

**10. *A. pulvinatum*** Rech.f. in *Fl. Iranica* 157: 32 (1984). Type: Pakistan, Makran, *Rechinger f.* 27934a (W!, holo.).

Low growing suffrutex with numerous branches. *Leaflets* obovate, 3–4 × ±2 mm, petiole 2–5 mm long, stipules linear, small 1–2 mm long. *Fruit* oblong, 5–6 × 2–3 mm, silky, 2-seeded.

*Diagnostic characters:* According to Rechinger (1994), this Pakistan endemic species closely resembles *A. roseum* but differs in its dense, suffrutescent habit, minute leaves and short, two-seeded pods.

**11. *A. barikotense*** Rech.f. in *Fl. Iranica* 157: 32 (1984). Type: Pakistan, Swat Barikot, *S.I. Ali* 25953 (W!, holo.).

Suffrutescent shrub with spreading branches, up to 0.12 m tall. *Leaflets* oblong-lanceolate, conduplicate, 6–10 × ±2 mm, petiole 2–9 mm long, stipule linear, minute 1–2 mm long. *Fruit* oblong, 20–30 × 2–3 mm, pilose, 5–7-seeded.

*Diagnostic characters:* This is another poorly known Pakistan endemic. It is described as close relative of *A. flaccidum* but

is much smaller in habit (only 0.12 m high; *A. flaccidum* is 0.3–0.4 m high), with conduplicate, much smaller leaflets and smaller calices (Rechinger, 1984).

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