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FLORA AND VEGETAL LANDSCAPE ON THE ISLAND OF FIGAROLO (NE SARDINIA)*

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Resumen. Se incluyen en este trabajo los resultados de un estudio desarrollado en la isla de Figarolo (NE de Cerdeña), como una contribución al conocimiento de la flora y vegetación de esta isla. La isla de Córcega, formada por una base granítica cubierta de rocas calcáreas, posee un componente florístico integrado por 2100 taxones agrupados en 54 familias y distribuidos en 160 géneros. Además de incluir comentarios sobre aspectos biológicos y corológicos, este trabajo pone de manifiesto la imposibilidad de encontrar algunos taxones que se han citado en estudios anteriores. Con respecto al paisaje vegetal, los tipos principales de vegetación, en su aspecto fisiognómico, y la variación de la cubierta vegetal a lo largo de varios años, se estudian por medio de fotografías aéreas. En vista de la importancia de la flora de la isla, se recomienda la creación de un reserva natural.

Summary. This paper presents the results of research undertaken on the island of Figarolo (North-east Sardinia) as a contribution to the knowledge of flora and of the vegetal landscape. The island, which consists of a granite base surmounted by calcareous rocks, possesses a floristic component consisting of 2100 taxas, grouped in 54 families and distributed in 160 genera. In addition to the discussion on biological and chorological aspects, this paper also highlights the failure to find some taxa which had been reported in previous surveys. With regards to vegetal landscape, the main types of vegetation in terms of their aspect, and the variation of the vegetal cover over a number of years is examined by means of aerial photographs. In view of the importance of the island's flora, the creation of a nature reserve is recommended.

INTRODUCTION

In the framework of the research programme concerning the study of botanical components of the small islands off the Sardinian coast, the authors undertook a survey of the island of Figarolo (North-east Sardinia) This island

(*) This research was carried out in the framework of the INTERREG project.

was the subject of a study performed by BÉGUINOT (1929) and of a preliminary survey by the authors, the results of which were presented in Paris during the IX° OPTIMA meeting.

This paper, in addition to completing the authors' researches on Figarolo aims to present the current status of the floristic patrimony and vegetal landscape of the island, with the added objective of assessing the botanical patrimony which, together with other naturalistic parameters, will be an essential instrument for the protection of the area and its controlled use.

GENERAL INFORMATION ON THE AREA

The island of Figarolo (Fig. 1) lies off the North eastern coast of Sardinia; it covers an area of over 20 hectares; maximum height asl is 139 m; it lies 340 m off the Sardinian coast. It consists of a granite base surmounted by calcareous rocks. The crystalline base dating back to the Palaeozoic age, consists of augen gneiss and is crossed by acid dyke rocks with rhyolitic chemism, inserted in discontinuities and oriented according to N 160 E. The Mesozoic series consists of the Dorgali formation and rests on ultra-metamorphic rocks. At the foot of the carbonatic rocks lie the transgressive elements of the Mesozoic sequence,

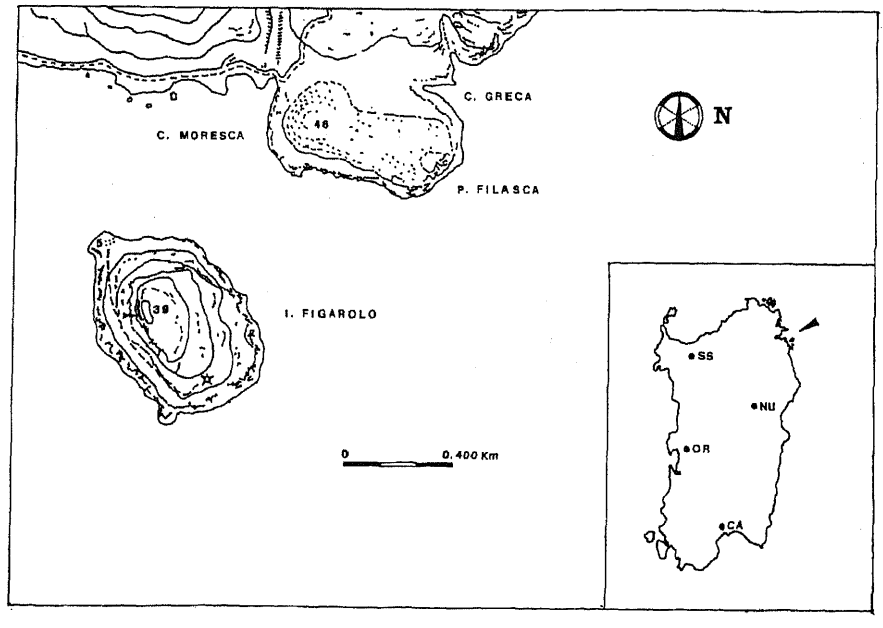

Fig. 1. The Island of Figarolo and its geographic location with respect to Sardinia.

consisting in siltstone, sandstone and weak carbonaceous levels, mainly represented by lignite. This series is, on the whole, strongly deviated towards south-east; the same deviation is found in the other klippens on nearby Cape Figari and on the island of Tavolara.

The coasts are almost wholly rocky; their morphology is closely linked to the erosive action of the waves and to the variation in the substratum, which consists of gneiss in the north-east portion of the island, and of calcareous rock in the south east. Neat the small pier lies the only stretch of sandy coast, which, in the summer months is subjected to intense trampling with extremely damaging effects on the already poor psammophilous flora.

With regards to pedological features, the island is characterised by the presence of thin, eroded soils, with prevailing stony and rocky ground, notably degraded and eroded as an effect of human presence and animal grazing.

In the calcareous area of the island, in association with rock outcrops it is possible to identify shallow *Lithic Xerorthents*[1], which reach depths of over 30 cm only in the rock crevices. They present an A-R or A-Bt-R profile, have poor organic substance, a clayey texture, structure from polyhedric to angular due to intense soil wearing caused by grazing animals; they have reduced permeability, neutral pH and a high capacity for cationic exchange; the exchange complex is saturated.

Over the Palaeozoic matrix there are associations between outcropping rock and *Lithic* and *Typic Rhodoxeralf*, of varying depth, with texture ranging from sandy-clayey to clayey and with poor permeability; carbonates are absent and reaction is neutral, whereas there is high capacity for cationic exchange, as well as a high degree of saturation in bases. In the siliceous sector, *Lithic*, *Dystric* and *Typic Xerorthents* are found; they have A-C type profiles and, in the second place, A-Bw-C, type, always with little depth and sandy to clayey texture, with low permeability; these soils are poor in organic matter, and have a well developed skeleton, with subangular polyhedric structure. Reaction is sub-acid, with low cationic exchange capacity, and partial desaturation.

Moreover, it is possible to find, in the western portion of Figarolo, *Typic* and *Aquic Xeropsamments* (with A-C profile), with sandy texture and structure from subangular to non-structured, and high degree of permeability; reaction ranges from neutral to sub-alkaline; organic substance content is poor, however, there is a relatively good degree of biological activity.

Description and analysis of climatic conditions on Figarolo are based on the data collected by the weather station of Olbia Island Bianca, which is geographically close to Figarolo, as well as presenting similar topographic

1. The pedological types described in this paper follow the taxonomic system designed by the U.S.D.A. Soil Service.

conditions, height asl, wind conditions, and for which a series of recorded temperature and rainfall data covering the last 50 years was available.

By observing the average monthly figures listed in Table 1, it is possible to identify the presence of two periods: a warm period, in the summer months, and a cold period, in the winter months; two intermediate periods are properly speaking transition periods. In fact, the hottest month is July, (average temperature 24.9 °C), at the peak of the warm period which covers the months from June to September; the coldest month is January (9.1°C), within a cold period stretching from December to March.

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Temperature	9.1	9.5	11.4	13.8	17.3	21.5	24.9	24.3	21.7	17.5	13.6	10.5
Precipitation	89	74	66	48	40	14	4	8	42	78	96	103

Table 1. Average monthly temperature and precipitation values (1927-1997).

Rainfall is concentrated in the cold period, with maximum value in December and minimum in July, in the warm period.

In this case too we can distinguish a dry period, which corresponds to the summer season, whereas the period of heaviest rainfall is found in the months of November and December, and only partially January, with two intermediate periods, in Spring and Autumn.

By analysing the values in Table 1, as well as those listed hereunder, we can identify a period of water surplus which stretches from the end of November to April, conversely, in July the soil water reserve is at its lowest, as well as the levels of evapo-transpiration; this also marks the highest water deficit, corresponding to the dry Thermo-Mediterranean climate (Table 2).

Period	Soil Temperature (°C)	Air Temperature (°C)	Precipitation (mm)
Winter	12.1	9.7	266
Spring	14.07	14.16	154
Summer	22.25	23.36	26
Autumn	16.8	17.6	216
Annual	17.3	16.3	662
Climatic Indexes	Ia = 44.8	Iu = 36.6	Ig = –8.1 PET = 842
Climatic Type = Clw2B'2d'	Regimen = Xeric	Bioclimate = Dry Thermo-Mediterranean	

Table 2. Climatic values.

FLORA

As indicated in the bibliography, Figarolo belongs to the group of small islands off the coast of Sardinia which were among the first to be explored, albeit in summary fashion, already in the XIX century. In fact, it was MORIS (1837-1859), with the help of his expert herborist Domenico Lisa who provided the first floristic data on the island, followed by the studies of VACCARI (1928) and BÉGUINOT (1929). In the years 1882 and 1884 the island was also visited by Forsyth Major, who, according to BARBEY (1884), found very few plant species there. Subsequently, BOCCHIERI (1988), in the course of a brief survey made in August 1986 along the almost inaccessible cliffs on the north eastern coast, reported the presence of two phanerophytes not previously reported. Among the above listed authors, BÉGUINOT (1929) produced the most complete work: in fact, while about ten species were known before him, his floristic and phyto-geographic survey augmented the floristic component of the island of Figarolo to no less than 126 species.

The study which is the subject of this paper was undertaken, on the basis of the data collected over the years, with the aim of verifying , about 70 years after the last census, the presence of the species found by the above mentioned authors on the island, in order to confirm their presence, to identify new species which have colonised the island in the meantime, and to report on species no longer found or which have become extremely rare.

The floristic survey was undertaken by means of monthly site surveys which were increased to various visits in the same month in the autumn and spring, over the years 1996 and 1997. Samples collected, most of which are currently coserved at the Herbarium of the Department of Botanical Sciences of the University of Cagliari (Erbario del Dipartimento di Scienze Botaniche di Cagliari (CAG)), were successively identified on the basis of the *Nuova Flora Analitica d'Italia* (FIORI, 1923-1929), *Flora d'Italia* (PIGNATTI, 1982) and *Flora Europaea* (TUTIN & al., 1964-1980; 1993). The latter publication was utilised, together with the tables of plants endemic to Sardinia (ARRIGONI & al., 1977-1991), also to draw up the floristic list. This list, which is presented hereunder, includes, for each entity, the specific or infraspecific binomial; life form and the chorological element according to the acronyms utilised by PIGNATTI (1982), bibliographical reference where present, the area or sector of the island where the plant in question may be found, and notes on the habitat, on the rarity of the species or its disappearance. For ease of consultation of the list, species no longer found are preceded by a +; newly reported species are preceded by an asterisk*.

With reference to the vegetal landscape, various surveys were performed with the aim of identifying the aspect of the vegetation. An attempt was also

made to assess changes which occurred in the various plant formations, both in terms of variation in extension and in terms of changes in plant types, with the aid of aerial photographs taken over a number of years.

PTERIDOPHYTA

Selaginellaceae

***Selaginella denticulata** (L.) Link - Ch rept - Steno-Medit.
Northern slope, immediately after the oleasters deformed by the wind, at times found in crevices or small cavities among the rocks; rare.

Aspleniaceae

***Asplenium trichomanes** L. - H ros - Cosmop.
Crevices in the northern and western cliffs; extremely rare.

***Ceterach officinarum** DC. - H ros - Euras. temp.
Western and northern cliffs; rare.

Polypodiaceae

Polypodium australe Fée - H ros - Euri-Medit.
Béguinot, 1929 – Crevices, stony grounds, seasonally moist areas; diffuse.

GYMNOSPERMAE

Cupressaceae

Juniperus turbinata Guss. - P scap - Euri-Medit
Béguinot, 1929; Vaccari, 1928 – Quite diffuse throughout the island.

DICOTYLEDONES

Fagaceae

Quercus ilex L. - P scap - Steno-Medit.
Bocchieri, 1988 - Specimens of notable size were found on the north eastern and eastern slopes, while on a small plateau to the east of the ruined building there is a group of specimens which seem to have been planted by man.

Moraceae

Ficus carica L. - P scap - Medit.-Turan.
Bocchieri, 1988 – found in rocky northern crevices and at the foot of the western cliffs; extremely rare.

Urticaceae

***Urtica urens** L. T scap - Subcosop.
Found in small meadows close to the northern and western cliffs; quite rare.

***Urtica caudata** Forskål - T scap - S-Medit.
Stony ground, small meadows, crevices and at times underneath the oleasters; there are sparse specimens throughout the island, but this species is not very diffuse.

Parietaria diffusa Mert. & Koch - H scap - Euri-Medit.-Macarones.
Béguinot, 1929 – Along the path leading to the lighthouse and on the stony grounds at 60-85 m asl; diffuse.

Parietaria lusitanica L. - T rept - Steno-Medit.
Béguinot, 1929 - At the foot of the cliffs, where it sometimes grows close to the wild cabbage; rare.

Santalaceae

Osyris alba L. - NP - Euri-Medit.
Béguinot, 1929 On stony ground on the northern and western slopes; truly rare and difficult to find.

Polygonaceae

***Rumex bucephalophorus** L. - T scap - Medit.-Macarones.
Clearings, stony ground, small erosion basins, also slipped rocks; common.

***Rumex obtusifolius** L. - H scap - Subcosmop.
Clearings in the scrubland of the northern plateau and in the vicinity of the ruined building; rare.

Chenopodiaceae

***Beta vulgaris** L. subsp. **maritima** (L.) Arcangeli - H scap - Euri-Medit.
On the small beach near the pier and in some small meadows close to the ruined building; not very diffuse.

Aizoaceae

***Mesembryanthemum nodiflorum** L. - T scap - S-Medit.-Sudafr.
Found exclusively in the small meadows near the western and southern coast of the island; rare.

Caryophyllaceae

***Arenaria leptoclados** (Reichenb.) Guss. - T scap - Paleotemp
Crevices, small meadows with thin soil and at the foot of the western and northern cliffs; not very diffuse.

Stellaria pallida (Dumort.) Piré - T scap - Paleotemp.
Béguinot, 1929 – under the scrubland near the holm-oaks and in the high scrubland north of the lighthouse; not very diffuse.

***Cerastium glomeratum** Thuill. - T scap - Euri-Medit.
At the end of the northern path, near the holm-oaks and the oleasters; rare.

Polycarpon tetraphyllum (L.) L. - T scap - Euri-Medit
Béguinot, 1929 – In the lithosols on the eastern slope, among the low and sparse scrubland; rare.

+Silene nocturna L. -
Béguinot, 1929 - Not found. According to the data available, this species is reported, among the islands off the Sardinian coast, on the islands of Budelli, Caprera, Maddalena and Spargi.

Silene gallica L. - T scap - Euri-Medit.
Béguinot, 1929 – Clearings in the scrubland, crevices and small meadows in steep areas and on the upper plateau; common.

Silene vulgaris (Moench) Garcke subsp. **angustifolia** (Miller) Hayek - H scap - Subcosmop. Béguinot, 1929 – Cool areas in the western sector, rarely on stony ground; not very diffuse.

Petrorhagia prolifera (L.) P.W. Ball & Heywood - T scap - Euri Medit.
Béguinot, 1929 – Arid, rocky and stony ground; common.

***Dianthus siculus** C. Presl. - H scap - W Medit.
Crevices in the northern cliffs near the large ficus tree; rare.

Ranunculaceae

Anemone hortensis L. - G bulb - N-Medit.
Béguinot, 1929 - Clearings in the western sector and on the highest area; rare.

Clematis cirrhosa L. - P lian - Steno-Medit.-Turan.
Béguinot, 1929 – Found throughout the island; lianas of considerable size were found in the western and northern sector.

***Nigella damascena** L. - T scap - Euri Medit.
Slightly to the south of the ruined building, near the holm-oaks and among the *Ampelodesmos* scrub; not very diffuse.

***Ranunculus bullatus** L. - H ros - Steno-Medit.
Clearings and stony ground in the north western sector and scrubland clearings in the highest areas; not very diffuse.

Papaveraceae

+Papaver pinnatifidum Mor.
Béguinot, 1929 - Not found.

***Fumaria bastardii** Boreau - T scap - Subatl.
On the northern slope and in some crevices; not very diffuse.

Cruciferae

***Sisymbrium irio** L. - T scap - Paleotemp.
Where the path widens as it leads to the lighthouse, approximately 50 m asl; rare.

Sisymbrium officinale (L.) Scop. - T scap - Subcosmop.
Béguinot, 1929 – Among the oleasters and holm-oaks of the northern sector; rare.

Matthiola tricuspidata (L.) R. Br. - T scap - Steno-Medit.
Béguinot, 1929 – In the pebbly-sandy area and near the ruined building; scattered specimens.

***Cardamine hirsuta** L. - T scap - Cosmop.
On the stony grounds of the north western sector and on the peak plateau; rare.

***Arabis verna** (L.) R. Br. - T scap - Steno-Medit.
Cool areas in the northern and western cliffs; rare.

Clypeola jonthlaspi L. - T scap - Steno-Medit.
Béguinot, 1929 – In an open space along the path leading to the lighthouse; rare.

Capsella bursa-pastoris (L.) Medicus - H bienn - Cosmop.
Béguinot, 1929 - Clearings in the small Ampelodesmos scrub just before the myrtle shrub, stony ground, path edges; common.

Brassica insularis Moris - Ch suffr - Endem ?
Béguinot, 1929 - Common among the calcareous rocks, in particular in the western sector.

Succowia balearica (L.) Medicus - T scap - SW Medit.-Macarones.
The presence of this species on the island is attributed to Barbey (1884) who followed the indications of Forsyth Major as reported by Vaccari (1928) and Béguinot (1929). Currently it is extremely rare and difficult to find; it may be found to the north, near the large holm-oaks and in the high scrubland of the central-eastern sector, in the clearings of which the rare *Erica multiflora* also grows.

***Cakile maritima** Scop. subsp. **aegyptiaca** (Willd.) Nyman - T scap - Medit. Atl.
Rare specimens in the stretch of sand west of the pier.

+**Rapistrum rugosum** (L.) All.
Béguinot, 1929 - Not found. On the basis of the information available to us, this species is reported on the islands of Asinara and Caprera, ,while it has disappeared from the island of S. Stefano (Bocchieri, 1997) where it had been reported by Gennari (1870).

***Raphanus raphanistrum** L. subsp. **landra** (Moretti ex DC.) Bonnier & Layens - T scap - Steno-Medit.
Coastal areas, steep and craggy slopes in the southern sector near the shore. Rare perennial specimens have been observed.

Resedaceae

***Reseda alba** L. - H scap - Steno-Medit.
Just before reaching the lighthouse, in a clearing frequented by the mouflon; rare.

Crassulaceae

Umbilicus rupestris (Salisb.) Dandy - G rhiz - Medit.-Atl.
Béguinot, 1929 - Crevices, stony ground, clearings; not very diffuse.

Sedum sediforme (Jacq.) Pau - Ch succ - Steno-Medit.
Béguinot, 1929 - Fairly diffuse in crevices and on the cliffs. Figarolo appears to be, at the present time, the only island off the coast of Sardinia where it is possible to find this crassulacea, which, according to Pignatti (1982), is not present in Sardinia.

Sedum stellatum L. - T scap - Steno-Medit.
Béguinot, 1929 - Stony ground, crevices and deposits of soil in the western sector and on the highest area towards the east; not very diffuse.

***Sedum rubens** L. - T scap - Eurimedit.-Subatl.
Sunny western areas and crevices in the highest area; not very diffuse.

Leguminosae

Calicotome villosa (Poiret) Link - P caesp - Steno-Medit.
Béguinot, 1929 - Found throughout the island, but certainly not a common species.

Bituminaria morisiana (Pignatti *et* Metlesics) Greuter - Ch frut - Endem.
Béguinot, 1929 - Diffuse on the whole island, especially on rocks and gaps in calcareous rocks. Of all the islands off the coast of Sardinia, the presence of this plant has been reported only on the island of Ogliastra.

Vicia benghalensis L. - T scap - Steno-Medit.
Béguinot, 1929 - small meadows near the north-western cliffs; rare.

***Vicia sativa** L. subsp. **nigra** (L.) Ehrh. - T scap - Subcosmop.
Small meadows close to the ruined building and on the highest plateau; not very diffuse.

+Lathyrus cicera L.
Béguinot, 1929 - Not found. This species is no longer confirmed also on the island of S. Stefano (Bocchieri, 1997) where its presence had been reported by Desole (1961).

Lathyrus articulatus L. - T scap - Steno-Medit.
Béguinot, 1929 – Among low scrubland; rare.

***Pisum sativum** L. subsp. **elatius** (Bieb.) Ascherson & Graebner - T scap - Steno-Medit.-Turan Close to the myrtle shrub in the northern sector of the island; extremely rare

***Ononis reclinata** L. - T scap - S-Medit.-Turan.
Clearings in the scrubland in the highest area and small soil deposits in the erosion basins; not very diffuse.

+Melilotus elegans Salzm.
Béguinot, 1929 - Not found.

Melilotus sulcata Desf. - T scap - S-Medit.
Béguinot, 1929 – Extremely rare in a small meadow north of the lighthouse.

***Medicago truncatula** Gaertner - T scap - Steno-Medit.
In the scrubland close to the trigonometric point; not very diffuse.

Medicago littoralis Rohde - T scap - Euri-Medit.
Béguinot, 1929 - Small coastal meadows near the ruined building and those between the lighthouse and the trigonometric point.

***Medicago minima** (L.) Bartal. - T scap - Euri-Medit.-Centroasiat.
Found in various locations on the island but not common.

***Trifolium campestre** Schreber - T scap - W-Paleotemp.
Clearings, path edges, stony ground; rare.

***Trifolium arvense** L. - T scap - W-Paleotemp.
Lithosols and fissures in the rocks; extremely rare.

Trifolium scabrum L. - T scap - Euri-Medit.
Béguinot, 1929 - Northern slope and clearings near the lighthouse; not very diffuse.

***Trifolium stellatum** L. - T scap - Euri-Medit.
Clearings near the stony ground on the western slope; not very diffuse.

***Trifolium cherleri** L. - T scap - Euri-Medit.
Clearings on the plateau near the lighthouse and along the path that crosses the Ampelodesmos scrub; not very diffuse.

***Trifolium angustifolium** L. - T scap - Euri-Medit.
Clearings and clearings in the scrubland between the lighthouse and the trigonometric point; extremely rare.

***Trifolium subterraneum** L. T rept - Euri-Medit.
Among the clearings in the cistus scrub near the ruined building; diffuse.

Lotus edulis L. - T scap - Steno-Medit.
Béguinot, 1929 - In some stony grounds and among the low scrubland of the central-western and northern sector; rare.

Lotus cytisoides L. - Ch suffr - Steno-Medit.
Béguinot, 1929 - Coastal areas and also often inland within crevices and in clearings; common.

***Lotus ornithopodioides** L. T scap - Steno-Medit.
Slightly to the south-west of the ruined building; rare.

***Anthyllis vulnerarea** L. subsp. **praepropera** (A. Kerner) Bornm. - H bienn - Euri-Medit.
Along the path leading to the lighthouse and near the trigonometric point; rare.

Scorpiurus muricatus L. - T scap - Euri-Medit.
Béguinot, 1929 – Present throughout the island but not abundant.

Geraniaceae

Geranium rotundifolium L. - T scap - Paleotemp.
Béguinot, 1929 – Path edges and clearings in the scrubland near the lighthouse; diffuse.

Geranium molle L. - T scap - Subcosmop.
Béguinot, 1929 – Extremely rare specimens on the northern slope, near the holm-oaks.

Geranium purpureum L. T scap - Euri-Medit.
Béguinot, 1929 – Under the oleasters and the phyllireae of the peak sector; not very diffuse.

Erodium moschatum (L.) L'Hér. - T scap - Subcosmop.
Béguinot, 1929 - Small meadows near the ruined building and slightly to the south of the trigonometric point; not very diffuse.

Linaceae

Linum tryginum L. - T scap - Euri-Medit.
Béguinot, 1929 – In the pebbly clearings of the western slope; not very diffuse.

***Linum strictum** L. subsp. **spicatum** Guss. - T scap - Steno Medit.
Diffuse throughout the island but especially in the highest area.

Euphorbiaceae

Mercurialis annua L. T scap - Paleotemp.
Béguinot, 1929 - Specimens scattered throughout the island, in particular along the paths traced by the mouflons.

Euphorbia dendroides L. - NP - Steno-Medit.-Macarones.
Béguinot, 1929 - Diffuse in the western and northern sector, rare in the eastern sector and on the peak plateau. Large specimens were found, as already reported by Béguinot (1929).

Euphorbia peplus L. - T scap - Cosmop.
Béguinot, 1929 - Clearings in the scrubland, stony ground, small meadows and crevices; not very diffuse.

***Euphorbia peploides** Gouan - T scap - Cosmop.
Same locations as the preceding plant, in particular in stony ground and dry areas.

Euphorbia pinea L. - Ch suffr - W-Medit.
Vaccari, 1928 - Béguinot, 1929 - Crevices in coastal reefs and a few specimens also in the small sand area; rare.

Euphorbia paralias L. - Ch frut - Euri.Medit.-Atl.
Béguinot, 1929 - Extremely rare specimens in the sandy area. Numerous plantules were observed: they could also be attributed to the preceding species.

Rutaceae

Ruta chalepensis L. - Ch suffr - S-Medit.
Béguinot, 1929 – Along the path leading to the lighthouse and in the highest area; not very diffuse.

Anacardiaceae

Pistacia lentiscus L. - P caesp - Steno-Medit.
Béguinot, 1929 - Common.

Rhamnaceae

***Rhamnus alaternus** L. - P caesp - Steno-Medit.
Northern sector, close to the escarpment; extremely rare.

Malvaceae

Malva parviflora L. - T scap - Euri-Medit.
Béguinot, 1929 – Along the path leading to the lighthouse and among the large oleasters; not common.

***Lavatera olbia** L. - P caesp - Steno-Medit.
Among the lentisk near the abandoned building; very rare.

Cistaceae

Cistus incanus L. - NP - Steno-Medit.
Béguinot, 1929 - Northern and western slopes; rare.
Cistus monspeliensis L. - NP - Steno-Medit.-Macarones.
Béguinot, 1929 - Common.
Fumana laevipes (L.) Spach - Ch suffr
Steno-Medit. - Béguinot, 1929 - Small meadows in the highest area and near the lighthouse; not very diffuse.

Tamaricaceae

***Tamarix tetragyna** Ehrenb. - P caesp - W-Medit.
Between the ruined building and the abandoned kiln; rare.

Myrtaceae

***Myrtus communis** L. - P caesp - Steno-Medit.
Only one very large specimen was found, in the northern sector at the end of the path, among granite and calcareous rocks.

Thelygonaceae

Theligonum cynocrambe L. - T scap - Steno-Medit.
Béguinot, 1929 - Stony ground, crevices, small meadows; not diffuse.

Umbelliferae

Crithmum maritimum L - Ch suffr - Euri-Medit.
Béguinot, 1929 - Extremely rare and difficult to find; rare specimens were found at the edges of the central-western and central-eastern sectors.
Seseli bocconi Guss. subsp. **praecox** Gamisans - H scap - Endem.
Vaccari, 1928 - Béguinot, 1929 - Diffuse in particular in calcareous rocks, where it grows in crevices, many of which are impossible to reach.
+Foeniculum vulgare Miller subsp. **piperitum** (Ucria) Coutinho
Béguinot, 1929 - Not found.
Ferula communis L. - H scap - S-Medit.
Béguinot, 1929 – In the low scrubland near the ruined building and in the highest area; diffuse.

Tordylium apulum L. - T scap - Steno-Medit.
Béguinot, 1929 - Small meadows just before reaching the lighthouse; extremely rare.

Thapsia garganica L. - H scap - S-Medit.
Béguinot, 1929 – Found in various locations, also in the fissures of the rocks and in the pebbly –sandy area.

*__Torilis nodosa__ (L.) Gaertner - T scap
Euri-Medit. Turan. - Clearings under the oleasters and at the foot of the western cliffs; diffuse.

*__Daucus carota__ L. subsp. __drepanensis__ (Arcangeli) Heywood - H bienn - Steno-Medit
Coastal clearings and crevices; not common.

Ericaceae

Erica multiflora L. - NP - Steno-Medit.
Moris, 1837-1859 - Vaccari, 1928 - Béguinot, 1929 – This species is difficult to find since it is extremely rare. Only two small size specimens in poor condition were found in the highest area.

Primulaceae

*__Asterolinon linum-stellatum__ (L.) Duby - T scap - Steno-Medit.
Among the scrubland, on stony ground and in some crevices; common.

Anagallis arvensis L. - T rept - Euri-Medit.
Béguinot, 1929 - Specimens are scattered in various sites throughout the island. In the highest area, slightly north of the lighthouse, specimens with red flowers were found.

Plumbaginaceae

Limonium protohermaeum Arrigoni *et* Diana - Ch suffr - Endem.
Béguinot, 1929 – Typically siliceous coastal areas; common. This limonium is undoubtedly the same observed in 1928 by Béguinot who labelled it as *Statice dubia* Andr.

Oleaceae

Olea europaea L. var. **sylvestris** Brot. - P scap - Steno-Medit.
Vaccari, 1928 - Béguinot, 1929 - Common on the whole island.

Phillyrea latifolia L. - P scap - Steno-Medit.
Vaccari, 1928 – Found in the highest area where rare, very large specimens were found. This genus was not reported by Béguinot (1929), who on the contrary highlighted its absence on the island.

Gentianaceae

***Centaurium erythraea** Rafn - T scap - Paleotemp.
Northern slope, between the lime kiln and the myrtle bush; rare.
***Centaurium maritimum** (L.) Fritsch - T scap - W-Steno-Medit.
Clearings in the cistus scrub near the ruined building; rare.

Rubiaceae

Sheradia arvensis L. - T scap - Subcosmop.
Béguinot, 1929 - Common throughout the island.
***Galium lucidum** All. - H scap - Euri-Medit.
Crevices in the western and northern cliffs; diffuse.
Galium aparine L. - T scap - Eurasiat.
Béguinot, 1929 – Among the large oleasters of the western sector; not very diffuse.
***Galium verrucosum** Hudson subsp. **halophilum** (Ponzo) Natali & Jeanmonod - T scap - Endem. Coastal areas with prevailing sandy soil; not common. Béguinot (1929) labelled this taxon as *Galium vaillantia* Web.
***Galium minutulum** Jordan - T scap - Steno-Medit.-N-W.
Beneath the scrub and in some clearings; diffuse.
Galium murale (L.) All. - T scap - Steno Medit.
Béguinot, 1929 - Clearings, stony ground; not very diffuse.
Valantia muralis L. - T scap - Steno-Medit.
Béguinot, 1929 - Small meadows and clearings with prevailing sandy soil; not common.
Rubia peregrina L. - P lian - Steno-Medit.-Macarones.
Béguinot, 1929 – Among the lentisk and in fissures in the rocks; common.

Convolvulaceae

+Cuscuta planiflora Ten.
Béguinot, 1929 - Not observed.
***Convolvulus siculus** L. - T scap - S-Medit.
Clearings and crevices near the lighthouse and the trigonometric point; rare.
Convolvulus althaeoides L. - H scand - W-Steno-Medit.
Béguinot, 1929 - Scrubland, clearings, coastal areas; common.

Boraginaceae

Echium pustulatum Sibth. & Sm. - H bienn - Steno-Medit.-W.
- Béguinot, 1929 – Grassy meadows in the coastal areas and in the highest area; not common.

Echium plantagineum L. - H bienn - Euri-Medit.
Béguinot, 1929 - Western coastal area; rare

Echium parviflorum Moench - H bienn - Steno-Medit.
Béguinot, 1929 – Along the edges of the path leading to the lighthouse and on stony ground; rare.

+**Anchusa arvensis** (L.) Bieb.
Béguinot, 1929 - Not observed. This species was reported by Barbey (1884) following thr indications of Forsyth Major; Vaccari (1928) advanced doubts on its indigenous origins, since it could have been imported as a consequence of sea traffic between Golfo Aranci and mainland Italy. Béguinot (1929) also included it in his floristic list, but without having observed it.

*__Myosotis arvensis__ (L.) Hill - T scap - Europ.-W-Asiat.
Small meadows at the foot of the northern cliffs; diffuse.

Labiatae

*__Teucrium marum__ L. - Ch suffr - Subendem.
Clearings and crevices in the highest area near the lighthouse; rare.

Prasium majus L. - Ch frut - Steno-Medit.
Barbey, 1884 - Vaccari, 1928 - Béguinot, 1929 – Among the lentisk; not very diffuse.

Stachys ocymastrum (L.) Briq. - T scap - W-Medit.
Béguinot, 1929 – In the scrubland and in a few clearings among the oleasters; extremely rare.

Solanaceae

*__Hyosciamus albus__ L. - H bienn - Euri-Medit.
Among the ruined structures and perimeter walls of the old building; rare.

*__Solanum nigrum__ L. - T scap - Cosmop.
At the foot of the cliffs where muflons pass or gather; not very diffuse.

Scrophulariaceae

*__Scrophularia peregrina__ L. - T scap - Steno-Medit.
Cool areas at the foot of the cliffs near the large holm-oaks; not very diffuse.

***Scrophularia trifoliata** L. - H scap - Endem.
Crevices and small erosion basins in the western sector; not very diffuse.
***Misopates orontium** (L.) Rafin. - T scap - Paleotemp.
Rocky crevices, clearings, stony ground; rare.
***Parentucellia viscosa** (L.) Caruel - T scap - Medit.-Atl.
Clearings and stony ground on the northern slope; not very diffuse.

Orobanchaceae

***Orobanche minor** Sm. - T par - Subcosmop. - Clearings in the scrubland and stony ground; not common.

Plantaginaceae

Plantago lanceolata L. - H ros - Cosmop.
Béguinot, 1929 - Clearings in the scrubland and the stony ground; not very diffuse.
***Plantago lagopus** L. - T scap - Steno-Medit.
Clearings near the ruined building; rare.
Plantago afra L. - T scap - Steno-Medit.
Béguinot, 1929 – Found in various locations throughout the island, in some instances abundant; common.

Valerianaceae

***Valerianella microcarpa** Loisel. - T scap - Steno-Medit.
Near the large holm-oaks at the foot of the cliffs; very rare.
Centranthus calcitrapae (L.) Dufresne - T scap - Steno-Medit.
Béguinot, 1929 - Near the oleaster clusters at the foot of the south-western cliffs; rare.

Campanulaceae

Campanula erinus L. - T scap - Steno-Medit.
Béguinot, 1929 - Rocky crevices and stony ground; diffuse.

Compositae

***Conyza canadensis** (L.) Cronq. - T scap - Cosmop.
Rare specimens between the pier and the lime kiln.
***Filago eriocephala** Guss. - T scap - Steno-Medit.-CE
Clearings in the scrubland near the western stony ground; rare.
***Logfia gallica** (L.) Cosson & Germ. - T scap - Euri-Medit.
Clearings and paths leading to the sea near the ruined building; diffuse.

***Evax pygmaea** (L.) Brot. - T rept - Steno-Medit.
Along the path just before reaching the lighthouse; rare.

Helichrysum italicum (Roth.) Don subsp. **microphyllum** (Willd.) Nyman - Ch suffr - W-Medit. Béguinot, 1929 - Diffuse especially in the pebbly area near the beach.

+Phagnalon sordidum (L.) Reichenb.
Béguinot, 1929 - Not found.

Phagnalon saxatile (L.) Cass. - Ch suffr - W-Medit.
Béguinot, 1929 - Rocky crevices, erratic boulders, cliffs; diffuse.

+Inula conyza DC.
Béguinot, 1929 - Not observed.

***Inula crithmoides** L. - Ch suffr - SW-Europ.
Along the western coast south of the pebbly-gravelly area and in a crevice on the south-western coast; very rare.

***Dittrichia viscosa** (L.) W. Greuter - H scap - Euri-Medit.
Near the holm-oaks of the northern slope and in the clearings north of the lighthouse; not very diffuse.

***Pulicaria odora** (L.) Reichenb. - H scap - Euri-Medit.
Among the scrubland and clearings, also near the ruined building and along the path leading to the lighthouse; common.

***Pallenis spinosa** (L.) Cass. - H bienn - Euri-Medit.
Near the ruined building and in the first stretch of the path leading to the lighthouse; not very diffuse.

***Anthemis arvensis** L. subsp. **incrassata** (Loisel.) Nyman - T scap - Subcosmop.
Near the ruined building and in the pebbly-gravelly area; not very diffuse.

Otanthus maritimus (L.) Hoffmanns. & Link - Ch suffr - Medit.-Atl.
Béguinot, 1929 – Only one specimen, which is also subjected to trampling in the summer period, in the sandy area.

***Chrysanthemum segetum** L. - T scap - Euri-Medit.
Near the ruined building and at the edges of some stony areas; common.

+Chrysanthemum coronarium L.
Béguinot, 1929 - Not found.

Senecio bicolor (Willd.) Tod. subsp. **cinerarea** (DC.) Chater - Ch suffr - W-Medit.
Béguinot, 1929 - Rocky crevices; common.

+Senecio leucanthemifolius Poiret
Béguinot, 1929 - Not found.

***Senecio lividus** L. - T scap - Steno-Medit.
Beneath the holm-oaks and the oleasters and in the scrubland of the highest area; diffuse.

+**Senecio vulgaris** L.
Béguinot, 1929 - Not found. This taxon and *S. leucanthemifolius* could be included aomng the species that undergo floristic turnover.

Calendula arvensis L. - T scap - Euri-Medit. - Béguinot, 1929 - Scattered specimens in the western and northern sector, while the plant was not found in the eastern sector; not very diffuse.

Carlina corymbosa L. - H scap - Steno-Medit.
Béguinot, 1929 - Clearings, stony ground, path edges; not very diffuse.

Carduus pycnocephalus L. - H bienn - Euri-Medit.-Turan.
Béguinot, 1929 - Scattered specimens in the central-northern sector; rare.

*__Galactites tomentosa__ Moench - H bienn - Steno-Medit.
Scattered specimens in the scrubland and beneath the oleasters; not very diffuse.

Hyoseris radiata L. - Hros - Steno-Medit.
Béguinot, 1929 – Especially diffuse in the pebbly-gravelly area.

*__Hedypnois cretica__ (L.) Dum.-Courset - T scap - Steno-Medit.
Crevices and clearings; not very diffuse.

Urospermum picroides (L.) Scop. - T scap - Euri-Medit.
Béguinot, 1929 - At the edges of the path leading to the lighthouse; extremely rare.

Hypochoeris achyrophorus L. - T scap - Steno-Medit.
Béguinot, 1929 - Diffuse throughout the island; common.

*__Hypochoeris glabra__ L. - T scap - Euri-Medit.
In the cistus scrub and the clearings near the ruined building; not very diffuse.

*__Leontodon tuberosus__ L. - H ros - Steno Medit.
Northern and western clearings, peak plateau; not very diffuse.

Reichardia picroides (L.) Roth - H scap - Steno-Medit.
Béguinot, 1929 - Northern slope; very rare.

*__Aeheorhiza bulbosa__ (L.) Cass. - G bulb - Steno-Medit.
Pebbly-sandy area, stony ground and clearings in the scrubland; common.

+**Sonchus tenerrimus** L.
Béguinot, 1929 - Not found.

Sonchus oleraceus L. - T scap - Subcosmop.
Béguinot, 1929 -In the scrubland and in grassy areas; rare.

MONOCOTYLEDONES

Posidoniaceae

***Posidonia oceanica** (L.) Delile - I rad - Steno-Medit.
Underwater prairies along almost all the coasts of the island and in particular near the pier and between the coast and the artificial islet for fish farming.

Liliaceae

Asphodelus aestivus Brot. - G rhiz - Steno-Medit.
Béguinot, 1929 – Present in most areas of the island; common.

Ornithogalum arabicum L. - G bulb - S-Medit.
Moris, 1837-1859 - Vaccari, 1928 - Béguinot, 1929 – In some crevice and clearing of the eastern sector; extremely rare and difficult to find.

***Urginea undulata** (Desf.) Steinh. - G bulb - S-Medit.
Clearings in the scrubland and margins of the stony ground areas; not very diffuse.

Urginea maritima (L.) Baker - Steno-Medit.-Macarones.
Béguinot, 1929 - Near the Ampelodesmos scrub and in clearings on the highest area; not very diffuse.

+**Muscari comosum** (L.) Miller
Béguinot, 1929 - Not found.

Allium subhirsutum L. - G bulb - Steno Medit.
Béguinot, 1929 – Beneath the scrubland and on the peak plateau; diffuse.

***Allium triquetrum** L. - G bulb - W-Steno-Medit.
Western rocky crevices and in the coolest crevices in general; diffuse.

Allium ampeloprasum L - G bulb - Euri-Medit.
Béguinot, 1929 – Observed exclusively along the south-western coast; extremely rare.

Asparagus albus L. - Ch frut - W-Steno-Medit.
Béguinot, 1929 - Scattered specimens in the low scrubland; not very diffuse.

Asparagus acutifolius L. - G rhiz - Steno-Medit.
Béguinot, 1929 – Slightly east of the ruined building; extremely rare.

***Smilax aspera** L. - NP - Paleosubtrop.
Among the lentisk of the northern slope; not very diffuse.

Amaryllidaceae

***Narcissus tazetta** L. - G bulb - Steno-Medit.
Northern sector, crevices and small soil deposits at the foot of the cliffs; not very diffuse.

Pancratium maritimum L. - G bulb - Steno-Medit.
Béguinot, 1929 – sandy area near the pier; diffuse.

Dioscoreaceae

Tamus communis L. - G rad - Euri-Medit.
Béguinot, 1929 – Among the lentisk along the path leading to the lighthouse and in the northern and eastern sectors; common. Great variation in the leaves.

Gramineae

+**Festuca arundinacea** Schreber
Béguinot, 1929 - Not observed. This species is rarely found in the flora of the islands off the coast of Sardinia; at the current state of knowledge it is reported on the islands of Asinara and S. Antioco. In the month of May 1998 it was collected by Bocchieri on the island Piana di Stintino (NW Sardinia).

*__Vulpia geniculata__ (L.) Link - T caesp - W-Steno-Medit.
Peak clearings and among the small crevices near the trigonometric point; rare.

*__Vulpia fasciculata__ (Forskål) Samp. - T caesp - Medit.-Atl.
Pebbly-sandy area; very rare.

*__Vulpia myuros__ (L.) C.C. Gmelin - T caesp - Subcosmop.
Near the holm-oaks on the northern slope; not very diffuse.

*__Desmazeria marina__ (L.) Druce - T scap - Medit.-Atl.
Small meadows near the reefs and in the sandy area near the pier; not very diffuse. Béguinot's reported sighting (1929) of *Catapodium tuberculosum* Mor. should probably be attributed to this species.

Desmazeria rigida (L.) Tutin - T scap - Euri-Medit.
Béguinot, 1929 – Along the slopes, on stony ground, in crevices; rare.

Dactylis glomerata L. - H caesp - Paleotemp.
Béguinot, 1929 – Found throughout the island; common.

Cynosurus echinatus L. - T scap - Euri-Medit.
Béguinot, 1929 – In the scrubland and along the path leading to the lighthouse: extremely rare.

Lamarckia aurea (L.) Moench - T scap - Steno-Medit.-Turan.
Béguinot, 1929 - In some crevices of the peak and eastern sectors; rare.

Briza maxima L. - T scap - Paleo-Subtrop.
Béguinot, 1929 - Clearings near the ruined building and in the eastern sector; rare.

Melica minuta L. - H caesp - Steno Medit.
Béguinot, 1929 - Crevices in the cliffs and in some large calcareous rocks; diffuse.

***Melica ciliata** L. - H caesp - Euri-Medit.-Turan.
Among the lentisk shrubs near the ruined building and on the peak plateau near the trigonometric point; not very diffuse.

Bromus madritensis L. - T scap - Euri-Medit.
Béguinot, 1929 - Common.

***Brachypodium retusum** (Pers.) Beauv. - H caesp - W-Steno-Medit.
Common in the clearings among the scrubland, on stony ground and in some crevices.

Brachypodium distachyon (L.) Beauv. - T scap - Steno-Medit.-Turan.
Béguinot, 1929 - Clearings on the northern slope and small grass patches in the highest area; not very diffuse.

Hordeum murinum L. subsp. **leporinum** (Link) Arcangeli - T scap - Euri-Medit.
Béguinot, 1929 - Near the large holm-oaks, along the path leading to the lighthouse, peak clearings; not very diffuse.

Avena barbata Pott - T scap - Euri-Medit.-Turan.
Béguinot, 1929 - Scattered specimens on the island, but not abundant.

***Gaudinia fragilis** (L.) Beauv. - T scap - Euri-Medit.
Clearings and small meadows in the cistus scrub near the ruined building; rare.

***Lophochloa cristata** (L.) Hyl. - T caesp - Subcosmop.
Clearings in the scrubland and path edges; not very diffuse.

***Lagurus ovatus** L. - T scap - Euri-Medit.
In the scrubland on the northern and south western slopes, clearings near the trigonometric point; not very diffuse. Small specimens.

***Gastridium ventricosum** (Gouan) Schinz &Thell. - T scap - Medit.Atl.
On stony grounds and on the eastern slope; scattered specimens, always rare.

***Parapholis incurva** (L.) C.AND. Hubbard - T scap - Medit.-Atl.
Crevices near the pier and in the small coastal meadows with mainly sandy soil; not very diffuse.

***Piptatherum miliaceum** (L.) Cosson - H caesp - Steno-Medit.-Turan.
Scattered specimens throughout the island, particularly in the highest sector.

Stipa capensis Thunb. - T scap - Steno-Medit.
Béguinot, 1929 - Clearings in the scrubland; rare.

Ampelodesmos mauritanica (Poiret) T. Durand & Schinz - H caesp - W-Steno-Medit.
Béguinot, 1929 - Diffuse in the northern sector, rare in the western sector and on the peak plateau.

+**Aeluropus littoralis** (Gouan) Parl.
Béguinot, 1929 - Not found.

*__Sporobolus pungens__ (Schreber) Kunth - G rhiz - Subtrop.
Pebbly-gravelly area; common.

Hyparrhenia hirta (L.) Stapf - H caesp - Paleotemp
Béguinot, 1929 - Crevices and small meadows on the peak plateau; rare.

Araceae

*__Arisarum vulgare__ Targ.-Tozz. - G rhiz - Steno-Medit.
Common and abundant throughout the island.

Cyperaceae

*__Carex distachya__ Desf. - H caesp - Steno-Medit.
Under the holm-oaks and the oleasters; not very diffuse.

Carex flacca Schreber subsp. **serrulata** (Biv.) W. Greuter - G rhiz - S-Europ.
Béguinot. 1929 - Clearings near the ruined building and on the peak plateau; common.

Orchidaceae

*__Gennaria diphylla__ (Link) Parl. - G bulb - Steno-Medit.-W.-Macaron.
Near the lime kiln; very rare.

*__Orchis papilionacea__ L. - G bulb - Euri-Medit.
Clearings near the stony grounds in the central- western and northern sectors; rare.

Serapias parviflora Parl. - G bulb - Steno Medit.
Béguinot, 1929 - Clearings near the lighthouse; very rare.

REMARKS ON THE FLORA

On the basis of the floristic list compiled during our survey of the island we may state that 210 entities were observed, grouped in 54 families and distributed in 160 genera which include 193 species, 16 subspecies and 1 variety. In this instance as well, as already noted on the other islands surrounding Sardinia, the most numerous families are *Leguminosae* and

Compositae among the Dycotiledons and *Gramineae* among the Monocotyledons; together, they compose over 1/3 of the entire floristic component of the island.

The biological spectrum, listed in Table 3, is typically Mediterranean; it shows the high ratio of Therophytes which characterises areas with notable water shortage and extended droughts, as is reported in the discussion of climatic aspects. The wind, which in the nearby anemometric station of Olbia very often exceeds 100 Km/h and hinders research in micro-insular environments, also affects the ratio of Chamaephytes and, in particular, tends to bend phanerophytes in the direction of prevailing winds; moreover, the salt-spray carried by the wind, which reaches even the highest areas of the island, contributes to drying out the young shoots of the oleaster, lentisk and of the only specimen of myrtle. With regards to Phanerophytes, present in the ratio of 9.1%, we should note that this ratio is considerably higher than that indicated for the nearby island of Tavolara (7.1%), which shares the same geological and lithological features as Figarolo. This aspect could be explained by the fact that floristic inventories of Tavolara do not include taxa such as *Cistus incanus*, *Lavatera olbia* and *Myrtus communis* which, together with others, contribute to the overall numbers of this life form.

T=52.8%	Ch=9.5%	H=18.6%	G=9.5%	I=0.5%	P=9.1%
T scap 102	Ch rept 1	H ros 7	G bulb 13	I rad 1	P scap 5
T rept 4	Ch suffr ... 14	H scap 14	G rhiz 6		P lian 2
T caesp 4	Ch succ 1	H bienn 9	G rad 11		P caesp 6
T par 1	Ch frut 4	H scand 1			NP 6
		H caesp 8			
Total 111	Total 20	Total 39	Total 20	Total 1	Total 19

Table 3. Biological spectrum (in bold type and expressed in %) and numerical values of the biological sub-forms observed in the flora of Figarolo

The chorological aspects of the flora are summarised in Fig. 2. The Mediterranean species, with over l'80%, are the dominant ones in the flora of Figarolo; the most well-represented among them are and the Stenomediterraneans. Especially significant (Fig. 3) is the reasonably good presence of elements of the western Mediterranean (11%) and the prevalence of connections with the Macaronesian dominion (5%) with respect to the Turanian (2%). The endemic component is present on Figarolo in the ratio of 2.3%; this ratio, though very low with respect to other areas, certainly should

not reduce the value of the island's botanical resources; in fact, species of relevant phyto-geographic interest are present on Figarolo, for instance *Erica multiflora* and *Ornithogalum arabicum* which have a very limited distribution on the islands off the coast of Sardinia and on Sardinia itself, and at times are extremely rare.

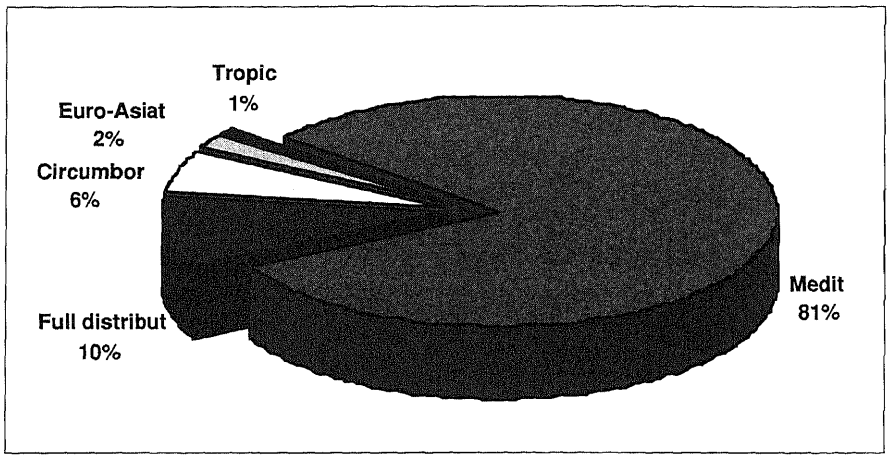

Fig. 2. General chorological spectrum.

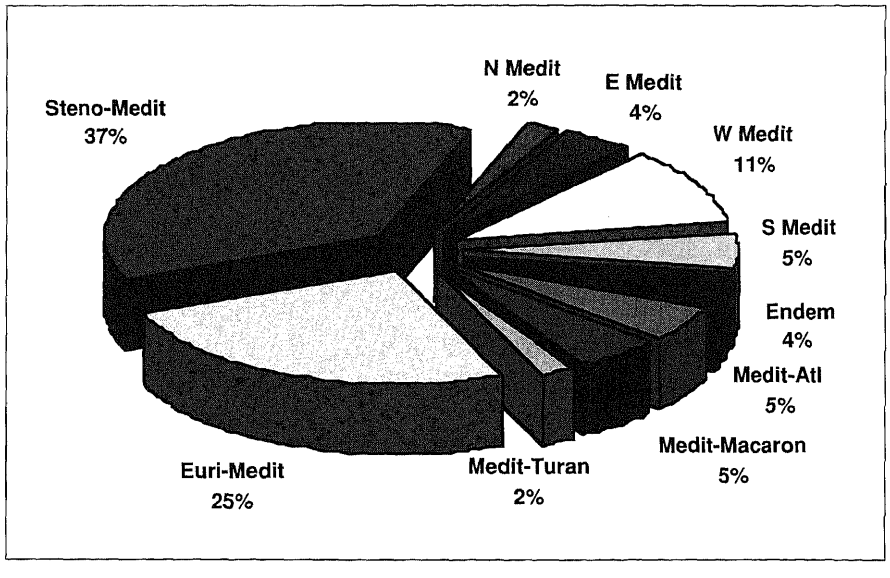

Fig. 3. Chorological spectrum of Mediterranean subelements.

On Figarolo also, as already observed on other small islands, the current floristic component differs notably from the one previously recorded. In fact, BÉGUINOT (1929), who also made use of the reports of other researchers who collected specimens on the island from 1827 onwards, listed 126 taxa, only 109 of which have been reconfirmed by the authors, while 98 are new acquisitions.

With regards to species previously reported but not found at the last survey, we may note that 64% are Therophytes, 18% are Hemicryptophytes, 12% are Geophytes, 6% are Chamaephytes, while the chorological elements reveal that over 70% are Mediterranean species. The same characteristics are shared by the 98 species observed for the first time. In fact Therophytes (62%), Hemicryptophytes (20%), Geophytes (8%), Chamaephytes (4%) and Mediterranean species (73%) represent respectively the life forms and the chorotypes of those species that are able to colonise and integrate themselves in the flora of a well-defined area with the highest likelihood and frequency. Moreover, the prevalence of Therophytes with regards to life forms, and Mediterranean elements with regards to the chorology of species no longer observed, corresponds with the observations made by BOCCHIERI (1998) on the failure to find previously observed plant species within the system of micro-islands surrounding Sardinia.

The failure to find previously observed species, which at times are to be considered as being "plants wihch have disappeared", was reported also with regards to some islands off the coast of Sicily. We may mention, for instance, the example of the island of Linosa, in the group of the Pelagie islands, where DI MARTINO (1961) highlighted the failure to find numerous entities previously observed, as was recently confirmed by BRULLO & SIRACUSA (1995) who could not find over 80 previously reported species. The same considerations hold true for the island of the Cyclops (eastern Sicily), for which SIRACUSA (1995) concluded that numerous previously reported species, no longer found, are to be considered as "having disappeared".

REMARKS ON THE PLANT LANDSCAPE

Plant landscape of Figarolo is strongly dominated by Mediterranean scrubland formations belonging to the phyto-climatic horizon of mixed sclerophyllae forests and coastal termoxerophylae scrubland. This scenario is strongly altered in its aspect, structure and floristic composition, as a result of previous human activities, in particular the felling of wood species to provide fuel for the operation of lime kilns, as well as the presence of grazing animals, originally introduced by man (cattle and goats), with the associated old practice of setting fire to clear pasture lands in areas covered by scrub. These combined

actions further impoverished of the vegetal cover, increasing its degradation and favouring the diffusion of pyrophyle species.

In more recent times, cattle and goat grazing has been replaced by mouflon grazing: these animals swim to the island from the nearby wildlife oasis of Capo dei Figari; their large numbers and rustic habits has led in a very short period to the alteration of the low woodland and scrubland that had developed in previous years.

This scenario is clearly noticeable from the observation of aerial photographs and the comparison between photographs taken in the years 1977, 1988 and 1997. In fact, photographs taken in 1977 show th epresence of a visibly evolving, dense scrub, as revealed by patches arranged in an 2irregular mosaic" pattern. Ten years later, the scrub was deeply altered, as shown by the presence of increasingly irregular boundaries between the sectors of the mosaic, the reduction in the vegetal cover and the development of increasingly marked fragmentation. Recent pictures taken in 1997 show that this process has by now reached an almost balanced state: the conditions of the vegetal landscape is on the whole unchanged with respect to 1988, although we would recommend that adequate measures be taken to limit the number of grazing animals on the island and to encourage the development of an adequate vegetal cover, by means of flora protection measures. In fact, only a few traces remain of the climax vegetation of evergreen sclerophyllae forest; these few remains are found in the least accessible areas, and bear witness to a profoundly different environment, dominated by forest vegetation.

At present, *Quercus ilex* L. formations are limited to a few, isolated small stands located especially in the north and north-eastern sectors of Figarolo, they originate from the re-sprouting of old stumps; here, excessive grazing has produced deep alterations in the floristic series.

Both the branch growth and crown of the holm-oak plants are altered, showing signs of distress, as is witnessed by phenomena of leaf retention, with torsion of the stipe and abundant male blossoms. In the most arid sections of the island, formations of *Olea europea* L. var. *sylvestris* Brot. Are certainly more common, either as scrubland–forest, with large-size specimens, or creating a typical scrubland. The structure and aspect of these plants are altered by animal grazing, and by the action of the winds, with effects on the type of crown, spinosity, small leaves and torsion of the stipe.

These stands are in contact with formations of *Pistacia lentiscus* L., which is much lower and at times almost creeping, especially in the siliceous soil areas of the island, where it established phytocenoses with *Juniperus turbinata* Guss., and forms pulvini near the sandy shore. On the other hand, in the calcareous area, the lentisk is often included in calcareous garrigues, with accentuated structure, branches and small leaves, due to the extreme aridity of the area.

The Phoenician juniper is found in various phytocoenoses, both with the oleaster, and, to a lesser extent, with the arboreal euphorbia, throughout the island, especially with young specimens, within the scrubland.

In the highest area, but especially in the northern and western sector of the island, formations of *Euphorbia dendroides* L. are found, especially in areas where outcropping rock dominates over lithic soils, in contact with oleaster formations.

The marks of advanced degradation are clearly visible, if we consider the distribution of *Cistus monspeliesis* L., resulting from the effect of repeated fires, in particular on siliceous areas.

Herbaceous formations are of particular interest, we should especially mention *Ampelodesmos mauritanicus* (Poiret) Durand et Schinz, which has developed in large, stable communities, at the boundary of its distribution zone. With respect to coastal areas, we may notice rock plant formations almost in direct contact with the sea, which has been impoverished by the action of breakers and by the transportation of sediments along erosion channels.

On the other hand, psammophilous vegetation is only present in a limited area of sandy shore, which bears the brunt of current human activity on the island; the limited size of this area and the intensity of trampling certainly limit the development of formations typical of these areas.

FINAL REMARKS

The floristic component and the vegetal cover are the elements that, together with existing wildlife, have led the European Community to classify the island of Figarolo and nearby Capo Figari as a nature site of Community interest. This site, which extends on an overall surface of 450 Ha, naturalistic aspects are represented, in addition to the relevant botanical resources, by the nesting of the rare Corsican seagull, the green cormorant, the Mediterranean and Manx shearwater; moreover, this is one of the last sanctuaries of the mouflon, whose survival is seriously threatened by the environmental degradation caused in the past by intensive wood-cutting to provide fuel for the lime kilns and, in present times, by the unregulated flow of tourists, which is at times excessive for the resources of the island. This is the case for the only beach on the island, where the excessive presence of tourists impedes the development of typically psammophilous species, while constantly reducing the numbers of existing species; among which we should mention Otanthus maritimus which, currently represented by a single specimen, is certainly destined to disappear from the island. We therefore recommend that an environmental protection plan be implemented as soon as possible, setting out regulations for the controlled use

of the area; a nature reserve should be set up, and the site devoted to controlled, nature-oriented tourism, coupled with intense research activity. We need not stress the fundamental role played by natural environments, and in particular, small islands, which represent the main sites of bio-diversity, that is of the variety of animal and plant species, genetic components, various biological associations and their dynamism. Maintaining bio-diversity, and overcoming the continuing conflict between economical development and protection of the environment should therefore constitute our main objective, also in view of the fact that today we cannot postulate what the guidelines of the systems governing life will be.

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