Taxonomic revision of the Astragalus genargenteus complex (Fabaceae)

Authors: Gianluigi Bacchetta, and Salvatore Brullo

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GIANLUIGI BACCHETTA & SALVATORE BRULLO

Taxonomic revision of the *Astragalus genargenteus* complex (*Fabaceae*)

Abstract


Within the *Astragalus genargenteus* complex three morphologically, ecologically and chorologically well differentiated taxa are distinguished: *A. genargenteus* from siliceous substrate in the Gennargentu massif (central Sardinia) and two species described as new to science, *A. gennarii* from limestone on Monte Albo (NE Sardinia) and *A. greuteri*, widespread on siliceous substrate in the Corsican mountains. The relationship of these species with the allied, spine cushion-like *A. sirinicus* and *A. angustifolius* is examined. A key to the species and illustrations are given.

Key words: *Leguminosae*, Sardinia, Corsica, taxonomy, endemism.

Introduction

The populations in Sardinia and Corsica hitherto referred to *Astragalus genargenteus* Moris, being orophilous, pulvinate shrubs with a tragacanthoid habit, are examined. In Corsica this species is widespread in mountains on Palaeozoic siliceous substrata. In Sardinia, instead, it is restricted to the tops of Mt Gennargentu and Mt Albo. In the first locality it occurs on Palaeozoic siliceous substrate, in the second on Mesozoic limestone.

Field investigations carried out on the various known sites of this species highlighted the presence of marked differences between the two Sardinian populations, as well as between these and the Corsican ones. Morphological features, ecology and chorology allow separation of three taxa, *Astragalus genargenteus* exclusive of the Gennargentu massif, *A. gennarii* restricted to Mt Albo and *A. greuteri* in Corsica, the latter two being species new to science.

Material and methods

The present study is based on specimens of the herbaria CAG, CAT, FI, M, TO (abbreviations according to Holmgren & Holmgren 1998-) and living material collected in various Sardinian, Corsican and peninsular Italian localities.
Fig. 1. *Astragalus genargenteus* – A: flowers; B: flower bud; C: opened calyces; D: calyx indumentum; E: petals; F: stamens; G: pistil; H: stigma; I: legumes; J: seeds; K: leaves. – Drawn after material from Bruncu Spina in Mt Gennargentu (locus classicus).
**Results**


Lectotype (designated by Corrias 1979): Moris ... - Fonni, 25.5.2004, Bacchetta & Brullo (CAT); Broncu Spina, Gennargentu – Fonni (NU), Willdenowia 36 – 2006 159

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Dwarf shrub forming a compact, spiny cushion, 10-30 cm tall. Stems woody, densely branched, tough, with persistent stipules and rachis in the old parts of the branches. Leaves imparipinnate, 3-6 cm long, with ivory rachis, when juvenile covered by scattered hairs and protracted into a straight spine, longer than the upper leaflets. Leaflets oblong, green, rounded to obtuse at the apex, (5-)9-11(-12) paired, 2-6 × 1.5-3 mm, covered by appressed, medifixed hyaline hairs; petiololes 0.2-0.4 mm long. Stipules linear-triangular, 6-7 mm long, joined to the rachis about half-way, acute at the apex, coriaceous, straw-coloured, uninerious, sparsely hairy at the margin with hairs 0.2-0.3 mm long. Raceme (2-)3-5-flowered, with peduncle 1-2 cm long. Bract lanceolate, hyaline, long-apiculate, 2.5-3.5 mm long, densely hairy. Bracteoles lanceolate, densely hairy, 1.5-2 mm long, inserted on the pedicel. Calyx cymocephalous, bilabiata, 9-10 mm long, 4-4.5 mm in diameter, densely covered by medifixed hyaline and black hairs, the hyaline ones 0.5-1 mm long, the black ones 0.2-0.5 mm long; teeth linear-triangular, the lower ones 2.5-2.8 mm long, the upper ones 2-2.2 mm long. Corolla white to yellowish, 16-20 mm long; standard platonychoid, undulate at the margin, rotate at the apex, 16-20 × 8-9 mm; wings 15-18 mm long; keel 13-15 mm long. Stama with filaments 12-13 mm long; anthers yellow, oblong, 1 mm long. Pistil 12-13 mm long; ovary hairy; style glabrous; stigma papillate, subglobose. Legume 12-15 × 3-4 mm, subglabrous to sparsely hairy, with white, 1-1.2 mm long hairs, irregularly oblong with a short, 2 mm long beak. Seeds reniform, 2.2-2.5 × 1.2-1.5 mm, brown-olivaceous, smooth, laterally compressed. – Chromosome number: 2n = 16 (Villa 1979).

**Etymology.** – The name refers to the Gennargentu massif, where the taxon occurs.

**Phenology.** – Flowering May to June, fruiting July to August.

**Distribution and habitat.** – *Astragalus genargenteus* is an orphophyte occurring at an altitude of 1250-1750 m and is restricted to a few sites in the Gennargentu massif (central Sardinia). It grows on the more or less sloping side on Palaeozoic siliceous rocks, such as metamorphites, metaquartzites and granodiorites. It is found in dwarf shrub communities belonging to the Carici-Genistetalia lobelii Klein 1972, accompanied by many Sardinian or Cyrno-Sardinian endemics of mountain habitats, such as *Thymus cathariniae* Cambarda, *Helichrysum microphyllum* subsp. *tyrrhenicum* Bacch. & al., *Armeria sardoa* subsp. *genargentea* Arrigoni, *Festuca morisiana* Parl., *Viola corsica* subsp. *limbarae* Merxm. & W. Lippert, *Carlina macrocephala* Moris, *Gallium corsicum* Spreng., *Genista corsica* (Loisel.) DC., *Hieracium soleirolianum* Arv.-Touv. & Briq., *Plantago subulata* subsp. *insularis* (Gren. & Godr.) Nyman. It grows in the temperate-sub-Mediterranean bioclimate between the lower supratemperate and the upper supratemperate belt, with an upper subhumid and lower humid ombrotype.

**Additional specimens examined.** – SARDINIA: Gennargentu, 7.1859, Gennari (FI); Monte Novo, ad radices montis Gennargentu, 29.4.1872, Marcucci (FI); Monte Gennargentu, 8.6.1883, *Sardagna* (FI); prope fontam Corri’s Boi, Gennargentu, 1250 m, 31.5.1884, *Forysth-Major* (FI); sopra la miniera di Corri’s Boi in Monte Gennargentu, 31.5.1884, *Forysth-Major* 32 (FI); Mte Gennargentu presso Desulo, 29.6.1899, *Martelli* (FI); Pressi di Desulo, *Bonomi* (CAG); Gennargentu au dessus du rufiego Broncu Spina, 1570-1700 m, 27.5.1983, *Charpin & al AC 17798* (FI); Gennargentu, 15.6.1993, *Fougu* (CAG); Correboi - Fonni (NU), 15.5.1989, *Mulas* (CAG); Genna Perdu Sorbi - Bruncu Spina, Fonni, esp. ENE, 7.7.2000, *Bacchetta et al.* (CAG); Broncu Spina - Fonni (NU), metamorfiti, 1635 m, NNE 30°, 40°01.397’N, 9°17.861’E, supratemp. sup.-umido inf., 25.6.2003, *Bacchetta et al. 399/03* (CAG); Broncu Spina - Desulo (NU), metamorfiti paleozoische, 1645 m, W 270°, 40°01.219’N, 9°18.035’E, 6.12.2003, *Bacchetta et al. 784/03* (CAG); Gennargentu, Broncu Spina - Fonni, 25.5.2004, *Bacchetta & Brullo* (CAT); Broncu Spina, Gennargentu – Fonni (NU),
versante NE, 18.7.2004, Bacchetta & Brullo (CAT); Broncu Spina - Fonni (NU), graniti, 1675 m, E 85°, 11.6.2005, Bacchetta & al. 274/05 (CAG); Riu Aratu – Desulo (NU), metamorfiti, 1635 m, NW 310°, 11.6.2005, Bacchetta & al. 282/05 (CAG).

Conservation status. – At present the populations, although well spread, are threatened by over-grazing, fire and skiing. It is suggested to classify Astragalus genargenteus as Endangered (EN), according to the IUCN criteria (IUCN 2001), B 1ab (ii, iii, v) + 2ab (ii, iii, v); C2a (i).

Astragalus gennarii Bacchetta & Brullo, sp. nov.

Holotype: Sardinia, Monte Albo, Punta Turuddò - Lula, 26.5.2004, Bacchetta & al. (CAT); isotypes: B, CAG, CAT, FI – Fig. 2.

Astragalus genargenteus affinis sed habitu dense compacto, usque ad 80 cm alto, foliolis 1-2.2 mm latis, stipulis late triangularis, 5-6 mm longis, dense pilosis exterior superficie, pilis 0.4-0.7 mm longis, pedunculo racemi 2-10 mm longo, bracteâ 1.5-2.5 mm longa, bracteolis 0.5-1.5 mm longis, calyce 0.6-0.7 mm longo, 3-3.5 mm diametro, pilis hyalinis 0.3-0.5 mm longis, calycis dentibus triangularibus, inferioribus 1-1.2 mm longis, superioribus 1.2-1.5 mm longis, vexillo 14-18 × 7-8 mm longo, alis 13-15 mm longis, pistillo 11-12 mm longo, stigmate subhemisphaerico, legume densiore piloso, 11-13 × 3-3.2 mm, pilis 0.1-0.7 mm longis, rostro 1.5-1.8 mm longo, semine saepe maculato, 2.6-2.9 × 1.6-1.7 mm differt.

Dwarf shrub forming a dense, compact, spiny cushion, 20-80 cm tall. Stems woody, densely branched, tough, with persistent stipules and rachis in the old parts of the branches. Leaves imparipinnate, 3-5 cm long, with ivory rachis, when juvenile covered by scattered hairs and protracted into a straight spine, longer than the upper leaflets. Leaflets oblong, green, rounded to obuse at the apex, 6-11-paired, 2-6 × 1-2.2 mm, covered by appressed, medifixed hyaline hairs; petiolules 0.2-0.4 mm long. Stipules pinnate, 3-5 cm long, with ivory rachis, when juvenile covered by scattered hairs and protracted into a straight spine, longer than the upper leaflets.

Stems woody, densely hairy, 0.5-1.5 mm long, inserted on the pedicel. Calyx cylindrical, bilabiate, 6-7 mm long, 3-3.5 mm in diameter, densely covered by medifixed, hyaline and black hairs, the hyaline ones 0.3-0.5 mm long, the black ones 0.1-0.5 mm long; teeth triangular, the lower ones 1-1.2 mm long, the upper ones 1.2-1.5 mm long. Corolla white to yellowish, tinged violet mainly on the keel, 15-18 mm long; standard platonichoid, undulate at the margin, retuse at the apex, 14-18 × 7-8 mm; wings 13-15 mm long; keel 12-15 mm long. Stamina with filament 12-13 mm long; anthers yellow, oblong, 1 mm long. Pistil 11-12 mm long; ovary hairy; style glabrous, stigma papillose, subglobose. Legume 11-13 × 3-3.2 mm, more densely hairy, with white, 0.1-0.7 mm long hairs, irregularly oblong with a short, 1.5-1.8 mm long beak. Seeds reniform, 2.6-2.9 × 1.6-1.7 mm, brown-olivaceous, often blotched, smooth, laterally compressed.


Phenology. – Flowering May to June, fruiting June to July.

Distribution and habitat. – Astragalus gennarii is an orophyte occurring at an altitude of 800-1055 m, in a very restricted area near the top of Punta Turuddò in the SW part of the Monte Albo massif (NE Sardinia), from where it was already reported by Corrias (1979) and Camarda (1984a-b). The species is represented by a small population localized on the W and NW slope of this mountain, on Mesozoic limestone. It prefers lithosols or pedogenetically little developed soils. A. gennarii grows in the Mediterranean pluviseasonal oceanic bioclimatic, in the upper meso-Mediterranean and the lower supra-Mediterranean belt and the upper subhumid ombrotype. It is found in dwarf shrub communities belonging to the Carici-Genistetea lobelii Klein 1972, ac-
Fig. 2. *Astragalus gennarii* – A: flowers; B: flower bud; C: open calyces; D: calyx indumentum; E: petals; F: stamens; G: pistil; H: stigma; I: legumes; J: seeds; K: leaves. – Drawn after material from Punta Turuddò in Mt. Albo (locus classicus).
comppanied by endemic species such as Cerastium supramontanum Arrigoni, Cephalaria mediterranea (Viv.) Szabó, Sesleria insularis subsp. barbaricina Arrigoni, Santolina corsica Jord. & Fourn., Brassica insularis Moris, Dianthus sardous Bacch. & al., Acinos sardous (Asch. & Levier) Arrigoni, Stachys corsica Pers.

Additional specimens examined. – SARDINIA: Punta Turuddò - Lula (NU), calcari, 1025 m, SW 235°, 23.12.2002, Bacchetta & al. 563/02 (CAG); ibid., calcari mesozoici, 1050 m, W 265°, 40°27.708’N, 9°31.192’E, 26.5.2004, Bacchetta & al. 266/04 (CAG); Punta Turuddò - Lula (NU), calcari mesozoici, 1050 m, W 265°, 40°27.708’N, 9°31.192’E, 14.7.2005, Bacchetta 340/05 (CAG).

Conservation status. – Because of its rarity, its scarce numerical presence and great fire hazard of the only known population, it is suggested to classify Astragalus gennarii as Critically Endangered (CR), according to the IUCN criteria (IUCN 2001) B1 ab (i, ii, iii, v) + 2ab (i, ii, iii, v), C2a (ii).

Astragalus greuteri Bacchetta & Brullo, sp. nov.

Holotype: Corsica, Col di Bavella, Zonza, 27.5.2004, Bacchetta, Brullo & Casti (CAT; isotypes: B, CAG, CAT, FI) – Fig. 3.

Astragalo genargenteo affinis sed habitu laxe ramoso, stipulis linear-lanceolatis, 6.5-8.5 mm longis, dense pilosis margine, pilis 0.5-1 mm longis, pedunculo racemi usque ad 30 mm longo, bractea 5-6 mm longa, bracteolis lineari-lanceolatis, 2-3 mm longis, calyce 3.5-4 mm diametro, pilis nigris 0.3-1.2 mm longis, calycis dentibus inferioribus (2.5-)3-4 mm longis, superioribus 2.5-3.5 mm longis, corolla alba vel albo-violacea, 20-23 mm longa, vexillo 20-22 mm longo, carina 15-17 mm longa, filimentis staminalibus 14-15 mm longis, antheris 1.1-1.2 mm longis, pistillo 13-14.5 mm longo, stigmate conico, legumine 11-12 mm longo, pilis 1-2 mm longis, rostro 1.5 mm longo, semine pallide brunneo-olivaceo, 2.5-3 × 1.5-1.6 mm differt.

Dwarf shrub forming a loose spiny cushion, 10-30 cm tall. Stems woody, densely branched, tough, with persistent stipules and rachis in the old parts of the branches. Leaves imparipinnate, 3.5-6 cm long, with ivory rachis, when juvenile covered by scattered hairs and protracted into a straight spine, longer than the upper leaflets. Leaflets oblong, green, rounded to obtuse at the apex, 9-11-paired, 2-6 × 1.5-2.5 mm, covered by appressed, medifixed hyaline hairs; petiolules 0.2-0.3 mm long. Stipules linear-lanceolate, 6.5-8.5 mm long, joined to the rachis about half-way, acuminate at the apex, coriaceous, straw-coloured, uninerved, densely hairy at the margin with 0.5-1 mm long hairs. Raceme 3-5-flowered, with 1-3 cm long peduncle. Bracteoles linear-lanceolate, densely hairy, 2-3 mm long, inserted in the pedicel. Calyx cylindrical, bilabiate, 9-10 mm long, 3.5-4 mm in diameter, densely covered by medifixed, hyaline and black hairs; the hyaline ones 0.3-1 mm long, the black ones 0.3-1.2 mm long; teeth linear-triangular, the lower ones (2.5-)3-4 mm long, the upper ones 2.5-3.5 mm long. Corolla white to white-violet, 20-23 mm long; standard platonychioid, undulate at the margin, retuse at the apex, 20-23 × 8-9.5 mm; wings 15-16 mm long; keel 15-16 mm long. Stamina with filaments 14-15 mm long; anthers yellow, oblong, 1.1-1.2 mm long. Pistil 13-14.5 mm long; ovary hairy; style glabrous; stigma papillose, conic. Legume 11-12 × 3-4 mm, sparsely hairy, with white, 1-2 mm long hairs, irregularly oblong with a short, 1.5 mm long beak. Seeds reniform, 2.5-3 × 1.5-1.6 mm, pale brown-olivaceous, smooth, laterally compressed. – Chromosome number: 2n = 16 (Contandriopoulos 1962, sub Astragalus genargenteus).

Eponymy. – Named in honour of Werner Greuter, botanist in Berlin.

Flowering. – May to July, fruiting June to August.

Distribution and habitat. – Astragalus greuteri is an orophyte very widespread at (600-)800-2100(-2300) m in the mountains of S, central W and NW Corsica. It grows on siliceous substrate (metamorphites and granites) and subacid, little developed soils, in the temperate sub-Mediterra-
Fig. 3. *Astragalus greuteri* – A: flowers; B: flower bud; C: open calyces; D: calyx indumentum; E: petals; F: stamens; G: pistil; H: stigma; I: legumes; J: seeds; K: leaves. – Drawn after material from Col di Bavella (locus classicus).
nean bioclimate, ranging between the upper mesotemperate and the lower orotemperate belt, with an upper subhumid and lower humid ombrotype. It occurs in dwarf-shrub communities of the Carici-Genistetalia lobelii Klein 1972, characterized by many Corsican and Sardo-Corsican endemics such as Thymus herba-barona Loisel., Armeria multiceps Wallr., Genista salzmannii var. lobeloides (Gamisans) Gamisans & Jeann., Hieracium soleirianum Arn.-Touv. & Briq., Carlina macrocephala Moris, Poa bulbisii Parl., Bunium corydalium DC., Cerastium soleirolii Duby, Ligusticum corsicum Gay and Galium corsicum Spreng.

Additional specimens examined. – CORSICA: Serre di Scapamere, pres de Sartene (Corse), 9.6.1879, Tillet (FI); in dumosum apricis inter Silvana del Melo, in vallem Niolo, secus viam a Corte et Calacuccia, 13.7.1880, Levier 18 (FI); Passo di Vizzavona, 10.6.1999, Brullo & al. (CAT); Col di Bavella - Zonza (Ajaccio), graniti, 1155 m, S 185°, 41°38.302'N, 9°14.173'E, 20.11.2003, Bacchetta & al. 748/03 (CAG); Col di Vizzavona, 27.5.2004, Bacchetta & al. (CAT); Aullene, 27.5.2004, Bacchetta & al. (CAT); Col di Bavella - Zonza (Ajaccio), graniti, 1180 m, WNW 280°, 41°47.330'N, 9°13.198'E, 25.7.2004, Adamo & al. 469/04 (CAG); Col di Bavella, Zonza, 25.7.2004, Bacchetta & al. (CAT); Col di Bavella - Zonza (Ajaccio), graniti, 1130 m, WSW 240°, 41°47.537'N, 9°13.308'E, 18.7.2005, Bacchetta & al. 346/05 (CAG).

Conservation status. – Since Astragalus greuteri is widespread in most of the Corsican mountains, protective steps do not seem necessary.

Taxonomic remarks

Astragalus genargenteus shows a close relationship with A. sirinicus Ten. (Fig. 4), which is widespread in the central and S Apennines and in the central and SW Balkan peninsula and diploid with 2n = 16 like the A. genargenteus group (Pellegrini 1963). Whereas Chater (1968) and Pignatti (1982) considered A. genargenteus a subspecies of the latter species, many other authors (Corrias 1979, Camarda 1984a-b, Greuter & al. 1989, Gamisans & Jeanmonod 1993) treated them as distinct species, a view confirmed by our investigations. The differences between the three species of the A. genargenteus complex and A. sirinicus are summarised in Table 1. An identification key is given below.

The Astragalus genargenteus complex, distributed in the Cyrno-Sardinian biogeographical province, and A. sirinicus form a species group, which shows close phylogenetic relationship with A. angustifolius Lam. The latter represents another very complex group, which is distributed in the E Mediterranean and included by Chater (1968) in A. subg. Cercidothrix Bunge, whereas by Chamberlain & Matthews (1969) in A. sect. Melanocercis Bunge.

Key to the Astragalus sirinicus group

1. Plant 20-50(-70) cm tall; stipules widely triangular, 5-6 mm long; bract 1.5-2.5 mm long; calyx 6-7 mm long with 1-1.5 mm long teeth; seeds often blotched .... A. gennarii
   – Plant up to 30 cm tall; stipules linear-triangular to linear-lanceolate, 6-9 mm long; bract 2.5-6 mm long; calyx 7.5-10 mm long with 2-3.5 mm long teeth; seeds never blotched .... 2
2. Stipules 6-7 mm long, sparsely hairy at the margin, with 0.2-0.3 mm long hairs; bract 2.5-3.5 mm long; legume 12-15 mm long; seed 2.2-2.5 mm long .... A. genargenteus
   – Stipules (6.5-)7-9 mm long, densely hairy at the margin, with 0.5-2 mm long hairs; bract 4-6 mm long; legume 10-12 mm long; seed 2.5-3.2 mm long .... 3
3. Leaflet tips rounded to obtuse; raceme 3-5-flowered; bracteoles 2-3 mm long, inserted in the pedicel; calyx 9-10 mm long with 2.5-3.5 mm long teeth; standard 20-23 × 8-9.5 mm; keel 15-16 mm long; anthers 1.1-1.2 mm long; pistil 13-14.5 mm long, with conic stigma; legume sparsely hairy, 3-4 mm wide, with only white hairs; seed pale brown-olivaceous, 2.5-3 × 1.5-1.6 mm .... A. greuteri
   – Leaflet tips acute; raceme 8-15-flowered; bracteoles 0.8-1.3 mm long, inserted at the base of the calyx; calyx 7.5-8 mm long, with 2-2.5 mm long teeth; standard 16-18 × 7.7-7.5 mm;
Fig. 4. *Astragalus sirinicus* – A: flowers; B: flower bud; C: open calyces; D: calyx indumentum; E: petals; F: stamens; G: pistil; H: stigma; I: legumes; J: seeds; K: leaves. – Drawn after material from Mt Sirino (locus classicus).
Table 1. Main differential characters of the species belonging to the *Astragalus genargenteus* group and *A. sirinicus* s.s.

<table>
<thead>
<tr>
<th>Characters</th>
<th><em>A. genargenteus</em></th>
<th><em>A. gennarii</em></th>
<th><em>A. greuteri</em></th>
<th><em>A. sirinicus</em></th>
</tr>
</thead>
<tbody>
<tr>
<td>Habit</td>
<td>compact</td>
<td>compact</td>
<td>loose</td>
<td>loose</td>
</tr>
<tr>
<td></td>
<td>10-30 cm tall</td>
<td>20-50(-70) cm tall</td>
<td>10-30 cm tall</td>
<td>10-30 cm tall</td>
</tr>
<tr>
<td>Leaflet shape size [mm] tip</td>
<td>oblong</td>
<td>oblong</td>
<td>oblong</td>
<td>oblong-lanceolate</td>
</tr>
<tr>
<td></td>
<td>2-6 × 1.5-3 rounded to obtuse</td>
<td>2-6 × 1-2.2 rounded to obtuse</td>
<td>2-6 × 1.5-2.5 rounded to obtuse</td>
<td>2.5-7 × 1.5-2.7 acute</td>
</tr>
<tr>
<td>Stipules</td>
<td>linear-triangular, 6-7 mm long, sparsely hairy at the margin; hairs 0.2-0.3 mm long</td>
<td>broad- triangular, 5-6 mm long, densely hairy on outer face and at the margin; hairs 0.4-0.7 mm long</td>
<td>linear-lanceolate, 6.5-8.5 mm long, densely hairy at the margin; hairs 0.5-1 mm long</td>
<td>linear-triangular, 7-9 mm long, densely hairy at the margin and on central outer face; hairs 0.7-2 mm long</td>
</tr>
<tr>
<td>Raceme</td>
<td>(2-)3-5-flowered</td>
<td>2-4-flowered</td>
<td>3-5-flowered</td>
<td>8-15-flowered</td>
</tr>
<tr>
<td>Bract length [mm]</td>
<td>2.5-3.5</td>
<td>1.5-2.5</td>
<td>5-6</td>
<td>4-6</td>
</tr>
<tr>
<td>Bracteoles length [mm]</td>
<td>on the pedicel 1.5-2</td>
<td>on the pedicel 0.5-1.5</td>
<td>on the pedicel 2-3</td>
<td>at the calyx base 0.8-1.3</td>
</tr>
<tr>
<td>Calyx size [mm]</td>
<td>9-10 × 4.4-5</td>
<td>6-7 × 3.5-3</td>
<td>9-10 × 3.5-4</td>
<td>7.5-8 × 3.6-4</td>
</tr>
<tr>
<td>Calyx teeth - lower length [mm]</td>
<td>linear-triangular 2.5-2.8</td>
<td>triangular 1-1.2</td>
<td>linear-triangular (2.5-)3-4</td>
<td>triangular 2-2.5</td>
</tr>
<tr>
<td>- upper length [mm]</td>
<td>linear-triangular 2-2.2</td>
<td>triangular 1.2-1.5</td>
<td>linear-triangular 2.5-3.5</td>
<td>broad-triangular 2-2.5</td>
</tr>
<tr>
<td>Calyx indument white hairs</td>
<td>densely hairy 0.5-1 mm long</td>
<td>densely hairy 0.3-0.5 mm long</td>
<td>densely hairy 0.3-1 mm long</td>
<td>densely hairy 0.4-1 mm long</td>
</tr>
<tr>
<td></td>
<td>0.2-0.5 mm long</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>black hairs</td>
<td>densely hairy 0.1-0.5 mm long</td>
<td>densely hairy 0.3-1.2 mm long</td>
<td>densely hairy 0.3-0.9 mm long</td>
<td></td>
</tr>
<tr>
<td>Corolla</td>
<td>white to yellowish, 16-20 mm long</td>
<td>white to yellowish tinged violet at the keel, 15-18 mm long</td>
<td>white to violet, 20-23 mm long</td>
<td>white to yellowish tinged violet at the keel, 17-18 mm long</td>
</tr>
<tr>
<td>Standard</td>
<td>16-20 × 8-9 mm, retuse at apex</td>
<td>14-18 × 7-8 mm, ± retuse at apex</td>
<td>20-23 × 8-9.5 mm, retuse at apex</td>
<td>16-18 × 7-7.5 mm, emarginate at apex</td>
</tr>
<tr>
<td>Keel length</td>
<td>13-15 mm</td>
<td>12-15 mm</td>
<td>15-16 mm</td>
<td>12-14 mm</td>
</tr>
<tr>
<td>Filament length</td>
<td>12-13 mm</td>
<td>12-13 mm</td>
<td>14-15 mm</td>
<td>12.5-13 mm</td>
</tr>
<tr>
<td>Anther length</td>
<td>1 mm</td>
<td>1 mm</td>
<td>1.1-1.2 mm</td>
<td>0.8 mm</td>
</tr>
<tr>
<td>Pistil length stigma</td>
<td>12-13 mm subglobose</td>
<td>11-12 mm subglobose</td>
<td>13-14.5 mm conical</td>
<td>12.5-13 mm subovoid</td>
</tr>
<tr>
<td>Legume size [mm]</td>
<td>± sparsely hairy 12-15 × 3-4</td>
<td>± densely hairy 11-13 × 3.2</td>
<td>sparsely hairy 11-12 × 3-4</td>
<td>densely hairy 10-12 × 4-5</td>
</tr>
<tr>
<td>beak [mm]</td>
<td>1-2</td>
<td>1.5-1.8</td>
<td>1.5</td>
<td>2.5-3</td>
</tr>
<tr>
<td>hairs</td>
<td>white, 1-1.2 mm</td>
<td>white, 0.1-0.7 mm</td>
<td>white, 1-2 mm</td>
<td>black and white, 0.3-1.5 mm</td>
</tr>
<tr>
<td>Seed colour</td>
<td>brown-olivaceous</td>
<td>brown-olivaceous, often blotched</td>
<td>pale brown-olivaceous</td>
<td>blackish brown</td>
</tr>
<tr>
<td>size [mm]</td>
<td>2.2-2.5 × 1.2-1.5</td>
<td>2.6-2.9 × 1.6-1.7</td>
<td>2.5-3 × 1.5-1.6</td>
<td>3-3.2 × 1.9-2.2</td>
</tr>
</tbody>
</table>
keel 12-14 mm long; anthers 0.8 mm long; pistil 12.5-13 mm long, with subovoid stigma; legume densely hairy, 4-5 mm wide, with black and white hairs; seed blackish brown, 3.2 × 1.9-2.2 mm

A. sirinicus

References


Addresses of the authors:

Gianluigi Bacchetta, Centro Conservazione Biodiversità (CCB), Dipartimento di Scienze Botaniche, Università degli Studi di Cagliari, v.le S. Ignazio da Laconi 13, I 09123 Cagliari, Italy; e-mail: bacchetta@unica.it
Salvatore Brullo, Dipartimento di Botanica, via A. Longo 19, I-95125 Catania, Italy; e-mail: brullo@dipbot.unict.it