A study on rare and noteworthy lichenized ascomycetes from Sardinia (Italy)

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Abstract: The study reports about remarkable lichen species from the Mediterranean region, collected from various substrates during a one-week trip through Sardinia in May 2018. One of them was recorded for the first time in Sardinia and thirty-two lichenized ascomycetes could be classified as either extremely rare, very rare or rare. The aim of this publication is to contribute to the lichen flora by means of a photographic documentation including short comments on rare species and additional information about the collecting sites. A species list of all recorded taxa is provided.

Zusammenfassung: Die Studie berichtet über bemerkenswerte Flechtenarten aus dem Mittelmeerraum, gesammelt auf verschiedenen Substraten während einer einwöchigen Fahrt durch Sardinien im Mai 2018. Eine Art wurde erstmals in Sardinien belegt und 32 lichenisierte Ascomyceten konnten als extrem selten bis selten eingeordnet werden. Das Ziel dieser Publikation ist ein Beitrag zur Flechtenflora mithilfe einer fotografischen Dokumentation inklusive kurzer Kommentare über seltene Arten und zusätzliche Informationen über den Fundort. Eine Liste aller belegten Taxa wird zur Verfügung gestellt.

Key words: Mediterranean region, rare records, taxonomy, photographic documentation.

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INTRODUCTION

The second largest island of the Mediterranean region coveres an area of 24,090 km^2 and is characterized by a high diversity of habitats and many different geological formations.

The lichen flora of Sardinia was investigated and summarized in a comprehensive, annotated list by NIMIS & POELT (1987) who chose the island because of its great phytogeographical diversity. Substrates, geology, climate and vegetation was treated in detail in their study. The two authors mentioned ninety taxa from Sardinia, cited as first lichens records in a paper by MORIS (1829) which represent the first lichen records in this area. Another important contribution to the lichen flora of the island was provided by BAGLIETTO (1879) who analyzed specimens from collections which had been sent to him. The investigations resulted in a total number of 397 species (NIMIS & POELT 1987).

Modern literature on these topics refers to ZEDDA & SIPMAN (2001) who discussed a special group of lichens on *Juniperus oxycedrus*. NIMIS & MARTELLOS (2002) provided a key for the identification of terricolous lichens in Italy. RIZZI et al. (2011) presented a checklist of epilithic and epiphytic lichen species from seventy localities in western Sardinia. The „Lichens of Italy", the second annotated catalogue by NIMIS (2016), followed by ITALIC 5.0 (the information system on Italian lichens 2017), completed the latest results on lichen research in Italy, including all records from Sardinia.

MATERIAL AND METHODS

Morphological characters were examined on dry material under a Euromex Mic 1642 ZHT dissecting microscope. A Rei-

Fig. 1: Some collecting sites. A — Calasetta, littoral; B — tuff rocks in the littoral zone near Calasetta; C — Castelsardo, La Bagnu, granite rock; D — Limbara Forest; E — Passo di Limbara: epiphytic lichen society on *Quercus suber*; F — Capo Testa, coastal granite rocks; G — Tortuli, open vegetation.

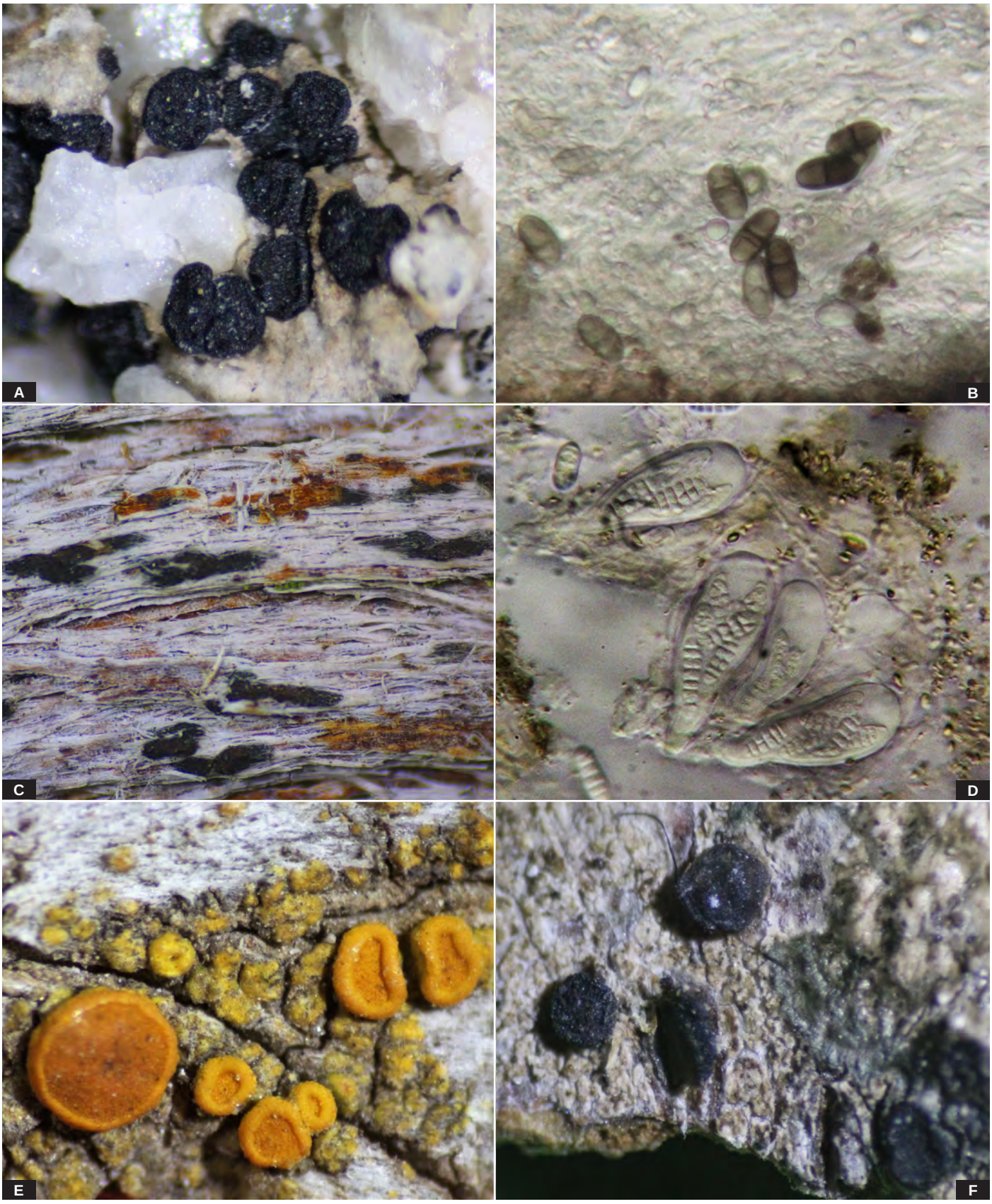

Fig. 2: Ascomata and ascospores of species. A — *Amandinea pelidna*, apo. 0.5 mm in diameter; B — *Amandinea pelidna*, ascosp. 12-15 x 7-8 µm; C — *Arthothelium crozalsianum*, lirellae 0.8-1.2 mm; D — *Arthothelium crozalsianum*, ascosp. 24-30 x 8-10 µm; E — *Athallia cerinelloides*, apo. 0.3-1 mm; F — *Bacidia subincompta*, apo. 0.6-0.8 mm.

chert Neovar compound microscope was used to investigate the sections for anatomical features and analysis of ascospores. The chemistry of lichen substances was detected by spot reactions with KOH, C, KC, Pd and Lugol's solution.

All photographs were taken by the author using a Canon EOS 600D-camera connected to an LM-Scope camera adapter or a Sony Cyber-shot camera. Not all specimens were included photographically in this manuscript due to the low quality of several specimens. Names of taxa are mostly listed in alphabetic order, but the abbreviations of figures sometimes appear randomly.

The specimens were recorded from 37 locations, mainly in the north of Sardinia. No specimens were collected in nature reserves, except in the Parco Regionale del Limbara, where the administration granted a permit. Unfortunately several specimens remain unidentified at present, but further research on them will be done. Specimens will be deposited in the private herbarium of the author (Ne) and some duplicates in LI. Coordinates follow Google Earth Navigation System.

ANNOTATED COMPILATION OF THIRTY-THREE RARE OR REMARKABLE LICHEN SPECIES

The evaluation of the rarity as rather rare, rare or extremely rare to the whole island of Sardinia correlates with the distribution maps in the National Checklist of Italy (ITALIC) by NIMIS & MARTELLOS (2017) and follows the assessments in this study. Some species may be common in certain regions of Sardinia.

Abbreviation: apo. = apothecia, ascosp. = ascospores, Fig. = figure, Ne = Neuwirth (with a hb. number in the private herbarium of the author); collecting sites: please see species list.

Amandinea pelidna (ACH.) FRYDAY & L. ARCADIA (Fig. 2 A, B)

Prov. Olbia-Tempio, 0.5 km W of Palau, SS 133, 20 m, on granites; 22.05.2018; 41°10‘26.1“ N/ 9°24‘12.8“ E; Ne 11612, 11618, 11620. Capo Testa, at the edge of the car park near the regional nature reserve; 50 m, on granite; 22.05.2018; 41°14‘26“ N/ 9°8‘36“ E; Ne 11652; Capo Testa, on the coast 700 m W of the lighthouse, 48 m, 41°14‘26.9“ N/ 9°8‘36.3“ E; Ne 11654; 1.8 km SE of Portobello Mare, on granites on a slope along the narrow road, 43 m; 22.05.2018; Ne 12620.

The genus *Amandinea* was separated from *Buellia* because of the filiform pycnospores which are ellipsoid or bacilliform in *Buellia*. The separation based on this character is controversial (WIRTH et al. 2013).

Classified as very rare, but distributed throughout the island.

Arthothelium crozalsianum DE LESD. (Fig. 2 C, D)

Prov. Sassari, 2 km W of Castelsardo; gardens of Hotel Bajaloglia Resort; 120 m, on the bark of *Phillyrea angustifolia*, 20.05.2018; 40°54‘19.57“ N/ 8°41‘58“ E. Ne 12558. Prov. Nuoro, Nuraghe 1.7 km S of Tortuli, on the bark *Euphorbia* sp., 25 m, 17.05.2018; 39°54‘44.1“ N/ 9°40‘04.1“ E. Ne 12472.

GRUBE & GIRALT (1996) synonymized the well-delimited species with *A. adriaticum* and not with *A. sardoum* as was done by REDINGER (1937). *A. crozalsianum* and *A. sardoum* have often been confused, but the species are easy to separate. Only one selected specimen from Sardinia was mentioned by GRUBE & GIRALT (1996), recorded by NIMIS (Sassari, St. Teresa di Gallura, Rena Maiore, 4 m, on *Pistacia lentiscus*; TSB).

All features of the present specimen correlate with the description in the paper above. Symbiotic algae could not be found, the non-lichenized thalli are chracteristic for this rare species.

Athallia cerinelloides (ERICHSEN) ARUP, FRÖDEN, & SØCHTING (Fig. 2 E)

Prov. Olbia-Tempio, Capo Testa, along the road on decorticated roots of *Juniperus* sp.; 25 m, 22.05.2018; 41°14‘32“ N/ 9°08‘54“ E. Ne 11660, 12498.

Very rare.

Bacidia subincompta (NYL.) ARNOLD Fig. 2 F

Prov. Sassari, Reg. Gallura; road to Tempio Pausania, 252 m, on the bark of *Quercus ilex*; 252 m, 22.05.2018; 40°53’22.6” N/ 9°03’37” E. Ne 11552.

Rare to very rare.

Buellia badia (FR.) A. MASSAL. (Fig. 3 A)

Prov. Sassari, Reg. Gallura, along the road from Arzachena to Tempio Pausanio, on siliceous rocks in the embankment; 190 m, 22.05.2018; 41°01’24” N/ 9°21’51” E. Ne 11573.

The species is characterized as holarctic, subtropical to boreal-montane lichen. The distribution in Sardinia varies from extremely rare in the east to very rare in the central part and rare in some sites on the western coast (NIMIS & MARTELLOS 2017).

Buellia leptoclinoides (NYL.) STEINER (Fig. 3 B, C)

Prov. Iglesias-Carbonia, Calasetta; steeply inclined coast at the edge of the town; on eroded tuff rocks; 19.05.2018; 39°06’46.5” N/ 8°22’01.9” E. Ne 12497, 12512, 12513, 12518.

Abundant at the collecting site in the supralitoral zone between 3 to 5 m, but classified as very rare except for some habitats in other coastal regions of the island.

Buellia subdisciformis (LEIGHT.) VAIN. (Fig. 3 D)

Prov. Olbia-Tempio, Capo Testa, 2 km W of car park, on granite, 25 m, 22.05.2018; N 41°14’32”/ E 9°08’54”. Ne 11632, 11633, 12655. North coast, SS 133, 0.5 km E v. Palau; on granite, 20 m; 22.05.2018. 41°10’26.1” N/ 9°24’12.8” E. Ne 11610.

The species, showing the typical chemical reaction K+ yellow turning red (Norstictic acid) was only found on rocks in coastal habitats. Very rare in Sardinia.

Caloplaca herbidella (HUE) MAGN.

Prov. Olbia-Tempio, Capo Testa, at the edge of the Nature Reserve; on hard wood of exposed roots of *Juniperus* sp.; 48 m, 22.05.2018; 41°14‘26.9“ N/ 9°08‘36.3“ E. Ne 11659.

Together with *Lecanora anopta*. Extremely rare to rare.

Diploschistes caesioplumbeus (NYL.) VAIN.

Prov. Olbia-Tempio, northern coast, near Palau, SS 133, on siliceous rocks, 20 m; 41°10’26” N/ 9°24’12” E. Ne 12660.

The comparison with two specimens LI 014128 and LI 851708 from Sardinia (Monte di Sette Fratelli, 600 m) confirmed the identification of the collected species. Rarely recorded on the island.

Flavoplaca cf. ***marina*** (WEDD.) ARUP, FRÖDEN & SØCHTING (Fig. 3 E)

Prov. Carbonia-Iglesias, Isola di Sant' Antioco, Calasetta, eastern edge of the town, tuff rocks in the litoral zone, 3-5 m. 39°06'46.5" N/ 8°22'01.9" E. 19 May 2018. Ne 12526.

All features refer to this species although the position in lichen taxonomy is problmatic. NIMIS & MARTELLOS (2017) cited the following statement in their National Checklist of Italy: „According to VONDRACK (in litt.), however, *F. marina* could be absent from Italy. The lichen with *F. marina* appearance from siliceous shores in Sardinia and Sicily is in fact a member of *Haloplaca*." VONDRACK et al. (2009) mentioned *F. marina* and *F. maritima* in their study on the taxonomy of the *Caloplaca citrina* group in the Black Sea region.

Unfortunately I have not had the chance to check molecular data, so I could not exactly clarify the status. My option was investigating the lichen species conventially by comparing my specimens with other someones in different herbaria (GZU, LI, hb. Neuwirth). The anatomical and morphological characteristics accord with the descriptions in the keys that I studied (POELT 1974, DOBSON 2005, SMITH et al. 2009, WIRTH 2013).

A relatively rare species only occurring on coastal siliceous rocks in Sardinia.

Flavoplaca cf. ***maritima*** (B. DE LESD.) ARUP, FRÖDEN & SØCHTING (Fig. 3 E, 5 F)

Prov. Carbonia-Iglesias, Isola di Sant' Antioco, Calasetta, eastern edge of the town, tuff rocks in the litoral zone, 3-5 m. 39°06'46.5" N/ 8°22'01.9" E. 19 May 2018. Ne 12496, 12527.

The species accompanies with the lichen above and differs clearly by its convex lobes and the yellow colour. It is not listed in National Checklist, but NIMIS & MARTELLOS (2017) are of the opinion that *Flavoplaca ora* could prove to be a synonym of *Flavoplaca maritima*.

Details of identification see above.

Lecania koerberiana J. LAHM (Fig. 3 F)

Prov. Olbia-Tempio, Passo di Limbara, S of Tempio Pausanio, 680 m, hidden on bark of small shrubs; 21.05.2018; 40°50'34" N/ 9°06'12.2" E. Ne 12597.

The identification of this taxon is confusing, because the colour of the apothecial discs changes from pale brown-beige in younger specimens to dark-brown and almost black in older apothecia, leaving a pale margin. The hyaline ascospores sometimes appear non-septate or 3-septate in mature asci. The very small acocarpes can be easily overlooked. Rather rare to rare in Sardinia, but lacking in many regions of Italy.

Lecanora anopta NYL. (Fig. 3G)

Prov. Olbia-Tempio , at the edge of the Nature Reserve Capo Testa; on hard wood of exposed roots of *Juniperus* sp.; 48 m, 22.05.2018; 41°14'26.9" N/ 9°08'36.3" E. Ne 11659.

The species is hardly visible due to the very small ascocarpes. The investigated specimen occurs on hard wood of *Juniperus* sp., together with *Caloplaca herbidella*.

Extremely rare in Sardinia and only found in the alpine regions of Italy.

Lecanora cenisia ACH.

Prov. Olbia-Tempio, Portobello Mare, near Nuraghe Tuttusoni, on the embankment of country road, siliceous soil and granites; 43 m, 22.05.2018; 41°06'50.5" N/ 09°02'28.6" E. Ne 12604, 12621.

A well-known species on siliceous rocks and widespread in alpine regions of Italy, but rare in Sardinia, where it grows mainly in the central part.

Lepraria caesioalba (B. de LESD.) J.R. LAUNDON

Prov. Olbia-Tempio, Passo di Limbara, on the road from Tempio Pausanio to Oschiri, on well-lit and rain-exposed granites along the road, 540 m, 22.05.2018; 40°52'16.9" N/ 9°97'49.7" E. Ne 11598.

Although the identification of the genus is problematic, this specimen shows the typical characters. The P+ orange and UV- reaction, the rosette-forming thallus and the humid habitat confirm the species. First reported from Sardinia by ZEDDA (2000). Distributed throughout the island, but nevertheless rare.

Ocellomma picconianum (BAGL.) ERTZ & TEHLER (Fig. 4 A)

Prov. Ogliastra, East-coast, south of Tortuli, 450 m SE of Nuraghe, in the surroundings of a little church, 26 m; in the shrubland found on *Pistacia lenticulus*; 17.05.2018; 39°54'29.4" N/ 9°40'17" E. Ne 12481.

The species (Syn. *Schismatomma picconianum*) was characterized in the distribution-map of Italic (NIMIS 2017) as rare to rather rare in the central and western part of the island, but so far has not been reported from the eastern coast. The inconspicuous species grows in association with *Parmeliopsis ambigua* in a densly coastal vegetation of the maquis shrubland.

Ochrolechia androgyna (HOFFM.) ARNOLD

Prov. Olbia-Tempio, Pittulungo, near the Hotel Stefania; on granites, 22.05.2018; 40°56'29.2" N/ 9°33'53.7" E. Ne 11528.

The distribution of this well-known species in Sardinia is stated as rare to rather rare.

Ochrolechia tartarea (L.) A. MASSAL.

Prov. Olbia-Tempio, surrounding of Capo Testa; on granite rocks, 300 m S of the lighthouse; 48 m 22.05.2018; 41°14'26.9" N/ 9°8'36.3" E. Ne 11656.

The chemical reactions in the spot tests identify the species. Rare to extremely rare.

Parmotrema reticulatum (TAYLOR) M. CHOISY

Prov. Olbia-Tempio, 1.5 km N of Tempio Pausanio, Nuraghe Majori; on *Quercus ilex* along the path to the archeological excavations. 487 m, 21.05.2018; 40°55'08.8" N/ 9°05'50" E. Ne 11624.

The distribution map indicates the species as rather rare in the western half and extremely rare in the eastern part of the island.

Pertusaria flavicans (HOFFM.) ARNOLD (Fig. 4 B)

Prov. Olbia-Tempio, Capo Testa, on granite rocks around the car park, 25 m, 22.05.2018; 41°14'32" N/ 9°8'54" N; Ne 11633, 11646.

Widespread rather rare albeit common in few areas of central Sardinia.

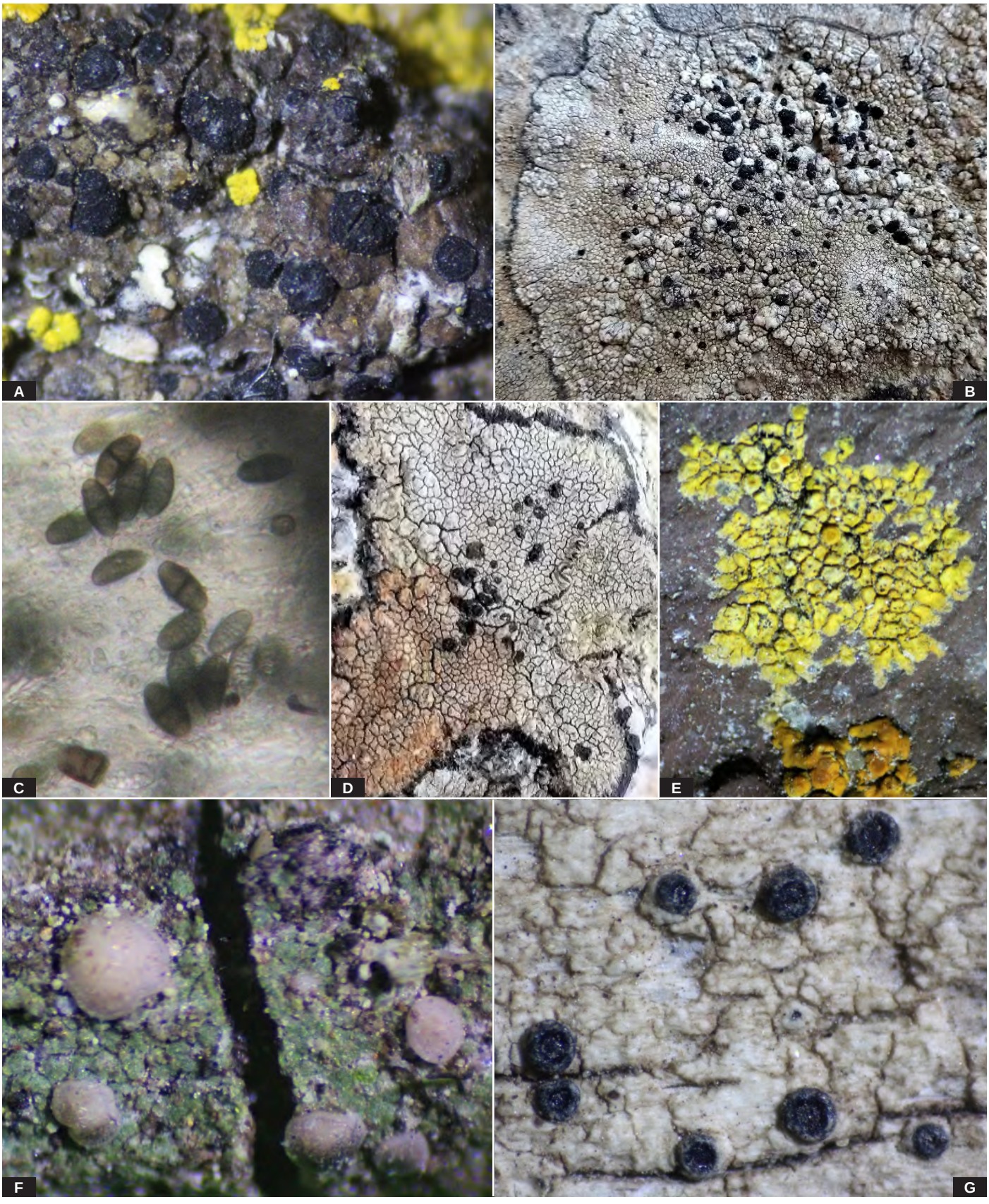

Fig. 3: Habitus and ascospores of some taxa. A — *Buellia badia*, apo. 0.2-0.5 mm; B — *Buellia leptoclinoides*, apo. 0.3-1.2 mm; C — *Buellia leptoclinoides*, ascosp. 13-15 x 5-6 µm; D — *Buellia subdisciformis*, apo. 0.7-1.3 mm; E — *Flavoplaca marina* (orange) & *Flavoplaca maritima* (yellow), thalli 1-3 cm; F — *Lecania koerberiana*, apo. 0.2-0.5 mm in diameter; G — *Lecanora anopta*, apo. 0.2-0.5 mm.

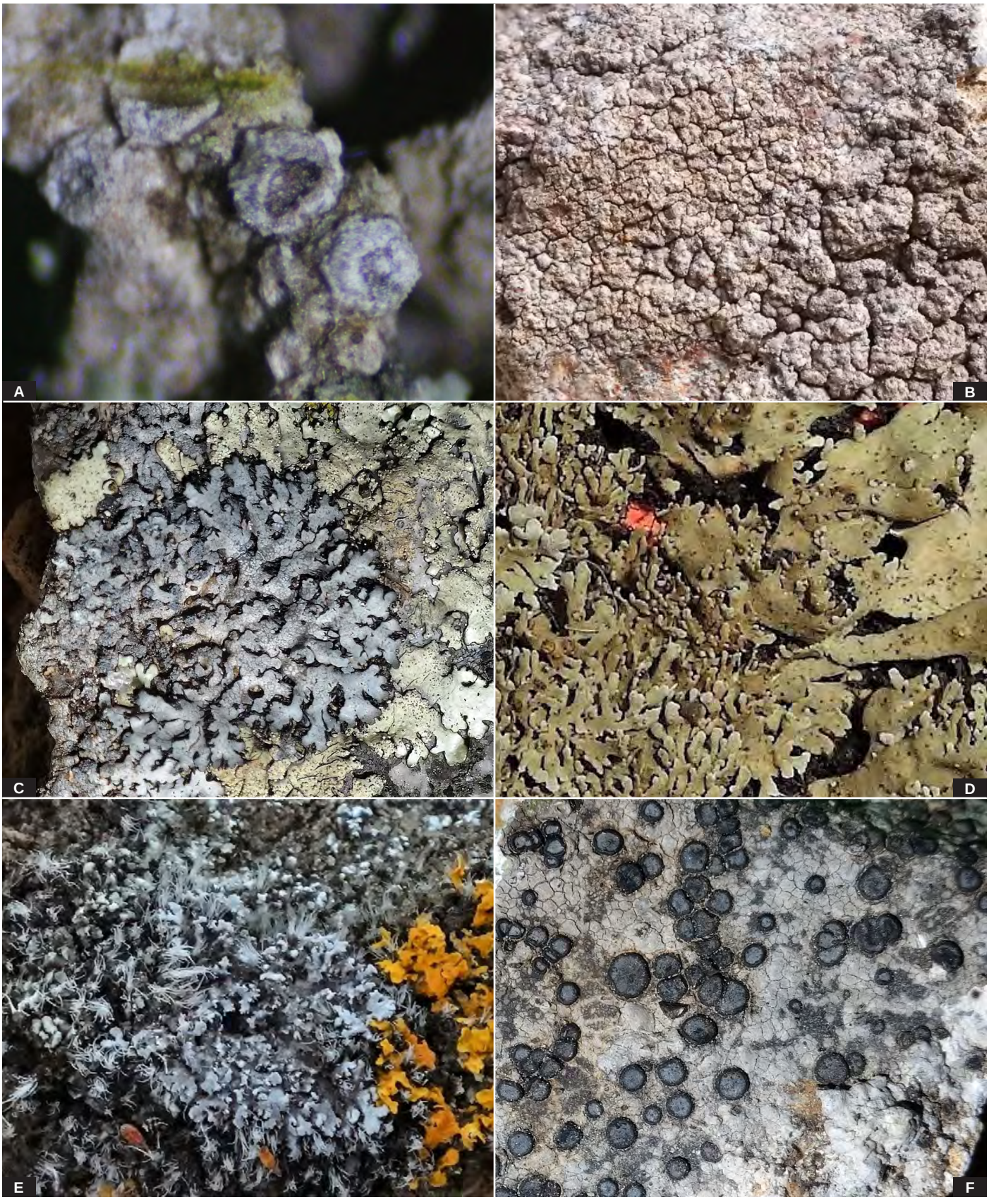

Fig. 4: Habitus and apothecia. A — *Ocellomma picconianum*, apo. 0.2-0.3 mm; B — *Pertusaria flavicans*, total width of the picture 15 mm; C — *Physcia caesia*, thallus 13 mm in diameter; D — *Physconia venusta*, thallus with adventive lobules, 10 mm; E — *Physconia petraea*, thallus 16 mm; F — *Porpidia rugosa*, apo. 0.3-2 mm.

Fig. 5: Saxicolous species. A — *Roccella phycopsis*, thallus branches up to 4 cm; B — *Roccella phycopsis*, soralia 0.5-1.2 mm, apo. 0.4-0.8 mm; C — *Rufoplaca subpallida*, apo. 0.3-0.7 mm on *Circinaria caesiocinerea*; D — *Verruculopsis lecideoides*, perith. 0.2-0.5 mm; E — *Variospora flavescens*, thalli 1-4 cm in diameter; F — *Flavoplaca* cf. *maritima*, thallus 2.5 cm.

Physcia caesia (Hoffm.) Hampe ex Fürnr. (Fig. 4 C)

Prov. Ogliastra, Eastern coast, 1.7 km S of Tortoli; near the Nuraghe on a mural crown of a granite wall bordering a narrow road; 15 m above sealevel, 17.05.2018; 39°54'42.2'' N/ 9°40'08.7'' E. Ne 12467. Prov. Olbia-Tempio, northern coast, along the road to Santa Teresa; on the embankment on a piece of granite; 22.05.2018. 41°06'00'' N/ 9°02'25.9'' E. Ne 12632, 12633.

Although widespread on the island, rather rarely recorded.

Physconia petraea (Poelt) Vězda & Poelt (Fig. 4 E)

Prov. Sassari, 2 km W of Castelsardo, driveway to Hotel Bajaloglia Resort; on embankment consisting of siliceous material and rocks; 95 m, 20.05.2018; 40°54'27.6'' N/ 8°41'45'' E. Ne 12548.

Occuring on granites in association with *Xanthoria parietina*. Extremely rare throughout the whole island.

Physconia venusta (Ach.) Poelt (Fig. 4 D)

Prov. Olbia-Tempio, Passo di Limbara, S of Tempio Pausanio, 668 m, on the bark of *Quercus ilex*; 21.05.2018; 40°50'29.6'' N/ 9°06'11.2'' E. Ne 11669.

Abundant in the central part, but as a whole rather rare.

Porpidia rugosa (Taylor) Coppins & Fryday (Fig. 4 F)

Prov. Olbia-Tempio, road from Passo di Limbara to Oschiri, on granite rocks along the road, 540 m, 22.05.18; N 40°52'16''/ E 9°07'49.7''. Ne 11599.

The difficult identification is based on two descriptions which correlate exactly with the investigated specimen from the Limbara region. Fryday (2005) gave a comprehensive survey with regard to anatomical and ecological features. He mentioned two morphotypes, one of them having a thin thallus with soralia developing in lines along the cracks in the thallus, occuring on siliceous rocks. The exciples of the apothecia have dark pigments, but a pale medulla. The description in Smith et al. (2009) reports a tartareous, whitish to glaucous grey, continuous to areolate-cracked, hummocky, verrucose thallus. These characteristics, the absence of chemical reactions in the spot-tests, the dimensions of ascospores and the ecological parameters led to *Porpidia rugosa*. Above all, the similar *P. tuberculosa* has a thicker, more verrucose thallus and more irregular apothecia (Smith et al. 2009).

The result, including all features found in the two publications, as well the comparison with the collected specimen, distinguishes the species as *Porpidia rugosa*. New to Sardinia and very rare in Italy.

Ramalina breviuscula (Nyl.) Nyl.

Prov. Carbonia-Iglesias, Isola di Sant' Antioco, Calasetta, eastern edge of the town, tuff rocks in the supralittoral zone, 3-5 m. 39°06'46.5'' N/ 8°22'01.9'' E. 19 May 2018. Ne 12515. Prov. Olbia-Tempio, at the edge of the Nature reserve Capo Testa, 34 m, 22.05.2018; 41°14'33'' N/ 9°08'47.7'' E; Ne 11640.

The species is evaluated as common throughout Sardinia by Nimis & Poelt (1987), but the distribution map on the ITALIC web site (Nimis & Martellos 2017) shows that it is in fact locally common on a few coastal rocks, but otherwise rarely distributed on the island.

Ramalina canariensis J. Steiner

Prov. Olbia-Tempio, Capo Testa, maquis vegetation around the car park, 25 m, 22.05.2018; 41°14'32'' N/ 9°8'54'' N; Ne 11650, 11651. Arzachena-St. Pantaleon; on branches of *Olea europaea*, 31 m; 22.05.2018; 41°02'06'' N/ 9°26'03'' E; Ne 11538.

Rather common in the western part, but extremely rare in the eastern maquis vegetation.

Rhizocarpon geographicum (L.) DC. s.l.

Prov. Olbia-Tempio, Golfo Aranci, E of Olbia, Pittulungo, on granite rock, 5 m; 22.05.2018; 40°56'29.2'' N/ 9°33'53.7'' E; Ne 11527.

A well-known species on siliceous rocks especially in alpine regions. The specimen, whose features indicate *R. geographicum* s.l., was collected from a solitary granite block near a hotel in the coastal area. Surprisingly, although siliceous rocks dominate the north-eastern region, parts of central Sardinia and the south-eastern corner, *R. geographicum* is specified to be rather rare to rare in the distribution map.

Rinodina dubyana (Hepp.) J. Steiner

Prov. Ogliastra, along the road to Arbatax, SS 125; 15 km NW, 1.7 km NW from Baunei; 535 m, 16.05.2018; 40°02'33'' N/ 9°39'03.1'' E. Ne 12658.

Rather rare in the eastern part, but very rare in the western half of the island, corresponding to the occurrence of limestone formations which are the smallest geological habitat in Sardinia and appear especially along the Golfo di Orosei and the mountains of its back country. The species is associated with *Bagliettoa marmorea* and *Pyrenodesma albopruinosa*.

Roccella phycopsis Ach. (Fig. 5 A, B)

Prov. Olbia-Tempio, Capo Testa, around the car park, on granite, 34 m, 22.05.2018; 41°14'33''N/ 9°08'47.7'' E. Ne 11639. Prov. Iglesias-Carbonia, Calasetta; steeply inclined coast at the edge of the town; on eroded tuff rocks; 19.05.2018; 39°06'46.5'' N/ 8°22'01.9'' E. Ne 12517, 12525. Prov. Olbia-Tempio, 2 km W of Castelsardo; on the driveway to Hotel Bajaloglia Resort, on granites; 120 m, 20.05.2018; 40°54'19.5'' N/ 8°41'58'' E. Ne 12560.

Restricted to siliceous rocks in coastal areas and locally abundant. The investigated specimens are well developed and show many ascocarpes.

Rufoplaca subpallida (H. Magn.) Arup, Fröden & Søchting (Fig. 5 C)

Prov. Iglesias-Carbonia, Isola di S. Antioco, Calasetta; steeply inclined coast at the edge of the town; on eroded tuff rocks; 19.05.2018; 39°06'46.5'' N/ 8°22'01.9'' E. Ne 12504.

The specimen was found on coastal tuff rocks in the far south of Sardinia near Calasetta parasiting on *Circinaria caesiocinerea*. It is extremely rare not only in Sardinia, but also in Italy. The distribution map indicates the occurrence mainly in norther regions.

Usnea ceratina Ach.

Prov. Olbia-Tempio, S of Tempio Pausanio, Passo di Limbara, on *Quercus ilex*, 668 m; 21.05.2018. 40°50'29.6'' N/ 9°06'11.2'' E. Ne 11674.

The medullary chemistry is distinguishing and unique. The spot-tests K-, Pd-, C+ yellow, CK+ orange (Randlane et al.

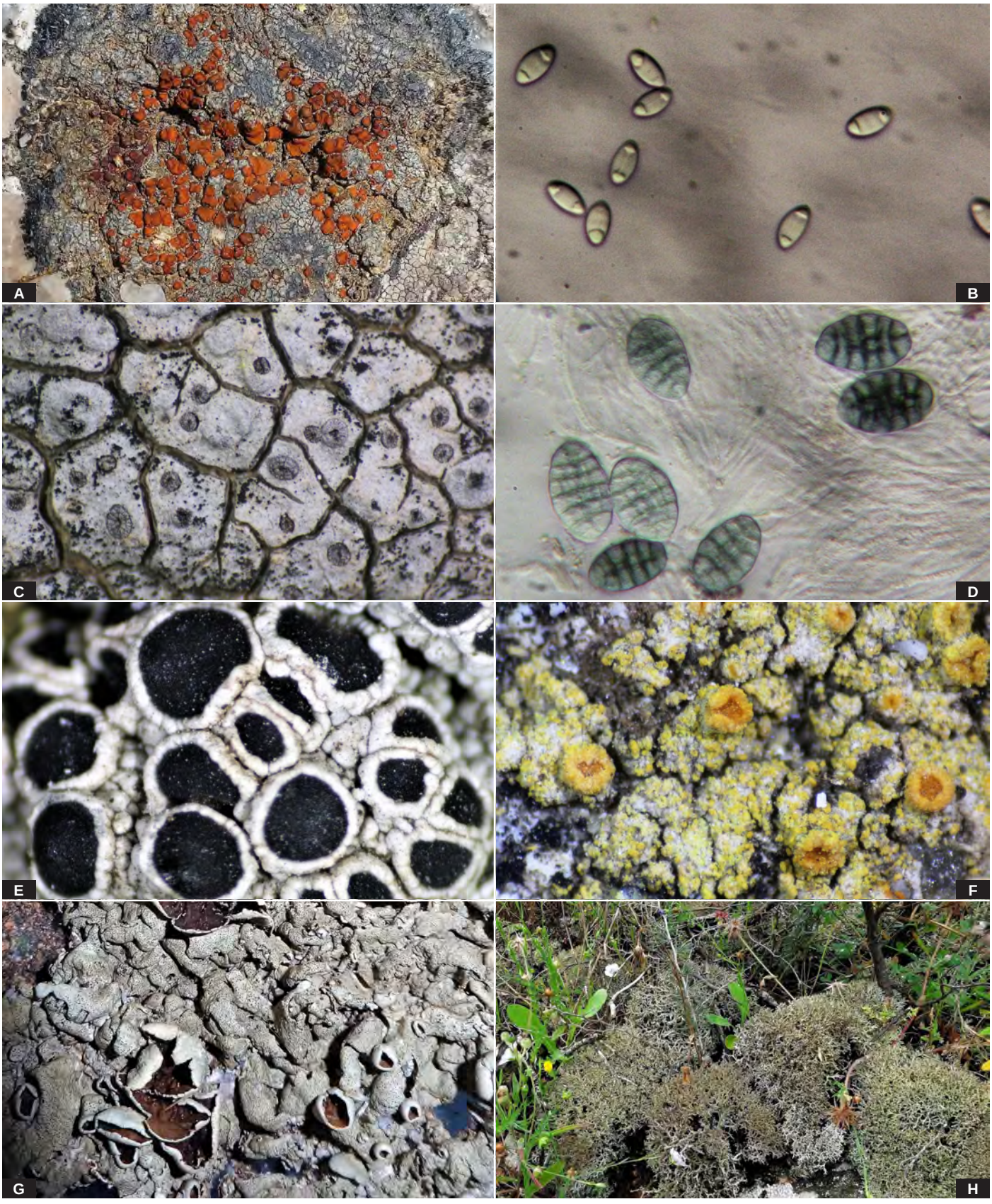

Fig. 6: Some examples of rather common taxa. A — *Blastenia crenularia*, thallus 2 cm in diameter; B — *B. crenularia,* bipol. ascosp. 12-15 x 5-6 µm; C — *Diploschistes actinostoma*, apo. 0.2-0.5 mm; D — *D. actinostoma*, muriform ascosp. 18-27 x 10-12 µm; E — *Lecanora gangaleoides*, apo. 0.6-1.5 mm; F — *Scythoria phlogina*, thallus 15 mm in diameter; G — *Xanthoparmelia protomatrae*, apo. up to 12 mm. H — *Cladonia rangiformis*, pod. up to 4 cm.

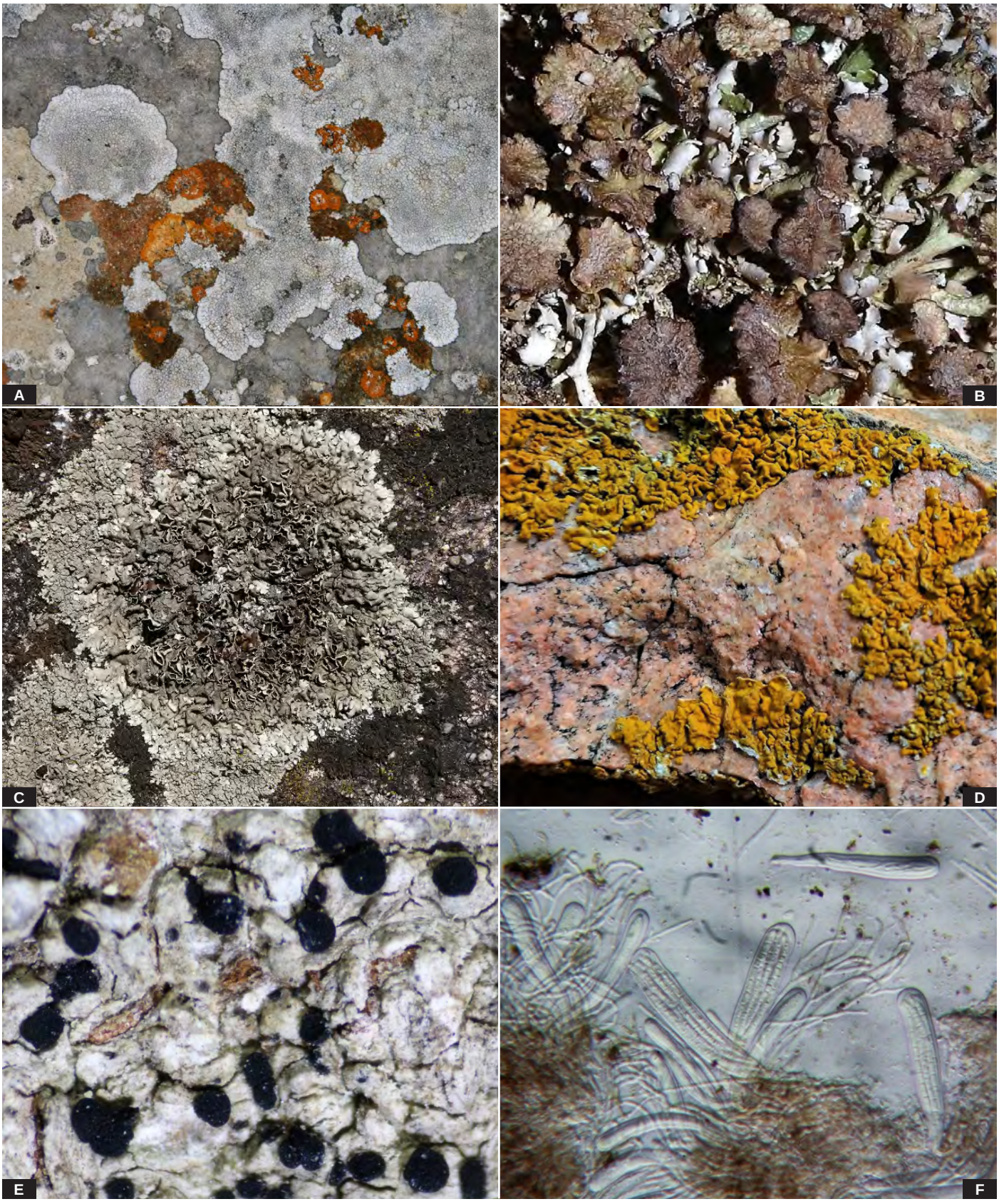

Fig. 7: Very common and easy visible species growing on calcareous or siliceous rocks. A — *Circinaria calcarea* (thalli 12 cm) and *Variospora flavescens* (thalli 2-3 cm) on eroded wall of limestones; B — *Cladonia verticillata*, pod. 3-5 mm in diameter; C — *Xanthoparmelia conspersa*, thallus 16 cm in diameter; D — *Xanthoria parietina* on red porphyry rocks (total width of the photo 10 cm); E — *Bacidia laurocerasi*, apo. 0.3 -0.8 mm; F — *Bacidia laurocerasi*, ascosp. 45-70 x 3-4 µm.

Fig. 8: „Roccia dell' Elephante". Trachyte rock covered by *Xanthoria* sp. near Castelsardo.

2009), confirm the presence of diffractic acid as the main substance. The pink medulla and the soralia-bearing tubercles are conspicuous.

In spite of the apparent distribution over the whole island, the taxon appears to be rare to extremely rare on the bark of trees.

Xanthoparmelia angustifolia (GYELN.) HALE

Prov. Olbia-Tempio, near Portobello Mare, embankment of a country road, siliceous rocks and soil, 43 m; 22.05.2018; 41°06'50.5'' N/ 9°02'28.6'' E. Ne 12615. Near Palau, SS 133, 20 m, on siliceous rocks; 41°10'26'' N/ 9°24'12'' E. Ne 12661.

An extremely rare member of the genus *Xanthoparmelia* in Sardinia.

Xanthoparmelia verruculifera (NYL.) O. BLANCO et al.

Prov. Olbia-Tempio, road from Arzachena to Tempio Pausanio, SS 427, 122 m, 22.05.2018; 41°03'09.1'' N/ 9°20'17.4'' E. Ne 11558.

The dark brown thallus, the C-, K-, KC- reaction of the medulla and the coarse isidia in clusters characertize the species.

COLLECTING SITES (localities)

The route started in Olbia, led around Sardinia and ended in this town again. The abbreviations of the localities, listed in alphabetic order, correspond to the dates at the collecting sites and the route of the itinerary.

A 1: Prov. Ogliastra, eastern coast, 15 km NW of Arbatax, 1.7 km NW of Baunei (Tortuli), along SS 125. On limestones, 535 m; 40°02'33.8'' N/ 9°39'03.1'' E; 16 May 2018.

B 1: Prov. Ogliastra, east coast, 1.7 km south of Tortuli, near Complesso Archeologico di S'Ortali e su Monti. On top of a dry gra-nite stone wall; 15 m, 39°54'42.2'' N/ 9°40'08.7'' E; 17 May 2018.

B 2: Prov. Ogliastra, east coast, 1.7 km south of Tortuli, near Complesso Archeologico di S'Ortali e su Monti. On trees around the Nuraghe area; 25 m, 39°54'44.1'' N/ 9°40'04.1'' E; 17 May 2018.

B 3: Prov. Ogliastra, east coast, south of Tortuli, 450 m SE of Nuraghe; along the road to a little church, on an embankment covered by siliceous rocks and soil. 24 m, 39°54'31.2'' N/ 9°40'12.5'' E; 17 May 2018.

B 4: Prov. Ogliastra, east coast, south of Tortuli, 450 m SE of Nuraghe, surrounding maquis shrubland around a little church; 26 m, *Pistacia lenticulus*; 17 May 2018; 39°54‘29.4“ N/ 9°40‘17“ E; on *Celtis australis*, 25 m; 39°54‘30.5“ N/ 9°40‘19.1“ E. On quartz porphyry over the lane to the church. 26 m; 39°54‘31.2“ N/ 9°40‘12.5“ E.

C 1: Prov. Carbonia-Iglesia, Isola di Sant‘ Antioco, Calasetta, eastern edge of the town, tuff rocks in the supralittoral zone, 3-5 m. 39°06‘46.5“ N/ 8°22‘01.9“ E. 19 May 2018.

D 1: Prov. Sassari, La Bagnu, 2 km W of Castelsardo; embankment along the driveway to Hotel Bajaloglia Resort, 95 m; on granite; 40°54‘27.6“ N/ 8°41‘45“ E; 20 May 2018.

D 2: Prov. Sassari, La Bagnu, 2 km W of Castelsardo; gardens of Hotel Bajaloglia, 120 m; on branches of *Phillyrea angustifolia* and shrubs; 40°54‘19.57“ N/ 8°41‘58“ E. 20 May 2018.

E 1: Prov. Olbia-Tempio, along the road to Tempio Pausanio, SS 672, 170-180 m; small path lined with *Quercus suber* and on soil; 40°52‘47.4“ N/ 9°02‘58.8“ E; 21 May 2018.

E 2: Prov. Olbia-Tempio, along the road to Tempio Pausanio, 252 m; steeply inclined embankment consisting of siliceous material, especially sandstone; 40°53‘22.6“ N/ 9°03‘37“ E; 21 May 2018.

E 3: Prov. Olbia-Tempio, along the road to Limbara, 4 km SE of Tempio Pausanio, 585 m; on *Quercus ilex, Pinus* sp. and shrubs; 40°51‘56.3“ N/ 9°07‘38“ E; 21 May 2018.

E 4: Prov. Olbia-Tempio, along the road from Tempio Pausanio to Limbara, 580 m; on *Quercus ilex*; 40°51‘50.5“ N/ 9°07‘49.4“ E; 21 May 2018.

F 1: Prov. Olbia-Tempio, Parco Regionale del Limbara, Passo di Limbara, 680 m; on soil, shrubs, *Quercus suber*; 40°50‘34“ N/ 9°06‘12.2“ E. 21 May 2018.

F 2: Prov. Olbia-Tempio, Parco Regionale del Limbara, Passo di Limbara, 670 m; on *Quercus ilex*; 40°50‘29.6“ N/ 9°06‘11.2“ E. 21 May 2018.

F 3: Prov. Olbia-Tempio, Parco Regionale del Limbara, Monte Limbara, 550 m; on *Quercus ilex*; 40°52‘26.2“ N/ 9°07‘40.5“ E. 21 May 2018.

F 4: Prov. Olbia-Tempio, Parco Regionale del Limbara, Monte Limbara, 560 m; on soil along the road; 40°51‘51“ N/ 9°07‘34“ E. 21 May 2018.

F 5: Prov. Olbia-Tempio, Parco Regionale del Limbara, road from Passo di Limbara to Oschiri, 540 m; on granite rocks; 40°52‘16.9“ N/ 9°07‘49.7“ E. 21 May 2018.

G 1: Prov. Olbia-Tempio, northern coast 0.5 km from Palau, SS 133, 20 m, on granite rocks ; 41°10‘26.1“ N/ 9°24‘12.8“ E. 22 May 2018.

G 2: Prov. Olbia-Tempio, 2 km E of Capo Testa, along the road on granite rocks, 25 m, 22.05.2018; 41°14‘32“ N/ 9°08‘54“ E. 22 May 2018.

G 3: Prov. Olbia-Tempio, Capo Testa, granite rocks around the car park near the entrance, 34 m, 41°14‘33“ N/ 9°08‘47.7“ E. 22 May 2018.

G 4: Prov. Olbia-Tempio, Capo Testa, 300 m W of a lighthouse on granite rocks; 48-55 m; 41°14‘26.9“ N/ 9°08‘36.5“ E. On hard wood of *Juniperus* sp. and on paving stones made from washed-out concrete, 20-25 m; 41°14‘49“ N/ 9°08‘44.2“ E. 22 May 2018.

G 5: Prov. Olbia-Tempio, Capo Testa, footpath made from washed-out concrete, 25 m, 41°14‘41.9“ N/ 9°08‘44.1“ E. 22 May 2018.

H 1: Prov. Olbia-Tempio, 4 km S of Arzachena, on maquis vegetation and *Olea europaea,* 30 m; 41°02‘06.1“ N/ 9°26‘03.7“ E. 22 May 2018.

H 2: Prov. Olbia-Tempio, between Arzachena and St. Pantaleon, on granite and *Quercus petraea*, 40 m, 41°02‘06.1“ N/ 9°26‘03.9“ E. 22 May 2018.

H 3: Prov. Olbia-Tempio, road from Arzachena to St. Pantaleon, on branches and trunks of *Quercus ilex*; 73 m, 41°04‘07.2“ N/ 9°27‘21.5“ E. 22 May 2018.

H 4: Prov. Olbia-Tempio, road from Arzachena to Tempio Pausanio, on granite rocks, SS 427, 122 m; 41°03‘09.1“ N/ 9°20‘17.4“ E. 22 May 2018.

H 5: Prov. Olbia-Tempio, road from Arzachena to Tempio Pausanio, on granite rocks, SS 427, 122 m; 41°01‘24“ N/ 9°21‘51“ E. 22 May 2018.

H 6: Prov. Olbia-Tempio, road from Arzachena to Tempio Pausanio, 0.7 km W of San Leonardo; on embankment, 255 m; 41°57‘58.1“ N/ 9°13‘39.5“ E. 22 May 2018.H 7: Prov. Olbia-Tempio, 5.4 km NE from Luras, large granite blocks in front of a vineyard; 247 m, 40°57‘58.41“ N/ 9°13‘39.85“ E. 22 May 2018.

H 8: Prov. Olbia-Tempio; 3 km S of Tempio-Pausanio, on *Pinus* sp. along the road; 576 m, 40°52‘34“ N/ 9°06‘09.6“ E. 22 May 2018.

I 1: Prov. Olbia-Tempio, 1.5 km N of Tempio Pausanio; Nuraghe Majori, trees (*Quercus ilex*) along the path to the archaeological excavations. 487-490 m; 40°55‘08.8“ N/ 9°05‘50“ E. 22 May 2018.

J 1: Prov. Olbia-Tempio, 1.8 km SE of Portobello Mare, country-road near Nuraghe Tuttusoni, San Silverio. 45 m, embankment along the road, on siliceous soil, granite rocks and surrounding shrubs; 41°06‘50.5“ N/ 9°02‘28.6“ E.

J 2: Prov. Olbia-Tempio, granite rocks along the road to Santa Teresa, 50 m; 41°06‘00“ N/ 9°02‘25.9“ E. 22 May 2018.

K 1: Prov. Sassari, E of Sassari, Valley Logudoro, SS 597; fragments of eroded wall made of limestone, near the Trinita Saccargia church, 204 m, parasitic on *Verrucaria nigrescens* Pers.; 40°40’16.5“ N/ E 08°41’20.8“ E. 22 May 2018.

L 1: Prov. Olbia-Tempio; Golfo Aranci, beach east of Olbia, Pittulongu, 3-5 m, on the bark of *Eucalyptus* sp.; 40°56‘28.8“ N/ 9°34‘03“ E. 23 May 2018.

L 2: Prov. Olbia-Tempio, Pittulongu, car park of a hotel, on a big granite rock; 3 m, 40°56‘29.2“ N/ 9°33‘29.2“ E. 23 May 2018.

M 1: Olbia, around Hotel Luna Lughante, on *Quercus petraea,* 70 m, 40°56‘10.9“ N/ 9°32‘46.9“ E. 23 May 2018.

LICHEN SPECIES LIST SARDINIA

(collection leg. G. Neuwirth, May 2018); asteriscs: * Rather rare, rare or extremely rare, **new to Sardinia. Abbreviations: Ne: hb. Neuwirth nr.; A-M connected with a number: collecting sites.

Amandinea pelidna (ACH.) FRYDAY & ARCADIA* Ne 11612, 11618, 11620, 11652, 11654, 12620. G 1, G 2, G 3, G 4, J 1

Arthonia punctiformis ACH. Ne 12478. B 4

Arthothelium crozalsianum DE LESD.* Ne 12558, 12472. B 2, D 2

Aspicilia intermutans (NYL.) ARNOLD Ne 11602, Ne 12556. D 1, F 5

Athallia cerinella (Nyl.) Arup, Fröden & Søchting Ne 12480, Ne 12630. B 4, E 4

Athallia cerinelloides (Erichsen) Arup, Fröden & Søchting* Ne 11660. B 2, G 4, M 1

Bacidia laurocerasi (Delise ex Duby) Zahlbr. Ne 11544, 11653. E 2

Bacidia subincompta (Nyl.) Arnold* Ne 11552. E 2, H 3

Bagliettoa marmorea (Scop.) Gueidan & Cl. Roux Ne 11657. A 1

Blastenia crenularia (With.) Arup, Søchting & Fröden Ne 11630, 12649. G 2, G 4

Blastenia hungarica (H. Magn.) Arup, Fröden & Søchting Ne 11652. E 4, M 1

Buellia aethalea (Ach.) Th. Fr. Ne 11631. G 2

Buellia badia (Fr.) A. Massal* Ne 11573. H 5

Buellia griseovirens (Turner & Borrer ex Sm.) Almb. Ne 12651. H 3, M 1

Buellia subdisciformis (Leight.) Jatta* Ne 11632, 11633, 11610. G 1, G 2

Buellia leptoclinoides (Nyl.) J. Steiner* Ne 12497, 12512, 12513, 12518. B 2

Caloplaca herbidella (Hue) H. Magn.* Ne 11659. G 4

Caloplaca inconnexa (Nyl.) Zahlbr. Ne 11530. K 1

Candelariella aurella (Hoffm.) Zahlbr. Ne 11563, Ne 12510. H 4

Candelariella vitellina (Hoffm.) Müll. Arg. Ne 11569, 11612, 12635. H 5, H 6, J 1, J 2

Catillaria chalybaia (Borrer) A. Massal. Ne 11638, 12533. D 1, G 2

Catillaria lenticularis (Ach.) Th. Fr. Ne 11532, 12530, 12610. B 1, G 4, J 1, K 1

Chrysotrix candelaris (L.) J. R. Laundon Ne 12570. E 1

Circinaria caesiocinerea (Nyl. ex Malbr.) A. Nordin, Savic & Tibell Ne 11573, 11619, 11753, 12501, 12552. B 1, D 1, G 1

Circinaria contorta (Hoffm.) A. Nordin, Savic & Tibell Ne 12580. E 1

Cladonia cervicornis (Ach.) Flot. ssp. ***cervicornis*** Ne 11559, 11585, 12600. D 1, H 4, H 6

Cladonia cervicornis (Ach.) Flot. ssp. ***verticillata*** J 1

Cladonia firma (Nyl.) Nyl. Ne 12576. E 1

Cladonia foliacea (Huds.) Willd. f. ***foliacea*** Ne 11540. H 2

Cladonia pyxidata (L.) Hoffm. Ne 11597, 12477, 12559. B 1, B 3, F 5

Cladonia rangiformis Hoffm. Ne 11584, 11603, 12476, 12577, 12626. B 3, E 1, F 5, H 6, J 1

Diploicia canescens (Dicks.) J. Steiner Ne 11661. B 2

Diplotomma chlorophaeum (Hepp ex Light.) Szatala Ne 12490. C 1

Diploschistes actinostoma (Ach.) Zahlbr. Ne 12503, 12629. B 1, J 1

Diploschistes caesioplumbeus (Nyl.) Vain.* Ne 12660. G 1

Diploschistes scruposus (Schreb.) Norman Ne 11557, 12581, 12598. E 1, F 1, H 4

Evernia prunastri (L.) Ach. Ne 12559, 12566, 12586, 12599. E 1, E 3, F 1, H 1

Flavoparmelia caperata (L.) Hale Ne 11543, 11592, 11671, 12568. E 1, F2, H 2, H 8

Flavoplaca citrina (Hoffm.) Arup, Fröden & Søchting Ne 11667. G 5

Flavoplaca oasis (A. Massal.) Arup, Fröden & Søchting Ne 12508. C 1

Hydropunctaria maura (Wahlb.) C. Keller, Gueidan & Thüs Ne 12490. C 1

Hypogymnia physodes (L.) Nyl. Ne 12590. E 3

Hypogymnia tubulosa (Schaer.) Hav. Ne 12588. E 3

Huneckia pollinii (A. Massal.) S.Y. Kondr., Kärnefelt, Elix, A. Thell, Jung Kim, A.S. Kondr. & Hur Ne 12630. E 1, J 1

Lasallia pustulata (L.) Merat. Ne 11590, 11627. H 7, I 1

Lecania cyrtella (Ach.) Th. Fr. Ne 11548. H 3

Lecania koerberiana J. Lahm* Ne 12597. F 1

Lecanora sp. J 1

Lecanora albescens (Hoffm.) Branth & Rostr. K 2

Lecanora anopta Nyl.* Ne 11659. G 4

Lecanora argentata (Ach.) Malme Ne 12595. E 4

Lecanora campestris (Schaer.) Hue Ne 12603. G 2, J 2

Lecanora cenisia Ach.* Ne 12604, 12621. J 1

Lecanora chlarotera Nyl. Ne 11526, 11679, 12468, 12573, 12584. B 2, E 1, E 3, F 2, H 2, M 1

Lecanora gangaleoides Nyl. Ne 12461, 12537, 12621. B 2, D 1, J 1, J 2

Lecanora rupicola (L.) Zahlbr. var. ***rupicola*** Ne 11607. F 5

Lecidea grisella Flörke Ne 11564, 11601, 12590. E 1, E 3, F 5, H 5

Lecidea lithophila (Ach.) Ach. Ne 11608. F 5

Lecidella asema (Nyl.) Knoph & Hertel var. ***asema*** Ne 12553. D 1

Lecidella elaeochroma (Ach.) M. Choisy Ne 12471, 12559, 12581, 12596, 12646. B 2, D 2, E 3, E 4, F 2, G 4, L 1, M 1

Lepra albescens (Huds.) Hafellner Ne 11529. L 2

Lepra amara (Ach.) Hafellner Ne 11549. G 3

Lepraria caesioalba (B. DE LESD.) J. R. LAUNDON* Ne 11598. F 5

Lepraria vouauxii (HUE) R. C. HARRIS Ne 11548. H 3

Melanelia subaurifera (NYL.) ESSL. Ne 11602, 12575. E 1, F 5

Melanelixia glabratula (LAMY) SANDLER & ARUP Ne 12569. E 1

Myriolecis dispersa (PERS.) SLIWA, ZHAO & LUMBSCH Ne 12535. D 1

Ocellomma picconianum (BAGL.) ERTZ & TEHLER* Ne 12481. B 4

Ochrolechia androgyna (HOFFM.) ARNOLD* Ne 11528. L 2

Ochrolechia tartarea (L.) A. MASSAL.* Ne 11656. G 4

Ochrolechia parella (L.) A. MASSAL. Ne 11635, 11647, 11654, 12614. G 2, G 3, J 1, J 2

Opegrapha vulgata (ACH.) ACH. Ne 12563. D 2

Parmelia saxatlis (L.) ACH. Ne 11570, 11586, 11604, 11702, 11717, 12589. E 3, F 5

Parmelia sulcata TAYLOR Ne 11595, 12648. F 3, M 1

Parmelina quercina (WILLD.) HALE Ne 12568. E 1

Parmelina tiliacea (HOFFM.) HALE Ne 12455, 12571. L1, E 1

Parmeliopsis ambigua (WULFEN) NYL. Ne 12481. L 4

Parmotrema perlatum (HUDS.) A. CHOISY Ne 11555, 11591, 11593, 11675, 11680, 12567, 12587, 12599. E 1, E 3, F 2, F 3, F 4, H 3, H 8

Parmotrema reticulatum (TAYLOR) M. CHOISY* Ne 11624. I 1

Peltigera praetextata (FLÖRKE ex SOMMERF.) ZOPF Ne 11625. I 1

Pertusaria coccodes (ACH.) NYL. Ne 11645. G 3

Pertusaria flavicans Lamy* Ne 11633, 11646. B 1, F 5, G 3

Pertusaria leioplaca DC. Ne 11551. H 3

Pertusaria pertusa (WEIGEL) TUCK. Ne 11626. I 1

Pertusaria pluripunctata NYL. Ne 12537. D 1

Phaeophyscia sciastra (ACH.) MOBERG Ne 12645. M 1

Phlyctis agelaea (ACH.) FLOT. Ne 11554. H 3

Phlyctis argena (SPRENG.) FLOT. Ne 11596. F 3

Physcia adscendens H. OLIVIER Ne 12532, 12622, 12623. D 1, J 1, M 1

Physcia aipolia (EHRH. ex HUMB.) FÜRNR. Ne 11521, 12643. F 2, L 1, M 1

Physcia caesia (HOFFM.) HAMPE ex FÜRNR.* Ne 12632, 12633. B 1, J 2

Physcia clementei (TURNER) LYNGE Ne 12615. J 1

Physcia enteroxantha (NYL.) POELT Ne 12464. B1

Physcia stellaris (L.) NYL. Ne 11523. L 1

Physcia tenella (SCOP.) DC. Ne 11524, 12470, 12597, 12644. B 2, F 1, F 2, J 2, L 1

Physconia distorta (WITH.) J. R. LAUNDON Ne 11594, 12545. D 1, F 3

Physconia petraea (POELT) VEZDA & POELT* Ne 12548. D 1

Physconia venusta (ACH.) POELT* Ne 11699. F 2

Pleurosticta acetabulum (NECK.) ELIX & LUMBSCH Ne 12592. E 3, F 2

Polysporina simplex (TAYLOR) VĚZDA Ne 11643, 12607. G 3, J 1

Porpidia cinereoatra (ACH.) HERTEL & KNOPH. Ne 11589, 11648. G 3, H 6

Porpidia macrocarpa (DC.) HERTEL & A. J. SCHWAB. Ne 11605. F 5

Porpidia rugosa (TAYLOR) COPPINS & FRYDAY** Ne 11599. F 5

Protoparmelia badia (HOFFM.) HAFELLNER NE 11573. H 5

Punctelia borreri (TURNER) KROG. 12575. E 1

Protoparmeliopsis muralis (SCHREB.) M. CHOISY Ne 11569. H 5

Pyrenocollema halodytes (NYL.) R. C. HARRIS Ne 12532. D 1

Pyrenodesma albopruinosa (ARNOLD) H. OLIVIER Ne 12659. A 1

Ramalina breviuscula (NYL.) NYL.* Ne 12515. C 1

Ramalina canariensis J. STEINER* Ne 11538, 11650, 11651. G 3, H 1

Ramalina farinacea (L.) ACH. Ne 11556, 11593, 11622, 11673, E 3, F 2, I 1

Ramalina fastigiata (PERS.) ACH. Ne 12623, 12475, 11537. F 2, H 1, I 1

Ramalina fraxinea (L.) ACH. Ne 11542, 11676, 12585. E 3, F 2, H2

Rhizocarpon geographicum (L.) DC.* Ne 11527, 11600, 11620. F 5, G 1, L 2

Rhizocarpon reductum Th. Fr. Ne 11589, H 6

Rinodina atrocinerea (HOOK.) KOERB. Ne 11639. G 2

Rinodina beccariana BAGL. Ne 11638, 12541. D 1, G 3

Rinodina dubyana (HEPP.) J. STEINER* Ne 12658. A 1

Rinodina pyrina (ACH.) ARNOLD Ne 12469, 12582. B 2, E 3

Rinodina sophodes (ACH.) A. MASSAL. Ne 11520, 11521, 11551, 12468. B 2, H 3, L 1

Roccella phycopsis ACH.* Ne 11639, 12517, 12525, 12560. B 1, G 3

Rufoplaca arenaria (PERS.) ARUP, FRÖDEN & SØCHTING Ne 11571, 11653. G 3, H 5, H 6

Rufoplaca subpallida (H. MAGN.) ARUP, SØCHTING & FRÖDEN* Ne 12504. B 1

Solenopsora candicans (DICKS.) A. STEINER Ne 11661. A 1

Squamulea subsoluta (NYL.) ARUP, SØCHTING & FRÖDEN Ne 11654. G 4

Tephromela atra (HUDS.) HAFELLNER Ne 11712. G 3

Toninia aromatica (TURNER) A. MASSAL. Ne 11668. G 4, G 5

Usnea ceratina ACH.* Ne 11674. F 2

Variospora aurantia (PERS.) ARUP, FRÖDEN & SØCHTING K 1

Variospora flavescens (HUDS.) ARUP, FRÖDEN & SØCHTING Ne 11657, 11661. G 4, K 1

Verrucaria nigrescens PERS. Ne 11531. K 1

Verruculopsis lecideoides (A. MASSAL.) GUEIDAN & CL. ROUX var. ***lecideoides*** Ne 11533. K 1

Xanthoparmelia angustifolia (GYELNIK) HALE* Ne 12615, 12661. G 1, J 1

Xanthoparmelia conspersa (EHRH. ex ACH.) HALE Ne 11560, 11574, 12463. B 1, H 4, H 6, J 1

Xanthoparmelia digitiformis (ELIX & P. M. ARMSTR.) FILSON Ne 11539, 12248, 12454, 12578, 12631. B 1, E 1, H 2, J 1

Xanthoparmelia protomatrae (GYELN.) HALE Ne 11628, 12625. H 5, I 1, J 1

Xanthoparmelia perrugata (NYL.) O. BLANCO, A. CRESPO, ELIX, D. HAWKSW. & LUMBSCH Ne 11573. H 5

Xanthoparmelia pulla (ACH.) O. BLANCO, A. CRESPO, ELIX, D. HAWKSW. & LUMBSCH Ne 11616, 11657, 12456, 12500, 12605. B 1, G 1, H 5, J 1

Xanthoparmelia tinctina (MAHEU & A. GILLET) HALE Ne 11570, 12250, 12464, 12616. B 1, H 5, H 6, J 1, J 2

Xanthoparmelia verruculifera (NYL.) O. BLANCO, A. CRESPO, ELIX, D. HAWKSW. & LUMBSCH* Ne 11558. H 4

Xanthoria parietina (L.) TH.FR. Ne 11564, 11629, 11642, 12458, 12483, 12499, 12541, 12623. B 1, B 4, D 1, G3, H 5, J 1, L 1

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