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Flora of the Mortorio Archipelago (N. E. Sardinia)*

Abstract

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Current knowledge of the flora and vegetation of the Mortorio Archipelago, in N. E. Sardinia, is reported. The Archipelago has a total area of more than 111 hectares and a botanical diversity of 358 species distributed over 67 families and comprising 216 genera. Although no plants are exclusive to this group of islands, there are no fewer than 19 endemic species of which three are typically Sardinian and seven belong to Sardinia and Corsica. The failure to find previously reported species is noted and information is given on the biological and chorological spectra of the species common to the various islands, as well as on the main forms of vegetation characterizing the landscape.

Introduction

Situated to the northeast of Sardinia, the Mortorio Archipelago is formed of the islands of Mortorio, Soffi, Western and Eastern Camere, Poveri, Portisco, and some rocks including those of Mortorietto (Fig. 1). These islands occupy an overall area of 111.5551 hectares (Table 1) and are part of the communes of Olbia (Portisco) and Arzachena (Mortorio, Soffi, Camere, and Poveri). Their flora is only partly known: in fact, for Mortorio, Soffi, and Poveri, data are available on the vegetation, while for Camere and Portisco no previous work has been published. The Mortorietto Rocks (or Mortorietto Islands, see Fig. 1) are devoid of vegetation. The aim of this work is to quantify the species present in the archipelago, to point out the presence of species which are rare or of considerable phytogeographic interest and thus deserve to be safeguarded, and to give information on the vegetation.

The Territory

The islands are included in the I.G.M. map sheets Nos 169 III NW Labiadori, 169 III SE Isola Mortorio, and 169 III SW S. Pantaleo. In the new Carta Topografica d'Italia map, the Poveri islands appear neither in F. 428 Sez. 1, Porto Cervo nor in F. 428 Sez. II, Porto Rotondo.

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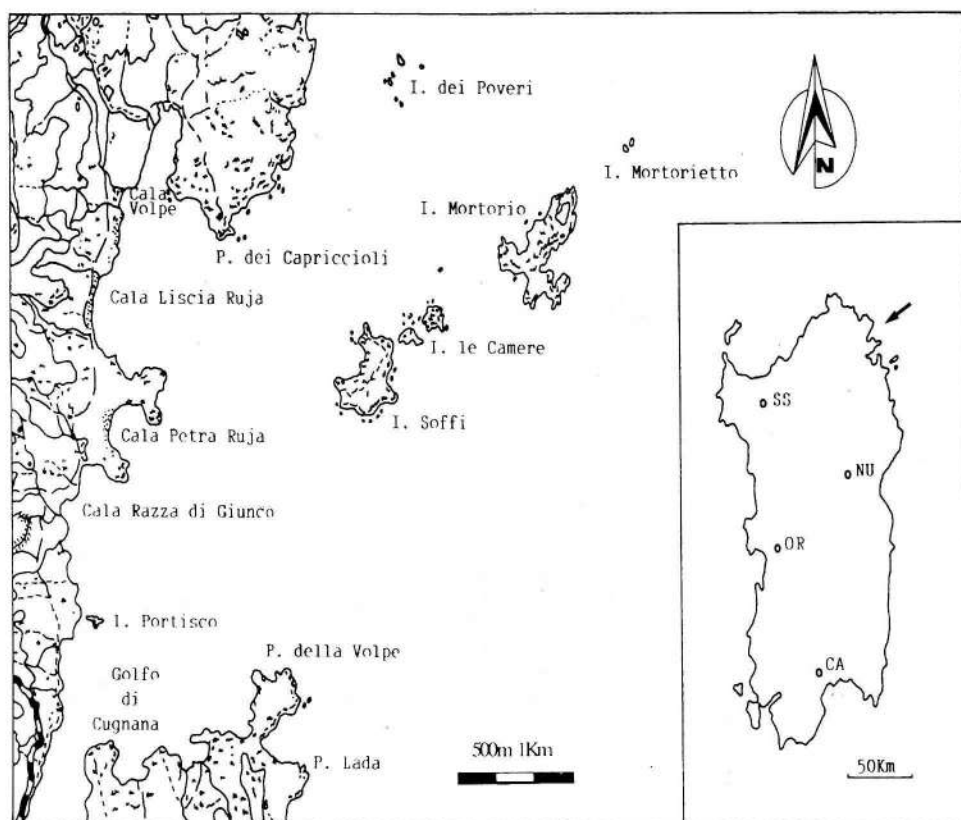


Fig. 1. The Mortorio Archipelago.

The island of Portisco is nearest to Sardinia and closes off the Gulf of Cugnana to the north; Soffi, the Camere islands, Mortorio, and the Mortorietto rocks lie, in order of increasing distance, off the coast near Cala Liscia Ruja and P. dei Capriccioli, while the Poveri islands are the most northern. The highest altitude is that of Mortorio (at 77 m).

All the islands emerge from the continental shelf slightly south of "Piano Gadduresu". On the shelf itself and outside the study area, sandstone outcrops, beach conglomerates, and abrasion platforms testify to the number of Quaternary sea levels and indicate how, until a few thousand years ago (Ulzega 1988), the sector had completely emerged and was part of presentday Sardinia.

With the exception of the small outcrops of Quaternary deposits (prevalently flood and beach deposits) along the coasts, or in the narrow depressions where the typology locally favours their accumulation, all the islands are built up on the Hercynian bedrock and display relatively uniform geological and morphological characteristics. The nature of the crystalline bedrock has favoured such typical formations. The hydrolysis of the silicates contained in the rock and the action of weathering has determined the formation of these well-modelled structures.

In the study sector, the typical Sardinian-Corsican Hercynian batholith lithologies that outcrop on the Sardinian mainland are present.

Table 1. Physical details of the islands of the Mortorio Archipelago.

Islands	Surface m ²	Perimeter m	Height m	Dist. from Sard. m	Gauss-Boaga Co-ord.
Mortorio	566039	6712	77	3020	X= 1550755 ; Y= 4547460
Soffi	435092	4038	30	2040	X= 1548417 ; Y= 4546090
Camere E.	53110	1368	16	2430	X= 1549270 ; Y= 4546714
Camere W.	36614	1095	22	2290	X= 1548870 ; Y= 4546515
Portisco	8280	539	5	100	X= 1544485 ; Y= 4543525
Poveri	11645	618	4	≈ 960	X= 1548825 ; Y= 4549355
Mortorietto	4771	404	≈ 3	4430	X= 1551970 ; Y= 4548470

In fact, all the islands are made up prevalently of equigranular leucogranites, whereas on c. 3/4 of Soffi (excluding the northern part) the migmatite complex outcrops.

The leucogranites make up the Hercynian bedrock, namely the Upper Carboniferous - Permian plutonic complex.

In Sardinia, a sequence of intrusive events has been recognized, represented initially by tonalitic- granodioritic-monzogranitic masses, and finally by leucogranitic plutons (Ghezzi & Orsini 1982). Radiometric dating confirms this sequence and places it in a period of time from 310 to 290 Ma B.P. (Carmignani & al. 1982).

It can be deduced that the final phases of the Hercynian orogenic event are represented in the present study area.

Instead, the migmatite complex is made up of leucogranitic migmatites, nebulites, agmatites, gneiss, and sometimes of chalk silicate lens. As already mentioned, this migmatite complex forms 3/4 of the island of Soffi and outcrops in isolated limbs along the whole northeastern coast (San Teodoro, Olbia, Costa Smeralda, and La Maddalena Archipelago).

These migmatites are prevalently characterized by a sillimanite + muscovite and sillimanite + K-feldspar association. Radiometric dating places them at 344 ± 7 Ma (Carmignani & al. 1982).

The events attributable to the complex still remain to be defined, both with respect to their chronological setting (Precambrian) and to their geodynamic significance.

Climate

As with the majority of the islands off Sardinia, the Mortorio Archipelago has no weather station. Therefore, to define the weather conditions, the data recorded by the Olbia station, the nearest one to the islands (Table 2), were elaborated.

The analysis of the data relating to 1951 to 1980 show that the Archipelago is characterized by a Mediterranean type of climate with hot, dry summers, but temperatures lowered by the influence of the sea.

Table 2. The Olbia weather station (1951-80).

Months	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Annual
Temp. max. °C	13.5	14	15.5	18	21.8	26	28.9	28.8	25.9	21.5	17.6	14.4	20.5
Temp. min. °C	5.5	6.8	7.3	9.4	13.2	17.2	19.9	20	17.5	13.5	9.8	7.4	12.3
Temp. med. °C	9.5	10.4	11.4	13.7	17.5	21.6	24.4	24.4	21.7	17.5	13.7	10.9	16.41
Rainfall mm	63.7	65.2	64.3	49.4	39.7	23.3	5.7	17.9	34.7	78.7	73.9	91.7	608

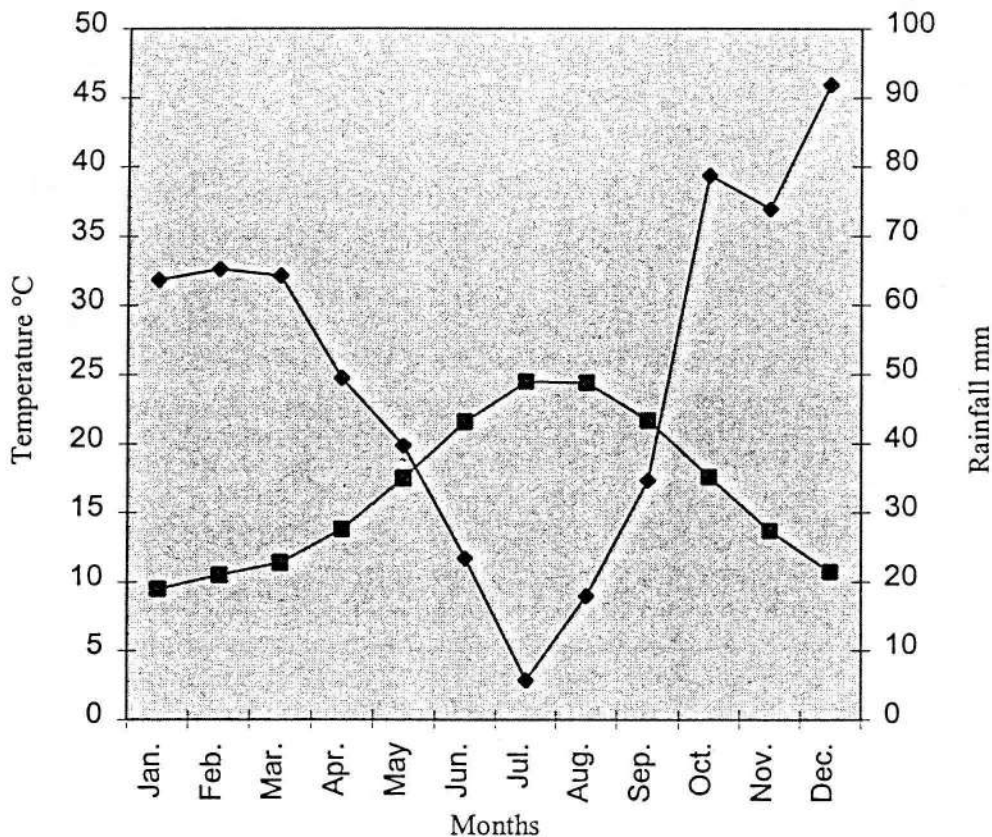


Fig. 2. Bagnouls and Gaussen diagram (1951-80) for Olbia, 15 m.

The Bagnouls and Gaussen diagram (Fig. 2) reveals the period of relatively marked aridity lasting from May until September. The abundance of thermoxerophilous species is a result of the rainfall, which is concentrated in the autumn and winter months, with a mean of only 608 mm a year, and by the frequency of the strong winds coming from the 4th quadrant, which can reach more than 140 km/h.

Unfortunately, the rainfall is subject to considerable variation and in certain years drops well below average, for example 317 mm recorded in 1970 and 412 mm in 1954.

Flora

The first reports on the flora of the Archipelago are by Vaccari (1908, 1928) for the island of Mortorio who noted a total of eight species, a figure that certainly does not correspond to that of the present flora on the island. Bocchieri (1995) later identified 284 species distributed over 59 families and including 183 genera. Bocchieri (1991) also gave a list of 14 species for the flora on the island of Poveri. With regard to Soffi, there are the graduation dissertations of Fogu (1983) and Giani (1997). The islands of Camere and Portisco have had no previous studies.

The list of species presented below follows the nomenclature and systematic order of Flora Europaea (Tutin & al. 1964-1980, 1993) and was made from the works mentioned

and the results of researches carried out on the islands of Portisco and Western and Eastern Camere in the years 1992 and 1993 by Bocchieri. To identify the species collected, the following reference works were utilized: *Flora d'Italia* (Pignatti 1982), *Nuova Flora Analitica d'Italia* (Fiori 1923-1929), *Flora Europaea* (Tutin & al. 1964-1980, 1993), and the lists of plants endemic to Sardinia published by Arrigoni & al. (1977-91).

For each species the biological and chorological type are given according to Pignatti (1982), the island or islands in which it is present, the environment in which it was collected, and its diffusion. Finally, the 68 species still not known for the Archipelago are indicated with an asterisk *, the 4 introduced but not present in the list of flora by **, and the 2 species previously reported but not observed by us by the symbol +.

Floristic List

PTERIDOPHYTA

Isoetaceae

Isoetes histrix Bory — G bulb, Steno- Medit.-Atl. — Soffi, in ephemeral ponds, very rare.

Ophioglossaceae

**Ophioglossum lusitanicum* L. — G rhiz, Steno-Medit.-Subatl. — Portisco, meadows.

Adiantaceae

Anogramma leptophylla (L.) Link — T caesp, Cosmopol. — Mortorio, western rocky ravines, very rare.

Polypodiaceae

Polypodium cambricum L. — H ros, Euri-Medit. — Mortorio, level rocky ravines and steep places on high areas, widespread. Soffi, among rocks, very rare.

Aspleniaceae

Asplenium obovatum Viv. — H ros, Steno-Medit. — Mortorio, dripping rocky ravines, not widespread. Camere W, northern ravines associated with *Cymbalaria aequitriloba*.

Asplenium onopteris L. — H ros, Subtrop.-nesicola. — Mortorio, humid rocks in the central-western side, rare.

SPERMATOPHYTAE GYMNOSPERMAE

Pinaceae

***Pinus pinea* L. — P scap, Euri-Medit. — Mortorio, near the beach. This species was planted in expectation of the land being divided into parcels.

Cupressaceae

Juniperus turbinata Guss. — P caesp, Euri-Medit. — Mortorio, specimens of remarkable size grow to the west of the trigonometric point. Widespread; those plants burnt in the fire of 1985 are continually cut and removed. Soffi, only three specimens on the

southeastern side. Portisco, rare.

SPERMATOPHYTA ANGIOSPERMAE DICOTYLEDONES

Moraceae

****Morus alba** L. — P scap, Asia Orient. — Mortorio, near a little stony pen, low and creeping, male and female specimens on the northwestern side of the island. This species was planted when the island was used as grazing land.

Ficus carica L. — P scap, Medit.-Turan. — Mortorio, rare specimens, sometimes low and creeping. The specimens on the southern bay and those of the northern gully are considerably large. Camere W, only one creeping plant in the northeastern side, and one in a northern ravine. Camere E, ravines.

Urticaceae

**Urtica atrovirens* Req. — H scap, Steno-Medit. — Soffi, among rocks.

Urtica membranacea Poiret — T scap, S-Medit. — Mortorio, rocky ravines and eastern meadows, not common. Soffi, in ruins. Camere E, rocky ravines.

Parietaria judaica L. (= *diffusa* M. & K.) — H scap, Euri-Medit.-Macaronens. — Mortorio, rocky ravines at N. E. and near the little pool located along the western path, rare. Camere W and E, meadows.

Parietaria lusitanica L. — T rept, Steno-Medit. — Mortorio, ravines in the eastern cliffs, extremely rare. Camere W, internal, rocky ravines.

Polygonaceae

Polygonum maritimum L. — H rept, Subcosm. — Mortorio, northwestern sandy area, rare. This species is becoming less common. Camere W, some specimens on the isthmus sands, very rare. Camere E, sandy areas.

* ***Rumex lunaria* L. — H scap, S-Medit. — Soffi, hedges, very rare.

+*Rumex scutatus* L. — Mortorio, Vaccari, 1928 — not observed.

Rumex crispus L. — H scap, Subcosm. — Soffi, uncultivated areas, rare.

Rumex sanguineus L. — H scap, Europ.-Caucas. — Mortorio, edges of the pools located at N. E. and in a basin on the western side, very rare.

**Rumex pulcher* L. — H scap, Euri-Medit. — Soffi, uncultivated areas, rare.

Rumex obtusifolius L. — H scap, Europ.-Caucas. — Mortorio, among the central-western basins, rare.

Rumex bucephalophorus L. — T scap, Medit.-Macaronens. — Mortorio, common. Soffi, on the coast, rare. Camere W, southern meadows, widespread Camere E, meadows.

Chenopodiaceae

Beta vulgaris L. subsp. *maritima* (L.) Arcangeli — H scap, Euri-Medit. — Mortorio, in a central-southern bay, in central-western sandy areas and in western rocky ravines, very rare. Soffi, on the south coast. Camere W, sands and ravines of the southeasterly side, common. Camere E and Portisco, sandy areas. Poveri, common in the smaller island, associated with *Lavatera*.

Chenopodium murale L. — T scap, Subcosm. — Mortorio, in habitats very rich in nitrates, widespread. Soffi, in ruins, rare. Camere W and E, sands and ravines, widespread.

Chenopodium album L. — T scap, Subcosm. — Mortorio, coastal meadows and ravines, rare. Soffi, in the ruins, rare. Camere W and E, sands and ravines, widespread. Poveri, in the smaller island, rare.

Atriplex prostrata Boucher. — T scap, Circumbor. — Soffi, in habitats rich in nitrates, quite common. Camere W and E, sands and coastal meadows. Poveri, common in both islands, sometimes associated with *Spergularia*.

Halimione portulacoides (L.) Aellen — Ch frut, Circumb. — Mortorio, coastal rocky and sandy areas, widespread. Soffi, on the coast, rare. Camere W, in some coastal basins, and near the isthmus in sandy areas. Camere E, sandy areas.

Salsola soda L. — T scap, Paleotemp. — Mortorio, western sandy areas, widespread. Camere W, isthmus sands.

Salsola kali L. — T scap, Paleotemp. — Mortorio, southeastern sandy and pebbly beach, rare.

Amaranthaceae

Amaranthus albus L. — T scap, Nordamer. — Mortorio, central-southern areas already burnt in the fire, very rare.

**Amaranthus lividus* L. — T scap, Euri-Medit. — Soffi, uncultivated areas, rare.

Aizoaceae

**Mesembryanthemum nodiflorum* L. — T scap, S-Medit.-Sudafr. — Camere W, western, coastal meadows. Portisco, meadows.

Portulacaceae

Portulaca oleracea L. — T scap, Subcosm. — Mortorio, near the dams, not common. Camere E, meadows. Poveri, in the smaller island associated with *Lavatera*, quite rare.

Caryophyllaceae

Arenaria balearica L. — Ch suffr, Endem. Sard., Cors., Balear. isl. and Montecristo isl. — Mortorio, humid ravines on the highest areas, rare.

Arenaria serpyllifolia L. — T scap, Subcosm. — Mortorio, central-southern sandy areas, under the bush near pine trees, and in any case in shaded areas, rare.

Stellaria media (L.) Vill. — T rept, Cosmopol. — Mortorio, meadows and cool areas, widespread.

Stellaria pallida (Dumort.) Piré — T scap, Paleotemp. — Mortorio, between *Helianthemum* and *Pistacia lentiscus* in the central-southern area, very rare.

**Cerastium glomeratum* Thuill. — T scap, Euri-Medit. — Soffi, uncultivated areas, rare.

Cerastium pumilum Curtis — T scap, Euri- medit. — Mortorio, sandy-clayey, sandy meadows near tamarisk, rare.

**Cerastium diffusum* Pers. — T scap, (Steno) Medit.-Atl. — Soffi, coastal arid areas, rare.

**Sagina apetala* Ard. — T scap, Euri-Medit. — Soffi, arid areas, rare.

Sagina maritima G. Don — T scap, (Steno) Medit.-Atl. — Mortorio, on the western path and in coastal and internal meadows, widespread. Camere W, coastal meadows, common. Camere E, coastal meadows, common.

Paronychia echinulata Chater — T scap, Steno-Medit. — Mortorio, arid meadows and sandy ravines on the central-southern areas, very rare. Soffi, sandy areas, very rare.

**Illecebrum verticillatum* L. — T scap, Subatl. — Soffi, in the ephemeral ponds, rare.

Polycarpon tetraphyllum L. — T scap, Euri-Medit. — Mortorio, central level areas, not common. Extremely variable species in its foliar verticils. Soffi, uncultivated areas, rare. Camere W, high meadows. Portisco, meadows.

Spergularia macrorrhiza (Req.) Heynh. — Ch suffr, Endem. Sard., Cors. — Mortorio, coastal and internal meadows, widespread. Soffi, cliffs, very rare. Camere W, coastal saline meadows, clearings and ravines, widespread. Camere E, meadows. Portisco, associated with *Frankenia hirsuta*, in coastal meadows.

Spergularia marina (L.) Griseb. — T scap, Subcosm. — Mortorio, on the western path, very rare. Soffi, subsaline areas, rare. Camere W, coastal saline meadows, rare. Poveri, in both islands, associated with *Parapholis*, common.

Spergularia rubra (L.) J. & C. Presl — Ch suffr, Subcosm. temp. — Mortorio, coastal and central-western areas, not common. Soffi, sandy areas, rare. Camere W, internal and coastal meadows, rare. Camere E, meadows.

**Silene laeta* (Aiton) Godron — T scap, SW-Medit. — Soffi, humid meadows, rare.

Silene gallica L. — T scap, Euri-Medit. — Mortorio, common, this species is extremely variable in its hairiness and in the colour of its petals. Soffi, common. Camere W, coastal and internal areas, common. Camere E and Portisco, meadows.

Silene canescens Ten. — T scap, Endem. (?) — Mortorio, western sandy areas, widespread. Camere W, in sands, very rare. The nomenclature used is that of Valsecchi (1995), who redetermined this *exsiccata* from Mortorio.

Silene valsecchiae Bocchieri — T scap, Endem. Sard. — Mortorio, rocky ravines, meadows on high areas and on the coast, rare. Camere W, high meadows, rare.

Petrorhagia prolifera (L.) P. W. Ball & Heywood — T scap, Euri-Medit. — Mortorio, stony and arid meadows, very rare.

Ranunculaceae

Anemone hortensis L. — G bulb, N-Medit. — Mortorio, southern area, widespread. Soffi, arid meadows, common.

Clematis flammula L. — P lian, Euri-Medit. — Mortorio, among the burnt olive trees and junipers, rare.

Clematis cirrhosa L. — P lian, Steno-Medit.-Turan. — Mortorio, common. Soffi, hedges, common.

**Ranunculus macrophyllus* Desf. — H scap, Endem. Sard., Cors. — Soffi, in humid meadows, very rare.

**Ranunculus cordiger* Viv. — H scap, Endem. Sard., Cors. — Soffi, in humid areas, rare.

Ranunculus muricatus L. — T scap, Euri-Medit. — Mortorio, basins and humid meadows in the central-western area, rare.

**Ranunculus bullatus* L. — H ros, Steno-Medit. — Soffi, uncultivated areas, rare.

**Ranunculus aquatilis* L. — I rad, Subcosm. — Soffi, in ephemerals ponds, rare.

Papaveraceae

**Glaucium flavum* Crantz — H scap, Euri-Medit. — Camere W, sandy areas near the isthmus, rare.

**Fumaria capreolata* L. — T scap, Euri-Medit. — Camere W, in the shrub and meadows, widespread.

Fumaria bicolor Sommier — T scap, W-Steno-Medit. — Mortorio, meadows in the shrub, widespread. Camere W, associated with *Calicotome* in the easterly side, rare.

**Fumaria bastardii* Boreau — T scap, Subatl. — Soffi, in the shrub, rare.

Fumaria officinalis L. — T scap, Paleotemp. — Mortorio and Soffi, in the shrub, rare.

Cruciferae

Arabis thaliana (L.) Heynh. — T scap, Paleotemp. — Mortorio, among *Helianthemum* and wild olive trees in cool areas and in the everlasting garigue in the northwestern area, widespread. Soffi, in humid meadows, very rare.

Matthiola tricuspidata (L.) R. Br — T scap, Steno-Medit. — Mortorio, western sandy coasts, eastern pebbly coasts, common. Camere W, sandy areas near the isthmus.

Cardamine hirsuta L. — T scap, Cosmopol. — Mortorio, central-western area, among the burnt wild olive trees and in the gaps between *Helianthemum* plants in the southeastern area, rare.

**Capsella rubella* Reuter — T scap, Euri-Medit. — Soffi, in arid meadows, rare.

**Coronopus didymus* (L.) Sm. — T rept, Nordamer. — Soffi, in arid meadows, very rare.

**Hirschfeldia incana* (L.) Lagrèze-Fossat — H scap, Medit.-Macaronens. — Soffi, uncultivated areas, common.

Cakile maritima Scop. subsp. *aegyptiaca* (Willd.) Nyman — T scap, Euri-Medit. — Mortorio, sandy and sometimes pebbly areas, rare. Soffi, coastal areas, rare. Camere W and E, sandy areas.

Raphanus raphanistrum L. subsp. *maritimus* (Sm.) Thell. — T scap, Euri-Medit. — Mortorio, southern area, very rare. Soffi, in ruins, very rare. Camere W, interruptions of the shrub, N. E., ravines, coastal meadows rich in humus, widespread. [According to some Floras this subspecies is synonymous with *Raphanus raphanistrum* L. subsp. *landra* (Moretti) ex DC.) Bonnier & Layens].

Resedaceae

**Reseda lutea* L. — H scap, Europ. — Soffi, uncultivated areas, common.

Crassulaceae

Crassula tillaea Lester-Garland — T scap, Submedit. — Mortorio, sandy meadows in the rockrose, rare. Soffi, sandy areas, rare.

Umbilicus rupestris (Salisb.) Dandy — G bulb, Medit.-Atl. — Mortorio, cracks in the central-southern rocks, rocky ravines, widespread. Soffi, in the rockrose, rare. Camere W, high, rocky ravines. Camere E, rocky ravines.

Sedum stellatum L. — T scap, Steno-Medit. — Mortorio, rocky ravines and meadows, widespread.

Sedum rubens L. — T scap, Eurimedit.-Subatl. — Mortorio, ravines in the high and coastal areas, widespread. Soffi, in the rocks, quite common. Camere W and E, meadows and ravines, widespread.

Sedum caeruleum L. — T scap, S. W. Medit. — Mortorio, in the rocks, meadows, widespread. Soffi, in the rocks, rare. Camere W, southeastern meadows and ravines, widespread. Camere E, meadows and ravines.

Leguminosae

***Acacia cyanophylla* Lindley — P scap, (Australia) — Soffi, only one individual situated on the southeast coast.

Calicotome villosa (Poiret) Link in Schrader — P caesp, Steno-Medit. — Mortorio, common and abundant. Soffi, common in the garigue. Camere W., E., and Portisco, common.

Genista corsica (Loisel) DC. In Lam. & DC. — NP, Endem. Sard., Cors. — Mortorio, extremely pebbly central-southern area, widespread.

Lupinus micranthus Guss. — T scap, Steno-Medit. — Mortorio, in *Helianthemum* and on the western side, rare. Soffi, in the shrub, rare. Portisco, in the shrub.

Biserrula pelecinus L. — T scap, Steno-Medit. — Mortorio, western sandy areas, rare.

Vicia villosa Roth subsp. *varia* (Host) Corb. — T scap, Euri-Medit. — Mortorio, in *Helianthemum* and in *Phillyrea*, rare.

Vicia benghalensis L. (*V. atropurpurea* Desf.) — T scap, Steno-Medit — Mortorio, in scrub.

Vicia disperma DC. — T scap, W-Medit. — Mortorio, in the scrub and in cool areas, rare.

Vicia pubescens (DC.) Link — T scap, Euri-Medit. — Mortorio, in the scrub and in some meadows, rare.

Vicia sativa L. subsp. *nigra* (L.) Ehrh. — T scap, Subcosm. — Mortorio, in the scrub, widespread. Soffi, meadows, common. Camere W and E, in the scrub, widespread.

**Vicia bithynica* (L.) L. — T scap, Euri-Medit. — Soffi, uncultivated areas, rare.

Lathyrus sphaericus Retz. — T scap, Euri-Medit. — Mortorio, in the scrub of the northwestern area, widespread.

Lathyrus clymenum L. — T scap, Steno-Medit. — Mortorio, in the scrub and in meadows on high areas, widespread. Portisco, in the shrub.

Pisum sativum L. subsp. *elatius* (Bieb.) Ascherson & Graebner — T scap, Subspont. — Mortorio, level ground on high areas and on a northwestern basin, very rare.

Ononis reclinata L. — T scap, S-Medit. Turan. — Mortorio, in some sandy clearings and in *Helianthemum*, widespread. Soffi, uncultivated areas, quite common.

**Melilotus sulcata* Desf. — T scap, S-Medit. — Camere W, clearings in sands near the isthmus, widespread.

Medicago marina L. — Ch rept, Euri-Medit. — Mortorio, western sandy areas, not common. Camere W, sandy areas near the isthmus, rare.

Medicago littoralis Rohde ex Loisel. — T scap, Euri-Medit. — Mortorio, coastal meadows and sands, rare. Camere W, meadows and ravines, rare.

Medicago polymorpha L. — T scap, Euri-medit. — Mortorio, in the *Helianthemum* scrub, rare.

Medicago minima (L.) Bartal. — T scap, Euri-Medit. — Mortorio, coastal western areas, widespread. Camere W, internal and coastal clearings, rare.

**Trifolium nigrescens* Viv. — T scap, Euri-Medit. — Soffi, arid areas, rare.

Trifolium glomeratum L. — T scap, Euri-Medit. — Mortorio, in the burnt junipers and on the central-southern level areas, not common.

Trifolium suffocatum L. — T scap, Steno-Medit. — Mortorio, southern areas, very rare.

Trifolium resupinatum L. — T rept, W-Paleotemp. — Mortorio, meadows and clearings, very rare.

Trifolium campestre Schreber in Sturm — T scap, W-Paleotemp. — Mortorio, meadows and high areas, widespread. Soffi, arid areas, quite common. Camere W, in the northeastern meadows, rare. Camere E and Portisco, meadows.

Trifolium arvense L. — T scap, W- Paleotemp. — Mortorio, stony and arid meadows, common. Soffi, arid areas, quite common. Camere W, meadows in sandy areas, rare. Camere E, meadows.

Trifolium bocconeii Savi — T scap, Steno-Medit. — Mortorio, northern area, rare. Soffi, arid areas, rare.

Trifolium scabrum L. — T rept, Euri-Medit. — Mortorio, meadows and gaps in the scrub, widespread. Soffi, arid areas, rare.

Trifolium incarnatum L. subsp. *molinerii* (Balbis ex Hornem.) Syme — T scap, Euri-Medit. — Mortorio, meadows towards the North of the central-western sands, rare.

**Trifolium angustifolium* L. — T scap, Euri-Medit. — Soffi, arid areas, rare.

**Trifolium squamosum* L. (*T. maritimum* Hudson) — T scap, Euri-Medit. — Soffi, arid areas, rare.

**Trifolium subterraneum* L. — T rept, Euri-Medit. — Soffi, arid areas, rare. Camere W, clearings and meadows, rare.

Lotus angustissimus L. — T scap, Euri-Medit. — Mortorio, northwestern table-lands, widespread. Soffi, in humid meadows, quite common. Camere W, meadows in the *Calicotome* scrub, widespread.

Lotus edulis L. — T scap, Steno-Medit. — Mortorio, interruptions of the scrub, common. Soffi, arid areas, common. Camere E, eastern meadows and in the scrub. Portisco, meadows.

Lotus cytisoides L. — Ch suffr, Steno-Medit. — Mortorio, rocky ravines and sandy ravines, common. Soffi, cliffs, common. Camere W, coastal areas and internal

meadows. Camere E and Portisco, meadows. Poveri, in both islands, but very rare.

Lotus ornithopodioides L. — T scap, Steno-Medit. — Mortorio, areas burnt in the fire and on the highest table-lands, rare.

Ornithopus compressus L. — T scap, Euri-Medit. — Mortorio, common. Soffi, in the scrub, rare.

Ornithopus pinnatus (Miller) Druce — T scap, Medit.-Atl. — Mortorio, central level areas and gaps in the scrub, widespread. Camere W, in the eastern meadows, rare.

Scorpiurus muricatus L. — T scap, Euri-Medit. — Mortorio, near cultivated pines and on the western path and adjacent meadows, rare. Soffi, in the scrub, rare. Portisco, in the scrub.

Geraniaceae

Geranium molle L. — T scap, Euroasiat. — Mortorio, groupings in the *Senecio bicolor* and in central-western areas, widespread. Soffi, meadows, quite common. Camere W, internal meadows, common. Camere E, meadows.

Geranium purpureum Vill. In L. — T scap, Euri-Medit. — Mortorio, coastal and internal scrub, common. Soffi, in rocky areas, quite common.

Erodium chium (L.) Willd. — T scap, Euri-Medit. — Mortorio, on the coastal scrub and near the dunes, rare.

Erodium malacoides (L.) L'Hér. in Aiton — T scap, Medit.-Macaronens. — Mortorio, coastal meadows and meadows, sometimes humid, on high areas, rare.

Erodium botrys (Cav.) Bertol. — T scap, Steno-Medit. — Mortorio, arid and sandy meadows, rare.

Erodium cicutarium (L.) L'Hér. in Aiton () — T scap, Subcosm. — Mortorio, coastal meadows, rare. Soffi, meadows, rare. This species is extremely polymorphic.

Erodium salzmannii Del. — T scap, W-Medit. — Mortorio, S. W. sandy areas, very rare.

**Erodium moschatum* (L.) L'Hér. in Aiton — H bienn, Euri-Medit. — Soffi, uncultivated areas, rare.

Linaceae

Linum bienne Miller — T scap (H bienn), Euri-Medit.-Subatl. — Mortorio, central level areas, rare.

Linum tryginum L. — T scap, Euri-Medit. — Mortorio, interruptions of the shrub, on table-lands, widespread. Soffi and Portisco, interruptions of the shrub, quite common.

Linum strictum L. — T scap, Steno-Medit. — Mortorio, table-lands, ravines and

interruptions of the scrub, widespread. Soffi and Portisco, interruptions of the scrub, quite common.

Euphorbiaceae

Mercurialis annua L. — T scap, Paleotemp. — Mortorio, ravines and clearings, widespread. Soffi, widespread. Camere W and E, meadows and ravines.

Euphorbia prostrata Aiton — T rept, Nordamer. — Mortorio, coastal meadows, rare. This species was observed only in 1993.

Euphorbia dendroides L. — NP, Steno-Medit. Macaronens. — Mortorio, central southern areas, small, rare specimens. After the fire this species is growing. Soffi, in the shrub, common. Camere W, in the scrub, modest sized specimens.

**Euphorbia helioscopia* L. — T scap, Cosmopol. — Soffi, meadows, rare.

Euphorbia exigua L. — T scap, Euri-Medit. — Mortorio, under *Helianthemum* and in some sandy meadows, rare. Portisco, meadows.

Euphorbia peplus L. — T scap, Cosmopol. — Mortorio, among wild olive trees and in gaps in the scrub, near the burnt junipers, widespread. Soffi, meadows, quite common. Camere W, in *Calicotome* scrub, widespread. Portisco, meadows.

**Euphorbia peploides* Gouan — T scap, Medit. — Portisco, meadows.

Euphorbia paralias L. — Ch frut, Euri-Medit.-Atl. — Mortorio, central-eastern sandy bay, not common.

Euphorbia characias L. — NP, Steno-Medit. — Mortorio, towards the trigonometrical point and in central-western areas, not common.

Rutaceae

Ruta chalepensis L. — Ch suffr, S-Medit. — Mortorio, high areas, rare.

Anacardiaceae

Pistacia lentiscus L. — P caesp, Steno-Medit. — Mortorio, common. Soffi, common. Camere W, common. Camere E, not common. Portisco, common.

Rhamnaceae

Rhamnus alaternus L. — P caesp, Steno-Medit. — Mortorio, this plant grows on tablelands, rocky ravines and on sandy areas near cultivated pines. It is almost always low and creeping, a specimen of about 4 m only near the burnt olive trees. Camere E, rare.

Malvaceae

Malva parviflora L. — T scap, Euri-Medit. — Mortorio, southern level, rare. Soffi, meadows, rare. Camere W, internal meadows.

Lavatera cretica L. — T scap, Steno-Medit. — Mortorio, meadows on high areas, rare.

Lavatera arborea L. — H bienn, Steno-Medit. — Camere W, a small grouping near bird nest. Poveri, the most common plant in both islands; with high level of cover. It can reach two metres.

Thymelaeaceae

Thymelaea hirsuta (L.) Endl. — NP, S-Medit. — Mortorio, table-lands, sands and ravines, common. Soffi, in the shrub, common. Portisco, in the shrub.

Cistaceae

Cistus incanus L. — NP, Steno-Medit. — Mortorio, near the southwestern beach and in high areas on the island, widespread. The leaves of some specimens are quite undulating and rippled. Soffi, in the scrub, quite common. Portisco, in the scrub, rare.

Cistus monspeliensis L. — NP, Steno-Medit. — Mortorio, common. Soffi, common. Camere E, Portisco, in the scrub, common.

Cistus salvifolius L. — NP, Steno-Medit. — Mortorio, sands, rocky areas, meadows, widespread. Soffi, in the scrub, quite common. Portisco, in the scrub, rare.

Tuberaria guttata (L.) Fourr. — T scap, Euri-Medit. - Mortorio, on the path and western meadows, in gaps in the scrub, widespread. Soffi, in interruptions of the scrub, quite common. Portisco, gaps in the scrub, common.

Tamaricaceae

**Tamarix africana* Poiret — P scap, W-Medit. — Soffi, eastern cliff, very rare.

Tamarix tetragyna Ehrenb. — P caesp, W-Medit. — Mortorio, small sandy basin in the central-western area and near the northern promontory.

Frankeniaceae

Frankenia hirsuta L. subsp. *intermedia* DC. — Ch suffr, Steno-Medit. — Mortorio, southern saline meadows and in the central-southern area, widespread. Soffi, on the coast, quite common. Camere W, saline coastal meadows. Camere E and Portisco, meadows. Poveri, common only in the westerly side of the larger island.

Cactaceae

Opuntia ficus-indica (L.) Miller — P succ, Neotropic. — Mortorio, coastal ravines in the central-western area, very rare.

Lythraceae

Lythrum hyssopifolia L. — T scap, Subcosm. — Mortorio, temporary water deposits on the western path, pools, widespread. Soffi, in ephemeral ponds, rare. Camere W, edges of pools.

Myrtaceae

Myrtus communis L. — P caesp, Steno-Medit. — Mortorio, towards the North of the southwestern beach, by the basin leading to the trigonometric point, not widespread. Soffi, in the scrub, not common. Camere W and E, with big leaves. Portisco, rare.

Theligonaceae

Theligonum cynocrambe L. — T scap, Steno-Medit. — Mortorio, cool rocky ravines in the central-eastern area, rare. Soffi, rocky areas, rare.

Umbelliferae

Eryngium maritimum L. — G rhiz, Medit.-Atl. — Mortorio, western coast, rare.

Crithmum maritimum L. — Ch suffr, Euri-Medit. — Mortorio, rocky coasts, widespread. Soffi, eastern cliffs, rare. Camere W, sands and rocky ravines. Camere E, associated with *Halimione*. Portisco, common on the northeastern side. Poveri, very rare, in pebbly areas, on the northeastern side.

Bupleurum semicompositum L. — T scap, Steno-Medit.-Turan. — Mortorio, coastal scrub near the southwestern beach and in the northwestern side, rare. Soffi, coastal areas, rare.

**Ferula communis* L. — H scap, S-Medit. — Soffi, in the middle of the island, quite common. Camere W, in the scrub, common. Camere E and Portisco, in the scrub.

Thapsia garganica L. — H ros, S-Medit. — Mortorio, in the scrub and in meadows, common.

Daucus carota L. subsp. *drepanensis* (Arcangeli) Heywood — H bienn, Medit. — Mortorio, on the sandy and rocky coasts, widespread. Soffi, meadows, quite common. Portisco, meadows.

Daucus carota L. subsp. *maritimus* (Lam.) Batt. — H bienn, Medit. — Mortorio, coastal and internal areas, widespread. Camere W and E, coastal meadows.

Ericaceae

Erica arborea L. — P caesp, Steno-Medit. — Mortorio, in the internal scrub, very rare. Soffi, in the scrub, rare. Portisco, rare.

Erica scoparia L. — P caesp, W-Medit. — Mortorio, in the scrub, widespread.

Primulaceae

Asterolinon linum-stellatum (L.) Duby — T scap, Steno-Medit. — Mortorio, in the scrub and in meadows, common. Soffi, meadows, rare. Camere W, in the scrub, widespread. Portisco, meadows.

Anagallis arvensis L. — T rept, Euri-Medit. — Mortorio, central level areas, common. Soffi, meadows, common; present with either blue or red flowers. Camere W, clearings and internal meadows. Portisco, meadows.

**Anagallis foemina* Miller — T rept, Steno-Medit. — Soffi, meadows, common.

Anagallis parviflora Hoffmanns. & Link — T rept, W-Steno-Medit. — Mortorio, subsaline coastal meadows with high clayey, sandy elements, rare.

Samolus valerandi L. — T scap, Subcosm. — Mortorio, dripping rocks and temporary humid basins, rare.

Plumbaginaceae

Limonium contortirameum (Mabille) Erben — Ch suffr, Endem. Sard., Cors. and Tusc. arch. — Mortorio, rocky and sandy coasts, widespread. Soffi, rocky and sandy coasts, rare. Camere W and E, rocky coasts.

Limonium protohermaeum Arrigoni & Diana — Ch suffr, Endem. Sard. — Mortorio, on the coasts, widespread. Soffi, coasts, rare. Camere W and E, rocky and sandy coasts. Portisco, common in the northeastern side.

Oleaceae

Olea europea L. var. *sylvestris* Brot. — P caesp, Steno-Medit. — Mortorio, in the scrub, widespread. It is usually low and creeping but specimens of remarkable size are found in the central-eastern area and by the trigonometric point. Soffi, in the southern scrub, quite common. Camere W and E, widespread, relatively small-shaped specimens. Portisco, rare.

Phillyrea angustifolia L. — P caesp, Steno-W-Medit. — Mortorio, in the scrub, common. Soffi, quite common. Camere W, some creeping specimens in the western side, rare. Camere E, Portisco, in the scrub.

Phillyrea latifolia L. — P caesp, Steno-Medit. — Mortorio, central-eastern area, very rare. Soffi, in the scrub, rare. Portisco, in the scrub.

Gentianaceae

Blackstonia perfoliata (L.) Hudson — T scap, Euri-Medit. — Mortorio, southern area, rare.

Centaurium erythraea Rafn — T scap, Paleotemp. — Mortorio, northwestern side, rare. Soffi, north-central side, rare.

**Centaurium tenuiflorum* (Hoffmanns. & Link) Fritsch — T scap, Paleotemp. — Soffi, north-central side, quite common.

Centaurium maritimum (L.) Fritsch — T scap, Steno-Medit. — Mortorio, in the rockrose scrub, meadows and gaps in the scrub, widespread. Soffi, widespread, Portisco, meadows.

Asclepiadaceae

Vincetoxicum hirundinaria Medicus — H scap, Eurasiat. — Mortorio, central western rocky ravines on high area, rare.

Rubiaceae

Sherardia arvensis L. — T scap, Euri-Medit. — Mortorio, scrub, meadows and edges of some paths, common. Soffi, meadows, quite common. Portisco, meadows.

Galium valantia Weber subsp. *holophilum* Ponzo — T scap, Sard., Cors., Sic., Tusc. arch. — Mortorio, clearings and interruptions of both the coastal *Helianthemum* scrub and the internal one, widespread. Soffi, arid areas, rare. Camere W, sandy, coastal meadows, southern, internal clearings, widespread. Camere E, meadows.

Galium aparine L. — T scap, Eurasiat. — Mortorio, northeastern area, in the scrub and on the wall delimiting sheep pen, meadows towards the trigonometric point, widespread. Soffi, in the scrub, widespread. Camere W, internal clearings.

**Galium divaricatum* Lam. — T scap, Steno-Medit. — Soffi, meadows, rare.

Galium murale (L.) All. — T scap, Steno-Medit. — Mortorio, ravines and meadows on high areas, very rare.

**Valantia hispida* L. — T scap, S-Medit. — Soffi, sandy areas, rare.

Valantia muralis L. — T scap, Steno-Medit. — Mortorio, in soil among rocks, rocky and arid meadows, common.

Rubia peregrina L. — P lian, Steno-Medit. Macarones. — Mortorio, in the scrub, common. It is an extremely polymorphic species; some specimens located by the wild olive trees could be attributed to var. *latifolia*. Mortorio, Soffi, in the scrub, quite common. Camere W, E and Portisco, in the scrub.

Convolvulaceae

Cuscuta planiflora L. — T par, Euri-Medit. — Mortorio, on the northwestern slope, rare. Portisco, in the scrub, very rare.

Convolvulus siculus L. — T scap, S-Medit. — Mortorio, rocky ravines and meadows on the southern area, rare.

Convolvulus althaeoides L. — H scand, Steno-Medit. — Mortorio, pebbly clearings in the central-eastern scrub, very rare.

Boraginaceae

Heliotropium europaeum L. — T scap, Euri-Medit.-Turan. — Mortorio, ravines and meadows, not widespread. Soffi, meadows, rare.

Echium plantagineum L. — H bien, Euri-Medit. — Mortorio, internal and coastal meadows, widespread. Soffi, meadows, quite common. Camere W, and E, in a meadow, in sandy areas.

Callitrichaceae

Callitriche stagnalis Scop. — I rad, Eurasiat. — Mortorio, northeastern pools, widespread. Soffi, in ephemeral ponds.

Labiatae

Teucrium marum L. — Ch suffr, W and C-Medit. — Mortorio, northeastern rocks, very rare.

Stachys glutinosa L. — Ch frut, Endem. Sard., Cors., Tusc. arch. — Mortorio, pebbly and gravelly soils located to N. E. of the southeastern beach, rare.

Stachys arvensis L. — T scap, Europ. — Mortorio, meadows and ravines in high areas, rare. Soffi, meadows, rare.

**Mentha pulegium* L. — H scap, Euri-Medit. — Soffi, in humid meadows, rare.

Solanaceae

Solanum nigrum L. — T scap, Cosmopol. — Mortorio, rocky ravines and interruptions of the scrub, common. Soffi, interruptions of the scrub, widespread. Camere W and E, coastal meadows and ravines. In the northwesterly side there are some suffruticosum specimens (var. *suffruticosum*, Schousboe). Poveri, only in the smaller island, in splits in the rocks with nitrate, very rare.

Scrophulariaceae

Scrophularia trifoliata L. — H scap, Endem. Sard., Cors., Tusc. arch. — Mortorio, rocky ravines and hollows in the highest central-western area, rare.

Misopates orontium (L.) Rafin. — T scap, Euri-Medit. — Mortorio, rocky ravines on the high areas, arid meadows in the scrub, rare.

Linaria pelisseriana (L.) Miller — T scap, Medit.-Atl. — Mortorio, interruptions of the rockrose scrub, on the garigue in the central-northern area, widespread. Soffi, interruptions of the scrub, quite common. Camere W, meadows, internal and coastal clearings.

Cymbalaria aequitriloba (Viv.) Chevalier — H rept, Sard., Cors., arch. Tusc, Balear isl. — Mortorio, humid rocky ravines located on high areas and the coasts, not common. Camere W, north ravines, associated with *Asplenium obovatum*.

Parentucellia viscosa (L.) Caruel — T scap, Medit.-Atl. — Mortorio, gaps in the scrub, behind the dunes, rare. Soffi, humid meadows, rare.

Bellardia trixago (L.) All. — T scap, Euri-Medit. — Mortorio, in the scrub of the central-western area, rare. Portisco, in the scrub.

Orobanchaceae

Orobanche minor Sm. — T par, Paleotemp. — Mortorio, central-southern level area, rare. Soffi, frequently associated with *Trifolium*, rare. Camere W, southern side, rare. Parasite of *Lotus*. Portisco, parasite of *Lotus*, rare.

Orobanche sanguinea C. Presl. — T par, Steno-Medit. — Mortorio, in *Lotus* of the southwestern sandy areas, rare.

Plantaginaceae

Plantago coronopus L. subsp. *coronopus* — H ros, Euri-Medit. — Mortorio, central level areas, rare. Camere W, southern clearings. Camere E, clearings.

Plantago coronopus L. subsp. *commutata* (Guss.) Pilger — T scap, Euri-Medit. — Mortorio, southeastern gravelly beach, sandy clayey coastal meadows, widespread. Soffi, coastal meadows, quite common. Camere W, coastal salted meadows and coastal rocky ravines, widespread. Camere E and Portisco, coastal meadows.

Plantago macrorhiza Poir. — H ros, W-Steno-Medit. — Mortorio, on the coast, common. Camere W, northern coasts, rare. Camere E, coastal areas.

Plantago lanceolata L. — H ros, Euroasiat. — Mortorio, central-southern level area and in the scrub, common. Soffi, near the paths, quite common. Portisco, associated with *Brachypodium*.

Plantago lagopus L. — T scap, Steno-Medit. — Mortorio, coastal meadows and ravines, internal clearings, widespread. Soffi, arid meadows, quite common. Camere W and Portisco, meadows.

Plantago bellardi All. — T scap, S-Medit. — Mortorio, southern arid meadows, rare. Soffi, arid meadows, rare.

Plantago afra L. — T scap, W-Medit. — Mortorio, meadows to the N. E. of the central southern sands, not common. Soffi, arid meadows, rare.

Valerianaceae

Centranthus calcitrapae (L.) Dufresne — T scap, Steno-Medit. — Mortorio, in *Phillyrea* in the sandy area, in *Euphorbia* and *Pistacia lentiscus* scrub in the southern area, rare. Soffi, arid meadows, rare.

Campanulaceae

**Laurentia gasparrinii* (Tineo) Strobl — H ros, W-Steno-Medit. — Soffi, humid meadows, rare.

Compositae

**Bellis perennis* L. — H ros, Europ.-Caucas. — Portisco, meadows.

Aster squamatus (Sprengel) Hieron — T scap, Neotropic. — Mortorio, on the edges of the northeastern pools, rare.

Conyza canadensis (L.) Cronq. — T scap, N-Americ. — Mortorio, on the burnt scrub, rare.

**Filago eriocephala* Guss. — T scap, Steno-Medit. — Soffi, arid meadows, rare.

Logfia gallica (L.) Cosson & Germ. — T scap, Euri-Medit. — Mortorio, coastal meadows, interruption of the scrub, widespread. Soffi, arid meadows, rare. Camere W and E, meadows and clearings, widespread. Portisco, meadows.

Evax pygmaea (L.) Brot. — T rept, Steno-Medit. — Mortorio, meadows in the scrub, coastal meadows, widespread.

Helichrysum italicum (Roth) G. Don subsp. *microphyllum* (Willd) Nyman — Ch suffr, S-Europ. — Mortorio, widespread but not abundant. Rare, coastal, small garigues on the western area. Soffi, garigues, rare. Camere W, coastal meadows. Camere E, in the eastern garigue. Portisco, meadows.

Phagnalon saxatile (L.) Cass. — Ch suffr, W-Medit. — Mortorio, ravines, clearings and small gaps in the scrub, widespread. Soffi, rocky areas, quite common.

Inula crithmoides L. — Ch suffr, SW-Europ. — Mortorio, western area, widespread. Camere W, southern side. Camere E, coastal areas.

Dittrichia viscosa (L.) W. Greuter — H scap, Euri-Medit. — Mortorio, coastal and internal areas, common. Soffi, humid meadows, quite common. Camere W, coastal ravines near the *Ficus*. Camere E, ravines.

Dittrichia graveolens (L.) W. Greuter — T scap, Medit.-Turan. — Mortorio, N. W. side and by the burnt wild olive trees, common. Soffi, meadows, quite common.

Pulicaria odora (L.) Reichemb. — H scap, Euri-Medit. — Mortorio, clearings in the scrub, coastal and high areas, common. Soffi, in the scrub, quite common. Portisco, in the scrub.

Bupthalmum inuloides Moris — Ch frut, Endem. Sard. — Mortorio, northern rocky ravines, widespread.

Anthemis maritima L. — H scap, W-Medit. — Mortorio, southwestern coastal areas, sands and internal areas where it grows with *Pancratium illyricum*, coastal central-western sandy areas, many plants, widespread. Camere W, ravines and coastal meadows, rare.

**Anthemis arvensis* L. subsp. *arvensis* — T scap, Steno-Medit. — Soffi, meadows, rare.

Anthemis arvensis L. subsp. *incrassata* (Loisel.) Nyman — T scap, Steno-Medit. — Mortorio, humid coastal meadows, rare.

Chamaemelum mixtum (L.) All. — T scap, Steno-Medit. — Mortorio, sands and coastal meadows, rare.

Chamaemelum fuscatum (Brot.) Vasc. — T scap, W-Medit. — Mortorio, temporary humid meadows where it grows associated with (*Ranunculus muricatus*), southern humid meadows, rare.

Otanthus maritimus (L.) Hoffmanns. & Link — Ch suffr, Medit-Atl. — Mortorio, northern sandy areas, very rare. This species, like *Elymus farctus*, is becoming less because of the excessive trampling.

Chrysanthemum segetum L. — T scap, Steno-Medit.-Turan. — Mortorio, southern level

area, rare. Soffi, meadows, rare. Camere W, meadows and interruptions of the scrub, widespread. Camere E and Portisco, meadows.

**Coleostephus myconis* (L.) Reichenb. — T scap, Steno-Medit. — Soffi, garigue, common.

+*Nananthea perpusilla* (Loisel.) DC. — Mortorio, Vaccari, 1928 — not observed.

Artemisia arborescens L. — NP, S-Medit. — Mortorio, northern area and between the two southern beaches. This species is increasing. Camere W, to the south of the dunes and in sandy areas, spreading. Camere E, sandy areas.

Senecio bicolor (Willd.) Tod. subsp. *cineraria* (DC.) Chater — Ch suffr, W Medit. — Mortorio, widespread. Camere W, in the isthmus areas. Camere E, coastal areas.

Senecio leucanthemifolius Poiret — T scap, Steno-Medit. — Mortorio, along the coasts, widespread. It is an extremely polymorphic species. Specimens with more or less fleshy leaves that are quite intact or dentate have been found. Soffi, in ruins, quite common. Camere W, E and Portisco, coastal areas. Poveri, in western side of both islands.

Senecio lividus L. — T scap, Steno-Medit. — Mortorio, in the *Helianthemum* scrub and by burnt wild olive trees, rare. Soffi, meadows, quite common.

Senecio vulgaris L. — T scap, Euri-Medit. — Mortorio, high areas and central-western areas, widespread.

Carlina corymbosa L. — H scap, Steno-Medit. — Mortorio, central-southern level areas, not common. Soffi, garigue, common. Camere W, interruptions of the scrub, meadows, rare. Camere E and Portisco, meadows.

**Atractylis gummifera* L. — H ros, S-Medit. — Soffi, arid meadows, quite common. Portisco, meadows.

**Carduus pycnocephalus* L. — H bienn, Euri-Medit.-Turan. — Soffi, arid meadows, rare.

Carduus cephalanthus Viv. — H bienn, W-Medit. — Mortorio, in high meadows and also on rocky ravines, widespread. Soffi, north, rocky areas, quite common. Camere W and E, rocky ravines.

Galactites tomentosa Moench — H bienn, Steno-Medit. — Mortorio, southern clearings, coastal meadows and high meadows, common. Soffi, garigue, common. Camere W, southeastern meadows and ravines. Camere E and Portisco, meadows.

**Onopordum illyricum* L. — H bienn, Steno-Medit. — Soffi, only one plant near the pebbly beach.

Scolymus hispanicus L. — H bienn, Euri-Medit. — Mortorio, southwestern sands, very rare.

- Tolpis umbellata* Bertol. — T scap, Steno-Medit. — Mortorio, in the *Helianthemum* scrub and on some ravines. Soffi, arid meadows, quite common.
- Hedypnois cretica* (L.) Dum.Courset — T scap, Steno-Medit. — Mortorio, trampled areas near the southwestern beach, clearings and meadows, widespread. Soffi, arid meadows, rare. Portisco, arid meadows.
- Urospermum dalechampii* (L.) Scop. — H scap, C.W.-Euri-Medit. — Mortorio, interruptions of the scrub and central-southern table-land, widespread Soffi, arid meadows, quite common.
- Urospermum picroides* (L.) Scop. — T scap, Euri- Medit. — Mortorio, northwestern side, rare. Soffi, in paths, rare.
- Hypochoeris achyrophorus* L. — T scap, Steno-Medit. — Mortorio, meadows and interruptions of the scrub, common. Soffi, arid meadows, common. Camere W, under the *Calicotome* and in the scrub, widespread. Camere E and Portisco, meadows.
- Hypochoeris glabra* L. — T scap, Euri- Medit. — Mortorio, southern meadows, rare. Soffi, meadows, rare.
- Leontodon tuberosus* L. — H ros, Steno-Medit. — Mortorio, widespread. Soffi, garigue, widespread. Portisco, in the scrub.
- Reichardia picroides* (L.) Roth — H scap, Steno-Medit. — Mortorio, rocky ravines, rare. Soffi, rocky ravines, rare. Portisco, rocky ravines.
- Aetheorhiza bulbosa* (L.) Cass. — G bulb, Steno-Medit. — Mortorio, coastal table-lands, in central-western areas, widespread. Soffi, coastal areas, quite common. Camere W and sands, only vegetative.
- Sonchus asper* (L.) Hill — H bien, Euroasiat. — Mortorio, southern level areas, very rare. Soffi, meadows, rare. Camere W, internal meadows.
- Sonchus tenerrimus* L. — T scap, Steno-Medit. — Mortorio, by big junipers and wild olive trees, rare.
- Sonchus oleraceus* L. — T scap, Eurasiat. — Mortorio, central level area and central-western side, widespread. Soffi, in ruins, rare Camere W, sandy areas near the isthmus, meadows and ravines, widespread. Camere E and Portisco, sandy areas. Poveri, only in the bigger island, in the gaps in *Lavantera* plants.
- Chondrilla juncea* L. — H scap, Euri-Medit. — Mortorio, towards the North of the central-southern beach, very rare.
- Crepis leontodontoides* All. — H ros, W-Medit. — Mortorio, cool areas near the big wild olive trees, very rare.

**Crepis vesicaria* L. — T scap, Submedit.-Subatl. — Soffi, in ruins, rare.

Andryala integrifolia L. — T scap, W-Medit. — Mortorio, among the burnt juniper, meadows and ravines, widespread. It is extremely variable in its branching and in the edge of its leaves. Soffi, arid meadows, rare.

SPERMATOPHYTA ANGIOSPERMAE MONOCOTYLEDONES

Alismataceae

**Alisma plantago-acquatica* L. — I Rad, Subcosm. — Soffi, in ephemeral ponds, rare.

Juncaginaceae

**Triglochin bulbosum* L. subsp. *barrelieri* Loisel. — G bulb, Steno-Medit. — Soffi, in humid meadows, rare.

Ruppiaceae

Ruppia maritima L. subsp. *brachypus* (Gay) Löve — I rad, Cosmopol. — Mortorio, in some pools of the southern and northeastern areas, widespread. Soffi, in salt pools, rare. Camere W, southwestern coastal pools. Camere E, in salt pools.

Posidionaceae

Posidonia oceanica (L.) Delile — I rad, Steno-Medit. — Mortorio, along the coast, widespread. Some gaps in the *Posidonia* meadows are visible where pleasure boats anchor. The same in Soffi, Portisco.

Liliaceae

Asphodelus aestivus Brot. — G rhiz, Steno-Medit. — Mortorio, central-eastern area, widespread but not abundant. Soffi, meadows, rare. Camere W, in the scrub, rare. Camere E and Portisco, in the scrub.

Colchicum neapolitanum (Ten.) Ten. — G bulb, W-Steno-Medit. — Mortorio, on a northeastern slope, rare.

Ornithogalum corsicum Jord. & Fourr. — G bulb, Endem. Sard., Cors. — Mortorio, southern area and on the edges of the central-western path, widespread. Many specimens have only one flower.

Urginea maritima (L.) Baker — G bulb, Steno-Medit.-Macarones. — Mortorio, by the highest areas, meadows on high areas and beside the coast, widespread. Soffi, arid slopes, rare.

Urginea undulata (Desf.) Steinh. — G bulb, S-Medit. — Mortorio, meadows in the scrub, rare. Soffi, arid slopes, rare.

Scilla autumnalis L. — G bulb, Euri-Medit. — Mortorio, meadows and clearings in the scrub, rare. Soffi, in arid, pebbly areas, rare. Portisco, meadows.

**Scilla obtusifolia* Poiret — G bulb, SW-Medit. — Soffi, in arid, pebbly areas, rare.

**Allium roseum* L. — G bulb, Steno-Medit. — Portisco, meadows, rare.

Allium subhirsutum L. — G bulb, Steno-Medit. — Mortorio, high areas near the trigonometric point, very rare.

Allium triquetrum L. — G bulb, W-Steno-Medit. — Mortorio, northern humid ravines, very rare.

Allium parviflorum Viv. — G bulb, Endem. Sard., Cors. — Mortorio, ravines and pebbles in the large southern harbour, to the East of the beach, rare.

Allium commutatum Guss. — G bulb, E-Steno-Medit. — Mortorio, near the northeastern cliffs, widespread. Soffi, coastal areas, quite common. Camere W, E and Portisco, clearings and rocky ravines, common.

Asparagus albus L. — Ch frutt, W-Steno-Medit. — Mortorio, inaccessible northeastern areas, central and northern areas, common. Soffi, cliffs, very rare. Camere W, in the western side, widespread. Camere E and Portisco, cliffs.

Asparagus acutifolius L. — G rhiz, Steno-Medit. — Mortorio, central area and central-western areas, widespread. Soffi, in the scrub, rare. Camere W, E and Portisco, in the scrub, not common.

Smilax aspera L. — NP, Paleosubtrop. — Mortorio, in the scrub, widespread. Camere W and E, in the scrub, common.

Amaryllidaceae

Narcissus serotinus L. — G bulb, Steno-Medit. — Mortorio, clearings and meadows, very rare. Soffi, arid meadows, rare. Camere W, meadows and ravines. Camere E, abundant, has scapes with 3-5 flowers. Portisco, associated with *Brachypodium*.

Narcissus tazetta L. — G bulb, Steno-Medit. — Mortorio, central-western ravines and clearings, in the bush on high areas, widespread. The flowers are completely yellow and the leaves are slightly narrower than those observed in other islands. Soffi, meadows, rare. Camere W and E, internal clearings, widespread.

Pancratium maritimum L. — G bulb, Steno-Medit. — Mortorio, western sands, widespread. Camere W and E, sands, associated with *Senecio bicolor* subsp. *cineraria*.

Pancratium illyricum L. — G bulb, Endem. Sard., Cors. and Capraia isl. — Mortorio, gravelly and stony areas in the southwestern side, gravelly impluvia and meadows in the central-western area, among the pebbles in the southwestern gravelly bay, common. It often grows associated with *Carduus cephalanthus*. Soffi, coastal areas, widespread.

Dioscoreaceae

Tamus communis L. — G rad, Euri-Medit. — Mortorio, on the inaccessible area among the wild olive trees and junipers, on high areas, widespread. The leaves of some

specimens are almost three lobes, the medium lobe is long and it could be ascribed to the subsp. *cretica* L. Soffi, in the scrub, quite common. Camere W, in the scrub and clearings, common. Heart- and arrow-shaped leaves. Camere E, in the scrub.

Iridaceae

Gynandris sisyrinchium (L.) Parl. — G bulb, Steno-Medit. — Mortorio, sandy clearings near cultivated pines and along the western path, widespread. Soffi, coastal meadows, quite common. Camere W, coastal meadows, rare. Portisco, meadows.

Crocus minimus DC. — G bulb, Endem. Sard., Cors., Tusc. arch. — Mortorio, to the south of the path connecting the two southern beaches, widespread. Portisco, common in meadows, some specimens have very short stems.

Romulea requienii Parl. — G bulb, Endem. Sard., Cors. — Mortorio, along the western path. Soffi, meadows near ephemeral ponds, rare.

Romulea columnae Sebastiani & Mauri — G bulb, Steno-Medit. — Mortorio, near the southwestern sands, very rare. Soffi, in the scrub, very rare.

Juncaceae

Juncus maritimus Lam. — G rhiz, Subcosm. — Mortorio, central-eastern coastal ravines, very rare. Soffi, coastal humid areas, rare. Camere E, humid areas.

Juncus acutus L. — H caesp, Euri-Medit. — Mortorio, near tamarisk on the central-western sands, in a basin of the southwestern coast, widespread. Soffi, humid meadows, quite common. Camere W, southwestern edges of pools. Camere E and Portisco, humid meadows.

* *Juncus subulatus* Forskål — G rhiz, S-Medit. — Soffi, saline ponds, rare.

Juncus bufonius L. — T caesp, Cosmopol. — Mortorio, temporary humid meadows on the NW coast, rare. Soffi, humid meadows, rare.

Juncus hybridus Brot. — T caesp, Medit.-Atl. — Mortorio, on the edges of the pools located to N. E., very rare.

* *Juncus pygmaeus* L. C. M. Richard — T caesp, Medit.-Atl. — Soffi, humid sands, very rare.

Gramineae

* *Lolium rigidum* Gaudin — T scap, Paleosubtrop. — Soffi, arid meadows, widespread. Camere W and E, meadows and clearings, widespread.

Vulpia geniculata (L.) Link — T caesp, W-Steno-Medit. — Mortorio, eastern side and southern area, rare.

Vulpia fasciculata (Forskål) Samp. — T caesp, Medit.-Atl. — Mortorio, on the sand reed of the southwestern beach, sands of the western area, widespread.

Vulpia myuros (L.) C. C. Gmelin — T caesp, Subcosm. — Mortorio, meadows on the highest areas, rare. Portisco, meadows.

**Vulpia ciliata* Dumort. — T caesp, Euri-Medit. — Soffi, meadows, wildspread.

Desmazeria marina (L.) Druce — T scap, Medit-Atl. — Mortorio, coastal meadows, it rarely grows on internal areas, wildspread. Soffi, coastal areas, quite common. Camere W, coastal meadows, common. Camere E, meadows.

**Desmazeria rigida* (L.) Tuttin — T scap, Euri-Medit. — Soffi, sands, rare.

**Dactylis hispanica* Roth — H caesp, Steno-Medit. — Camere W, E and Portisco, coastal areas and internal clearings.

Dactylis glomerata L. — H caesp, Paleotemp. — Mortorio, along the coast and on the internal areas, common. Soffi, meadows, common.

Puccinellia fasciculata (Torrey) E. P. Bicknell — H caesp, Medit-Atl. — Poveri, edges of pools, associated with *Spergularia* and *Parapholis*.

Lamarckia aurea (L.) Moench — T scap, Steno-Medit.-Turan. — Mortorio, rocky ravines on high areas and southern meadows, rare. Soffi, sand and rocky areas, quite common. Camere W and E, rocky ravines, rare.

Briza maxima L. — T scap, Paleo-Subtrop. — Mortorio, by *Calicotome* and burnt junipers, in interruptions of the scrub, wildspread. Soffi, interruptions of the scrub, rare. Camere W, E and Portisco, sandy areas, rare.

Briza minor L. — T scap, Subcosm. — Mortorio, central-western table-land, very rare. Soffi, interruptions of the scrub, rare.

**Melica ciliata* L. subsp. *ciliata* — H caesp, Euri-Medit.-Turan. — Soffi, arid meadows, rare.

**Melica ciliata* L. subsp. *magnolii* (Gran. & Godron) Husnot — H caesp, Steno Medit.-Turan. — Soffi, in the scrub, rare.

Bromus rigidus Roth — T scap, Paleo-Subtrop. — Mortorio, southern level area, very rare. Soffi, in ruins, rare. Camere W, meadows of N. E.

Bromus madritensis L. — T scap, Euri-Medit. — Mortorio, high areas, not wildspread. Soffi, high areas, wildspread. Camere E and Portisco, meadows.

Bromus hordeaceus L. subsp. *molliformis* (Lloyd) Maire & Weiller — T scap, Euri-Medit. — Mortorio, among wild olive trees and burnt junipers, rare. Soffi, coastal areas, rare.

Brachypodium plukenetii (All.) Beauv. — H caesp, W-Steno-Medit. — Mortorio, common. Soffi, in the scrub, rare. Camere W, meadows and interruptions of the scrub. Camere E and Portisco, very common.

Brachypodium distachyon (L.) Beauv — T scap, Steno-Medit.-Turan. — Mortorio, meadows and gaps in the scrub in the central-northern area, rare. Soffi, interruptions of the scrub, rare. Camere E, meadows.

Elymus farctus (Viv.) Runemark — G rhiz, Euri-Medit. — Mortorio, western sandy areas, rare. It is often trampled and, due to the erosion of the coast, it is removed as well. This species is diminishing. Camere W and E, sands, rare.

**Aegilops geniculata* Roth — T scap, Steno-Medit.-Turan. — Portisco, meadows.

Hordeum murinum L. subsp. *murinum* — T scap, Circumbor. — Mortorio, meadows on the highest areas and coastal rocky ravines, widespread. Soffi, subsaline areas, quite common.

Hordeum murinum L. subsp. *leporinum* (Link) Arcangeli — T scap, Euri-Medit. — Mortorio, meadows on the highest areas and coastal rocky ravines, widespread. Soffi, Camere W and E, coastal clearings, rare.

Hordeum marinum Hudson — T scap, W-Euri-Medit. — Mortorio, southern meadows and cliffs, rare. Camere E, meadows.

Avena barbata Pott — T scap, Euri-Medit.-Turan. — Mortorio, central-southern level area, meadows and ravines on high areas, widespread. Soffi, meadows, rare. Camere W, meadows, clearings, ravines, common. Camere E and Portisco, meadows and clearings.

Avena sterilis L. — T scap, Euri-Medit.-Turan. — Mortorio, among *Helianthemum*, very rare.

**Gaudinia fragilis* (L.) Beauv. — T scap, Euri-Medit. — Soffi, humid meadows, rare.

Lophochloa cristata (L.) Hyl. — T caesp, Paleotemp. — Mortorio, gaps in the scrub and among the northeastern lithosoils, rare. Soffi, paths, rare. Portisco, meadows.

Lophochloa pubescens (Lam.) H. Scholz — T caesp, Steno-Medit. — Mortorio, southwestern sandy, pebbly areas, rare.

Lagurus ovatus L. — T scap, Euri-Medit. — Mortorio, widespread. Soffi, sandy, coast areas, rare. Camere W, E and Portisco, gaps in the scrub and meadows.

**Aira caryophylla* L. — T scap, Paleosubtrop. — Soffi, in the scrub, rare.

**Aira elegantissima* Schur — T scap, Euri-Medit. — Portisco, meadows.

Anthoxanthum aristatum Boiss. — T scap, W-Medit.-Atl. — Mortorio, meadows between *Calicotome* and *Pistacia* southern area, widespread. Soffi, meadows, rare. Camere W, in the scrub and in *Brachypodium* clearings of N. E., common. Camere E and Portisco, in the scrub.

**Holcus lanatus* L. — H caesp, Circumbor. — Soffi, humid meadows, rare.

**Corynephorus divaricatus* (Pourret) Breistr. — T scap, Steno-Medit. — Soffi, interruptions of the scrub, rare.

**Agrostis stolonifera* L. — H rept, Circumbor. — Soffi, near ephemeral ponds, rare.

Gastridium ventricosum (Gouan) Schinz & Thell. — T scap, Medit.-Atl. — Mortorio, central level area, widespread. Portisco, meadows.

Polypogon monspeliensis (L.) Desf. — T scap, Paleosubtrop. — Mortorio, on the edges of N. E. pools, very rare. Soffi, humid meadows, rare.

Polypogon maritimus Willd. subsp. *maritimus* — T scap, Steno-Medit.-Macaronens. — Mortorio, meadows along the cliffs and usually located on the coast, widespread. Soffi, meadows, rare.

Polypogon viridis (Gouan) Breistr. — H caesp, Paleosubtrop. — Mortorio, basins and humid level areas on the central-western areas, rare. Soffi, coastal areas, rare.

**Polypogon maritimus* Willd. subsp. *subspathaceus* (Req.) Bonnier & Layens — T scap, Steno-Medit. — Camere W, coastal meadows, widespread.

Ammophila arenaria (L.) Link subsp. *arundinacea* H. Lindb. — G rhiz, Euri-Medit. — Mortorio, coastal western sands. This species is becoming less abundant. Camere W, in dunes near the isthmus. Camere E, in sands, rare.

Parapholis incurva (L.) C. E. Hubbard — T scap, Medit.-Atl. — Mortorio, coastal sandy, clayey meadows, widespread. Camere W and E, meadows and ravines, widespread. Poveri, edges of pools and in saline meadows.

Piptatherum miliaceum (L.) Cossom — H caesp, Steno-Medit.-Turan. — Mortorio, central-southern area, by cultivated pines, rare.

Stipa capensis Thunb. — T scap, Steno-Medit. — Mortorio, arid meadows, ravines and interruptions of the scrub near big wild olive trees, rare. Soffi, arid meadows, rare. Camere E, meadows.

Sporobolus pungens (Schreber) Kunth — G rhiz, Subtrop. — Mortorio, coastal western sands, widespread. Camere W, isthmus sands; these form carpets that contribute to stabilising the sand. Camere E, sandy areas.

Cynodon dactylon (L.) Pers. — G rhiz, Cosmopol. — Mortorio, central-southern level area, by the stone pen, rare. Soffi, paths, rare. Camere W and E, coastal meadows, not common.

Hyparrhenia hirta (L.) Stapaf — H caesp, Paleotrop. — Mortorio, central level area, high areas, rocky ravines on southern areas, rare. Soffi, in the scrub, rare.

Araceae

Arum pictum L. — G rhiz, Endem. Sard., Cors., Balear isl. — Mortorio, widespread. Camere W, in the S. E. *Lentiscus* plants, rare. Camere E, in the scrub.

Arisarum vulgare Targ.-Tozz. — G rhiz, Steno-Medit. — Mortorio, widespread. Some small specimens having a red spathe have been observed. Soffi, in the scrub, quite common. Camere W, E and Portisco, meadows and interruptions of the scrub.

Ambrosina bassii L. — G rhiz, W-Steno-Medit. — Mortorio, southern area to the West of *Euphorbia dendroides*, very rare.

Dracunculus muscivorus (L. fil.) Parl. — G rhiz, W-Medit. — Mortorio, widespread but rarely growing on sands. Camere E, coastal areas.

Cyperaceae

Scirpus holoschoenus L. — G rhiz, Euri-Medit. — Mortorio, temporarily humid meadows on the central-western area, widespread. Camere E, humid meadows.

Carex distachya Desf. — H caesp, Steno-Medit. — Mortorio, high table-lands, rare. Soffi, in the scrub, rare.

Carex divisa Hudson — G rhiz, Euri-Medit.-Atlant. — Mortorio, southern humid meadows, rare. Soffi, saline areas.

Carex flacca Schreber subsp. *serrulata* (Biv.) W. Greuter — G rhiz, Europ. — Mortorio, clayey, sandy meadows close to the sea and in the central-southern area, rare. Soffi, meadows, rare. Portisco, meadows.

**Schoenus nigricans* L. — H caesp, Subcosm. — Soffi, humid meadows, rare.

Orchidaceae

Serapias lingua L. — G bulb, Steno-Medit. — Mortorio, central-southern arid meadows, rare. Soffi, meadows, rare.

**Orchis papilionacea* L. subsp. *papilionacea* — G bulb, Euri-Medit. — Soffi, meadows, very rare.

Orchis papilionacea L. subsp. *grandiflora* (Boiss.) Nelson — G bulb, Euri-Medit. — Mortorio, meadows subject to erosion in the northwestern area, rare.

Notes on the Flora

An analysis of the species list indicates that in the Mortorio Archipelago 358 species are presently distributed over 67 families and 216 genera. This is a relatively numerous and diversified flora, considering that the 358 species are distributed over an area of little

more than 1 km². It should be noted that the Tavolara Archipelago, with an area of over 9 km², has approx. 700 species (Bocchieri 1996a). With regard to floristic distribution, as shown in Table 3, Mortorio proves to be the richest in species, which corresponds with it being the largest island.

This ratio between number of species and surface area is not confirmed in the Camere islands. In fact, Western Camere while being smaller than Eastern Camere (Table 1) is also the one with the richest flora. This may be due to the greater diversification of habitat and microenvironment present on the western island with respect to the eastern, and this is a factor that allows the settlement of species with various ecological requirements.

Table 3. The number of families, genera, species, subspecies and varieties for each of the Mortorio Archipelago islands.

Islands	Family	Genera	Species	Sub-species	Variety	Total
Mortorio	59	183	260	23	1	284
Soffi	56	148	196	19	1	216
Camere W	37	96	104	15	1	120
Camere E	31	80	80	13	1	94
Portisco	32	72	80	6	1	87
Poveri	10	14	12	2	.	14

The flora of the Archipelago also includes the most significant and numerous genera (Table 4) with respect to those found in other archipelagoes or in the Sardinian coastal areas (Bocchieri 1996b).

Table 4. The number of genera, species, subspecies, and varieties of the most numerous families present in the Mortorio Archipelago flora.

Family	Genera	Species	Sub-species	Variety	Total
<i>Compositae</i>	37	46	4	.	50
<i>Gramineae</i>	31	42	8	.	50
<i>Leguminosae</i>	15	34	4	.	38
<i>Caryophyllaceae</i>	10	20	.	.	20
<i>Liliaceae</i>	8	15	.	.	15
<i>Euphorbiaceae</i>	2	9	.	.	9

Unfortunately, the floristic list also records the failure to relocate some species previously seen: this is the case for *Nananthea perpusilla* (Loisel.) DC, a plant endemic to Corsica and Sardinia reported by Vaccari in 1928 on Mortori. *Rumex scutatus* L., also reported by the same Author, was not found; today its presence in the islands off Sardinia is limited to Molarà (Picci 1972), Molarotto (Lorenzoni 1970), and Ogliastro (Bocchieri & Mossa 1986). The difficulties that plants encounter in such tough environments, such as the limited availability of water (Fig. 2), and wind are well shown by analyses of the biological spectrum in the Archipelago where annual species are more than 54% of the entire flora (Fig. 3). With regard to the hydrophytes, their settlement is limited to temporarily humid environments and governed exclusively by rainfall, which in some years has been close on 400 mm. Few species are present in all the islands of the Archipelago. Among these, mention should be made of *Beta vulgaris* L. subsp. *maritima* (L.) Arcangeli, *Crithmum maritimum* L., *Frankenia hirsuta* L. subsp. *intermedia* DC, *Lotus cytoides* L., *Senecio leucanthemifolius* Poiret, and *Sonchus oleraceus* L. This aspect represents a marked biodiversity in the archipelago environment. With regard to the chorological spectra (Figs. 4, 5), the abundance of Mediterranean species is somewhat significant, in that altogether these constitute more than 66% of the entire flora.

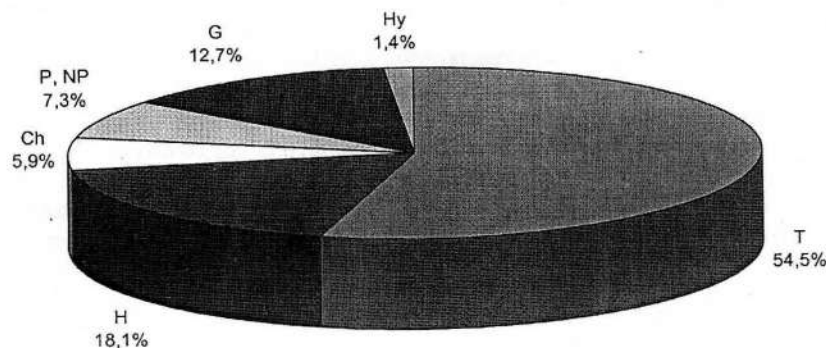


Fig. 3. Biological spectrum of the Mortorio Archipelago flora.

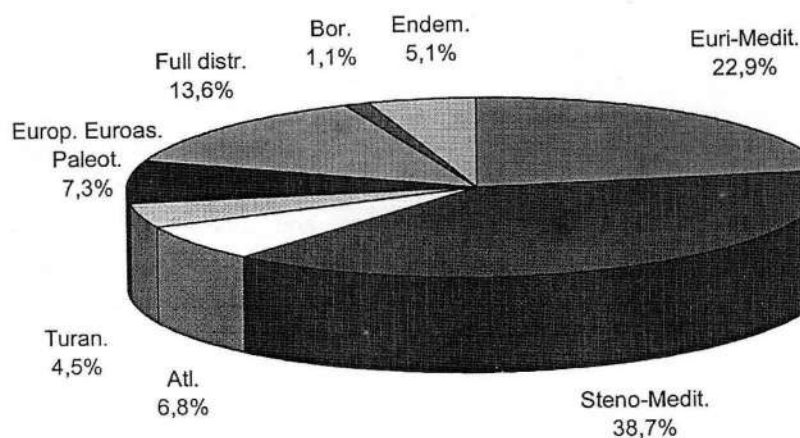


Fig. 4. Chorological spectrum of the Mortorio Archipelago flora.

The most characteristic species are reported below and account for almost 6% of the entire floristic list of the archipelago.

Taxa:

Allium parviflorum Viv.

Arenaria balearica L.

Arum pictum L.

Buphthalmum inuloides Moris

Carduus cephalanthus Viv.

Crocus minimus DC.

Cymbalaria aequitriloba (Viv.) Chevalier

Galium valantia Weber subsp. *holophilum* Ponzo

Genista corsica DC.

Distribution:

Sardinia, Corsica.

Sardinia, Corsica, Balear isl.,
Montecristo isl.

Sardinia, Corsica, Balear isl.

Sardinia.

W-Medit.

Sardinia, Corsica, Tusc. arch.

Sardinia, Corsica, Tusc arch.,
Balear isl.

Sardinia, Corsica, Sicilia, Tusc. arch.

Sardinia, Corsica.

Taxa:	Distribution:
<i>Limonium contortirameum</i> (Mabille) Erben	Sardinia, Corsica, Tusc. arch.
<i>Limonium protohermaeum</i> Arrigoni & Diana	Sardinia.
<i>Ornithogalum corsicum</i> Jord. & Fourr.	Sardinia, Corsica.
<i>Pancratium illyricum</i> L.	Sardinia, Corsica, isl. Capraia.
<i>Ranunculus cordiger</i> Viv.	Sardinia, Corsica.
<i>Ranunculus macrophyllus</i> Desf.	Sardinia, Corsica.
<i>Romulea requienii</i> Parl.	Sardinia, Corsica.
<i>Scrophularia trifoliata</i> L.	Sardinia, Corsica, Tusc. arch.
<i>Silene valsecchiaae</i> Bocchieri	Sardinia.
<i>Spergularia macrorrhiza</i> (Req. ex Loisel.) Heynh.	Sardinia, Corsica.
<i>Stachys glutinosa</i> L.	Sardinia, Corsica, Tusc. arch.
<i>Teucrium marum</i> L.	C.W-Medit.

From this list, it can be seen that the endemic Sardinian species are three in number, a further seven are only shared with Corsica, and another nine occupy an area which also includes the Balearic Islands or the Tuscan Archipelago. Taxa exclusive to the Mortorio Archipelago are completely lacking. This can be explained by the fact that until a few thousand years ago these islands formed a totally uniform sector with the nearby Sardinian coast; this was far too short a time for the building up of conditions which could lead to the genesis of any kind of endemism.

Seen as a whole, the Archipelago is characterized by various vegetation types such as the scrub and garigue, as well as rupicolous, psammophyte, and aquatic vegetation. The scrub is characterized on the island of Mortorio by *Calicotome villosa* and *Pistacia lentiscus*, species which reflect the degraded nature of the soil due to fires. Sites spared by these fires and where the soil is at its maximal stage of evolution harbor juniper populations. On the central part of Soffi, a low scrub with *Cistus monspeliensis* predominates, whereas in the southernmost part a higher scrub is found with an abundance of *Olea europea* var. *sylvestris*. On the same island, *Juniperus turbinata* is represented exclusively by three specimens situated on the southeastern coast. In Western Camere, apart from the pistachios and wild olives which cover the central part, there is the presence, in the central-eastern sector, of a grouping of *Calicotome villosa* often associated with *Euphorbia dendroides* and *Myrtus communis*; this association is particularly significant in so far that it can reach 3 m in height. In Eastern Camere, in a ravine running N.E.-S.W., there is a scrub of wild olive and pistachio together with one or two myrtle shrubs, which the presence of *Smilax aspera* has made impenetrable. In the rest of the island, the predominating vegetation is of *Euphorbia* and *Calicotome*. With regard to the island of Portisco, it is covered by approx. 80% by *Pistacia lentiscus*, *Calicotome* and *Phillyrea*, with rare examples of myrtle, wild olive, juniper, and *Erica arborea*. The garigue with *Helichrysum italicum* subsp. *microphyllum* and *Halimione portulacoides* characterizes the coastal areas of the islands of Mortorio, Soffi, and Eastern Camere, whereas in Western Camere and Portisco herbaceous populations are abundant with a predominance of *Brachypodium pinnatifidum*. In the rocky vegetation on the coast, the dominant plants are *Chrysothamnus maritimus* and *Limonium contortirameum*, at times found together with *Limonium protohermaeum*. These species can be found together with *Lotus cytisioides*, *Plantago coronopus* subsp. *commutata*, *Frankenia hirsuta* subsp. *intermedia*, often in association with *Spergularia macrorrhiza*.

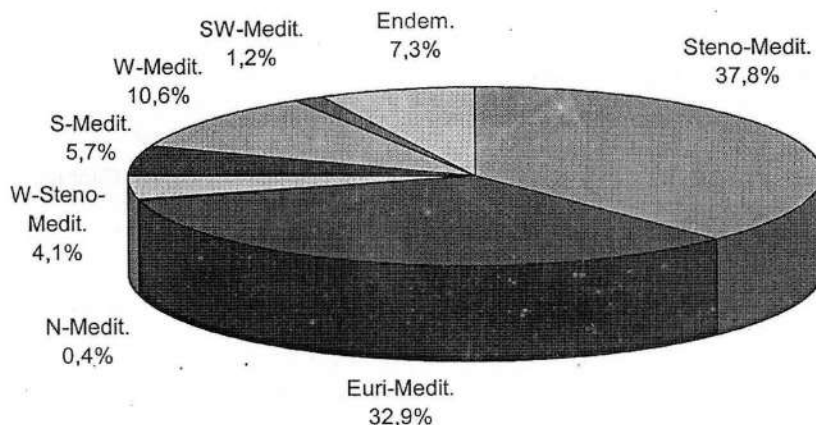


Fig. 5. Chorological spectrum of the Mediterranean sub-elements.

The psammophyte vegetation is often disturbed by anthropogenic action; on Mortorio and Western Camere it is characterized on the first stretches of sand by *Salsola soda* and *Cakile maritima* subsp. *aegyptica*; however the stabilisation of the sand is due to *Sporobolus pungens* and *Elymus farctus* which determine the formation of the embryonic dunes and of the more internal ammocolous plants.

In Eastern Camere, the psammophyte vegetation has almost completely disappeared due to excessive erosion and to disturbance due to trampling. At present, there remain rare bushes of *Elymus farctus* and *Ammophila arenaria* subsp. *arundinacea*. Pebbles covered by *Halimione portulacoides* and *Crithmum maritimum* have replaced the sand.

The hydrophyte vegetation, which in these islands is connected to the presence of wells or small ephemeral ponds, has a typically seasonal character and is characterized by *Isoetes histrix*, *Juncus acutus*, *Illecebrum verticillatum*, or by species such as *Ruppia maritima* subsp. *brachipus* connected with a humid saline environment.

The great richness in the flora of this small Archipelago is undoubtedly a factor of considerable importance from the phytogeographic standpoint. The interactions caused by anthropogenic impact of a massive summer tourism modify the fragile equilibrium of the species, and in particular those correlated with the coastal belt (rupicolous and psammophyte vegetation) which suffer most from trampling and the presence of man. A rapid application of the laws regulating the use of these areas, while not losing sight of the strong local economic interests, is, therefore, needed for preserving this biodiversity heritage for future generations.

The inclusion of this group of islands in the National Park of the La Maddalena Archipelago has thus been determinant in safeguarding all the aspects of natural history and the landscape.

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