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A contribution to the lichen flora of the island of Pantelleria, off Sicily

Abstract

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103 species and infraspecific taxa of lichens are reported as new to the island, whose presently known lichen flora consists of 155 such taxa.

Introduction

The island of Pantelleria lies in the central Mediterranean, in the strait between Sicily and Tunisia. While its phanerogamic flora and vegetation were thoroughly investigated from the floristic and phytosociological points of view, the cryptogamic flora is much less known. As far as lichens are concerned, The only significant contributions to the island's lichen flora were published by Jatta (1891, 1909-1911) and Sommier (1922). In addition, a few species were reported by Tretiach (1993), Nimis (1993) and Nimis & Poelt (1987).

Survey area

The island of Pantelleria lies in the so-called Sicilian Channel, 85 km off the nearest point of Sicily, and nearer to Tunisia from which the distance is but 70 km. Its co-ordinates are c. 36°47'N and 12°00'E. It has an oval shape, orientated NW to SE. It is 13.8 km long and 8.5 km broad, has a total surface area of 83 km^2, and a coast line of 53 km. It is of great phytogeographical interest because of its central position in the Mediterranean combined with a considerable height, peaking in the Montagna Grande at 836 m and with the additional summits of Mts Gibele (700 m), Cuddia di Mida (591 m), Cuddia Attalora (560 m), and many more that are lower than 500 m.

The island has a volcanic origin, dating back to the Tertiary period, with volcanic activity presently limited to steam emission in so-called "fumarole". The more frequent lithotypes are sodotrachytic and pantellerite rocks, basaltic rocks being less abundant. The surface is very rugged. A large part of the land is used for agriculture, and most of it is terraced.

The climate is fairly dry, as in other southern Mediterranean lands. In spite of the low precipitations, atmospheric humidity, due to maritime influence, is relatively high. The mean annual temperature is 17.6°C, with a maximum of 24.9°C in August and a minimum of 10.9°C in January. The mean annual rainfall is 480 mm, the monthly maximum being in December with 58.9 mm, and the minimum in July with 0.5 mm. According to Bagnouls & Gaussen (1957), this corresponds to a xero-thermo-mediterranean type of climate, characterized by rainfalls in autumn and winter, and by a five months' drought period in spring and summer.

Pantelleria's flora and vegetation were studied by many authors (for a complete bibliography, see Brullo & al. 1977). The natural vegetation is represented by dense, frequently burnt woodlands of *Pinus pinaster* Aiton, localized on the slopes of Montagna Grande, eventually evolving into *Erico-Quercetum ilicis,* a termophytic woodland dominated by *Quercus ilex* L. that is now restricted to upland areas. The most common communities are the *Pino-Genistetum aspalathoidis* with its thermophilous vicariants such as the *Rosmarino-Thymetum capitati,* and a very xerophilous maquis, the *Periploco-Euphorbietum dendroidis,* characterized by deciduous sclerophyll shrubs.

The high atmospheric humidity is reflected in an abundance of cryptogamic epiphytes. Fog on the top of Montagna Grande is very frequent and determines an almost subatlantic microclimate, favouring the high presence of mosses and other cryptogams of the *Lobarion* alliance.

Results

The present survey, although preliminary, confirms the presence of all lichen taxa previously reported from Pantelleria, plus 102 additional taxa. New records appear in boldface italics, the old, confirmed ones, in plain italics.

The nomenclature used follows Nimis (1993) for the most part. The sequence is alphabetical throughout. Each name is followed by a range diagnosis of the taxon, an abbreviation denoting its growth form, and an indication of the prevailing substrate.

The diagnoses of the distributional ranges conform to the model of Wirth (1980) and use the following main abbreviations: Arkt = Artic zone, Bor = Boreal zone, S'bor = southern part of boreal zone, Mieur = central European zone, S'mieur = southern part of central European zone, Smed = submediterranean zone, Med = Mediterranean zone, Atl = Atlantic province of Europe, Subatl = subatlantic province of Europe.

The abbreviations used to designate the growth forms are as follows: FO = foliose lichen, FR = fruticose lichen, CR = crustose lichen, LE = leprose lichen, SQ = squamulose lichen, PA = parasitic lichen.

Vouchers for all taxa are deposited in the herbarium of the Dipartimento di Scienze Botaniche, Università degli Studi di Palermo (PAL).

List of taxa

Acarospora rufescens (Ach.) Kremp. – Mieur-med – CR – epilithic.
– *umbilicata* Bagl. – Mieur-med – CR – epilithic – (Jatta 1891, 1909-1911).

Anaptychia ciliaris (L.) A. Massal. – S'bor-med.mo – FO – epiphytic.
– ***runcinata*** (With.) Laundon – S'bor-med, subatl – FO – epiphytic, epilithic.
Arthonia glaucomaria (Nyl.) Nyl. – Bor-med.mo – PA – parasitic.
Aspicilia calcarea (L.) Mudd – Bor-med – CR – epilithic.
– *calcarea* var. *viridescens* A. Massal. – Med – CR – epilithic – (Jatta 1891, 1909-1911).
– *cinerea* var. *trachitica* A. Massal. – Bor-med (mo) – CR – epilithic – (Jatta 1891, 1909-1911).
– ***contorta*** subsp. ***hoffmanniana*** Ekman & Fröberg – Bor-med – CR – epilithic.
– ***intermutans*** (Nyl.) Arnold – (Smed)-med – CR – epilithic.
– *radiosa* (Hoffm.) Poelt & Leuckert – S'bor-med – CR – epilithic – (Jatta 1891, 1909-1911).
Buellia punctata (Hoffm.) A. Massal. – Bor-med – CR – epilithic – (Jatta 1891, 1909-1911).
Buellia sp. – CR – epilithic.
Caloplaca aurantia (Pers.) J. Steiner – S'mieur-med – CR – epilithic.
– ***cerina*** (Ehrh. ex Hedw.) Th. Fr. – Bor-med – CR – epiphytic.
– ***citrina*** (Hoffm.) Th. Fr. – Bor-med – CR – epilithic.
– ***conglomerata*** (Bagl.) Jatta – Smed-med – CR – epilithic.
– ***crenularia*** (With.) Laundon – Mieur-med – CR – epilithic.
– ***flavovirescens*** (Wulf.) Dalla Torre & Sarnth. – Bor-med.subko – CR – epilithic.
– ***interna*** Poelt & Nimis – Med – CR – epilithic.
– ***irrubescens*** (Arnold) Zahlbr. – Mieur-med – CR – epilithic.
– *luteoalba* (Turner) Th. Fr. – Mieur-med – CR – epilithic – (Jatta 1891, 1909-1911).
– ***teicholyta*** (Ach.) J. Steiner – Mieur-med – CR – epilithic.
Candelariella aurella (Hoffm.) Zahlbr. – Arkt-med – CR – epilithic.
– ***vitellina*** (Hoffm.) Müll. Arg. – Arkt-med – CR – epilithic.
Carbonea vitellinaria (Nyl.) Hertel – Arkt-med(mo) – PA – endophytic.
Chiodecton myrticola Fée – Mieur.subatl-med – CR – epiphytic.
Cladonia cervicornis (Ach.) Flot. var. *cervicornis* – Bor(subatl)-med – FR – epigaeic, (Sommier 1922).
– ***cervicornis*** var. ***verticillata*** (Hoffm.) Flot. – Bor(subatl)-med – FR – epigaeic.
– ***ciliata*** var. ***tenuis*** (Flörke) Ahti – Bor-atl-mieur.subatl-med.atl – FR – epigaeic.
– ***convoluta*** (Lam.) Anders. – S'mieur-med – FO – epigaeic.
– *fimbriata* (L.) Fr. – Bor-smed (med) – FR – epigaeic – (Jatta 1891, 1909-1911, Sommier 1922).
– *foliacea* (Huds.) Willd. – Mieur (subatl) – Med – FO – epigaeic – (Jatta 1891, 1909-1911).
– ***furcata*** (Huds.) Schrad. – Mieur-med – FR – epigaeic.
– ***mediterranea*** P. A. Duvign. & Abbayes – Med, oz – FR – epigaeic.
– ***parasitica*** (Hoffm.) Hoffm. – S'bor-mieur.subatl – FR – epiphytic.
– ***pocillum*** (Ach.) Grognot – Arkt-med – FR – epigaeic.
– ***portentosa*** (Dufour) Coem. – Mieur-smed, subatl – FR – epigaeic.
– ***pyxidata*** (L.) Hoffm. (s.l.) – Arkt-med – FR – epigaeic.
– ***rangiformis*** Hoffm. – S'bor-med – FR – epigaeic.

– *rangiformis* var. *pungens* (Ach.)Vain. – S'bor.med – FR – epigaeic – (Jatta 1891, 1909-1911).
– ***subrangiformis*** Sandst. – Mieur-med – FR – epigaeic.
Coelocaulon aculeatum (Schreb.) Link – Bor-med.mo – FR – epigaeic.
– ***muricatum*** (Ach.) Laundon var. *muricatum* – Arkt-bor-med.alp – FR – epigaeic.
Collema nigrescens (Huds.) DC. – Bor.atl-mieur.subatl-med.mo,oz – FO – epiphytic.
– ***ryssoleum*** (Tuck.) A. Schneid. – Med(suboz) – FO – epilithic.
Dimerella pineti (Ach.) Vězda – Bor-med – CR – epiphytic.
Diploicia canescens (Dicks.) A. Massal. – Mieur.subatl-med – CR – epiphytic, epilithic.
– ***subcanescens*** (Werner) Hafellner & Poelt – Med – CR – epilithic.
Diploschistes actinostomum (Ach.) Zahlbr. – Med(suboz) – CR – epilithic.
– ***muscorum*** (Scop.) R. Sant. – Bor-med – CR – epigaeic.
– *scruposus* (Schreb.) Norman – Bor-med – CR – epilithic – (Jatta 1891, 1909-1911).
Diplotomma alboatrum (Hoffm.) Flot. – S'bor-med – CR – epilithic – (Jatta 1891, 1909-1911).
Dirina ceratoniae (Ach.) Fr. – Med – CR – epiphytic.
– ***massiliensis*** Durieu & Mont. – Mieur.atl-med – CR – epiphytic.
Evernia prunastri (L.) Ach. – Mieur-med. subko – FR – epiphytic.
Fulgensia subbracteata (Nyl.) Poelt – Smed-med – CR – epigaeic, epilithic – (Jatta 1891, 1909-1911).
Heterodermia leucomelos (L.) Poelt – Mieur.atl-med – FO – epiphytic – (Jatta 1891, 1909-1911).
Karschia talcophila (Ach. ex Flot.) Körb. – Mieur-med – SQ – parasitic (Jatta 1891, 1909-1911).
Lecanora albescens (Hoffm.) Branth & Rostr. – Bor-med – CR – epilithic.
– *argentata* (Ach.) Malme – Bor-mieur(med) – CR – epiphytic – (Jatta 1891, 1909-1911).
– ***campestris*** (Schaer.) Hue – Bor-med – CR – epilithic.
– ***chlarotera*** Nyl. – S'bor-med – CR – epiphytic.
– ***dispersa*** (Pers.) Sommerf. – Arkt-med – CR – epilithic.
– ***gangaleoides*** Nyl. – Mieur(.atl)-med – CR – epilithic.
– ***laevis*** Poelt – Med.atl-.subko – CR – epiphytic.
– ***muralis*** var. ***dubyi*** (Müll. Arg.) Poelt – Arkt-med – CR – epilithic.
– ***muralis*** (Schreb.) Rabenh. var. ***muralis*** – Arkt-med – CR – epilithic.
– ***pruinosa*** Chaub. – Smed-med – CR – epilithic.
– *rupicola* (L.) Zahlbr. subsp. *rupicola* – (Arkt) bor-med – CR – epilithic – (Jatta 1891, 1909-1911).
– ***rupicola*** subsp. ***sulphurata*** (Ach.) Leuckert & Poelt – Mieur-med – CR – epilithic.
– *sulphurea* (Hoffm.) Ach. – S'bor-mieur-med(mo) – CR – epilithic – (Jatta 1891, 1909-1911).
Lecidea psoroides Anzi – CR – epilithic – (Jatta 1891, 1909-1911).
Lecidea sp. (parasitic on *Ochrolechia parella*) – CR – epilithic.
Lecidella anomaloides (A. Massal.) Hertel & Kilias – Bor-med – CR – epilithic – (Jatta 1891, 1909-1911).
– ***elaeochroma*** (Ach.) Hazsl. (s.l.) – (Arkt-) bor-med – CR – epiphytic.

– ***elaeochromoides*** (Nyl.) Knoph & Hertel – Arkt-mieur-smed-med – CR – epilithic.
Lepraria nivalis Laundon – Bor-med – LE – epigaeic.
Leprocaulon microscopicum (Vill.) Gams ex D. Hawksw. – S'bor-med.subatl.(med) – LE – epilithic.
Leptogium cyanescens (Rabenh.) Körb. – S'bor.subatl-med (.mo), (oz) – FO – epiphytic.
– *lichenoides* (L.) Zahlbr. – Arkt-med – FO – epilithic – (Jatta 1891, 1909-1911).
Lobaria pulmonaria (L.) Hoffm. – Bor-med.mo – FO – epiphytic – (Jatta 1891, 1909-1911).
– ***pulmonaria*** var. ***meridionalis*** (Vainio) Zahlbr. – Bor-med.mo – FO – epiphytic.
– *virens* (With.) Laundon – S'bor.atl-mieur(.atl)-med.mo,oz – FO – epiphytic – (Tretiach 1993).
Nephroma laevigatum Ach. – Bor.atl-mieur.atl-med(.subatl)oz – FO – epiphytic.
Normandina pulchella (Borr.) Nyl. – Mieur-med,subatl(oz) – SQ – epiphytic – (Tretiach 1993).
Ochrolechia pallescens (L.) A. Massal. – Mieur.subatl-med – CR – epilithic – (Jatta 1891, 1909-1911).
– *parella* (L.) A. Massal. – Mieur.subatl-med – CR – epilithic – (Jatta 1891, 1909-1911).
– ***tartarea*** (L.) A. Massal. – Mieur.subatl-med – CR – epilithic.
Parmelia caperata (L.) Ach. – S'bor (.subatl)-med – FO – epiphytic – (Jatta 1891, 1909-1911).
– ***conspersa*** (Ehrh. ex Ach.) Ach. – S'bor-med – FO – epilithic.
– ***loxodes*** Nyl. – Mieur-med – FO – epilithic.
– ***pulla*** Ach. (s.l.) – S'bor-med – FO – epilithic.
– ***saxatilis*** (L.) Ach. – Arkt-mieur-med (.mo) – FO – epilithic.
– ***sulcata*** Taylor – Arkt-med – FO – epiphytic.
– ***tiliacea*** (Hoffm.) Ach. – Mieur-med – FO – epiphytic.
Parmotrema chinense (Osbeck) Hale & Ahti – Mieur.subatl-med(.mo) – FO – epiphytic – (Jatta 1891, 1909-1911).
– ***reticulatum*** (Taylor) M. Choisy – Mieur.atl-med.subatl – FO – epiphytic-Epilithic.
Peltigera polydactyla (Neck.) Hoffm. (s.l.) – Bor-smed – FO – epiphytic.
– ***rufescens*** (Weis) Humb. – Arkt-med – FO – epigaeic.
Pertusaria amara (Ach.) Nyl. – Bor-med – CR – epiphytic.
– ***amara*** var. ***flotowiana*** (Flörke) Erichsen – Bor-med – CR – epilithic.
– *amarescens* Nyl. – Mieur-med – CR – epilithic – (Jatta 1891, 1909-1911).
– *hemisphaerica* (Flörke) Erichsen – Mieur.subatl-med – CR – epilithic – (Jatta 1891, 1909-1911, sub *Ochrolechia pallescens* f. *variolosa*).
– ***pertusa*** (Weigel) Tuck. – Mieur-med – CR – epiphytic.
– ***pertusa*** var. ***rupestris*** (DC.) Dalla Torre & Sarnth. – Mieur-med – CR – epilithic.
– ***rupicola*** (Fr.) Harm. – Med – CR – epilithic.
Phaeophyscia orbicularis (Neck.) Moberg – Bor-med – FO – epiphytic.
Physcia adscendens (Fr.) H.Olivier – Bor-med – FO – epiphytic-Epilithic.
– ***semipinnata*** (Gmelin) Moberg – S'mieur-med – FO – epiphytic.
– ***tenella*** (Scop.) DC. – Bor-med – FO – epiphytic.
Porpidia macrocarpa (DC.) Hertel & Schwab – Arkt-med – CR – epilithic.
Psora decipiens (Hedw.) Hoffm. – Arkt-med – SQ – epigaeic.

Ramalina aff. *arabum* (Ach.) G. Mey. & Flot. – Med.atl – FR – epilithic – (Jatta 1891, 1909-1911).
– ***breviuscula*** Nyl. – Med (?) – FR – epilithic.
– ***canariensis*** J. Steiner – Med-subatl – FR – epiphytic.
– ***capitata*** (Ach.) Nyl. var. ***capitata*** – Arkt-med.mo – FR – epilithic.
– ***capitata*** var. ***streptilis*** Ach. – Arkt-med.mo – FR – epilithic.
– *digitellata* Nyl. – Med – FR – epilithic – (Jatta 1891, 1909-1911).
– ***farinacea*** (L.) Ach. var. ***farinacea*** – Bor-med – FR – epiphytic.
– ***farinacea*** var. ***reagens*** de Lesd. – Bor-med – FR – epiphytic.
– *fastigiata* (Pers.) Ach. – S'bor-med – FR – epiphytic – (Tretiach 1993).
– *fastigiata* var. *pumila* Moris & De Not. – Med – FR – epilithic – (Jatta 1891, 1909-1911).
– *fraxinea* (L.) Ach. – S'bor-med – FR – epiphytic – (Jatta 1891, 1909-1911).
– *maciformis* (Delile) Bory – Med – FR – epilithic – (Jatta 1891, 1909-1911).
– ***polymorpha*** (Lilj.) Ach. – Arkt-mieur.mo/alp.med.mo/alp – FR – epilithic.
– *requienii* (De Not.) Jatta – Med – FR – epilithic – (Jatta 1891, 1909-1911).
– ***siliquosa*** (Huds.) A.L. Sm. – S'bor-mieur(subatl)-med – FR – epilithic.
– *subfarinacea* (Nyl. ex Cromb.) Nyl. – Arkt-med(mo) – FR – epilithic – (Sommier 1922).
Rinodina atrocinerea (Dicks. ex Hook.) Körb. – Mieur.subatl-med – CR – epilithic – (Jatta 1891, 1909-1911).
– *atrocinerea* var. *caesiella* (Flörke) Jatta – Mieur.subatl-med – CR – epilithic – (Jatta 1891, 1909-1911).
– *confragosa* (Ach.) Körb. – Bor-med – CR – epilithic – (Jatta 1891, 1909-1911).
Roccella fuciformis (L.) DC. – Mieur.atl-med – FR – epilithic.
– ***phycopsis*** Ach. – Mieur.atl-med – FR – epiphytic-Epilithic.
– *tinctoria* DC. – Mieur.atl-med – FR – epilithic – (Jatta 1891, 1909-1911).
– *tuberculata* var. *vincentina* Vainio – Med – FR – epilithic (Nimis 1993).
Squamarina cartilaginea (With.) P. James (Jatta 1891, 1909-1911, sub *Placidiopsis cartilaginea*)- Mieur.subatl-med – SQ – epilithic.
– *gypsacea* (Sm.) Poelt – Mieur-med – SQ – epilithic – (Jatta 1891, 1909-1911).
Sticta limbata (Sm.) Ach. – Mieur-med, oz – FO – epiphytic.
Teloschistes chrysophthalmus (L.) Th. Fr. – Mieur.atl-med(ko) – FR – epiphytic.
– *flavicans* (Sw.) Norman – Mieur.atl-med(ko) – FR – epiphytic – (Jatta 1891, 1909-1911).
Tephromela atra (Huds.) Hafellner – Arkt-med – CR – epilithic – (Jatta 1891, 1909-1911).
Toninia aromatica (Sm.) A. Massal. – S'bor-med – CR – epilithic.
Tornabea scutellifera (With.) Laundon – Med-subatl – FR – epiphytic-Epilithic – (Jatta 1891, 1909-1911).
Usnea articulata (L.) Hoffm. – Mieur.atl-med, oz – FR – epiphytic-Epilithic.
– ***hirta*** (L.) Wigg. – Bor-mieur (-smed.mo) – FR – epiphytic.
– ***subfloridiana*** Stirton – Bor-mieur (-med.mo) – FR – epiphytic.
– ***wasmuthii*** Räsänen – Bor-smed (-med.mo) – FR – epiphytic.
Verrucaria nigrescens Pers. – Bor-med – CR – epilithic.

Table 1. Occurrence of the lichens found on Pantelleria in the main phytogeographical zones of Europe. Incidence = number of Pantelleria taxa occurring in a given zone (a taxon may occur in more than one zone).

Zone	incidence	%	Zone	incidence	%
Arctic	24	4.15	Submediterranean	45	7.78
Boreal	61	10.55	Mediterranean	134	23.18
Southern Boreal	65	11.24	Mediterranean mountains	14	2.42
Central European	114	19.72	Atlantic, Subatlantic district	42	7.26
Southern Central European	79	13.66	Total	578	100.00

Xanthoria calcicola Oxner – Mieur.subatl-med – FO – epilithic – (Jatta 1891, 1909-1911).
– *ectanoides* (Nyl.) Zahlbr. – Med – FO – epilithic – (Jatta 1891).
– ***parietina*** (L.) Th. Fr. – Bor-med – FO – epiphytic-Epilithic.
– ***resendei*** Poelt & Tavares – Med – FO – epilithic.

Excluded record

Cladonia rangiferina (L.) Hoffm. – (Arkt-)bor-mieur(-smed.mo) – FR – epigaeic – (Sommier 1922). – An arctic to boreal species, obviously recorded in error.

Discussion.

The list includes 155 infrageneric taxa; 52 had been recorded in previous literature, 103 are new to Pantelleria. 78 epilithic lichens (50.32 %) were collected on siliceous rocks, 41 (26.45 %) are epiphytic, 25 (16.12 %) are epigaeic, 8 (5.16 %) both epilithic and epiphytic, 2 (1.26 %) are endophytic, 1.26 % parasitic, 1 (0.63 %) both epigaeic and epilithic. 44.94 % of the species are crustose, 20.26 % foliose, 29.12 % fruticose, 3.16 % squamulose, 1.26 % leprose.

The occurrence of Pantelleria's lichen species in the main phytogeographical subdivisions of Europe is summarized in Table 1. There is an obvious predominance of species found in the Mediterranean zone (33.38 %). The high incidence of atlantic and subatlantic species (7.26 %) may reflect the fact that the rugged morphology and high air humidity of Pantelleria give rise to a great variety of microniches.

Foliose and fruticose subatlantic species are a peculiar feature of Pantelleria's flora. They are confined to particularly humid sites or to the mist zone, especially the top of Montagna Grande. Among the most frequent are *Cladonia portentosa, Collema nigrescens, Dimerella pineti, Diploicia canescens, Lecanora gangaleoides, Nephroma laevigatum, Normandina pulchella, Parmotrema reticulatum, Sticta limbata, Teloschistes flavicans,* and *Usnea articulata.*

Several species are new for Sicily as a whole, such as *Caloplaca interna, Cladonia mediterranea, C. parasitica, C. portentosa, C. subrangiformis, Coelocaulon muricatum, Dimerella pineti, Xanthoria resendei.* Most other taxa are new to the island, among which the most noteworthy are *Cladonia ciliata* var. *tenuis, Collema ryssoleum, Evernia prunastri, Lecanora gangaleoides, Leptogium cyanescens, Nephroma laevigatum, Sticta limbata, Usnea articulata,* and *U. wasmuthii. Chiodecton myrticola* and *Teloschistes chrysophthalmus* are also known from the island of Marettimo.

Summing up, the lichen flora of Pantelleria, even if but incompletely known so far, appears to be both rich and interesting from a phytogeographical point of view.

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