

Astragalus croaticus (Fabaceae), a new species from Croatia

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Astragalus croaticus Alegro, Bogdanović, Brullo & Giusso *sp. nova* (Fabaceae) is described and illustrated from Dalmatia (Croatia). It grows on the carbonatic mountains of Biokovo and Mosor on rocky stands. Morphologically, it shows close similarities with *A. sirinicus* and *A. angustifolius*, two thorny species belonging to the sect. *Melanocercis*. However, *A. croaticus* has several distinguishing features chiefly in the leaves, flowers and legumes.

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

In the frame of taxonomic investigations on thorny *Astragalus* occurring in the Mediterranean area (Brullo & Giusso del Galdo 2001, 2003, Bacchetta & Brullo 2006), the populations found on some mountain stands of Dalmatia (Mt. Biokovo and Mt. Mosor) were examined. Based on literature (de Visiani 1852, Alschinger 1859, Schlosser & Vukotinović 1869, Ascherson & Graebner 1909, Hirc 1912, Domac 1958, 1962, Lovašen-Eberhardt 1997), the plants coming from these sites were referred to as *Astragalus angustifolius*, *A. sirinicus*, *A. aristatus* or *A. sempervirens*. Kušan (1956) attributed them to a taxon named *A. angustifolius* subsp. *biokovensis*, but that name is invalid (Art. 36.1 of the ICBN) and therefore should not be used, even though it had been (Kušan 1969, Mayer 1983, Bedalov & Šegulja 1987, Lovrić & Rac 1987, Trinajstić

1987, 1991, Lukač 1994).

Based on herbarium and field studies, the Dalmatian populations by some morphological features clearly belong to the sect. *Melanocercis* of the subgen. *Cercidothrix*. In particular, they are characterized by a suffrutescent habit, medifixed black and white hairs, imparipinnate leaves with spine-like rachis, stipules adnate to the petiole, flowers joined in racemes, tubular calyx, and legume subequal to calyx (Bunge 1868, 1869).

According to Kušan (1956), the populations growing in the Dalmatian mountains bear very close morphological similarities to *A. angustifolius* and *A. sirinicus*, but several morphological features also distinguish them. For this reason, the Dalmatian populations are here treated as a new taxon.

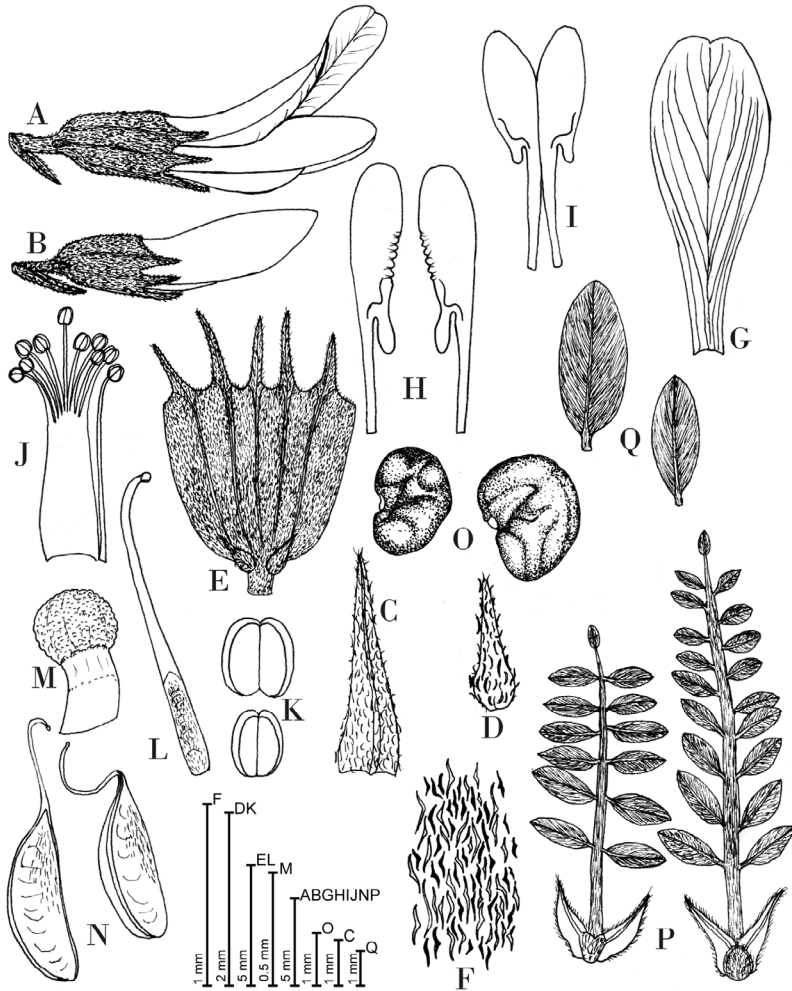


Fig. 1. *Astragalus croaticus* (from the holotype). — **A:** Flower. — **B:** Bud. — **C:** Bract. — **D:** Bracteole. — **E:** Open calyx. — **F:** Calyx hairs. — **G:** Standard. — **H:** Wings. — **I:** Keel. — **J:** Stamens. — **K:** Anthers. — **L:** Pistil. — **M:** Stigma. — **N:** Legumes. — **O:** Seeds. — **P:** Leaves. — **Q:** Leaflets.

***Astragalus croaticus* Alegro, Bogdanović, Brullo & Giusso, sp. nova (Figs. 1 and 2)**

Astragalus angustifolius Lam. subsp. *biokovens* Kušan Acta Mus. Maced. Sci. Nat. 4: 64. 1956, nom. inval. — *A. angustifolius* auct. croat. non Lam. 1783. — *A. sempervirens* auct. croat. non Lam. 1783. — *A. aristatus* auct. croat. non L'Hér. 1791. — *A. sirinicus* auct. croat. non Ten. 1826.

A. sirinico affinis sed max 30 cm alto, foliis usque ad 13 paribus foliolorum, foliolis oblan- ceolate 0.8–1.7 mm latis, apice obtusis, rachidii foliolio terminali longiori, stipulis lanceolatis, 4–5.5 mm longis, 1.2–1.3 mm latis, bracteo- lis ovato-lanceolatis, 1.4–2 mm longis, calyce 8–9 mm longo, viridi-roseo, pilis 0.1–0.3 mm longis, calycis dentibus subulatis, inferioribus 2.5–3 mm longis, vexillo 18–20 cm longo, alis

16–17 mm longis, pistillo 11–12 mm longo, ovario subglabro, stigmatе subgloboso, legu- mine subglabro, 2.5–3.5 mm lato, rostro 1.8–2 mm longo, semine olivaceo, 2–2.5 mm longo, 1.1–1.7 mm lato differt.

TYPE: Croatia. Dalmatia, Biokovo, Osičine, mountain rocky places within the clearings of *Pinus nigra* forests, 1320 m a.s.l., 07.VI.2007 A. Alegro & S. Bogdanović s.n. (holo- type CAT; isotypes CAT, ZA).

Dwarf shrub forming a loose, spiny cushion, 10–30 cm tall. Stems woody, densely branched, tough, with persistent stipules and rachis in old parts of branches. Leaves imparipinnate, 2–6 cm long, with ivory rachis, when juve- nile covered by scattered hairs and protracted into a straight spine, longer than upper leaf-



Fig. 2. Habit of *Astragalus croaticus* (from the type locality).

lets. Leaflets oblong, green-glaucous, obtuse at apex, 6–13 paired, 2.5×0.8 – 1.7 mm, covered by appressed medifixed hyaline hairs. Leaflet peduncle 0.2–0.6 mm long. Stipules lanceolate, 4.5×1.2 – 1.3 mm long, joined to rachis about half-way, acuminate at apex, coriaceous, straw coloured, 1-nerved, pubescent in middle, glabrous in limb and ciliate at margin. Raceme 6–10 flowered, with peduncle up to 1.5 cm long. Bract lanceolate, hyaline below, greenish above, apiculate, 4–5 mm long, densely hairy. Bracteoles ovate-lanceolate, densely hairy, 1.4–2 mm long, inserted at calyx base. Calyx cylindrical, white-greenish, tinged with pink, two-lipped, 8–9 mm long, 3–3.6 mm in diameter, densely covered by medifixed hyaline and black hairs; hyaline ones 0.1–0.3 mm long, black ones 0.1–0.2 mm long; teeth subulate, lower ones unequal (the lateral ones 2.8–3 mm long, and middle one 2.5–2.7 mm long), upper ones 2.2–2.5 mm long. Corolla white tinged with pink, yellowish when dried, 18–20 mm long; standard oblanceolate-spathulate, retuse at apex, 18×6.5 – 7 mm; wings 16–17 mm long; keel 13.5–14.5 mm long. Stamen filaments 12–14 mm long; anther yellow, subcircular, 0.8–0.9 mm long. Pistil 11–12 mm long; ovary sparsely hairy, hairs 0.2 mm long; style glabrous; stigma subglobose, slightly rugose. Legume ellipsoid, 11×2.5 – 3.5 mm, subglabrous, with white hairs and beak

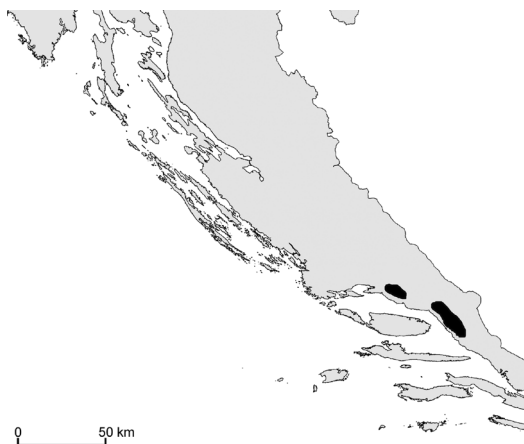


Fig. 3. Geographical distribution of *Astragalus croaticus* (black area).

1.8–2 mm long. Seeds reniform, 2.5×1.1 – 1.7 mm, olivaceous, smooth, laterally compressed. Flowering in May–June, fruiting in June–July.

DISTRIBUTION AND HABITAT ECOLOGY. *Astragalus croaticus* is endemic to the Dalmatian mountains of the Dinaric range (Mt. Biokovo and Mt. Mosor). The populations found in these two sites have numerous individuals growing in various stands at an altitude of 700–1700 m (Fig. 3). It is linked to carbonatic substrata (limestones and dolomites), where it usually grows in rocky places and screes localized within clearings of the *Pinus*

nigra forests. It is a member of a dwarf shrubby pioneer community, characterized by several endemic species (as *Genista pulchella*, *Bupleurum karglii*, *Cerastium grandiflorum*, *Campanula portenschlagiana*, *Cardamine maritima*, *Drypis spinosa* subsp. *jacquiniana*, *Teucrium arduinii* and *Portenschlagiella ramosissima*).

Astragalus croaticus, due to the loosely pulvinate habit, green-glaucous leaflets, corolla not entirely white, and stipules ciliate at the margin, is closely related to *A. angustifolius* and especially to *A. sirinicus*. The morphological differences among the three taxa are presented in Appendix. We think *A. croaticus* can be considered an Illyrian vicariant of *A. sirinicus*, the latter distributed in the southern Balkans and Italian peninsula.

SELECTED SPECIMENS EXAMINED (paratypes). — **Croatia.** Dalmatia, Biokovo, supra Makarska, in graminosis lapidosis solo calcareo, ca. 900 m s.m., 29.VI.1958 Mayer 55055 (M); Biokovo, Stemtust. (Kalk), 1400 m, 20.VI.1959 Mayer 10781 (M); Biokovo, Am Fussedis Troglav, 1600 m, 12.VI.1904 Poscharsky s.n. (M); Biokovo, prema vrhu Sv. Ilija, 1530 m, 7.VI.2007 Alegro & Bogdanović s.n. (CAT, ZA); Biokovo, sipari iznad Basta, 800 m, 7.VI.2007 Alegro & Bogdanović s.n. (ZA); Biokovo, Borovac, šuma crnog bora (uz vrh Šibenika), 1350 m, 5.VII.1958 Domac s.n. (ZA). Mosor, Volujak, ispod planinarskog doma U. Girometta, 6.VI.2007 Alegro, Bogdanović & Vladović s.n. (CAT, ZA).

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Appendix. Morphological comparison of <i>Astragalus croaticus</i> , <i>A. angustifolius</i> and <i>A. sirinicus</i> .			
Characters	<i>A. croaticus</i>	<i>A. angustifolius</i>	<i>A. sirinicus</i>
Habit	loosely pulvinate 2–6 cm	densely pulvinate 2–4.5 cm	loosely pulvinate 3–6 cm
Leaf length	6–13 pairs, green-glaucous,	6–8 pairs, green, oblong,	8–10 pairs, green-glaucous,
Leaflets	oblanceolate, 2.5 × 0.8–1.7 mm, obtuse	2–6 × 1–2.1 mm, rounded	oblong-lanceolate, 2.5–7 × 1.5–2.7 mm, acute
Rachis	longer than terminal leaflets	subequal or shorter than terminal leaflets	subequal or shorter than terminal leaflets
Stipule	lanceolate, 4–5.5 × 1.2–1.3 mm, pubescent in middle, glabrous in limb and ciliate at margin	ovate-lanceolate, 4.5–6 × 1.8–2 mm, totally hairy-ciliate	linear-triangular, 7–9 × 2–2.5 mm, pubescent in middle, glabrous in limb and ciliate at margin
Bract length	4–5 mm	3.5–5 mm	4–6 mm
Bracteoles	ovate-lanceolate, 1.4–2 mm	lanceolate, 2.5–3 mm	lanceolate, 0.8–1.3 mm
Calyx	8–9 mm long, green-pinkish, with hairs 0.1–0.3 mm long	9–10 mm long, green to green-brown, with hairs 0.3–0.8 mm long	7.5–8 mm long, green, with hairs 0.3–1 mm long
Calyx teeth	subulate, lower ones unequal, laterals 2.8–3 mm long, central 2.5–2.7 mm long, upper ones 2.2–2.5 mm long	lower ones subulate, unequal, laterals 3–3.5 mm long, central 3.2–4 mm long, upper ones linear-triangular, 3–3.5 mm long	lower ones triangular, equal, 2–2.5 mm long, upper ones broad-triangular, 2–2.5 mm long
Corolla	white tinged with pink, 18–20 mm long	white, 16–18 mm long	white-yellowish tinged with pink-violet, 17–18 mm long
Standard	18–20 × 6.5–7 mm	16–18 × 7.5–8 mm	16–18 × 7–7.5 mm
Wing length	16–17 mm	16 mm	12–15 mm
Keel length	13.5–14.5 mm	14 mm	12–14 mm
Filament length	12–14 mm	14 mm	12.5–13 mm
Pistil length	11–12 mm	10 mm	12.5–13 mm
Ovary indumentum	sparsely hairy, with hairs 0.2 mm long	densely hairy, with hairs 1 mm long	densely hairy, with hairs 0.6–1 mm long
Stigma	subglobose, scabrous	hemispherical, papillose	subovoid, scabrous
Legume	ellipsoid, 11–12 × 2.5–3.5 mm, subglabrous, with white hairs, beak 1.8–2 mm long	conic-ovoid, 9–10 × 3–3.2 mm, densely hairy, with black and white hairs, beak 0.5–0.7 mm long	ellipsoid, 10–12 × 4–5 mm, densely hairy, with black and white hairs, beak 2.5–3 mm long
Seed	olivaceous, 2–2.5 × 1.1–1.7 mm	brown-blackish, 2–2.2 × 1.2–1.5 mm	brown-blackish, 3–3.2 × 1.9–2.2 mm