

INVESTIGATIONS INTO THE DISTRIBUTION OF FLORISTIC EMERGENCIES OF PANTELLERIA ISLAND (CHANNEL OF SICILY, ITALY)

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GEOMORPHOLOGICAL AND BIOCLIMATIC CHARACTERISTICS - Pantelleria Island is the emerged part of an imposing volcano that rises along the "contact rift" between Africa and Europe. It's dominated by Montagna Grande summit (836 m a.s.l.), and characterized by other inactive volcanic cones, locally known as "cuddie". In the Island a fifty of these were identified, whose the highest are Mount Gibe (700 m), Cuddia di Mida (591 m) and Cuddia Attalora (560 m).

The basin of the "Specchio di Venere" Lake is the most expressive hydrographic element of the Island, located within a calderic depression and fed by rainwater and thermal springs. Along the main active tectonic structures some fumarolic areas are present, such as those of Costa della Favara, Fossa del Russo, Cuddia di Mida, Mount Gibe and Grotta del Bagno Ascittoso.

The climate of Pantelleria is typically mediterranean-maritime, characterized by hot summers and mild winters. From the bioclimatic point of view (RIVAS-MARTINEZ, 1994), the territory is divided into three different belts (GIANGUZZI, 1999a; 1999b):

- 1 - *inframediterranean semiarid* [yearly average temperature (T): 18-20 °C; average maximum temperature of the coldest month of the year (M): 18-20; average minimum temperature of the coldest month of the year (m): 9-10; Thermicity Index (It): 450-500; yearly average precipitation (P) 350 mm], located along the strictly coastal belt;
- 2 - *thermomediterranean dry* (T: 16-18 °C; M: 14-18; m: 5-9; It: 400-450; P: 350-450 mm), included between the upper limits of the previous type and 620-650 m a.s.l.;
- 3 - *mesomediterranean sub-humid* (T: 14-16 °C; M: 9-14; m: -1 to 5; It: 350-400; P: 450-600 mm), in the highest part of Montagna Grande (above 620-650 m a.s.l.), where there are high gradients of occult rainfall related to the frequent fogs.

According to the different edaphic conditions (volcanic andosols or lithosols), the vegetal landscape is predominantly characterized by the series of the Aleppo Pine (*Pistacia lentisci-Pino halepensis* sismetum), of the Maritime Pine (*Genista aspalathoides-Pino hamiltonii* sismetum) (AGOSTINI, 1973) and of the Holm Oak (*Erico arborea-Quercus ilex* sismetum), in turn diversified also in bioclimatic function.

Much of the Island is part of an Oriented Nature Reserve, extended for a total of 2626,69 hectares, of which 2145,37 hectares of "A zone" and 481,32 hectares of pre-reserve, as well as of two Sites of Community Importance (SCIs) and a Special Protection Area (SPA).



Ranunculus parviflorus



Matthiola incana subsp. pulchella

FLORISTIC PECULIARITIES - According to the most recent contributions, the vascular flora is composed of approximately 600 infrageneric entities (BRULLO et al., 1977; GIANGUZZI, 1995, 1999a, 1999b, 2000a, 2000b), a rather small number compared to the territory extent, but due to its young geological age and to geographic isolation in the Channel of Sicily.

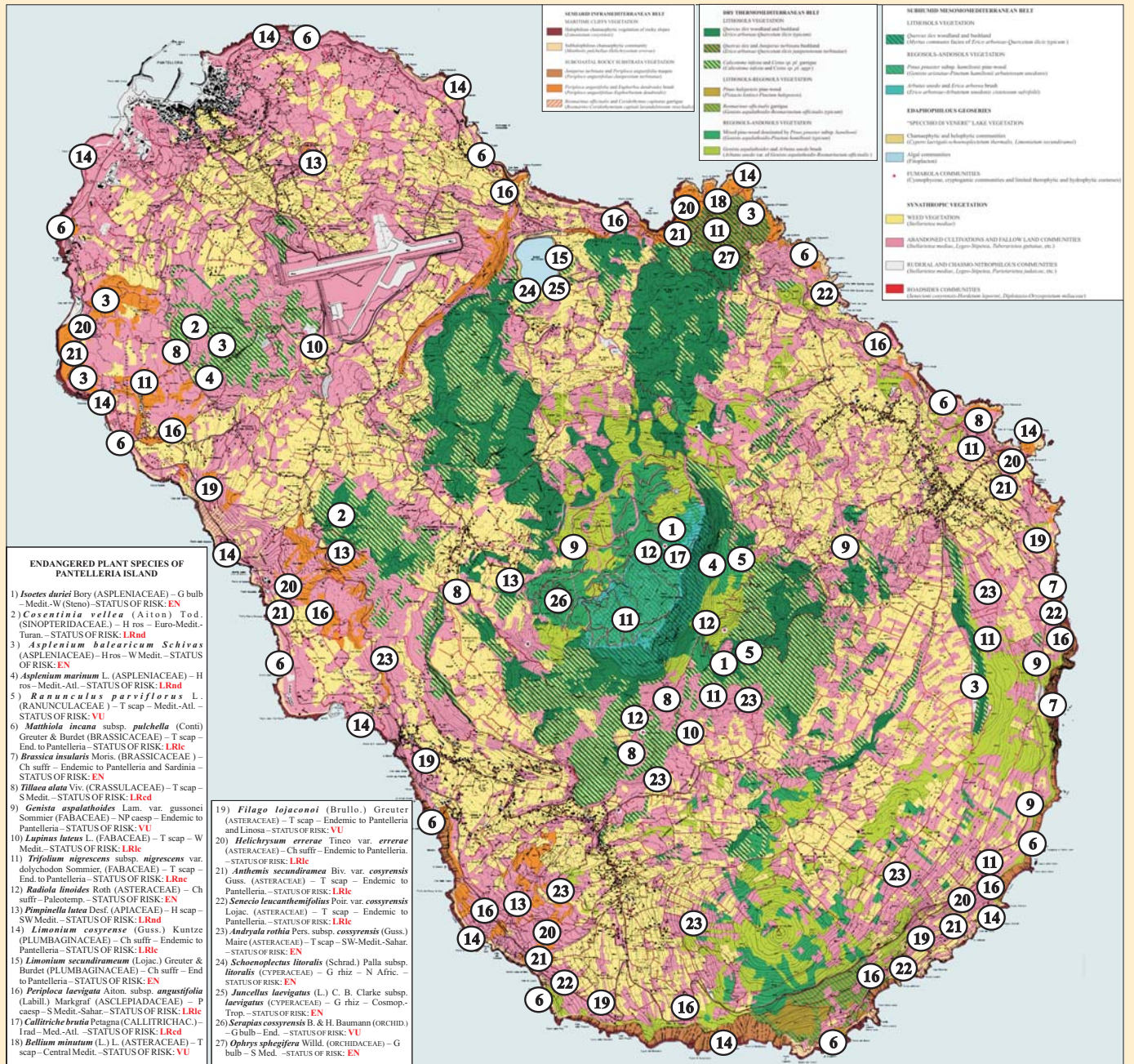
This study focuses on the floristic emergencies of the island, which includes several endemic species, all neogenic, among which are exclusive: *Limonium cosyrense*, *Matthiola incana subsp. pulchella*, *Medicago truncatula* var. *cosyrensis*, *Trifolium nigrescens* subsp. *nigrescens* var. *dolychodon* and *Serapias cosyrensis*. Among other endemic species, which are present in the near areas, it can be mentioned *Anthemis secundiramea* var. *cosyrensis*, *Filago lajoconoi* and *Senecio leucanthemifolius* subsp. *crassifolius*. There are, furthermore, various elements of a certain phytogeographical significance, almost all from the South, as *Pinus pinaster* subsp. *hamiltonii*, *Periploca laevigata* subsp. *angustifolia*, *Genista aspalathoides*, *Carex illegitima*, *Andryala rothia* subsp. *cosyrensis*, *Limodorum trabutianum*, *Ophrys sphegifera*, *Brassica insularis*, *Tillaea alata*, etc.



Brassica insularis



Genista aspalathoides var. gussonei

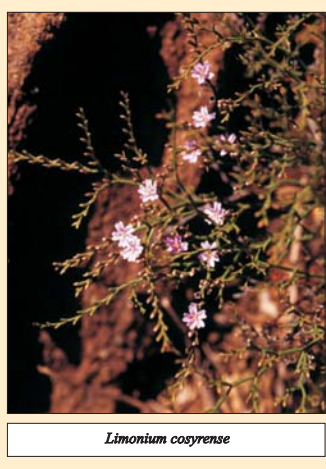


ENDANGERED PLANT SPECIES OF PANTELLERIA ISLAND

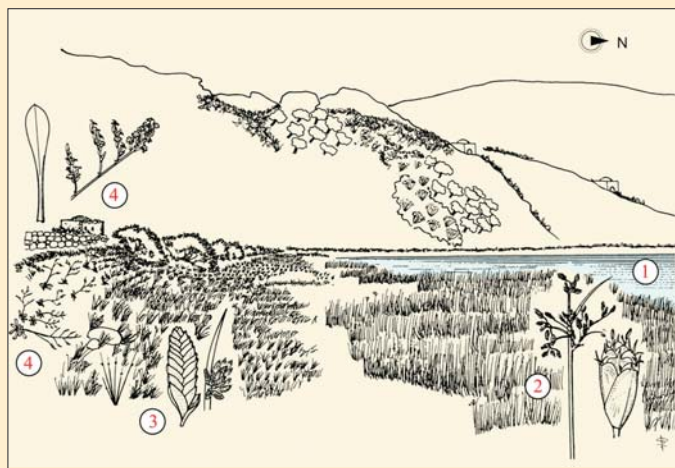
- 1) *Isoetes duriei* Bory (ASPLENIACEAE) - G bulb - Medit.-W (Sinon) - STATUS OF RISK: EN
- 2) *Cosentia vellea* (Aiton) Tod. (SINOPTERIDACEAE) - H ros - Euro-Medit.-Turk. - STATUS OF RISK: L,R
- 3) *Asplenium balearicum Schivas* (ASPLENIACEAE) - Hros - W Medit. - STATUS OF RISK: EN
- 4) *Asplenium marinum* L. (ASPLENIACEAE) - H ros - Medit.-Atl. - STATUS OF RISK: L,R
- 5) *Ranunculus parviflorus* L. (RANUNCULACEAE) - T scap - Medit.-Atl. - STATUS OF RISK: VU
- 6) *Matthiola incana subsp. pulchella* (Conti) Greuter & Burdet (BRASSICACEAE) - T scap - End to Pantelleria - STATUS OF RISK: L,R
- 7) *Brassica insularis* Mart. (BRASSICACEAE) - Ch suffr - Endemic to Pantelleria and Sardinia - STATUS OF RISK: EN
- 8) *Tillaea alata* Vv. (CRASSULACEAE) - T scap - S Medit. - STATUS OF RISK: L,R
- 9) *Genista aspalathoides* Lam. var. *gussonei* Sommier (FABACEAE) - NP caesp - Endemic to Pantelleria - STATUS OF RISK: VU
- 10) *Lupinus luteus* L. (FABACEAE) - T scap - W Medit. - STATUS OF RISK: L,R
- 11) *Trifolium nigrescens* subsp. *nigrescens* var. *dolychodon* Sommier. (FABACEAE) - T scap - End to Pantelleria - STATUS OF RISK: L,R
- 12) *Radiola linoides* Roth (ASTERACEAE) - Ch suffr - Paleotemp. - STATUS OF RISK: EN
- 13) *Piniphiella lutea* Desf. (APIACEAE) - H scap - SW Medit. - STATUS OF RISK: L,R
- 14) *Limonium cosyrense* (Guss.) Kuntze (PLUMBAGINACEAE) - Ch suffr - End to Pantelleria - STATUS OF RISK: EN
- 15) *Limonium secundirameum* (Lojac.) Greuter & Burdet (PLUMBAGINACEAE) - Ch suffr - End to Pantelleria - STATUS OF RISK: EN
- 16) *Periploca laevigata* Aiton. subsp. *angustifolia* (Labill.) Markgraf. (ASCLEPIADACEAE) - P caesp - S Medit.-Sahar. - STATUS OF RISK: L,R
- 17) *Callitriche bruta* Petagna (CALLITRICHACEAE) - Irad - Med.-Atl. - STATUS OF RISK: L,R
- 18) *Bellium minutum* (L.) L. (ASTERACEAE) - T scap - Central Medit. - STATUS OF RISK: VU
- 19) *Filago lajoconoi* (Brullo) Greuter (ASTRACAEAE) - T scap - Endemic to Pantelleria and Linosa - STATUS OF RISK: VU
- 20) *Helichrysum errerae* Tineo var. *errerae* (ASTRACAEAE) - Ch suffr - Endemic to Pantelleria - STATUS OF RISK: L,R
- 21) *Anthemis secundiramea* Biv. var. *cosyrensis* Guss. (ASTRACAEAE) - T scap - Endemic to Pantelleria - STATUS OF RISK: L,R
- 22) *Senecio leucanthemifolius* Poit. var. *cosyrensis* Lojac. (ASTRACAEAE) - T scap - Endemic to Pantelleria - STATUS OF RISK: L,R
- 23) *Andryala rothia* Pers. subsp. *cosyrensis* (Guss.) Maire (ASTRACAEAE) - T scap - SW-Medit.-Sahar. - STATUS OF RISK: EN
- 24) *Schoenoplectus litoralis* (Schrad.) Palla subsp. *litoralis* (CYPERACEAE) - G thiz - N Afric. - STATUS OF RISK: EN
- 25) *Juncellus laevigatus* (L.) C. B. Clarke subsp. *laevigatus* (CYPERACEAE) - G thiz - Cosmop.-Trop. - STATUS OF RISK: EN
- 26) *Serapias cosyrensis* B. & H. Baumann (ORCHID.) - G bulb - End. - STATUS OF RISK: VU
- 27) *Ophrys sphegifera* Willd. (ORCHIDACEAE) - G bulb - S Med. - STATUS OF RISK: EN



Periploca laevigata subsp. angustifolia



Limonium cosyrense



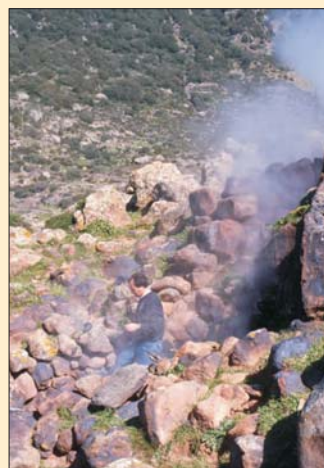
1) Specchio di Venere lake; 2) *Schoenoplectus litoralis*; 3) *Cyperus laevigatus*; 4) *Limonium secundirameum*



Limonium secundirameum



Helichrysum errerae var. errerae



The biotope of Favara Grande fumarole



Trifolium nigrescens var. dolychodon

ISSUES OF CONSERVATION - Among the most vulnerable biotopes, for their peculiarity and limited distribution, there are fumaroles (KRUMBELN, 1979) and "Specchio di Venere" Lake. In the fumarolic series it's possible to find rare species, such as *Radiola linoides*, *Kickxia cirrhosa*, *Isoetes duriei* and *Ranunculus parviflorus*. The "Specchio di Venere" represents a biotope of particular scientific, biogeographical and landscape interest (CALVO & GIANGUZZI, 2000), on the banks of which the sequence of different belts of hydro-hydrophytic vegetation can be detected. In particular, marsh aspects with *Schoenoplectus litoralis* and *Cyperus laevigatus* subsp. *laevigatus* settle in the most humid and muddy areas, while aspects with *Limonium secundirameum* are located along the outer edges, in the margins of the road that separates the lake from cultivated lands, the Mediterranean maquis and the Holm Oak woodland.

Among the most threatened plant species of Pantelleria Island there are precisely those related to the fumaroles as well as to the "Specchio di Venere" Lake, biotopes with peculiar and restricted habitats. On this basis, therefore, the reflections of the human pressure on the biotope are not to be neglected, especially pronounced during the summer, so that it's one of the most significant threat.

As a result of the abandonment of the countryside, there is a slow but inexorable collapse of the dry stone walls of lava stone typical of the rural environment, resulting in an accentuation of the erosive events related to runoff and wind. These phenomena also take place within the catchment area of the "Specchio di Venere", accentuating the natural silting of the reservoir, due to the contribution of solid material to the Lake.

To facilitate the in situ conservation of the species settled on the edge of the biotope, the following actions on the territory would therefore be appropriate:

- 1 - maintenance of the dry stone walls, stabilizing their dual function of retaining solids (upstream) and of barrier against the muddy waters (downstream);
- 2 - controlled access to the water body and to the surrounding dirt track;
- 3 - verification of the "eco-sustainability" and regulation of human activities along the banks and in the lacustrine waters.



Serapias cosyrensis



Ophrys sphegifera

REFERENCES

AGOSTINI, R. 1973 - *Interesse fitogeografico e fitosociologico del Pino marittimo (Pinus pinaster Ait.) e del Pino d'Aleppo (Pinus halepensis Mill.) a Pantelleria*. - Lav. Soc. It. Biogeogr., Forl., n. 3, 1-127.
 BARTOLO, G. & BRULLO, S. 1993 - *La classe Crithmo-Limonietea in Sicilia*. - Boll. Acc. Gioenia Sci. Nat., 26 (342): 5-47, Catania.
 BRULLO, S., DI MARTINO, A. & MARCONO, C. 1977 - *La vegetazione di Pantelleria (Studio fitosociologico)*. - Pubbl. Ist. Bot. Univ. Catania, pp. 111.
 CALVO, S. & GIANGUZZI, L. 2000 - *Aspetti naturalistici ed ecologici del Lago Specchio di Venere nell'Isola di Pantelleria*. - Atti del Conv. su "Giornate di Studio sul progressivo intrattamento dello Specchio di Venere". Pantelleria, 28-29 ottobre 1999. GEAM (Geoengineering Environment and Mining) 37 (1): 25-32.
 GIANGUZZI, L. 1999a - *Il paesaggio vegetale dell'Isola di Pantelleria*. - Collana Sicilia Foreste 8, Azienda Foreste Demaniali della Regione Siciliana, pp. 192. Palermo.
 GIANGUZZI, L. 1999b - *Vegetazione e bioclimatologia dell'Isola di Pantelleria (Canale di Sicilia)*. - Braun-Blanquetia, 22: 1-70 + 1 carta (scala 1:20.000).
 GIANGUZZI, L. 1995 - *A vegetation map (1:20.000) of Pantelleria island*. - Giorn. Bot. Ital., 129 (2): 249.
 GIANGUZZI, L. 2000a - *Il paesaggio vegetale dell'Isola di Pantelleria. Contributo alla conoscenza della flora, della vegetazione e delle serie di vegetazione*. - Collana Sicilia Foreste, Azienda Foreste Demaniali della Regione Siciliana, pp. 192. Palermo.
 GIANGUZZI, L. 2000b - *Indagini per una cartografia della vegetazione dell'Isola di Pantelleria (Canale di Sicilia)*. - Atti del Conv. su "Lo studio della vegetazione con il metodo fitosociologico per la programmazione e gestione delle aree protette". Pavia: 23 gennaio 1998. Arch. Geobot. 4(1): 109-114 (1998).
 KRUMBELN, W.E. 1979 - *Photolithotrophic and chemolithotrophic activity of bacteria and algae as related to beachrock formation and degradation (Gulf of Agaba, Sinai)*. - Geomicrobiol. J. 1: 139-203.
 RIVAS-MARTINEZ, S. 1994 - *Bases para una nueva clasificación bioclimática de la Tierra*. - Folia Bot. Madritensis, 10: 1-23.