

Check-list of the vascular flora of the “Bosco di Gibilmanna”, a Special Area of Conservation (S.A.C.) in northern Sicily (Italy)

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ABSTRACT

This paper reports the results of a floristic survey carried out in the area falling within the S.A.C. ITA020002 “Boschi di Gibilmanna e Cefalù” (Sicily, Italy), a site with a marked environmental heterogeneity lying from almost sea level to over 1000 meters of altitude. On the basis of our investigations, a total of 605 taxa has been detected, including some endemic or rare species, as *Anthemis cupaniana* Tod. ex Nyman, *Arabis collina* Ten. subsp. *rosea* (DC.) Minuto, *Brassica incana* Ten., *Hieracium racemosum* Waldst. & Kit. ex Willd. subsp. *crinitum* (Sm.) Rouy, *Melittis melissophyllum* L. subsp. *albida* (Guss.) P.W. Ball., *Stachys sylvatica* L., *Symphytum gussonei* F.W. Schultz, *Viburnum tinus* L., etc. A map with floristic emergencies has been prepared in order to highlight the sites with the greatest conservation interest in the area. Besides, the taxonomical, biological and chorological composition of this flora is analyzed and discussed.

KEY WORDS

Mediterranean; Plant conservation; Endemism; Madonie.

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INTRODUCTION

The Madonie massif, located in north-western Sicily, represents one of the main hotspots of plant biodiversity in the Mediterranean area, hosting about 1500 taxa and 170 endemisms (Raimondo et al., 2004a). The central highest part of the massif is quite well studied from a floristic and vegetational point of view (see Raimondo, 1980, 1984a, 1984b; Brullo, 1984), while specific contributions on the lower northern slopes are very scarce. Although this area does not present a phytogeographical interest comparable to that of the mountain belt, it is characterized by the presence of valuable plant communities and rare species, within a strongly anthropized and degraded context. In particular, the Gibilmanna wood, located in the hills above Cefalù, retains some inter-

esting forest communities, as well as sporadic aspects of chasmophilous vegetation on the limestone outcrops and temporary ponds. The first investigations about the flora of this area date back to first half of the nineteenth century, due to Enrico Pirajno di Mandalisca (1809–1864), a nobleman with wide cultural and naturalistic interests (Domina & Mazzola, 2005), who owned a large estate in Gibilmanna. Between the end of the nineteenth and the beginning of the twentieth century other botanists provided new data, including Michele Lojacono Pojero (1853–1919), author of a monumental *Flora Sicula*, and Domenico Lanza (1868–1940), who usually spent the summer time in his house of Contrada Pianetti inside the Gibilmanna wood. Later, only sporadic floristic reports about this area have been quoted by Raimondo & Mazzola (1983), Raimondo et al., (1994, 2004b)

and Falci & Giardina (2004). Therefore, the compilation of a floristic list for the S.A.C. ITA020002 “Boschi di Gibilmanna e Cefalù” represents the first attempt to provide a more complete and punctual account of the plant heritage occurring in the lower belt of Madonie massif.

MATERIAL AND METHODS

The boundaries of the investigated area coincide with those of the S.A.C. ITA020002 “Boschi di Gibilmanna e Cefalù” (Sicily, Italy), covering a surface of 2570 ha. It includes a quite heterogenous territory from the low hills above Cefalù at 150–200 m of altitude until the top of Pizzo Sant’Angelo at 1081 m. From the geological point of view, it is mainly constituted by substrata belonging to Numidian Flysch formation, mixed with scattered limestone outcrops. The flyschoid areas are characterized by gentle and rounded morphologies, while the calcareous ones show sharp ridges, deep valleys and macro- or micro-karst microforms. Until the second post-war period this area was probably intensely cultivated at least up to 600–700 m above sea level, while subsequently it became a popular holiday resort both for its proximity to Cefalù and for the particularly favorable climatic conditions in summer (Palmeri, 2007). Actually, the lower stands shows a spreading urbanization, sometimes interrupted by small patches of scrub with *Spartium junceum* and *Bupleurum fruticosum* belonging to *Spartio juncei-Bupleuretum fruticosi* Raimondo & Ilardi 2009 and few relicts of *Pinus pinea* forests (*Cisto cretici-Pinetum pineae* Brullo, Minissale, Siracusa, Scelsi, Spampinato 1993), often replaced by low garrigues with *Cistus creticus* and *Cistus salvifolius*. The quite evolved soils with loose texture are instead colonized by communities dominated by *Quercus suber*, which represent impoverished and thermophilous aspects of the *Genisto aristato-Quercetum suberis* Brullo 1983. The cork oak woods are widespread from 150 to 650 m, although occupy fairly small areas and often appear in a very degraded condition. Above 500 m, they are gradually replaced by deciduous oak woods dominated by *Quercus virgiliana*, often characterized by a dense undergrowth with *Erica arborea* and *Arbutus unedo*. This community, referable to *Erico arboreae-Quercetum virgiliana* Brullo & Marcenò 1985, still covers large surfaces in correspondence

with flat or slightly inclined surfaces with deep and humid soils (Figs. 1, 2). It lacks only in the slopes with a marked inclination and shallow soils, where it is replaced by a dense woody community with *Quercus ilex*, generally spread from 600 m to the top of Pizzo Sant’Angelo (Fig. 3). Sometimes, the woody vegetation is replaced by less evolved stages belonging to the same dynamic series, as perennial grasslands and shrublands. Among the other relevant plant communities, the greater example of chasmophilous vegetation occurs in the calcareous rocks of Rocca San Nicola (Fig. 4), while an interesting temporary pond is located near the road between Gibilmanna and Gratteri. Finally, some places (e.g., contrada Romito and Colombo) are characterized by artificial woods with *Castanea sativa*, now abandoned and severely damaged by fungal diseases, and small reforestations with *Pinus* sp. pl. or less frequently also *Eucalyptus* sp. pl.

The field surveys for this floristic research have been carried out during the years 2012–2019 in different seasons. The nomenclature follows Bartolucci et al. (2018) and Galasso et al. (2018). Besides, Flora of Italy (Pignatti, 1982; 2017–2019), Med-Checklist (Greuter et al., 1984; 1986) and Flora Europaea (Tutin et al., 1964–1980) were also consulted. The collected samples are preserved in the herbarium of the Department of Biological, Geological and Environmental Sciences of Catania University (CAT).

This study regards the native and naturalized vascular flora, highlighting the species of particular phytogeographic interest, whose location has been indicated with GIS mapping.

RESULTS AND DISCUSSION

Our investigations have allowed to record 605 species and intraspecific taxa of vascular plants, native or naturalized. The pteridophytic component is represented by 11 taxa, while only one conifer has been detected. The angiosperms are clearly more numerous, being represented by 593 taxa. Among the dicotyledons, the richest families are Asteraceae (79 taxa), Fabaceae (61), Caryophyllaceae (28), Lamiaceae (26), Apiaceae (24) and Brassicaceae (17). The monocotyledons are represented mainly by Poaceae (44), Orchidaceae (35) and Liliaceae (17). The biological spectrum (Fig. 5) reveals the



Figures 1–4. S.A.C. ITA020002 “Boschi di Gibilmanna e Cefalù” (Sicily, Italy). Figs. 1, 2: View of the woods around the Gibilmanna sanctuary. Fig. 3: Holm oak wood near Pizzo Sant’Angelo. Fig. 4: Limestone cliffs near Rocca San Nicola.

prevalence of terophytes (38%), followed by hemicytopytes (29%), geophytes (18%), phanerophytes (7%), chamaephytes (4%), nanophanerophytes (3%) and hydrophytes (1%).

As regards the chorotypes (Fig. 6), the Stenomediterranean is the most frequent (30%), while the Eurimediterranean represents the 19%. Among others, the Cosmopolitan (6%), Eurasian (5%), Paleotemperate (5%), South Mediterranean (3%), Mediterranean-Turanian (3%), West Mediterranean (3%), Sub-cosmopolitan (2%), Eastern Mediterranean (2%), European-Caucasian (2%) and Circumboreal (2%) can be mentioned. A special mention must be given to the alien species, which represent only the 4% of the total flora, including 12 terophytes, 6 geophytes, 4 phanerophytes and 1 hemicytopyte. The endemic elements are represented by 32 taxa (5%), including all species restricted to Sicily, Italy or a few neighboring areas. In particular, the Sicilian endemisms are *Anthemis cupaniana*, *Bellevalia dubia* subsp. *dubia*, *Dianthus*

siculus, *Echium italicum* subsp. *siculum*, *Odontites vernus* subsp. *siculus*, *O. archimedeia*, *Ophrys lumulata*, *Pimpinella gussonei*, *Symphytum gussonei* (Fig. 9) and *Trifolium bivonae*.

In addition, to the endemic species, the flora of the investigated area is characterized by some rare taxa or with a phytogeographical interest, such as *Astragalus echinatus*, *Isoetes durieui*, *Lavandula stoechas* subsp. *stoechas*, *Melittis melissophyllum* L. *albida*, *Serapias nurrica* subsp. *nurrica*, *Silene fruticosa*, *Viburnum tinus* subsp. *tinus* (Fig. 7), whose local distribution is shown in figure 11. As regards the latter, during the present study a small population almost certainly indigenous was found in Contrada Romito along a small stream inside the holm oak wood. A particularly interesting group from a phytogeographic point of view is represented by the species that in this area reach the western limit of their range in Sicily, such as *Brassica incana*, *Bupleurum fruticosum*, *Hieracium racemosum* subsp. *crinitum* (Fig. 10) and *Stachys sylvatica*

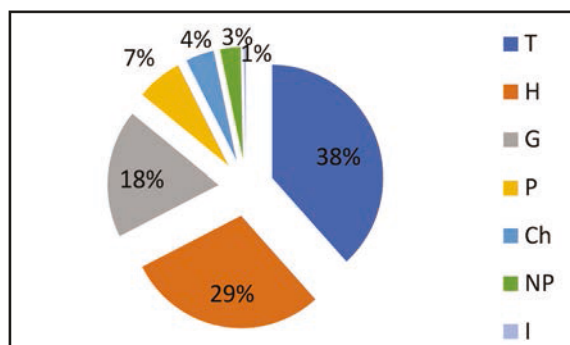


Figure 5. Biological spectrum of the vascular flora.

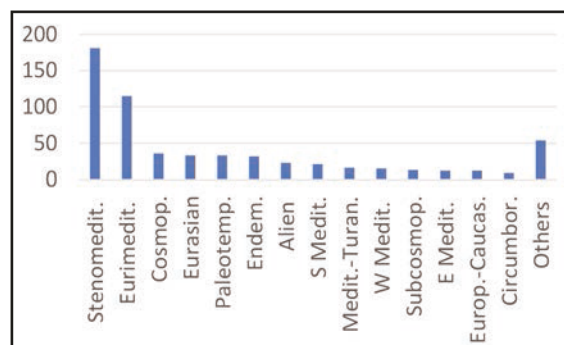


Figure 6. Chorological spectrum of the vascular flora.

(Fig. 8). In fact, the Gibilmanna wood shows some intermediate features between the Madonita and Nebrodense districts from an ecological, vegetational and floristic point of view. Its woody vegetation is clearly related to that of the nearby Nebrodi mountains, also due to the common presence of flyschoid substrates and the similar climatic conditions, as well as the isolated limestone outcrops host a chasmophilous flora closer to that of the Madonie massif and in general of north-western Sicily.

FLORISTIC LIST

PTERIDOPHYTA

EQUISETACEAE

Equisetum telmateia Ehrh.

SELAGINELLACEAE

Selaginella denticulata (L.) Spring,

ISOETACEAE

Isoetes durieui Bory

ADIANTACEAE

Adiantum capillus-veneris L.

DENNSTAEDTIACEAE

Pteridium aquilinum (L.) Kuhn subsp. *aquilinum*

POLYPODIACEAE

Polypodium cambricum L.

ASPLENIACEAE

Asplenium onopteris L.

Asplenium trichomanes L. subsp. *trichomanes*

Asplenium ceterach L. subsp. *ceterach*

DRYOPTERIDACEAE

Dryopteris pallida (Bory) Maire & Petitm. subsp. *pallida*

Polystichum setiferum (Forssk.) T. Moore ex Woyn.

SPERMATOPHYTA

GYMNOSPERMAE

PINACEAE

Pinus pinea L.

ANGIOSPERMAE

ACANTHACEAE

Acanthus mollis L. subsp. *mollis*

AMARANTHACEAE

Achyranthes sicula (L.) All.

**Amaranthus albus* L.

**Amaranthus blitum* L. subsp. *blitum*

**Amaranthus cruentus* L.

**Amaranthus deflexus* L.

**Amaranthus graecizans* L. subsp. *silvestris* (Vill.) Brenan

**Amaranthus hypocondriacus* L.

**Amaranthus retroflexus* L.

**Amaranthus viridis* L.

AMARYLLIDACEAE

Allium polyanthum Schult. & Schult.f.

Allium roseum L. subsp. *roseum*

Allium sphaerocephalon L. subsp. *arvense* (Guss.)

Arcang.

Allium subhirsutum L. subsp. *subhirsutum*

Allium triquetrum L.

**Amaryllis bella-donna* L.

Narcissus miniatus Donn.-Morg., Koop. & Zonn

Narcissus obsoletus (Haw.) Spach
Narcissus papyraceus Ken Gawl.
Narcissus tazetta L. subsp. *tazetta*

ANACARDIACEAE

Pistacia lentiscus L.
Pistacia terebinthus L. subsp. *terebinthus*
 **Rhus coriaria* L.

APIACEAE

Ammoides pusilla (Brot.) Breistr.
Anthriscus nemorosa (M.Bieb.) Spreng.
Athamanta sicula L.
Bupleurum fruticosum L.
Bupleurum tenuissimum L.
Chaerophyllum temulum L.
Conium maculatum L.
Daucus carota L. s.l.
Eryngium campestre L.
Eryngium tricuspdatum L. subsp. *bocconeii* (Lam.)
 Wörz
Eryngium triquetrum Vahl
Foeniculum vulgare Mill subsp. *piperitum* (Ucria)
 Bég.
Foeniculum vulgare Mill. subsp. *vulgare*
Kundmannia sicula (L.) DC.
Oenanthe globulosa L.
Oenanthe pimpinelloides L.
Pimpinella anisoides V. Brig.
Pimpinella gussonii Bertol.
Scandix pecten-veneris L. subsp. *pecten-veneris*
Smyrniolum olusatrum L.
Smyrniolum perfoliatum L. subsp. *perfoliatum*
Thapsia garganica L. subsp. *garganica*
Tordylium apulum L.
Torilis arvensis (Huds.) Link subsp. *arvensis*
Torilis nodosa (L.) Gaertn. subsp. *nodosa*

APOCYNACEAE

Vinca major L. subsp. *major*

ARACEAE

Arisarum vulgare O.Targ. Tozz. subsp. *vulgare*
Arum italicum Mill. subsp. *italicum*
Biarum tenuifolium (L.) Schott subsp. *tenuifolium*

ARALIACEAE

Hedera helix L. subsp. *helix*

ASPARAGACEAE

Asparagum acutifolium L.

Bellevalia dubia (Guss.) Kunth subsp. *dubia*
Charybdis pancration (Steinh.) Speta
Loncomelos narbonensis (L.) Raf.
Muscari comosum (L.) Mill.
Muscari commutatum Guss.
 **Oncostema elongatum* (Parl.) Speta
Ornithogalum montanum Cirillo ex Ten.
Prospero autumnale (L.) Speta
Ruscus aculeatus L.

ASPHODELACEAE

Asphodeline lutea (L.) Rchb.
Asphodelus fistulosus L.
Asphodelus ramosus L. subsp. *ramosus*

ASTERACEAE

Achillea ligustica All.
Anthemis arvensis L. subsp. *arvensis*
Anthemis cupaniana Tod. ex Nyman
Arctium minus (Hill) Bernh.
Artemisia arborescens (Vaill.) L.
Bellis annua L. subsp. *annua*
Bellis perennis L.
Bellis sylvestris Cirillo
Calendula arvensis (Vaill.) L.
Carduus argyrea Biv.
Carduus pycnocephalus L. subsp. *pycnocephalus*
Carlina gummifera (L.) Less.
Carlina involucrata Poir.
Carlina lanata L.
Carlina sicula Ten. subsp. *sicula*
Carthamus lanatus L.
Centaurea calcitrapa L.
Centaurea sicula L.
Centaurea solstitialis L. subsp. *schouvi* (DC.) Gugler
Cichorium intybus L.
Cirsium creticum (Lam.) d'Urv. subsp. *triumfetti*
 (Lacaita) K. Werner
Cirsium scabrum (Poir.) Bonnet & Barratte
Cirsium vulgare (Savi) Ten. subsp. *vulgare*
Coleostephus myconis (L.) Cass. ex Rchb.f.
Crepis vesicaria subsp. *hyemalis* (Biv.) Babč.
Crupina crupinastrum (Moris) Vis.
Cynara cardunculus L. subsp. *cardunculus*
Dittrichia graveolens (L.) Greuter
Dittrichia viscosa (L.) Greuter subsp. *viscosa*
Doronicum orientale Hoffm.
Echinops siculus Strobl
Eclipta prostrata (L.) L.
 **Erigeron bonariensis* L.
Eupatorium cannabinum L.

Filago eriocephala Guss.
Filago germanica (L.) Huds.
Filago pygmaea L.
Filago pyramidata L.
Galactites tomentosus Moench
 **Galinsoga parviflora* Cav.
Glebionis coronaria (L.) Spach
Glebionis segetum (L.) Fourr.
Hedypnois rhagadioloides (L.) F.W. Schmidt
Helminthotheca aculeata (Vahl) Lack subsp. *aculeata*
Helminthotheca echioides (L.) Holub
Hieracium racemosum Waldst. & Kit. ex Willd. subsp. *crinitum* (Sm.) Rouy
Hyoseris radiata L.
Hypochaeris achyrophorus L.
Hypochaeris radicata L.
Lactuca sativa L. subsp. *serriola* (L.) Galasso, Banfi, Bartolucci & Ardenghi
Lactuca viminea (L.) J. Presl & C. Presl subsp. *viminea*
Lapsana communis L. subsp. *communis*
Leontodon tuberosus L.
Logfia gallica (L.) Cosson & Germ.
Mycelis muralis (L.) Dumort. subsp. *muralis*
Notobasis syriaca (L.) Cass.
Onopordum illyricum L.
Pallenis spinosa (L.) Cass. subsp. *spinosa*
Pentanema squarrosus (L.) D. Gut. Larr., Santos-Vicente, Anderb., E. Rico & M.M. Mart.Ort.
Picris hieracioides L.
Pulicaria dysenterica (L.) Bernh.
Pulicaria odora (L.) Rchb.
Reichardia picroides (L.) Roth
Scolymus grandiflorus Desf.
Scolymus maculatus L.
Scorzonera hirsuta (Gouan) L.
Senecio leucanthemifolius Poir. subsp. *leucanthemifolius*
Senecio lividus L.
Senecio vulgaris L. subsp. *vulgaris*
Silybum marianum (L.) Gaertn.
Sonchus asper (L.) Hill subsp. *asper*
Sonchus oleraceus L.
 **Symphotrichum squamatum* (Spreng.) G.L. Nesom
Taraxacum minimum (V.Brig.) N. Terracc
Taraxacum officinale (L.) Weber ex F.H. Wigg.
Tragopogon porrifolius L.
Urospermum dalechampii (L.) F.W. Schmidt
Urospermum picroides (L.) Scop. ex F.W. Schmidt
Xanthium italicum Moretti
 **Xanthium spinosum* L.

BORAGINACEAE

Aegonychon purpureocaeruleum (L.) Holub
Anchusa azurea Mill.
Borago officinalis L.
Cerintho major L. subsp. *major*
Cynoglossum creticum Mill.
Echium italicum L. subsp. *siculum* (Lacaita) Greuter & Burdet
Echium plantagineum L.
Heliotropium europaeum L.
Myosotis ramosissima Rochel subsp. *ramosissima*
Myosotis sylvatica Hoffm. subsp. *elongata* (Strobl) Grau
Symphytum gussonei F.W. Schultz

BRASSICACEAE

Arabidopsis thaliana (L.) Heynh.
Arabis collina Ten. subsp. *collina*
Arabis collina Ten. subsp. *rosea* (DC.) Minuto
Arabis hirsuta (L.) Scop.
Arabis verna (L.) R. Br.
Biscutella maritima Ten.
Brassica incana Ten.
Brassica rapa L. subsp. *campestris* (L.) A.R. Clapham
Capsella bursa-pastoris (L.) Medik. subsp. *bursa-pastoris*
Cardamine hirsuta L.
Diplotaxis eruroides (L.) DC. subsp. *eruroides*
Draba verna L. subsp. *praecox* (Steven) Rouy & Foucaud
Draba verna L. subsp. *verna*
Isatis canescens DC.
Lobularia maritima (L.) Desv.
Lunaria annua L.
Raphanus raphanistrum L. subsp. *raphanistrum*
Sinapis pubescens L. subsp. *pubescens*

CACTACEAE

Opuntia ficus-indica (L.) Mill.

CAMPANULACEAE

Campanula dichotoma L.
Campanula erinus L.
Jasione montana L.

CANNABACEAE

Celtis australis L. subsp. *australis*

CAPPARACEAE

Capparis spinosa L.

CAPRIFOLIACEAE

Lonicera implexa Aiton subsp. *implexa*

CARYOPHYLLACEAE

Arenaria leptoclados (Rchb.) Guss. subsp. *leptoclados*

Arenaria serpyllifolia L. subsp. *serpyllifolia*

Cerastium brachypetalum Desp. ex Pers. subsp. *brachypetalum*

Cerastium glomeratum Thuill.

Cerastium semidecandrum L.

Dianthus sicutus C. Presl

Eudianthe coeli-rosa (L.) Endl.

Petrorhagia dubia (Raf.) G. López & Romo

Petrorhagia illyrica (L.) P.W. Ball & Heywood subsp. *haynaldiana* (F.N. Williams) P.W. Ball & Heywood

Petrorhagia prolifera (L.) P.W. Ball & Heywood

Petrorhagia saxifraga (L.) Link subsp. *gasparrinii* (Guss.) Greuter & Burdet

Petrorhagia saxifraga (L.) Link subsp. *saxifraga*

Polycarpon tetraphyllum (L.) L. subsp. *diphyllum* (Cav.) O. Bolós & Font Quer

Polycarpon tetraphyllum (L.) L. subsp. *tetraphyllum*

Sabulina tenuifolia (L.) Rchb. subsp. *tenuifolia*

Sagina apetala Ard. subsp. *apetala*

Silene colorata Poir.

Silene conica L.

Silene fruticosa L.

Silene fuscata Brot.

Silene gallica L.

Silene italica (L.) Pers. subsp. *sicula* (Ucria) Jeanm.

Silene latifolia Poir.

Silene nocturna L. subsp. *nocturna*

Silene vulgaris (Moench) Garcke subsp. *tenoreana* (Colla) Soldano & F. Conti

Silene vulgaris (Moench) Garcke subsp. *vulgaris*

Stellaria neglecta Weihe subsp. *cupaniana* (Jord. & Fourr.) Gutermann

Stellaria neglecta Weihe subsp. *neglecta*

Stellaria pallida (Dumort.) Crép.

CHENOPODIACEAE

Chenopodium album L. subsp. *album*



Figure 7. *Viburnum tinus* subsp. *tinus*. Figure 8. *Stachys sylvatica*.
Figure 9. *Symphytum gussonei*. Figure 10. *Hieracium racemosum* subsp. *crinitum*.

Chenopodiastrum murale (L.) S. Fuentes, Uotila & Borsch
Chenopodium vulvaria L.

CISTACEAE

Cistus creticus L. subsp. *eriocephalus* (Viv.) Greuter & Burdet
Cistus monspeliensis L.
Cistus salvifolius L.
Tuberaria guttata (L.) Fourr.

COLCHICACEAE

Colchicum bivonae Guss.

CONVOLVULACEAE

Convolvulus sepium L.
Convolvulus althaeoides L.
Convolvulus arvensis L.
Convolvulus cantabrica L.
Cuscuta epithymum (L.) L. subsp. *epithymum*
Ipomoea indica (Burm.) Merr.

CRASSULACEAE

**Aeonium arboreum* (L.) Webb & Berth.
Petrosedum amplexicaule (DC.) Velayos
Petrosedum sediforme (Jacq.) Grulich
Phedimus stellatus (L.) Raf.
Sedum album L. subsp. *album*
Sedum caeruleum L.
Sedum cepaea L.
Sedum dasyphyllum L.
Umbilicus horizontalis (Guss.) DC.
Umbilicus rupestris (Salisb.) Dandy

CUCURBITACEAE

Bryonia dioica Jacq.

CYPERACEAE

Carex caryophyllea Latourr.
Carex distachya Desf.
Carex flacca Schreb. subsp. *erythrostachys* (Hoppe) Holub
Carex hallerana Asso
Carex pendula Huds.
Cyperus rotundus L.
Eleocharis palustris (L.) Roem. & Schult. subsp. *palustris*
Schoenoplectus lacustris (L.) Palla
Scirpoides holoschoenus (L.) Soják

CYTINACEAE

Cytinus hypocistis (L.) L.
Cytinus ruber Fourr. ex Fritsch

DIOSCOREACEAE

Dioscorea communis (L.) Caddick & Wilkin

DIPSACACEAE

Dipsacus fullonum L. subsp. *fullonum*
Sixalix atropurpurea (L.) Greuter & Burdet

ERICACEAE

Arbutus unedo L.
Erica arborea L.

EUPHORBIACEAE

Chrozophora tinctoria (L.) A. Juss.
Euphorbia ceratocarpa Ten.
Euphorbia characias L.
Euphorbia dendroides L.
Euphorbia helioscopia L. subsp. *helioscopia*
Euphorbia meuselii Geltman
Euphorbia pepus L.
 **Euphorbia prostrata* Aiton
Euphorbia rigida M. Bieb.
Mercurialis annua L.
 **Ricinus communis* L.

FABACEAE

Anthyllis vulneraria L. subsp. *maura* (Beck) Maire
Astragalus boeoticus L.
Astragalus echinatus Murray
Astragalus hamosus L.
Bituminaria bituminosa (L.) C.H.Stirt.
Cytisus infestus (C. Presl) Guss. subsp. *infestus*
Cytisus villosus Pourr.
Emerus major Mill. subsp. *major*
Ervilia hirsuta (L.) Opiz
Hippocrepis multisiliquosa L.
Lathyrus annuus L.
Lathyrus cicera L.
Lathyrus clymenum L.
Lathyrus ochrus (L.) DC.
Lathyrus sphaericus Retz.
Lathyrus sylvestris L. subsp. *sylvestris*
Lotus biflorus Desr.
Lotus edulis L.
Lotus hispidus DC.
Lotus ornithopodioides L.
Lupinus albus L.
Medicago coronata (L.) Bartal.
Medicago doliata Carmign.

Medicago intertexta (L.) Mill.
Medicago minima (L.) L.
Medicago murex Willd.
Medicago orbicularis (L.) Bartal.
Medicago polymorpha L.
Medicago rugosa Desr.
Medicago truncatula Gaertn.
Onobrychis caput-galli (L.) Lam.
Ononis diffusa Ten.
Ononis mitissima L.
Ornithopus compressus L.
Pisum sativum L.
Scorpiurus subvillosus L.
Spartium junceum L.
Sulla coronaria (L.) Medik.
Trifolium angustifolium L.
Trifolium arvense L. subsp. *arvense*
Trifolium bivonae Guss.
Trifolium campestre Schreb.
Trifolium fragiferum L. subsp. *fragiferum*
Trifolium incarnatum L. subsp. *molinerii* (Balb. ex
 Hornem.) Ces.

Trifolium lappaceum L.
Trifolium nigrescens Viv. subsp. *nigrescens*
Trifolium pallidum Waldst. & Kit.
Trifolium physodes M. Bieb.
Trifolium pratense L. subsp. *pratense*
Trifolium repens L.
Trifolium resupinatum L.
Trifolium scabrum L.
Trifolium stellatum L.
Trifolium subterraneum L. subsp. *subterraneum*
Trigonella italica (L.) Coulot & Rabaute
Trigonella sulcata (Desf.) Coulot & Rabaute
Tripodion tetraphyllum (L.) Fourr.
Vicia bithynica (L.) L.
Vicia dasycarpa Ten.
Vicia disperma DC.
Vicia hybrida L.
Vicia sativa L.

FAGACEAE

Castanea sativa Miller
Quercus ilex L. subsp. *ilex*

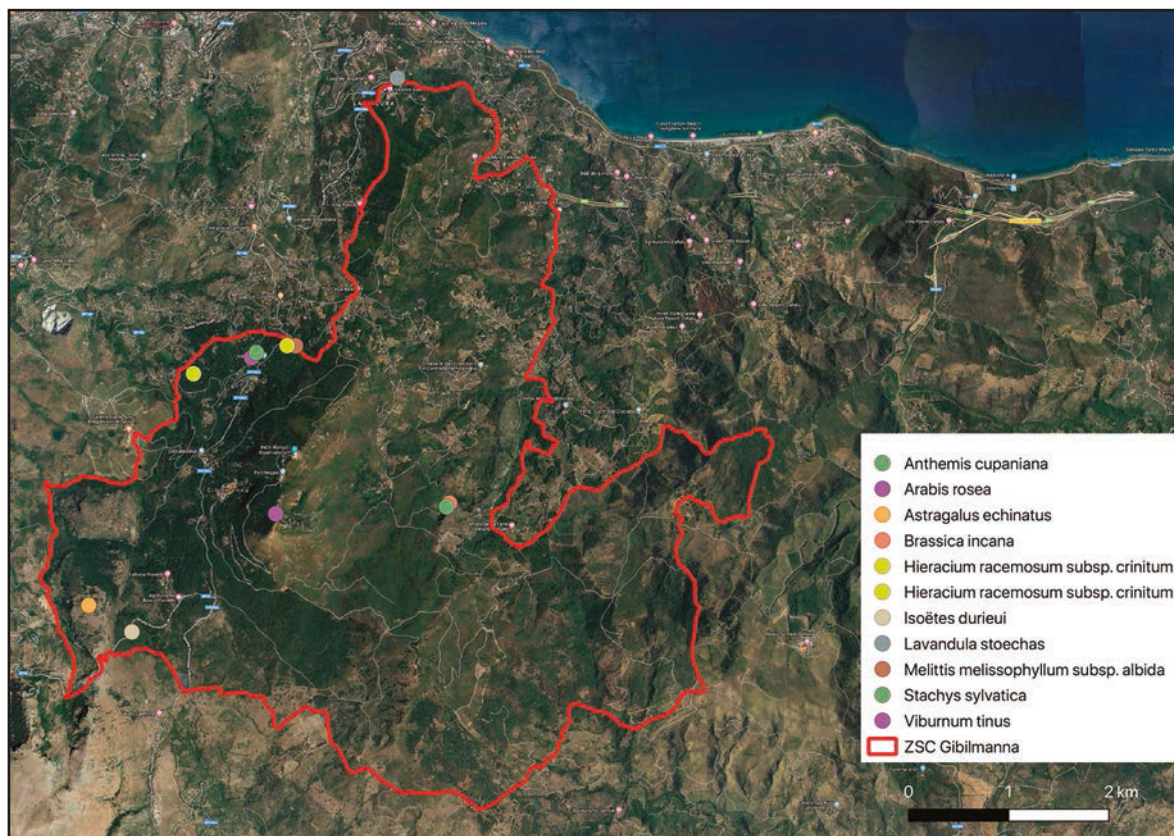


Figure 11. Bosco di Gibilmanna: local distribution of rare taxa or with a phytogeographical interest.

Quercus suber L.

Quercus virgiliana (Ten.) Ten.

GENTIANACEAE

Blackstonia perfoliata (L.) Huds. subsp. *intermedia* (Ten.) Zeltner

Centaurium erythraea Rafin subsp. *erythraea*

Centaurium grandiflorum (Pers.) Ronniger subsp. *grandiflorum*

Centaurium maritimum (L.) Fritsch

GERANIACEAE

Erodium ciconium (L.) L'Her.

Erodium cicutarium (L.) L'Her.

Erodium malacoides (L.) L'Her. subsp. *malacoides*

Geranium dissectum L.

Geranium lucidum L.

Geranium molle L.

Geranium purpureum Vill.

Geranium robertianum L.

Geranium rotundifolium L.

HYPERICACEAE

Hypericum perfoliatum L.

Hypericum perforatum L. subsp. *perforatum*

IRIDACEAE

Crocus longiflorus Raf.

Gladiolus byzantinus Mill.

Gladiolus italicus Mill.

Hermodactylus tuberosus (L.) Mill.

**Iris germanica* L.

Juno planifolia (Mill.) Asch.

Moraea sisyrinchium (L.) Ker Gawl.

Romulea bulbocodium (L.) Sebast. & Mauri

Romulea columnae Sebast. & Mauri

JUNCACEAE

Juncus bufonius L.

Juncus effusus L. subsp. *effusus*

Juncus inflexus L. subsp. *inflexus*

LAMIACEAE

Clinopodium nepeta (L.) Kuntze subsp. *nepeta*

Clinopodium vulgare L. subsp. *arundanum* (Boiss.) Nyman

Lamium amplexicaule L.

Lamium bifidum Cirillo subsp. *bifidum*

Lavandula stoechas L. subsp. *stoechas*

Marrubium vulgare L.

Melissa officinalis L. subsp. *officinalis*

Melittis melissophyllum L. subsp. *albida* (Guss.) P.W. Ball.

Mentha aquatica L. subsp. *aquatica*

Mentha pulegium L. subsp. *pulegium*

Micromeria graeca (L.) Benth. ex Rchb. subsp. *graeca*

Micromeria nervosa (Desf.) Benth.

Origanum vulgare L. subsp. *viridulum* (Martin-Donos) Nyman

Prunella laciniata (L.) L.

Prunella vulgaris L. subsp. *vulgaris*

Pseudodictamnus hispanicus (L.) Salmaki & Siadati

Salvia clandestina L.

**Salvia microphylla* Kunth

Salvia verbenaca L.

Stachys arvensis (L.) L.

Stachys germanica L. var. *dasyanthes* (Raf.) Ar-cang.

Stachys major (L.) Bartolucci & Peruzzi

Stachys ocymastrum (L.) Briq.

Stachys romana (L.) E.H.L.Krause

Stachys sylvatica L.

Teucrium chamaedrys L. subsp. *chamaedrys*

Teucrium siculum (Raf.) Guss. subsp. *siculum*

LAURACEAE

Laurus nobilis L.

LINACEAE

Linum strictum L.

Linum tryginum L.

Linum usitatissimum L. subsp. *angustifolium* (Huds.) Thell.

LYTHRACEAE

Lythrum junceum Banks & Sol.

MALVACEAE

Malva cretica Cav. subsp. *cretica*

Malva nicaeensis All.

Malva olbia (L.) Alef.

Malva sylvestris L.

Malva trimestris (L.) Salisb.

MORACEAE

Ficus carica L.

NYCTAGINACEAE

**Mirabilis jalapa* L.

OLEACEAE

- Fraxinus ornus* L. subsp. *ornus*
Olea europaea L. subsp. *oleaster* (Hoffmanns. & Link) Negodi
Phillyrea latifolia L.

ONAGRACEAE

- Epilobium hirsutum* L.
Epilobium tetragonum L. subsp. *tetragonum*

ORCHIDACEAE

- Anacamptis collina* (Banks & Sol. ex Russell) R.M. Bateman, Pridgeon & M.W. Chase
Anacamptis laxiflora (Lam.) R.M. Bateman, Pridgeon & M.W. Chase
Anacamptis longicornu (Poir.) R.M. Bateman, Pridgeon & M.W. Chase
Anacamptis papilionacea (L.) R. M. Bateman, Pridgeon & M.W. Chase subsp. *grandiflora* (Boiss.) Kreutz 2007
Anacamptis pyramidalis (L.) Rich.
Barlia robertiana (Loisel.) Greuter
Cephalanthera longifolia (L.) Fritsch
Dactylorhiza romana (Sebast.) Soó subsp. *markusii* (Tineo) Holub
Dactylorhiza romana (Sebast.) Soó subsp. *romana*
Epipactis helleborine (L.) Crantz
Epipactis microphylla (Ehrh.) Sw.
Himantoglossum hircinum (L.) Spreng.
Limodorum abortivum (L.) Sw.
Ophrys apifera Huds.
Ophrys archimedeae P. Delforge & M. Walravens
Ophrys bertolonii Moretti subsp. *bertolonii*
Ophrys bombyliflora Link
Ophrys fusca Link subsp. *lupercalis* (Devillers-Tersch. & Devillers) Kreutz
Ophrys lunulata Parl.
Ophrys lutea Cav. subsp. *lutea*
Ophrys lutea subsp. *sicula* (Tineo) Soldano 1993
Ophrys pallida Raf.
Ophrys passionis Sennen subsp. *garganica* E. Nelson
Ophrys speculum Link
Ophrys sphegodes Mill. subsp. *panormitana* (Tod.) Kreutz
Ophrys sphegodes Mill. subsp. *sphogodes*
Ophrys tenthredinifera Willd.
Orchis anthropophora (L.) All.
Orchis brancifortii Biv.
Orchis italica Poir.
Orchis provincialis Balb. ex Lam. & DC.
Serapias cordigera L. subsp. *cordigera*

- Serapias lingua* L.
Serapias nurrica Corrias subsp. *nurrica*
Serapias vomeracea (Burm. f.) Briq.
Spiranthes spiralis (L.) Chevall.

OROBANCHACEAE

- Bellardia trixago* (L.) All.
Bellardia viscosa (L.) Fisch. & C.A. Mey
Odontites vernus (Bellardi) Dumort. subsp. *siculus* (Guss.) P.D. Sell
Orobanche caryophyllacea Sm.
Orobanche crenata Forssk.
Orobanche hederæ Vaucher ex Duby
Phelipanche lavandulacea (Rchb.) Pomel subsp. *lavandulacea*
Phelipanche mutelii (F.W. Schultz) Reut.
Phelipanche nana (Reut.) Soják
Phelipanche ramosa (L.) Pomel

OXALIDACEAE

- **Oxalis articulata* Savigny
 **Oxalis pes-caprae* L.

PAEONIACEAE

- Paeonia mascula* (L.) Miller subsp. *russoi* (Biv.) Cullen & Heywood

PAPAVERACEAE

- Fumaria capreolata* L. subsp. *capreolata*
Fumaria flabellata Gasp.
Papaver dubium L.
Papaver hybridum L.
Papaver rhoeas L. subsp. *rhoeas*
Papaver rhoeas L. var. *himerense* Raimondo & Spadaro
Papaver setigerum DC.

PLANTAGINACEAE

- Antirrhinum majus* L. subsp. *tortuosum* (Bosc ex Lam.) Rouy
Callitriche obtusangula Le Gall
Callitriche stagnalis Scop.
Kickxia spuria (L.) Dumort. subsp. *integrifolia* (Brot.) R. Fern.
Linaria purpurea (L.) Mill.
Linaria reflexa (L.) Desf. subsp. *reflexa*
Misopates orontium (L.) Rafin.
Plantago afra L. subsp. *afra*
Plantago lagopus L.
Plantago lanceolata L.
Plantago major L.

Plantago serraria L.
Veronica anagallis-aquatica L. subsp. *anagallis-aquatica*
Veronica cymbalaria Bodard
Veronica persica Poir.

PLUMBAGINACEAE

Plumbago europaea L.

POACEAE

Aira caryophyllea L.
Ampelodesmos mauritanicus (Poir.) T. Durand & Schinz
Anisantha madritensis (L.) Nevski subsp. *madritensis*
Anisantha sterilis (L.) Nevski
Anisantha tectorum (L.) Nevski
Anthoxanthum odoratum L.
Arundo donax L.
Arundo plinii Turra
Avena fatua L.
Avena sativa L.
Brachypodium distachyon (L.) P. Beauv.
Brachypodium retusum (Pers.) Beauv. (Host) Roem. & Schult.
Brachypodium sylvaticum (Hudson) P. Beauv.
Briza maxima L.
Bromus hordeaceus L. subsp. *hordeaceus*
Catapodium rigidum (L.) C.E. Hubb. subsp. *rigidum*
Cynodon dactylon (L.) Pers.
Cynosurus cristatus L.
Cynosurus echinatus L.
Dactylis glomerata L. subsp. *glomerata*
Dactylis glomerata L. subsp. *hispanica* (Roth) Nyman
Dasyphyrum villosum (L.) P. Candargy
Eragrostis cilianensis (All.) Vignolo ex Janch. subsp. *cilianensis*
Festuca ligustica (All.) Bertol.
Festuca myuros L. subsp. *myuros*
Hordeum bulbosum L.
Hordeum murinum L. subsp. *leporinum* (Link) Arcang.
Hyparrhenia hirta (L.) Stapf subso. *hirta*
Koeleria splendens Presl subsp. *splendens*
Lagurus ovatus L. subsp. *ovatus*
Lolium perenne L.
Lolium rigidum Gaudin
Melica ciliata L. subsp. *ciliata*
Oloptum miliaceum (L.) Röser & H.R. Hamasha
Paspalum distichum L.
Phalaris paradoxa L.

Poa annua L.
Poa infirma Kunth
Poa sylvicola Guss.
Poa trivialis L.
Rostraria cristata (L.) Tzvelev
Sorghum halepense (L.) Pers.
Stipellula capensis (Thunb.) Röser & H.R. Hamasha
Triticum vagans (Jord. & Fourr.) Greuter

POLYGONACEAE

Polygonum aviculare L. subsp. *aviculare*
Rumex bucephalophorus L. subsp. *bucephalophorus*
Rumex crispus L.
Rumex cristatus DC.
Rumex thyrsoides Desf.

PORTULACACEAE

Portulaca oleracea L.

PRIMULACEAE

Cyclamen hederifolium Aiton subsp. *hederifolium*
Cyclamen repandum Sm. subsp. *repandum*
Lysimachia arvensis (L.) U. Manns & Anderb. subsp. *arvensis*
Samolus valerandi L.

RANUNCULACEAE

Anemone hortensis L. subsp. *hortensis*
Clematis cirrhosa L.
Clematis vitalba L.
Delphinium halteratum Sm. subsp. *halteratum*
Ficaria verna Huds. subsp. *verna*
Nigella damascena L.
Ranunculus bulbosus L. subsp. *aleae* (Willk.) Rouy & Foucaud
Ranunculus bulbosus L. subsp. *neapolitanus* (Ten.) H. Lindb.
Ranunculus bullatus L.
Ranunculus muricatus L.
Thalictrum calabricum Spreng.

RESEDACEAE

Reseda alba L.

RHAMNACEAE

Rhamnus alaternus L. subsp. *alaternus*

ROSACEAE

Agrimonia eupatoria L. subsp. *eupatoria*
Crataegus monogyna Jacq.
Fragaria vesca L. subsp. *vesca*
Malus sylvestris (L.) Mill.
Mespilus germanica L.
Potentilla reptans L.
Poterium sanguisorba L. subsp. *sanguisorba*
Prunus spinosa L. subsp. *spinosa*
Pyrus communis L. subsp. *communis*
Pyrus spinosa Forssk.
Rosa canina L.
Rosa micrantha Borrer ex Sm.
Rosa sempervirens L.
Rubus ulmifolius Schott

RUBIACEAE

Asperula aristata L. f. subsp. *scabra* Nyman
Galium aparine L.
Galium lucidum All.
Galium verrucosum Huds.
Galium verum L. subsp. *verum*
Rubia peregrina L.
Sherardia arvensis L.
Valantia muralis L.

RUTACEAE

Ruta chalepensis L.

SALICACEAE

Salix pedicellata Desf.

SANTALACEAE

Osyris alba L.

SAPINDACEAE

Acer campestre L.,

SAXIFRAGACEAE

Saxifraga bulbifera L.
Saxifraga tridactylites L.

SCROPHULARIACEAE

Scrophularia peregrina L.
Verbascum sinuatum L.
Verbascum thapsus L. subsp. *thapsus*

SIMAROUBACEAE

**Ailanthus altissima* (Mill.) Swingle

SMILACACEAE

Smilax aspera L.

SOLANACEAE

Mandragora autumnalis Bertol.
Solanum nigrum L.

THYMELAEACEAE

Daphne gnidium L.
Daphne laureola L.

TYPHACEAE

Typha angustifolia L.
Typha latifolia L.

ULMACEAE

Ulmus minor Mill. subsp. *canescens* (Melville)
 Browicz & Ziel.

URTICACEAE

Parietaria judaica L.
Parietaria lusitanica L. subsp. *lusitanica*
Urtica dioica L. subsp. *dioica*
Urtica membranacea Poir.
Urtica pilulifera L.

VALERIANACEAE

Centranthus ruber (L.) DC. subsp. *ruber*
Fedia graciliflora Fisch. & C.A. Mey.
Valerianella eriocarpa Desv.

VERBENACEAE

Verbena officinalis L.

VIBURNACEAE

Viburnum tinus L. subsp. *tinus*

VIOLACEAE

Viola alba Besser subsp. *dehnhardtii* (Ten.) W.
 Becker
Viola odorata L.

ZYGOPHYLLACEAE

Tribulus terrestris L.

CONCLUSIONS

This study allowed to survey the vascular flora of the Gibilmanna and Cefalù woods, an area clas-

sified as a Special Area of Conservation (S.A.C.). It provides new data on a territory that had not previously been the subject of specific floristic investigations, having a certain phytogeographical interest for its location and ecological features.

Besides, the results obtained show a low incidence of exotic plants (23 species), mostly restricted to cultivated areas and to the most disturbed sites located near country houses and roads.

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