

S. Brullo, C. Gangale & D. Uzunov

Taxonomic remarks on the endemic flora of the Sila Massif (S Italy)

Abstract

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Within floristic investigations on the Sila Massif (S Italy), taxonomical considerations and new contributions on the endemics of this territory are given. The flora of Sila has 13 exclusive endemics and includes further 55 endemics with a wider distribution range, 8 of which are restricted to the siliceous Calabrian massifs. In order to contribute to the knowledge of the endemics of the Silan flora, two new species (*Adenocarpus tenoreanus* and *Allium julianum*) are here described and a new combination is proposed.

Introduction

Within taxonomical investigations on the flora of Southern Italy, a contribution on the endemic flora of Sila is presented.

The Sila Massif, located in Northern Calabria and reaching 1927 m asl (Monte Botte Donato), represents a territory of remarkable phytogeographic interest because of its geology, geographical position and bioclimatic features. This area, together with other S Calabrian mountains and NE Sicily, belongs to the Calabrian Arc, an Ercinic unit dominated by siliceous substrata, mostly granites, mica-schists and kinzigitic gneiss. According to Rivas-Martinez & Loidi Arregui (1999), the bioclimate of the upper parts of Sila are to be included within the supra-temperate submediterranean thermotype and marginally also to the supramediterranean one, with subhumid or humid ombrotypes.

The mountain vegetation of Sila, between 1000-1927 m asl, includes by beechwoods, often mixed to Calabrian pine (*Pinus nigra* subsp. *calabrica*) forests, thorny cushion-like shrub communities, meadows and wetlands. In the submontane belt, ranging between 700-1000(1200) m, deciduous oakwoods dominate the landscape.

The flora of Sila has been studied by many authors (Solla 1896; Longo 1903, 1905; Trotter 1911; Grande 1913; Fiori 1919, 1922; Albo 1935; Sarfatti 1959, 1965; Gentile & Martini 1974; Cesca 1981, 1982; Ballelli & Venanzoni 1993; Cesca & Peruzzi 2002; Brullo & al. 2002, 2004; Marhold & al. 2003, etc.). On the basis of these studies, the Silan flora consists of about 1000 taxa at specific and subspecific level, 7% of which are endemics. In the present paper, taxonomic considerations on the endemic flora of the Silan Massif are given, with particular attention to some critical taxa.

Results and discussion

For the mountain belt (over 1000 m asl) of the Silan territory, 68 endemic species or subspecies are recorded. The most part (47) are, either, Apenninic/S Apenninic endemics or restricted to the mountains of Calabria and Northern Sicily. Twenty one taxa are endemic to the Calabrian siliceous massifs and thirteen of these are exclusively found on the Sila (Fig. 1). Most of them are characteristic elements of dry and open places occurring on the Silan plateau between 1200-1700 m asl, and they are: *Astragalus calabricus*, *Armeria brutia*, *Avenula praetutiana* subsp. *rigida*, *Anthemis hydruntina* subsp. *silensis*, *Centaurea sarfattiana*, *Genista silana*, *Koeleria splendens* subsp. *brutia*, *Knautia dinarica* subsp. *silana*. Other species are frequent at the fringe of pine and beech forests (*Adenocarpus tenoreanus*, *Allium julianum*, *Anthemis triumphetti* subsp. *briquetii*) or in wetlands (*Luzula calabra*, *Cardamine silana*).

Some of these taxa have been recently described (Brullo & al. 2002a, 2004; Marhold & al. 2003), and two of them new to science are presented here.

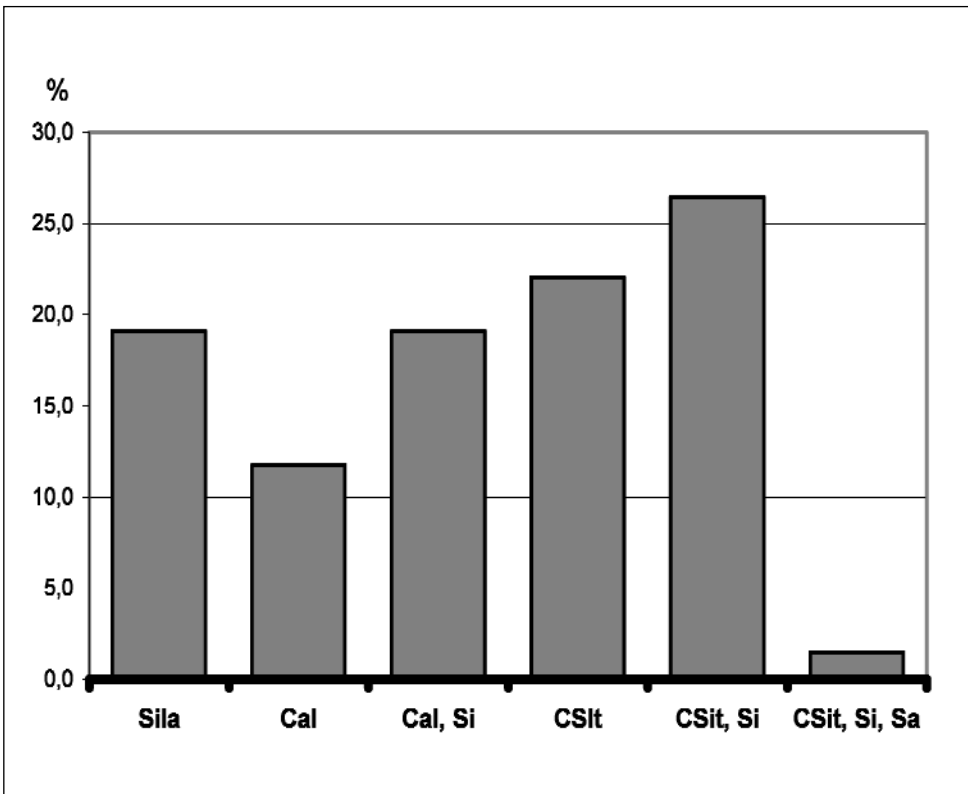


Fig. 1. Chorologic spectrum of the endemic taxa of the Silan flora: Sila - exclusive of the Sila Massif, Cal - Calabria, Si - Sicily, CSIt - C and S Italy, Sa - Sardinia.

Adenocarpus tenoreanus Brullo, Gangale & Uzunov sp. nova

Type: Calabria, Sila Piccola, Valle del Roncino, Monaco, 19/7/1998, *Bartolo, Brullo, Gangale & Giusso* (Holotype: CAT; Isotypes: CAT, CLU, FI).

Adenocarpus brutio similis sed ramulis eburnei, pedunculis 1-8 mm longis, foliolis lineari-ellipticis, stipulis 1.5-2.5 mm longis, inflorescentia 3-12 cm longa, bracteis 3-5 × 0.8-1 mm, bracteolis lineari-subulatis, 3-4 × 0.25-0.4 mm, pedicellis 2.5-4 mm longis, calice 5-7.5 mm longo, dense glanduloso sparsim piloso, labio inferiore 3.5-5 mm longo dentibus 1-1.5 mm longis, vexillo elliptico-suborbicularis 8-10 mm longo, rotundato apice, carina 9-10 mm longa.

Description: Shrub erect, 50-150 cm high, ivory, densely ciliate-villous, very branched. Leaves 3-foliolate, with peduncle 1-8 mm long, ciliate-hairy and leaflets 7-15 × 2-5 mm, linear-elliptical, densely hairy on the lower surface, subglabrous to sparsely hairy on the upper one. Stipule 1.5-2.5 long. Inflorescence lax, 3-12 cm long. Bracts ovate-lanceolate, ciliate, 3-5 × 0.8-1 mm. Bracteoles linear-subulate, ciliate, 3-4 × 0.25-0.4 mm. Pedicels 2.5-4 mm long. Calyx 5-7.5 mm long, densely glandular with sparsely hairs; lower lip 3.5-5 mm long, with central tooth 1.2-1.5 mm long, and lateral ones 1-1.2 mm long; upper lip with two triangular teeth 2.5-3 mm long. Corolla yellow; standard elliptical-suborbicular 8-10 × 7-8 mm, rounded at apex, with appressed hairs on the back and claw 1.5-2 mm long; wings 7-10 mm long; keel 9-10 mm long. Legume brown-blackish, 20-50 × 4-5 mm, 2-9 seeded.

Iconography: Fig. 2.

Ecology and Distribution: It is localized in the Southern Sila at the margin of pine woods or in deforested areas, at 1000-1400 m altitude. It occurs on siliceous substrata, mainly granites.

This species belongs to *Adenocarpus complicatus* (L.) Gay group, a Mediterranean element represented in Italy by *A. bivonii* (C. Presl) C. Presl, *A. commutatus* Guss., *A. brutius* Brullo, De Marco & Siracusa, and *A. samniticus* Brullo, De Marco & Siracusa (Brullo & al. 2001).

Allium julianum Brullo, Gangale & Uzunov, sp. nova

Type: Calabria, Sila Greca, Campi, lungo la strada per il santuario S. Maria del Pathirion, 2/7/99, *Brullo, Giusso & Gangale* (Holotype: CAT; Isotypes: CAT, CLU, FI).

Scapus glabrus, 20-45 cm altus ad 1/2-2/3 usque vaginis foliorum tectus. Folia 5-7, usque ad 30 cm longa, pluricostata. Inflorescentia expansa, diffusa, 15-75 floribus, pedicellis inaequalibus 8-30 (40) mm longis. Spata persistens, bivalvis, valvis inaequalibus 2.5-12 cm longis. Perigonium albo-viride, subcylindricum, tepalis subaequalibus, oblongis vel oblungo-obovatis, ad apicem rotundatis, 4.5-5.5 mm longis, 2-3 mm latis. Stamina simplicia, inclusa, filamentibus albis, exterioribus 1.5-2 mm longis, interioribus 2.5-3 mm longis, antheris stramineis, ellipticis ad apicem rotundatis 1-1.2 mm longis. Ovarium subcylindricum, scabri-papillosum superne. Capsula obovoidea, 4.5 × 4 mm.

Description: Bulb ovoid, 10-14 × 8-12 mm, with outer tunics coriaceous brown, the inner ones membranous, whitish. Scape glabrous, erect, 20 – 45 cm high, covered by leaf sheaths for 1/2 – 2/3 of its length. Leaves 5-7, green, semicylindrical, costate up to 30 cm long. Spathe persistent, with 2 unequal valves, longer than umbel, the larger 7-nerved, 6-12 cm long, the smaller 5 nerved, 2.5-6 cm long. Inflorescence expanse, diffuse 15-75

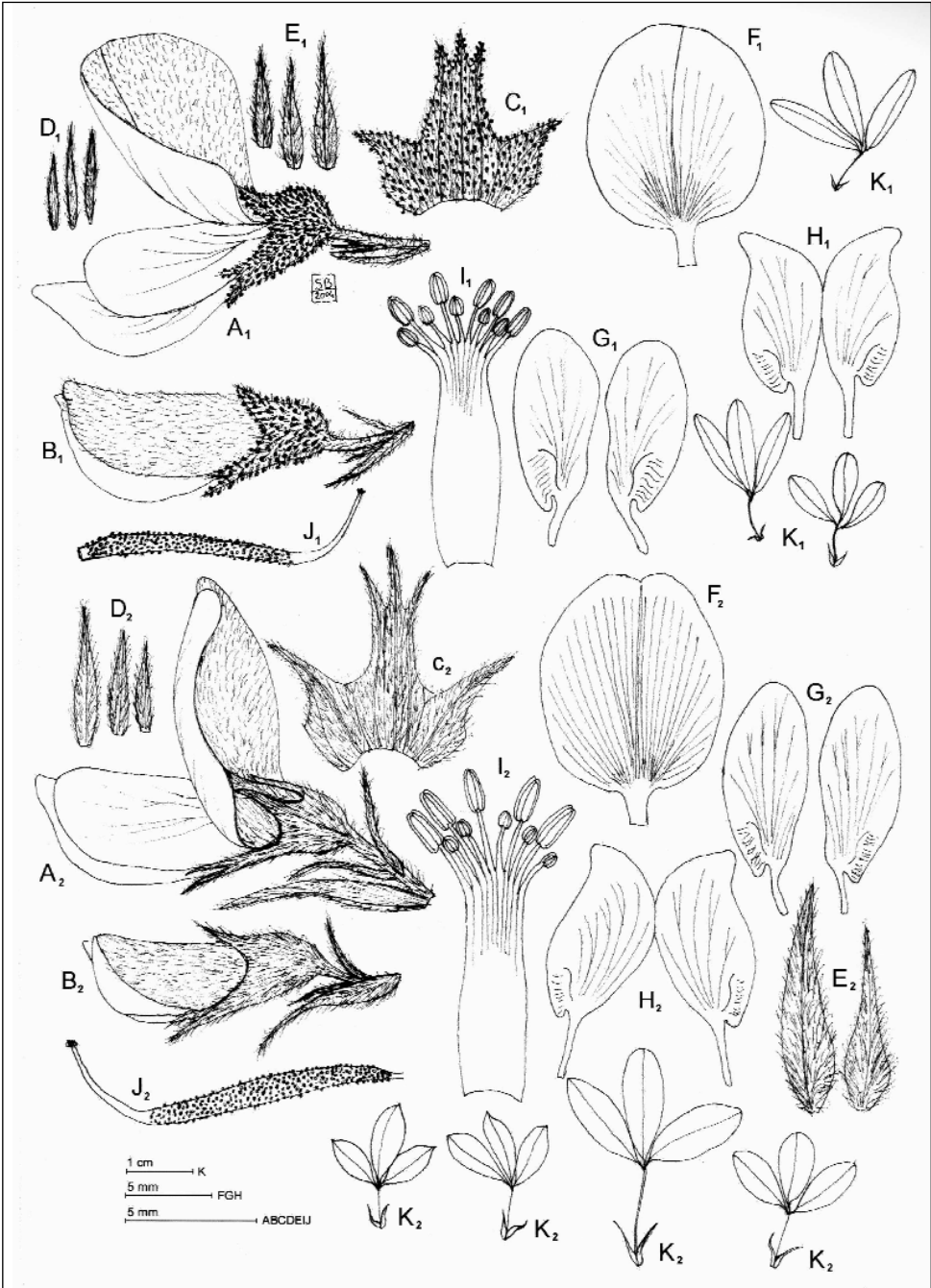


Fig. 2. *Adenocarpus tenoreanus* Brullo, Gangale & Uzunov (1), *A. brutius* Brullo, De Marco & Siracusa (2): A - flower, B - bud, C - open calyx, D - bracteoles, E - bracts, F - standard, G - wings, H - keel - I - staminal tube, J - pistil, K - leaves.

flowered; pedicels unequal, flexuous, 8-30(40) mm long. Perigon subcylindrical, with tepals subequal, white-greenish with green midrib, oblong to oblong-obovate, rounded at apex, 4.5-5.5 mm long, 2-3 mm wide. Stamens simple, included, with filaments white, subulate, the outermost 1.5-2 mm long, the innermost 2.5-3 mm long, connate at base into an annulus 0.6-0.8 mm high; anthers elliptical, pale yellow, rounded at apex 1-1.2 × 0.7-0.9 mm. Ovary subcylindrical, greenish, scabrid-papillose above, 2.5-3 × 1.5-1.8 mm. Style white, 0.4-0.8 mm long. Capsule obovoid, green 4.5 × 4 mm.

Iconography: Fig. 3.

Etymology: The species is dedicated to Prof. Giuliano Cesca, for his significant contribution to the investigation of the Calabrian flora.

Ecology and distribution: It grows in the underwood of *Quercus cerris* forests at about 800 m altitude on siliceous substrata (schists). It occurs on the NE slope of Sila Massif (Sila Greca), where it is very rare and localized.

A very localized and rare endemic species, belonging to the *A.* sect. *Codonoprasum*, is well differentiated from the other known species of the *A. paniculatum* group and in particular it shows close relations mainly with *A. tenuiflorum* Ten., occurring in the Italian Peninsula (Brullo & al., 2002a).

Other species endemic to Sila territory:

Anthemis hydruntina H. Groves subsp. ***silensis*** (Fiori) Brullo, Gangale & Uzunov

A. hydruntina subsp. *hydruntina* is restricted to few localities of Puglia and Basilicata (S Italy), where it occurs on calcareous rocky places, while subsp. *silensis* is an orophilous taxon, linked to siliceous substrata and localized in a small area of the eastern slope of the Silan Massif (Brullo & al. 2004).

Cota triumfetti (L.) J. Gay subsp. ***briquetii*** (Fiori) Brullo, Gangale & Uzunov, comb. & stat. nov.

Type: Calabria Sila a S. Giovanni in Fiore, 18/6/1899, Fiori sub *A. tinctoria* var. *discoidea* (Lectotype: FI!).

Basion.: *A. tinctoria* L. var. *briquetii* Fiori, Nuov. Fl. Anal. Ital. 2: 649 (1927).

Syn.: *A. tinctoria* var. *discoidea* Fiori, N. Giorn. Bot. Ital. 7: 270 (1900), non DC. (1837); *A. triumfetti* var. *discoidea* Fiori, in Fiori e Paoletti, Fl. Anal. Ital. 3: 260 (1903) p. p.

This taxon differs from the type, widely spread in S Europe, by the capitula discoid and achenes with a well developed coronule.

Armeria brutia Brullo, Gangale & Uzunov

Species belonging to the Tyrrhenian element, like *Armeria nebrodensis* (Guss.) Boiss. from Sicily, *A. aspromontana* Brullo, Scelsi & Spampinato from Aspromonte, *A. sardoa* Sprengel from Sardinia, *A. multiceps* Wallr. from Corsica and *A. gracilis* Ten. from Central and Southern Apennines, up to Mt. Pollino (Brullo & al. 2004).

Astragalus calabricus Fisch.

It belongs to the cycle of *Astragalus thracicus* Griseb., represented by taxa distributed in the E-Mediterranean area.

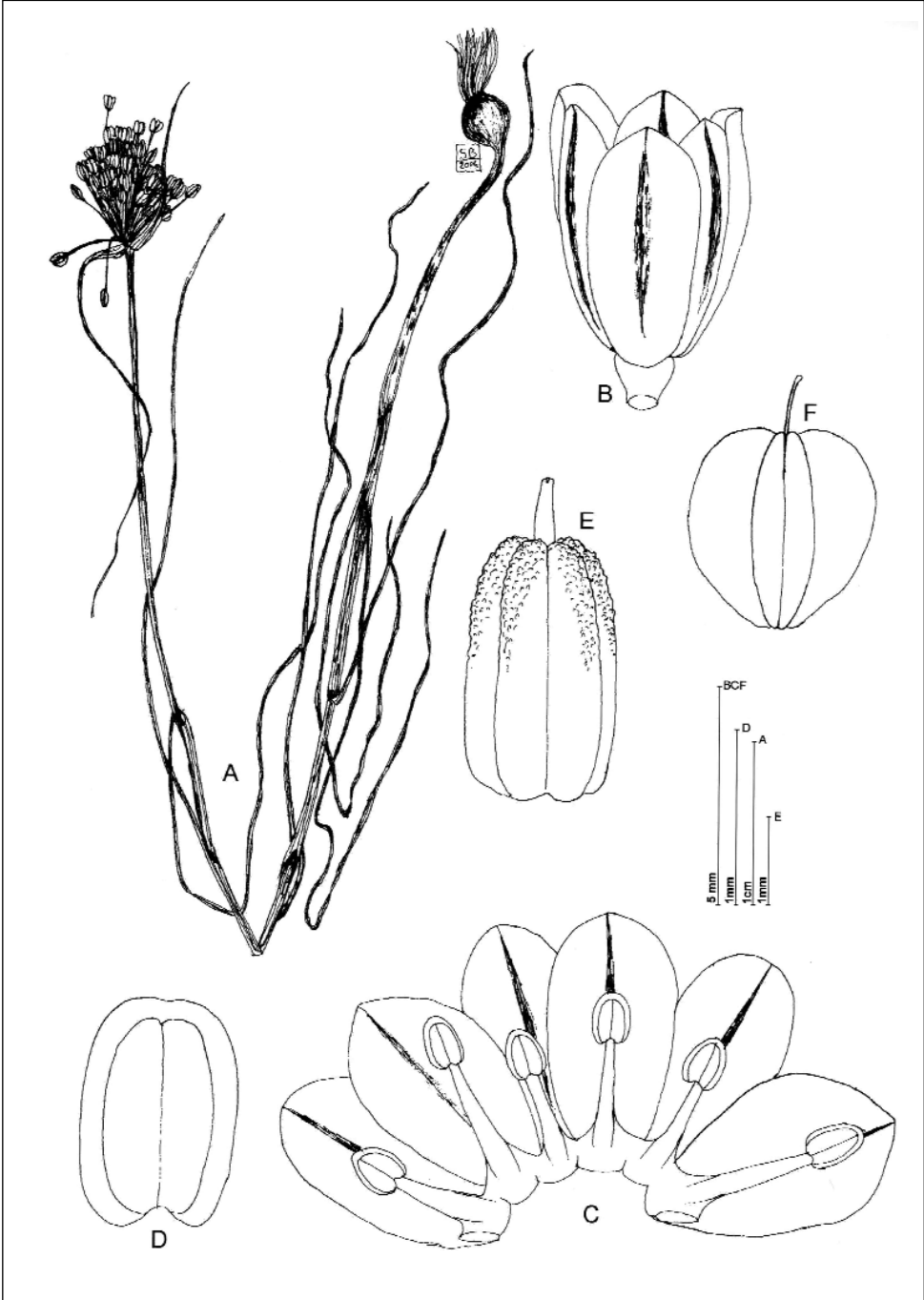


Fig. 3. *Allium julianum* Brullo, Gangale & Uzunov: A - habit, B - flower, C - open perigon and stamens, D - anther, E - ovary, F - capsule.

Avenula praetutiana (Parl. ex Arcang.) Pignatti subsp. ***rigida*** (Sarfatti) Brullo, Gangale & Uzunov

Avenula praetutiana is an Apenninic endemic, belonging to the cycle of *A. versicolor*, widely spread in C and S Europe (Brullo & al. 2004). It is represented by two subspecies: a calcicolous one, (subsp. *praetutiana*) having a discontinuous distribution on the whole Apenninic range and a silicolous one (subsp. *rigida*), occurring on the Sila Massif.

Centaurea sarfattiana Brullo, Gangale & Uzunov

It is closely related to *C. deusta*, belonging to the sect. *Phalolepis* (Cass.) DC., which is represented in C and S Italy by manifold *taxa*, mainly chasmophilous or linked to shrub-communities (Brullo & al. 2001, 2004).

Cardamine silana Marhold & Perny

This taxon is hexaploid, like some populations of *C. raphanifolia* Pourr., but morphologically shows closer relationships with the diploid Balkan population of *C. acris* Griseb. (Marhold & al. 2003).

Genista silana Brullo, Gangale & Spampinato

It is vicariated in S Calabria (Aspromonte) by *G. brutia* Brullo, Scelsi & Spampinato, both species closely related to *G. anglica* L., a typical atlantic element distributed in Northern and Central Europe (Brullo & al. 2002).

Knautia dinarica subsp. ***silana*** (Grande) Ehrend.

According to Ehrendorfer (1975) *Knautia dinarica* is represented by subsp. *dinarica*, distributed in the Balkanic Peninsula, and subsp. *silana* exclusive of the Silan Massif, which differs from the type mainly in the pubescence of lower stem internodes and in the longer petiole of the leaves.

Koeleria splendens subsp. ***brutia*** Brullo, Gangale & Uzunov

A silicolous taxon morphologically and ecologically well differentiated from the other known subspecies, which are normally linked to limestones; in particular *Koeleria splendens* subsp. *splendens* occurs in N Sicily, while *K. splendens* subsp. *grandiflora* (Bertol. ex Schultes) Domin is distributed in the rest of the calcareous mountains of the Apennines (Brullo & al. 2004).

Luzula calabra Ten.

This taxon, belonging to the group of Euroasiatic *Luzula campestris* Lam., was described by Tenore (1829) “*ex paludibus Silae*”. According to Migliaccio (1964), *L. calabra* differs from *L. campestris* subsp. *vulgaris*, occurring in Sila territory too, in laxer anthera, longer capitula and shorter capsule, stamens, style and tepals, and in the colour of capsule and tepals. *L. calabra* occurs on wetlands of mountain belt of Sila, especially in swamps, *Nardus stricta* communities and along the border of small streams in open places, while *L. campestris* is linked to dry grassland. It is a member of igrophylous communities belonging to *Luzulo calabrae-Nardetum*.

Other endemic species occurring on Sila but ranging, as well, on other Calabrian siliceous massifs are: *Anthemis calabrica* (Arcang.) Brullo, Scelsi & Spampinato closely related to *A. cretica* L., *Hypericum calabricum* Spreng. geographic vicariant of *H. barbatum* Jacq., *Lereschia thomasii* (Ten.) Boiss. belonging to a taxonomically isolated monotypic genus, *Soldanella calabrella* Kress close to the SE European *S. hungarica* Simonkai, *Limodorum brulloi* Bartolo & Pulvirenti showing more ancestral features within the genus, *Cardamine battagliae* Cesca & Peruzzi related to SW European *C. heptaphylla* (Vill.) O. E. Schulz, *Salix brutia* Brullo & Spampinato, a Calabrian vicariant of *S. triandra* L., and *Buglossoides calabra* (Ten.) Johnston morphologically well differentiated from *B. purpurocaerulea* (L.) Johnston.

Besides, well represented is the set of Siculo-Calabrian endemics that emphasizes the closest floristic affinities of Sila with Sicilian flora rather than the rest of Apennines. Among these, there are *Carlina nebrodensis* Guss., *Silene sicula* Ucria, *Ranunculus aspromontanus* Huter, Porta & Rigo, *Cirsium vallis-demonii* Lojac., *Viola messanensis* (W. Becker) Brullo, *Pinus nigra* Arnold subsp. *calabrica* (Land.) E. Murray, *Barbarea sicula* C. Presl, *Epipactis schubertiorum* Bartolo, Pulvirenti & Robatsch, etc.

The present study is a first contribution for the characterisation of the endemic element of the Silan flora. Further research on the qualitative and quantitative features of the endemics will contribute to the interpretation of the Silan and S Calabrian flora genesis and phytogeography.

List of the endemic species to the Sila Massif

Acer lobelii Ten.; *Acer neapolitanum* Ten.; *Achillea tenorii* Grande; *Acinos granatensis* (Boiss. & Reuter) Pignatti subsp. *aetnensis* (Strobl) Pignatti; *Adenocarpus tenoreanus* Brullo, Gangale & Uzunov; *Ajuga tenorei* Presl; *Allium julianum* Brullo, Gangale & Uzunov; *Anthemis hydruntina* Groves subsp. *silensis* (Fiori) Brullo, Gangale & Uzunov; *Anthemis montana* L. subsp. *calabrica* Arcang.; *Arabis rosea* DC.; *Armeria brutia* Brullo, Gangale & Uzunov; *Artemisia variabilis* Ten.; *Astragalus calabricus* Fiori; *Avenula praetutiana* (Parl.) Pign. subsp. *rigida* (Sarfatti) Brullo, Gangale & Uzunov; *Barbarea sicula* Presl; *Buglossoides calabra* (Ten.) Johnston; *Bunium petraeum* Ten.; *Campanula tricocalycina* Ten.; *Cardamine battagliae* Cesca & Peruzzi; *Cardamine silana* Marhold & Perny; *Carduus chrysacanthus* Ten.; *Carlina nebrodensis* Guss.; *Centaurea centaurium* L.; *Centaurea sarfattiana* Brullo, Gangale & Uzunov; *Cerastium granulatum* (Huter, P. & R.) Chiov.; *Cerastium scaranii* Ten.; *Cirsium vallis-demonii* Lojac.; *Cota triumfetti* (L.) J. Gay subsp. *briquettii* (Fiori) Brullo, Gangale & Uzunov; *Dianthus vulturius* Guss. & Ten. subsp. *vulturius*; *Digitalis micrantha* Roth; *Echinops siculus* Strobl; *Epipactis meridionalis* H. Baumann & R. Lorenz; *Epipactis schubertiorum* Bartolo, Pulvirenti & Robatsch; *Euphorbia amygdaloides* L. subsp. *arbuscula* Meusel; *Euphorbia corallioides* L.; *Gagea chrysantha* (Jan) Schultes; *Galium aetnicum* Biv.; *Genista silana* Brullo, Gangale & Spampinato; *Helleborus bocconei* Ten. subsp. *intermedius* (Guss.) Greuter & Burdet; *Hieracium virgaurea* Coss.; *Hypericum calabricum* Sprengel; *Knautia calycina* (Presl) Guss.; *Knautia dinarica* (Murb.) Borbas subsp. *silana* (Grande) Ehrend.; *Koeleria splendens* C. Presl subsp. *brutia* Brullo, Gangale & Uzunov; *Lathyrus jordanii* (Ten.) Ces., Pass.

& Gib.; *Leontodon intermedius* Huter, P. & R.; *Lereschia thomasi* (Ten.) Boiss.; *Limodorum brulloi* Bartolo & Pulvirenti; *Linaria purpurea* (L.) Miller; *Luzula calabra* Ten.; *Luzula sieberi* Tausch. subsp. *sicula* (Parl.) Pignatti; *Paeonia mascula* (L.) Miller subsp. *russii* (Biv.) Cullen & Heyw.; *Petrorhagia saxifraga* (L.) Link subsp. *gasparrinii* (Guss.) Pignatti; *Phleum ambiguum* Ten.; *Pimpinella anisoides* Briganti; *Pinus nigra* Arnold subsp. *calabrica* (Land.) E. Murray; *Ranunculus aspromontanus* Huter, P. & R.; *Ranunculus thomasi* Ten.; *Salix brutia* Brullo & Spampinato; *Senecio samniticus* Huet; *Silene echinata* Oth; *Silene sicula* Ucria; *Soldanella calabrella* Kress; *Teucrium siculum* Rafin.; *Thalictrum calabricum* Sprengel; *Trifolium brutium* Ten.; *Vicia consentina* Sprengel; *Viola aethnensis* Parl. subsp. *messanensis* (W. Becker) Merxm & Lippert.

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Address of the authors:

Salvatore Brullo, Dipartimento di Botanica, Università di Catania, via A. Longo 19, I-95125 Catania, Italy. E-mail: brullo@dipbot.unict.it.

Carmen Gangale & Dimitar Uzunov, Museo di Storia Naturale della Calabria ed Orto Botanico, Università della Calabria, I-87030 Arcavacata di Rende (CS), Italy. E-mails: cgangale@inwind.it, duzunov@libero.it.