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## Taxonomical notes on the genus *Adenocarpus* DC. (*Leguminosae*) in Italy

### Abstract

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The species of *Adenocarpus* occurring in the Italian territory are examined. Their taxonomic investigation has allowed to recognize four species which are represented by *A. commutatus* Guss., *A. bionii* C. Presl., *A. brutius* sp. nov. and *A. samniticus* sp. nov. The morphological features, ecology, chorology and relationships of these species are discussed.

### Introduction

The genus *Adenocarpus* DC. shows close relationships with other archaic genera of *Leguminosae* such as *Genista* L., *Cytisus* L., *Chamaecytisus* Link, *Laburnum* Fabr., *Calicotome* Link, *Teline* Medicus, but it differs by the legume with glandular stipitate tubercles. This taxon, which must be considered natural, was placed by Bentham & Hooker (1862) in the tribe *Genisteae* and more recently by Hutchinson (1964) in the tribe *Laburneae*.

As concerns its geographical distribution, the genus *Adenocarpus* prevalently occurs in the Mediterranean area, with some species localized in Macaronesia, W-Europe and Tropical Africa. According to Vicioso (1955), Gibbs (1967), Rivas-Martinez & Belmonte (1989), Greuter & al. (1989), Castroviejo (1999 a, b), this genus is very hard because it includes some critical taxa, which are treated in different way by the various authors. The Italian populations occurring in Sicily and Calabria were ascribed by Candolle (1825) to *A. intermedius*, while Presl (1822, 1826) considered the population on Mt. Etna (Sicily) as a distinct species, named *A. bionii*. Then Gussone (1827, 1844), in addition to *A. bionii*, described *A. commutatus*, from some localities of the Peloritani range (N-E Sicily). Afterwards Caruel (1894) attributed all Italian populations to *A. parvifolius* DC., within which he distinguished three varieties: var. *polyadenius* from C Italy, var. *bionii* from Etna and var. *commutatus* from Calabria and the Peloritani mountains. More recently Fiori (1925), Gibbs (1968), Pignatti (1982) and Greuter & al. (1989), recognized only *A. complicatus* (L.) Gay with various subspecies or varieties, from Italy and Sicily.

In order to clarify the taxonomic question about the genus *Adenocarpus* in Italian territory, extensive field work and herbarium investigations were carried out. On the basis of this study four well distinguished species can be recognized, which are different in numerous morphological characters regarding habit, leaf, flower, legume and seed features.

## Results and remarks

### 1. *Adenocarpus bivonii* (C. Presl) C. Presl, Fl. Sic. 1: 19. 1826. - Fig. 1.1, 2

*Syn.* *Genista bivonii* C. Presl in J. & C. Presl, Del. Prag. 1: 33. 1822; *Adenocarpus parvifolius* (Lam.) DC. var. *bivonii* (C. Presl) Caruel in Parl., Fl. Ital. 10: 120. 1894; *Adenocarpus complicatus* (L.) Gay var. *bivonii* (C. Presl) Fiori & Paol., Fl. Anal. Ital. 2: 11. 1900; *Adenocarpus parvifolius* (Lam.) DC. var. *humilis* Bertol., Fl. Ital. 7: 366. 1850.

Typus: in siccis sylvaticis Aetnae, VII, C. Presl (lectotypus PRC).

Shrub prostrate-ascending, 40-80 cm high, with many branches ivory-whitish, ciliate-hairy. Leaves 3-foliolate, with peduncle 4-8 mm, hairy, and leaflets 5-11 × 2-5 mm, oblong, shining and sparsely hairy in the lower surface, opaque and glabrous the in upper one. Stipules 1-4 mm long. Inflorescences lax, 5-12 cm long. Bract triangular-subulate, ciliate with some glandular stipitate papillae, 4-4.5 × 0.7-1 mm. Bracteoles subulate, ciliate with some glandular stipitate papillae, 2-2.5 × 0.2-0.4 mm. Pedicels 2-4 mm long. Calyx 5-6.5 mm long, with glandular stipitate papillae mixed to sparse and short hairs; lower lip 3.5-4 mm long, with central tooth 1.8-2 mm long, and the lateral ones 1.2-1.6 mm long; upper lip with two triangular teeth 2.5-3 mm long. Corolla yellow; standard suborbicular, 10-11 mm long, with appressed hairs on the back, and claw 1.5-2 mm long; wings 9-10 mm long; keel 9-10 mm long. Legume pale-brown 25-40 × 3.5-4 mm, 6-8 seeded. Seed brown-greenish, 2.5-2.8 mm long.

*Specimina visa.* - Etnae, 1832, *Gussone* (BOLO); Catania, M. Etna versante est (Linguaglossa, Rif. Citelli), 31.5.1972, *Anzalone* (FI, RO); In sylvaticis siccis reg. mont. et rup. Aetna, VI.1905, *Ross* 623 (FI); Etna (Mascalucia), VI.1894, *Martelli*. (FI); in sylvaticis siccis reg. mont. et subalpine, Etna, VI.1908, *Ross* (BM, FI, G, M); Etna, 1200 m, VI.1885, *Ross* (FI); Etna Pietracannone, V. 1894, *Fichera* (FI); Etna sopra Zafferana, 1899, *Lopriore* (FI); Giarrida (prov. Catania), VII.1894, *Amigoni* (FI); Etna, sylvaticem *Parlatore* (FI); Etna, 3.8.1884, *Ross* (RO); Etna verso N.E. al di sotto del bosco di betulla lungo la strada interrotta dalle lave, 31.5.1972, *Montelucci* 12284 (RO); In M.te Aetna, *Cesati* (RO); in summitate montis Aetnae, 1834, *Cosentini* (P); Etna, s. l. (PAL); monte presso la valle del Voi, s. l. (PAL); Milo, Cerrita, s. l. (PAL); Etna al vallone dei Zappini, s. l. (PAL); mont Etna, 27.6.1995, *Certa, Schimmenti & Scafidi* (PAL); in regione nemore montis Aetnae, solo vulcanico, 26.6.1874, *Strobl* (M); Cerrita (Etna), 23.7.1991, *Brullo* (CAT); Casa Cantoniera (Etna), 21.7.1980, *Brullo* (CAT); Rifugio Citelli, 27.7.1980, *Brullo* (CAT); Rifugio Citelli, 3.7.1983, *Brullo* (CAT); Aetna, in elatis al Sambuco, julio augusto, *Tornabene* (CAT); Aetna, Valle del Bove, 12.6.1903, *Cavara* (CAT); Etna, strada tra Zafferana e Citelli, 1899 (CAT); Etna Valle del Bove, 11.6.1903, *Cavara* (CAT); a Giarrida in Val del Bove, 7.1894, *Baccarini* (CAT).

*Distribution.* - *A. bivonii* is confined to Mt. Etna (Sicily), where occurs in NE to SW-facing slopes at 1200-2000 m of altitude (Fig. 3).

*Ecology.* - This species grows on the volcanic substrata in the *Betula aetnensis* woods or more rarely in *Pinus nigra* subsp. *calabrica* pinewoods. Besides it is a member of orophilous bushland dominated by *Genista aetnensis*.

*Remarks.* - *Genista bivonii* was at first described by Presl (1822) and later by the same author (Presl 1826) included in the genus *Adenocarpus*. Many of the subsequent authors



Fig. 1. Some significant morphological features of *Adenocarpus bivonii* (1), *A. commutatus* (2), *A. brutius* (3), *A. samniticus* (4). – A, flower; B, bud; C, open calyx; D, bract; E, bracteole; F, leaves.

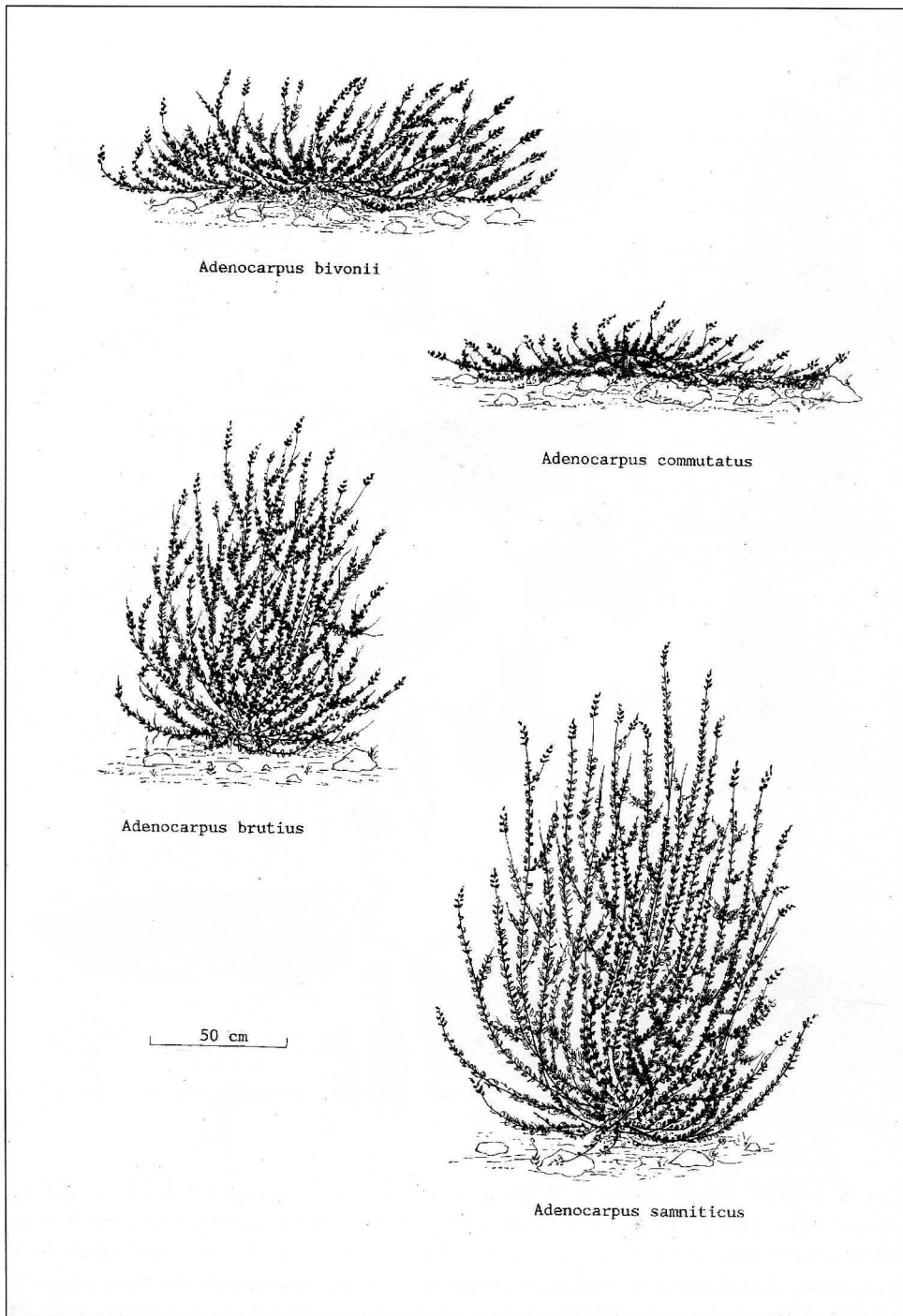


Fig. 2. Habit of Italian species of *Adenocarpus*.

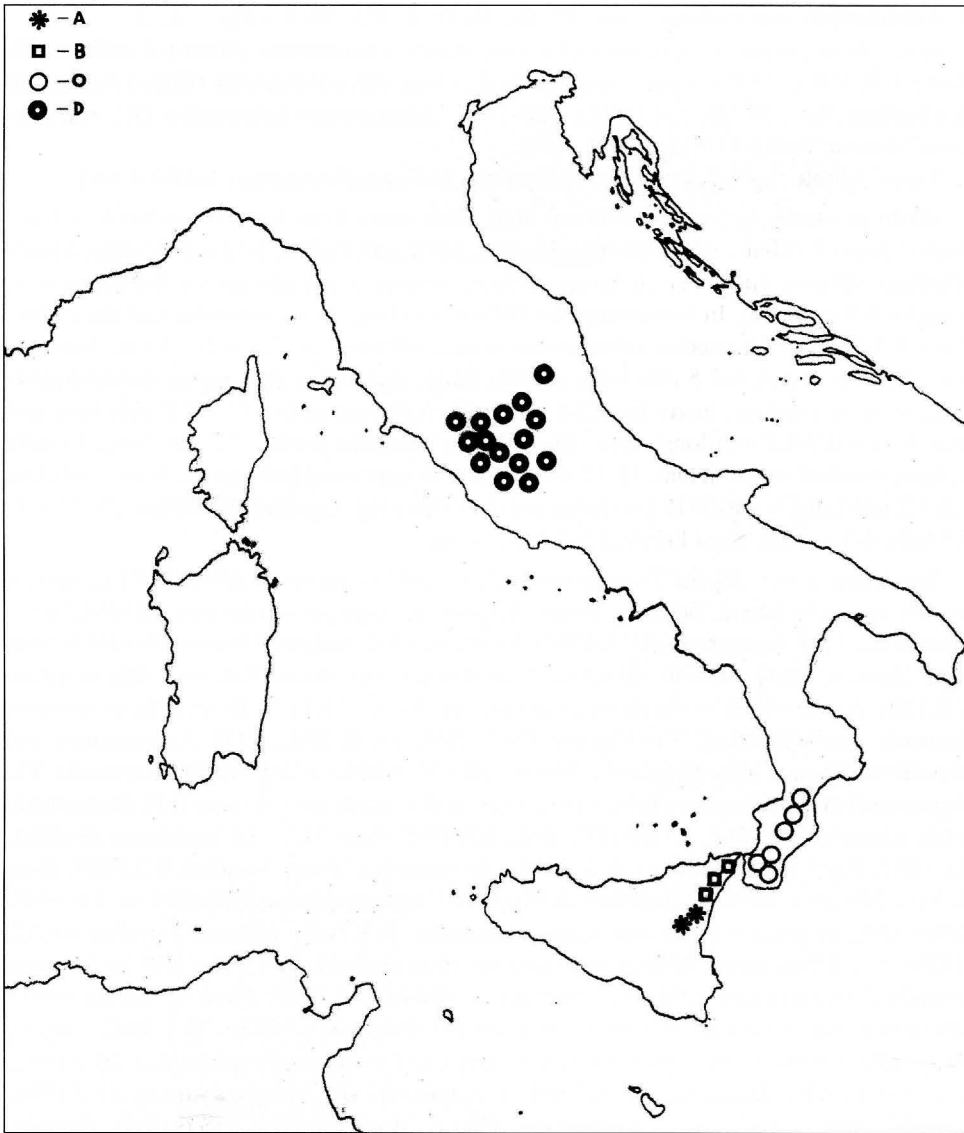


Fig. 3. Geographical distribution of *Adenocarpus bionii* (A), *A. commutatus* (B), *A. brutius* (C), *A. samniticus* (D).

(Gussone 1827, 1844, Strobl 1880, Tornabene 1887, 1890, Lojacono 1891) shared the same opinion and considered *Adenocarpus bionii* as a distinct species too, while some others treated it as a variety. In particular, Bertoloni (1850) and Caruel (1895) includes it in *A. parvifolius*, the first describing it as var. *humilis*, and the second as var. *bionii*. On the other hand Fiori (1902, 1925) quoted it as *A. complicatus* var. *bionii*. More recently Pignatti (1982) considered *A. bionii* as a synonym of *A. complicatus* s. str.

**2. *Adenocarpus commutatus*** Guss., Fl. Sic. Prodr. 2: 375. 1828. - Fig. 1.2., 2

*Syn.*: *Adenocarpus complicatus* (L.) Gay subsp. *commutatus* (Guss.) Coutinho, Fl. Port.: 320. 1913; *Adenocarpus complicatus* (L.) Gay var. *commutatus* (Guss.) Ascherson & Graebner, Syn. Mitteleur. Fl. 6(2): 208. 1907; *Adenocarpus intermedius* DC. var. *gussonei* Nicotra, Prodr. Fl. Mess.: 174. 1878.

*Typus*: Monte Scuderi verso Fiume Trepizzi, *Gussone* (lectotypus: NAP-GUSS).

Shrub prostrate-pulvinate, 20-50 cm high, with many branches ivory-whitish, ciliate-hairy. Leaves 3-foliolate, with peduncle 3-6 mm, hairy, and leaflets 5-11 × 2-3.5 mm, linear-elliptical, shining and hairy in lower surface, opaque and glabrous on the upper one. Stipules 1-3 mm long. Inflorescences lax (6)8-16 cm long. Bract ovato-lanceolate, ciliate, 5-8 × 1.5-2.2 mm. Bracteoles subulato-lanceolate, ciliate, 2.2-3.7 × 0.5-0.7 mm. Pedicels 3-5 mm long. Calyx 6-7.5 mm long, densely hairy, sometimes with some scattered glandular stipitate papillae; lower lip 4.2-5 mm long, with central tooth 1.8-2.5 mm long and lateral ones 0.9-1.2 mm long; upper lip with two triangular teeth 2-2.2 mm long. Corolla yellow; standard suborbicular, 10-12 mm long, with appressed hairs on the back, and claw 1.5-1.7 mm long; wings 9-10 mm long; keel 8-9 mm long. Legume pale-brown 20-30 × 4-5.5 mm, 4-7 seeded. Seed brown 2.5-2.8 mm long.

*Specimina visa.* - Monte Dinnammare, 27.6.1847, *Gussone* (NAP-GUSS); in apricis asperis montosis Monte Scuderi, Monti di Messina, majo julio, *Gussone* (NAP-GUSS); Mandanici, 11.6, *Gussone* (NAP-GUSS); Monte Scuderi, giugno, *Gussone* (NAP-GUSS); M.te Scuderi, 1847, *Schow* (BOLO); Antennammare sui monti Nettunii, 900 m circa, VII.1901, *Nicotra* (FI); in sterilibus montosis Mandanici, VI.1882, Borzi (FI); in arenosis montosis monte Scuderi, VI, *Citarda 1201* (BM, FI, P, PAL, RO); Antennammare nel Messinese, *Nicotra* (FI); Mandanici, *Nicotra* (G); Mandanici a Colleverde Castoreale, VI, *Seguenza* (FI); Castoreale, *Munafò* (FI); Colline di Castoreale, *Nicotra* (FI); in montosis aridis Messina, 6.7.1905, *Zodda* (FI); *ibid.*, 6.7.1905, *Ross 522* (FI); Mandanici (Sicilia), 4.6.1882, *Borzi* (RO); Messina, s. l. (PAL); in montibus aridis, Messina, 6.7.1905, *Ross 522* (G, M); prov Messina sudwestlich Messina, l'Antennammare 950-1000 m, 9.6.1988, *Erben* (M); in pascuis subalpinis supra Mandanici, 18.6.1856, *Huet du Pavillon 64* (G, OXF); in collibus prope Messenam, *Gussone* (G); Messina, c. 15 Km SW of Messina towards l'Antennammare, Monti Peloritani c. 800 m, 7.6.1979, *Davis et Sutton 64649* (BM); Messina in summo iugo inter Telegrafo et Dinnammare c.750 m, 26.5.1907, *Lacaita 99/7* (BM); Monte Scuderi prope Messina, *Arrosto* (C); Antennammare (Me), 23.7.1992, *Siracusa* (CAT); Dinnammare, 6.1980, *Piccione* (CAT); Antennammare 11.5.1990, *Bartolo, Brullo, Pulvirenti, Spampinato* (CAT); Monte Scuderi, 13.6.1990, *Bartolo, Brullo, Scelsi, Spampinato* (CAT); Antennammare (Me) 20.6.1981, *Brullo* (CAT); Colle S. Rizzo, 11.6.1980, *Brullo* (CAT); Dinnammare, 11.6.1980, *Brullo* (CAT); Messina Monte Scuderi in elatis, majo julio, *Tornabene* (CAT).

*Distribution.* - *A. commutatus* is localized in some places of Peloritani range (NE Sicily) at an altitude between 700 and 1200 m (Fig. 3).

*Ecology.* - This species is a member of a shrub acidophilous community, represented by *Calicotomo infestae-Adenocarpetum commutati*, association belonging to the class *Cytisetea striato-scoparii* (Bartolo & al. 1994). It requires light and occurs on schists and gneiss mainly in windy rocky places.

*Remarks.* - From literature (Maire 1987, Vicioso 1955, Gibbs 1968, etc.) this species is recorded, apart from Sicily, also from various territories of W Mediterranean area (Portugal, Spain, France, S Italy, Morocco, Algeria). On the basis of herbarium investigations, it was possible to check that these records were based on misidentified material morphologically well different from the typical Sicilian populations of *A. commutatus*, as highlighted by Castroviejo (1999a). Therefore, this taxon must be considered an endemic species confined to the Peloritani range, having some relationships with *A. complicatus* (L.) G. Gay. In particular, both the species have a legume generally without glandular tubercles, but *A. complicatus* has an erect habit, up to 3 m high, leaves sometimes fasciculated, leaflets ovate to obovate, bract lanceolate 2.6-5 mm long, bracteole filiform 1-2.5 mm long, calyx tube 1.6-2.6 mm long, standard ovate 10-15 mm long, wings 8.7-9.3 mm long, seeds dark green to blackish 2.8-3.5 mm long; while *A. commutatus* has a prostrate-pulvinate habit, up to 50 cm high, leaves never fasciculated, leaflets linear helleptical, bract ovate-lanceolate 5-8 mm long, bracteole subulate-lanceolate 2.2-3.7 mm long, calyx tube 1.2-1.6 mm long, standard suborbicular 10-12 mm long, wings 9-10 mm long, seeds brown 2.5-2.8 mm long. In accordance with Castroviejo (1999b), *A. complicatus* is to be restricted to a W-Mediterranean range (Portugal, Spain and France), centred in the Duero river valley.

**3. *Adenocarpus brutius* Brullo, De Marco & Siracusa sp. nova** - Fig. 1.3., 2.

*Syn.*: *Adenocarpus intermedius* DC. in Lam. & DC., Fl. Fr. 5: 549. 1815, p.p.

*Typus*: Calabria, Aspromonte, Gambarie, 10.6.1995, Brullo & Spampinato (holotypus CAT).

*A. commutato* similis sed habitu adscendenti vel erecto, laxo, usque ad 150 cm alto, pedunculis 3-15 mm longis, foliolis 6-20 × 2,5-7 mm, obovatis, sparsim pilosis superne, stipulis 2-6 mm longis, racemis 6-30 cm longis, bractea, 6-10(15) × 1,8-2,2 mm, bracteolis 3,8-5,5 × 0,5-1 mm, calice 7,5-10 mm longo, labio inferiore 4,3-5,6 mm longo, vexillo retuso apice, legumine brunneo-nigrescenti, 30-45 × 4-5 mm, semine brunneo-rubenti, 2,5-3 mm longo.

Shrub adscendent to erect, 50-150 cm high, with many branches pale-brown-greenish, ciliate-villous. Leaves 3-foliolate, with peduncle 3-15 mm long, ciliate-hairy, and leaflets 6-20 × 2.5-7 mm, obovate, densely hairy in lower surface, opaque and sparsely hairy on the upper one. Stipules 2-6 mm long. Inflorescence lax, 6-30 cm long. Bract ovate-lanceolate, ciliate, 6-10(15) × 1.8-2.2 mm. Bracteoles subulate-lanceolate, ciliate, 3.8-5.5 × 0.5-1 mm. Pedicels 3-5 mm long. Calyx 7.5-10 mm long, densely hairy, sometimes with some scattered glandular stipitate papillae; lower lip 4.3-5.6 mm long, with central tooth 1.8-2.5 mm long, and lateral ones 1.5-1.8 mm long; upper lip with two triangular teeth 2.8-3 mm long. Corolla yellow; standard suborbicular 10-12 mm long, retuse at apex, with appressed hairs on the back, and claw 1.5-2 mm long; wings 9-10 mm long; keel 8-9 mm long. Legume brown-blackish, 30-45 × 4-5 mm, 7-10 seeded. Seed brown-reddish, 2.5-3 mm long.

*Specimina visa.* - Calabria a Mongiana, alla Sessa, 1828, *Gussone* (BOLO); Calabria, Aspromonte, 1828, *Gussone* (BOLO, RO, P); In collibus aridis Calabriae, Scilla, 1826, *Gussone* (BOLO); Calabria, 1830, *Gussone* (P); Aspromonte, W from Gambari on S.S. 184 road from Gallico, 22.7.1983, *Akeroyd, Jury, Miles, Rumsey 3812* (BM, FI); prov. Reggio Gerace in rupibus scistosis versus Pian di Melia, 6.6.1898, *Rigo 331* (FI, M, P);

ad vias sylvarum a Gerace versum i Piani di Melia, 22.6.1907, *Rigo* (G); Aspromonte in locis aridis, 17.7.1898, *Rigo 454* (FI, G, P); Monte San Copolo sopra Arno (Reggio Calabria), 27.5.1921, *Lacaita* (BM, FI); in summis jugis montis Aspromonte Calabriae, locis umbrosis, 10.7.1874, *Strobl* (FI, M); Serra S. Bruno Calabria, 30.6.1884, *Zuweirlein* (FI, M); in nemoribus montis Pecoraro Calabria, 18.6.1877, *Biondi* (FI); In dumetis Calabriae, Serra S. Bruno, VI.1884, *Zuweirlein & Lojacono 72* (BM, FI); Aspromonte loc. Tre Aie, 3.8.1958, *Moggi* (FI); In herbosis asperis silva mixta Abietis albae et Fagi sylvaticae, prope Ferdinandea (Serra S. Bruno), loco Tre Ponticelli dicto, 6.8.1958, *Moggi 125* (FI, G); Serra S. Bruno Calabria, 30.6.1884, *Zuweirlein* (FI, RO); Pecoraro Calabria, 18.6.1877, *Biondi* (FI); in fruticis prope S. Eufemia di Aspromonte secus via ducit Bagnara, 22.6.1877, *Arcangeli* (FI, RO); in sylvaticis umbrosis supra i Piani di Aspromonte, 21.6.1877, *Arcangeli* (FI, RO); in sylvaticis secus viam inter Stilo et Mungiana, prope Pecoraro in Calabria, 18.6.1877, *Biondi* (FI); in fruticetis ad Serra S. Bruno, 15.6.1884, *Zuweirlein* (FI); *ibid.*, 30.6.1884, *Zuweirlein* (FI); Calabria presso Miriolo, 16.6.1899, *Fiori* (FI); in clivibus apricis supra S. Stephano in Aspromonte, 30.7.1877, *Huter, Porta & Rigo 475* (BM; FI, P); in dumetis supra S. Stefano Calabria, 27.6.1856, *Huet du Pavillon 297* (BM, FI, G, OXF, P); in sabulosis collium inter S. Eufemia et Palmi in Calabria, *Arcangeli* (RO); Aspromonte, Gebiet der Montalto, 10.8.1965, *Merxmüller & Grau 20538* (M), Reggio di Calabria on der Strasse auf dem Montalto, 13.9.1974, *Buttler & Erben 18772* (M); Aspromonte, C. 10 Km E of Santa Cristina d'Aspromonte, 13.6.1979, *Davis et Sutton 65078* (BM); Lungo la strada riserva Basilicò, 19.7.1985, *Bartolo* (CAT); Faggio del Re, 28.10.1980, *Brullo* (CAT); Soriano Calabro, 5.7.1980, *Brullo* (CAT); Monte Pecoraro, 28.10.1980, *Brullo* (CAT); Mongiana, 20.8.1980, *Brullo* (CAT); Campi d'Aspromonte, 7.1984, *Signorello & Spampinato* (CAT); Torrente Vasi, 15.5.1995, *Spampinato* (CAT); Aspromonte, 14.6.1981, *Brullo* (CAT); Fabrizia, 6.7.1980, *Brullo* (CAT); Serra S. Bruno, 7.7.1980, *Brullo* (CAT); Calabria (Bgnara), 3.6.1982, *Brullo & Signorello* (CAT).

*Distribution.* - *A. brutius* is exclusive of South Calabria (Aspromonte and Calabrian Sierras) where it is widespread at a 800-1500 m altitude (Fig. 3).

*Ecology.* - It grows on siliceous substrata, mainly schists, gneiss and granites, in mesophilous bushland with *Cytisus scoparius* and *Erica arborea*, an acidophilous community described as *Centaureo-Adenocarpetum intermedii* Brullo & Furnari 1982, belonging to the class *Cytisetia striato-scoparii* (cfr. Barbagallo & al. 1982). Therefore the name of this association must be rectified and a new name is proposed, *Centaureo-Adenocarpetum brutii* nom. corr.

*Remarks.* - At first, De Candolle (1825) attributed specimens of this species, together with those referable to *A. commutatus* from Sicily and *A. complicatus* from Portugal, to *A. intermedius*. As a matter of fact, as remarked by Castroviejo (1999a), *A. intermedius* is a *nomen dubium*, since De Candolle (Lamarck & De Candolle 1815), when created the genus *Adenocarpus*, proposed to replace it with the name at issue *Cytisus complicatus* Brot., a portuguese taxon of uncertain identification because of the lack of original specimens and a protologue with a not very clear diagnosis (Brotero 1804). More recent authors, mainly basing the identification on the non glandular calyx, referred the Calabrian populations to *A. commutatus*.



4. *Adenocarpus samniticus* Brullo, De Marco & Siracusa **sp. nova.** - Fig. 1.4., 2.

*Syn:* *A. parvifolius* DC. var. *polyadenius* Caruel in Parl., Fl. Ital. 10: 119 (1894)

*Typus:* Italy, Latium, Lago di Vico, Casaletto, 29-6-1995, De Marco s.n. (holotypus CAT)

*A. bivonii* similis sed habitu erecto, usque ad 2 m alto, caule viridulo vel eburneo-viridulo, subglabro vel sparsim piloso, foliolis sparsim pilosis superne, stipulis 0,5-2 mm longis, racemis usque ad 30 cm longis, bractea lanceolata, 5,5-7 × 1,2-1,5 mm, bracteolis 3,5-4,5 × 0,5-0,7 mm, pedicello 5-10 mm longo, calice 9-12 mm longo, dense piloso sparsim glandulosis papillis, labio inferiore 6-10 mm longo, labio superiore dentibus 3,8-5,5 mm longis, vexillo 12-15 mm longo, alis 11-12 mm longis, legumine brunneo-nigrescenti, 40-50 × 5-6 mm, semine brunneo-nigrescenti.

Shrub erect, 50-200 cm high, with many branches greenish to ivory-greenish, subglabrous or sparsely hairy. Leaves 3-foliolate, with peduncle 4-10(15) mm long covered with short and appressed hairs, and leaflets 6-17 × 3-7 mm, obovate, shining and hairy on the lower surface, opaque and sparsely hairy on the upper one. Stipules 0.5-2 mm long. Inflorescence lax, 10-30 cm long. Bract lanceolate, ciliate-glandular, 5.5-7 × 1.2-1.5 mm. Bracteoles subulate-lanceolate to subulate, ciliate-glandular, 3.5-4.5 × 0.5-0.7 mm. Pedicels 5-10 mm long. Calyx 9-12 mm long, densely hairy with scattered glandular stipitate papillae; lower lip 6-10 mm long, with central tooth 3-4.3 mm long, and lateral ones 1.5-2.5 mm long; upper lip with two triangular teeth 3.8-5.5 mm long. Corolla yellow; standard suborbicular 12-15 mm long, rounded at apex, with appressed hairs on the back, and claw 2-3 mm long; wings 11-12 mm long; keel 10-11 mm long. Legume brown-blackish, 40-50 × 5-6 mm, 7-12 seeded. Seed brown-blackish, 2.5-3 mm long.

*Specimina visa.* - M. Sibilla, 1820, *Orsini* (BOLO); Bolsena, 1828, *Masquillier 160* (BOLO); fra Ronciglione e Monte Rosi sulla strada portale, 1828, *Mauri* (BOLO); Albano, 1828, *Masquillier 130* (BOLO); M.te Fortino a Loto, V.1836, *Marzialetti* (BOLO); *ibid.*, VI.1840, *Marzialetti* (FI); M.te Fortino a Loto Piceno, 1845, *Marzialetti* (BOLO); *ibid.*, 19.7.1844, *Marzialetti* (FI); Agro viterbensis, 1826, *Camilli* (BOLO); Montagne di Viterbo, 1847, *Schow* (BOLO); *ibid.* 30.9.1824, *Schow* (C); Valmontone, 1847, *Schow* (BOLO); in Monte Albano, 15.10.1829, *Schow* (C); Roma, *Schow* (C); M.te Fortino a Viedemosta, 1843, *Marzialetti* (FI); In ericetis apricis M. Fortino, *Orsini* (FI); Colli del Lazio ai Campi d'Annibale, 25.8.1849, *Gennari* (FI); abbondantissimo lungo via da Paliano alla stazione di Segni, 20.7.1897, *Beguinet* (FI); in aridis et ad sepes secundum viam inter Paliano et stazionem Segni, Paliano loco dicto Pimpinara, 30.7.1906, *Beguinet 1066* (BM, FI, OXF, RO); Campi di Annibale bei prati, 9.7.1939, *Senni* (FI); pendici settentrionali di M.te Sarapullaro, 9.7.1939, *Senni* (FI); nei boschi presso Rocca di Papa, 21.5.1886, *Biondi* (FI); tra Roma e Acquapendente, *Parlatore* (FI); Monti Albani a Roccapriora, V-VI.1850, *Rolli* (FI); Monti Tuscolani 16.6.1858 - 7.9.1858, *Rolli* (FI); Monte Cimino presso Viterbo, 19.10.1936, *Parlatore* (FI); Monte Bosano 1.10.1884, *Macchiati* (FI); tra Frascati e Rocca di Papa, 29.9.1889, *Caruel* (FI); Viterbe (St. Romain), *Richard* (P); Frascati, VII.1841, *Drake* (P); Colli Albani alla Doganella sotto Rocca Priora, prati e aree a *Cytisus scoparius*, 26.8.1961, *Montelucci 8729* (RO); lungo la via Cassia, esposti al sole ma sotto castagneto, a Capranica, 25.7.1935, *Montelucci 3958* (RO); Lazio a Cave (presso Palestrina), 28.8.1931, *Montelucci 1996* (RO); Lago di Vico dintorni di M. Venere, 7.1954, *Anzalone* (RO); Lago di Vico presso pendici M. Venere, 5.6.1992, *Anzalone* (RO); pendici di M.

Venere e M. Fagliaro Pantanacce, rive lago, 3.5.-13.6. 1985, *Anzalone* (RO); Sasso (presso Furbara-S. Severa-Roma 18.7.1988, *Anzalone* (RO); Rocca Priora (Castelli Romani), 23.9.1973, *Anzalone* (RO); ai piedi dell'Artemisio, 8.8.1954, *Cacciato 1637* (RO), Rocca Priora, i Prati, 15.9.1891, *Boldini* (RO), nei prati della Stazione di Palestrina al Lago della Doganella 4.11.1894, *Grampini* (RO); boscaglia presso Caprarola (Lazio), 15.8.1922, *Bambacioni* (RO); poggi presso Sasso (Furbara), 4.9.1918, *Lusina 10606* (RO); Roma, Albano, *Mauri* (RO); vignonello lungo il fosso d'Agliano, 29.6.1900, *Pappi* (RO); tra Monterosi e Trevignano, 3.7.1900, *Pappi* (RO); lungo un fosso tra Canepina e Vallerano, 28.6.1900, *Pappi* (RO); via Madonna del Tufo ed Albano, 29.8.1876, *Botto* (RO); Lago di Vico, 23.9.1897, *Pappi* (RO); nei boschi bassi per andare a M. Algiolo, 4.11.1894, *Cortesi* (RO); in faucibus montium ad Antrodoco (Aprutii Apitani), *Palanza* (RO); in Abruzzo, 19.7, *Rolli* (RO); in ericetis elatioris M. Fortino (Piceno), *Orsini* (RO); Vettore della Sibilla, 30.7, *Sanguinetti* (RO); Colli Albani, M. Canino tra Genzano e Velletri, 24.5.1952, *Montelucci 8890* (RO); Colli Albani, tra M. Impiccati e M. Canino, 11.6.1948, *Montelucci 7367* (RO); Colle Arpino, nel bosco castagni lungo la strada, 29.6.1942, *Montelucci 4750* (RO); castagneto sopra Leofreni (Pescarocchiano), 29.5.1955, *Montelucci 6806* (RO); Lazio, Viterbo, Vetrulia e adiacenze M. Fogliano, Norchia Bomarso 8.1980, *Anzalone* (RO); M. Fogliano ed M. Cimino, Lago di Vico, 5.1979, *Anzalone* (RO); Oriolo Romano (boschi di M. Raschio), 5.1953, *Anzalone* (RO); Caldera di Manziana, 10.1984, *Anzalone* (RO); S. Cesareo (salendo verso Rocca Priora), 24.5.1963, *Anzalone* (RO); M. Artemisio alle falde del versante NW lungo la strada del Pratone, 25.9.1953, *Anzalone* (RO); Castelli Romani, Doganella Tuscolo, 6-7.1984, *Anzalone* (RO); radure nel bosco S. Cesareo, 30.5.1950, *Cacciato* (RO); M. Cavotra tra i Laghi di Nemi e Albano, 23.6.1877, *Canepa* (RO); Soriano nel Cimino, 8.1957, *Anzalone* (RO); Monti Albani, 29.9.1889, *Grampini* (RO); Monti Albani, 23.6.1877, *Canepa* (RO); Monti Albani sopra Palazzuolo, 1.9.1852, *Rolli* (RO); Monte Algiolo, 31.6, *Sanguinetti* (RO); Ronciglione, 30.7, *Sanguinetti* (RO); sopra i Monti Albani per la via di Gagnano, 12.9.1852, *Rolli* (RO); Albano, 1880, *Cortesi 10609* (RO); Poggio S. Venanzio tra Soriano e Canepina, 28.6.1900, *Pappi* (RO); Lago di Vico Casaletto (Lazio), 29.6.1995, *De Marco* (CAT); Cimite (strada tra Colferro e Poliate) a 4 Km dal casello autostradale di Colferro 29.7.1994, *De Marco* (CAT); Caldara di Monziana (Lazio), 5.7.1995, *De Marco* (CAT); Oriolo Lago di Bracciano (Lazio), 29.6.1995, *De Marco* (CAT); Oriolo Romano (Lazio), 5.7.1995, *De Marco* (CAT).

*Distribution.* - *A. samniticus* is restricted to C Italy (Latium, Marches) where it occurs between 200-1000 m altitude (Fig. 3).

*Ecology.* - This species occurs mainly on volcanic rocky places, where it grows in acidophilous bushland together with *Cytisus scoparius*. It is a member of a shrub community, represented by *Adenocarpo complicati-Cytisetum scoparii*, association described by Blasi & al. (1990). The name of this syntaxon should be therefore changed in *Adenocarpo samnitici-Cytisetum scoparii* nom. corr.

*Remarks.* - Previously, the populations occurring in C Italy were referred to different taxa, such as *A. telonensis* DC. (De Candolle 1825), *A. parvifolius* (Lam.) DC. (Bertoloni 1850), *A. parvifolius* var. *polyadenus* Caruel (Caruel 1894), *A. complicatus* var. *parviflorus* (DC.) Fiori (Fiori 1902, 1925), *A. complicatus* subsp. *complicatus* and subsp. *aureus*

(Cav.) Vicioso (Pignatti 1982). The attribution to these taxa is not correct, since all of them are restricted to the Iberian peninsula and France (Castroviejo 1999a, b).

**Conclusions**

The genus *Adenocarpus* probably represents a relict of Tertiary flora adapted to humid subtropical climate condition which characterized the Mediterranean basin before the Quaternary glaciations. The present distribution reflects a typically relictual status, partially related to the distributive fragmentation that affected ancestral populations during the Quaternary climatic worsening. The group occurring in subequatorial high mountains of Africa is likely to be the result of a new adaptive radiation derived from a unique ancestor, as hypothesized by Gibbs (1967). In the Mediterranean basin, it is likely that both geographic isolation of populations and the ecological specialisation, helped speciation processes. As reported by Castroviejo (1999a), the maximum diversity of the group can be found in Morocco, where 12 species occur, while the Iberian peninsula counts 7 species, Italian territory, according to our results, holds 4 species, France at least 3, East Mediterranean (Greece, Turkey and Syria) at least 1 and Macaronesia 2. Nowadays the dwelled sites are characterised by extremely moisty climatic conditions, like those occurring along the Thyrrenian and Atlantic coasts or on the top of mountain ranges facing the sea, in a belt where the condensation of moisture coming from the sea are maximized by the sudden air cooling due to the mountain-effect. The oceanic requirements are however testified by the general adaptation of all the Mediterranean species to acid or markedly leached soils, which are more frequent in the mountain or submountain belts where the annual rainfall is higher.

To help in the identification of the Italian *Adenocarpus* species, the following key is provided:

- 1 Calyx densely hairy, rarely with some scattered glandular stipitate papillae . . . . . 2
- 1 Calyx regularly with glandular stipitate papillae mixed to hairs . . . . . 3
- 2 Shrub ascending to erect, 50-150 cm high; bracteoles 3.8-5.5 × 0.5-1 mm; calyx 7.5-10 mm long; legume brown-blackish, 30-45 × 4-5 mm, 7-10 seeded . . . . . *A. brutius*
- 2 Shrub prostrate-pulvinate, 20-50 cm high; bracteoles 2.2-3.7 × 0.5-0.7 mm; calyx 6-7.5 mm long; legume pale-brown 20-30 × 4-5.5 mm, 4-7 seeded . . . . . *A. commutatus*
- 3 Shrub erect, 50-200 cm high; inflorescence 10-30 cm long; bract lanceolate, 5.5-7 mm long; bracteoles 3.5-4.5 mm long; calyx densely hairy, 9-12 mm long; standard 12-15 mm long; legume brown-blackish, 40-50 × 5-6 mm . . . . . *A. samniticus*
- 3 Shrub prostrate-ascending, 40-80 cm high; inflorescence 5-12 cm long; bract triangular-subulate, 4-4.5 mm long; bracteoles 2-2.5 mm long; calyx sparsely hairy, 5-6.5 mm long; standard 10-11 mm long; legume pale-brown 25-40 × 3.5-4 mm . . . . . *A. bionii*

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