A synopsis of the Middle-eastern and Asian species of *Argyrolobium* (Genisteaee–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: *Arbyrolobium*; 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.


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

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

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E-mail address: amoteetee@uj.ac.za (A. Moteetee).
Narrowly oblong, 5–6 mm long above, 10 mm long, stipules ovate-lanceolate.

- A. arabicum
- A. rupestris

8. Staminal sheath open on upper side
9. Staminal sheath closed on upper side

- A. barikotense
- A. scouleri

Leaflets

10. Petioles 3–5 mm long; pods 2–3-seeded
   Petioles 2–9 mm long; pods 5–7-seeded

- A. barikotense

Stems mostly shorter and prostrate, indumentum spreading or sparsely subappressed pilose; petioles 4–6 (–8) mm long ..............................................subsp. aberdariicum

- A. flaccidum
- A. biebersteinii
- A. stenophyllum

Flowers

Inflorescences head-like racemes, 1–2 mm long, stalked lanceolate, 4–9 mm long, persistent

- A. rupestre
- A. crotalariaoides

Fruits

7×±1 mm.

- A. rupestre
- A. uniflorum

Plants

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

- A. uniflorum

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 139 (K).


2. Argyrolobium confertum

- Argyrolobium remotum

- Argyrolobium rupestre

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

Stems short ascending; calyx sericeous-tomentose ...

- subsp. kilimandscharicum
- subsp. rupestrum

Key to subspecies of 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);

- Zimbabwe, Umtali, upper lip 7 mm, sparsely pilose to silky tomentose at least beneath, petiole 4 mm, pubescent.
- A. rupestre

- Genista virgata
- Tigre, Schimper 570 (K!, holotype; BM, iso.).

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

- Leaflets obovate-oblong, 13–25×(6–)–10–14 mm, petiole (3–)–7–17 mm long, stipules oavate-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).

Diagnostic characters:

- The leaflets are pilose, with the margins fringed with long brown hairs. The petioles are much longer than those of subssp. aberdariicum 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).


- Argyrolobium uniflorum

- Argyrolobium rupestre

- Argyrolobium remotum


- Argyrolobium rupestre

(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!, holotype; BM, iso.).

- Argyrolobium virgatum

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

- Leaflets obovate-oblong, 13–25×(6–)–10–14 mm, petiole (3–)–7–17 mm long, stipules oavate-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 subssp. aberdariicum and kilimandscharicum.
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. Collenette 6268 (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).


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

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.


Argyrolobium 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.


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).


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

Locality unknown: Schimper 923 (P).


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).


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

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

**Fig. 7.** Approximate geographical distribution of *A. stenophyllum.*
*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); Nábílek in Publ. Fac. Sci. Univ. Masaryk 35: 65 (1923). Type: Iran, "in monte Kotel Kumaredj; Persiae austro-occidentalis" [on Kotel Kumaredj Mountain, south-western Iran], Haussknecht s.n. (G!, iso., 4 sheets).


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.

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

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, 6–9 × 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.

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**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.
**Distribution and habitat:** India (tropical and temperate NW Himalaya), Pakistan (Baluchistan, Punjab; Kashmir); Afghanistan; Iraq and Oman (Fig. 9). This variety is found on gravely 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).


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 Dharamsala from Pathinkote.

**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.


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).


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-
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**: *Argyrolobium 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.


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


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.
Specimens examined


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. Gynoeicum 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: Argyrolobium 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). Gurbwal, Herbarium of the late East India Co. 410 (K).


Locality unknown: V. Jacquemont 1099 (P).


Fig. 13. Approximate geographical distribution of A. crotalarioideae.

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

_Argyrolobium syriacum_ Boiss. in Diagn. Pl. Nov. Orient. ser 1, fascicle 2: 13 (1843), superfluous name. Type as for _A. crotalarioides_.


Suffrutescent, silky dwarf shrub with numerous, erect stems up to 0.2 m tall. _Leaflets_ oblong-lanceolate, conduplicate, 7–12 × ±2 mm, petiole 2–9 mm long, stipules small, linear-lanceolate, 1–2 × ±0.5 mm. _Inflorescences_ terminal racemes, 30–90 (–150) mm long, with (4–) 8–18 flowers, flowers 4–7 mm long; bracts linear-subulate, 1.5–2.5 × 0.2–0.4 mm; bracteoles linear-lanceolate, 0.5–1.0 × 0.2–0.4 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, 5–7 × 3–4 mm, with a well-developed, channelled claw, 0.5–1.0 mm long; wings oblong, sculptured, 5–7 × 1.5–2.5 mm, with a linear claw, 1–2 mm long; keel equal to the wings, 5–7 × 2–3 mm, with a linear claw 1–2 mm long. _Gynoecium_ narrowly oblong, 2–6-ovuled, 2–4 × 0.5–1.0 mm. _Fruit_ linear-oblong, 10–20 (–30) × 4–7 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, Evanhlust 3726 (K); K. H. Rechinger 11539 (K).

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


Suffrutescent shrub with erect stems, older branches thorny. _Leaves_ exstipulate, _leaflets_ elliptic 8–12 × 1–2 mm. _Inflorescences_ solitary-flowered, ±10 mm long. _Fruit_ oblong, (12–) 15–20 × 2–3 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
Calispepala Vved. to Argyrolobium but did not formally make the new combination.


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


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


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 Tarsanli to Inegol, *Dudley D.* 36166 (K). Coruh Province: Artvin, *Davis & Hedge D* 30009 (K).

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


Low growing suffrutex with numerous branches. *Leaflets* obvate, 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.


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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References


