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Lichens from sandy dune habitats on the Ionian Coast (Basilicata, southern Italy)

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Résumé – Cet article apporte une contribution à la connaissances de la flore lichénique des habitats dunaires côtiers. Quatre-vingt-neuf lichens ont été récoltés dans les zones dunaires et les dépressions inter-dunaires de la côte Ionienne (Basilicata, Italie du sud). Seize espèces sont nouvelles pour la région de Basilicata. Le but principal de ce travail a été d'évaluer la biodiversité lichénologique d'un habitat particulièrement intéressant pour la conservation.

Abstract – A contribution to the knowledge of the lichen flora from sandy dunes habitat is provided. Eighty-seven lichen species are reported from sand dunes and intradunal depressions on the Ionian Coast (Basilicata, Southern Italy). Sixteen species are new to the Basilicata Region. The aim was mainly to recognize lichen biodiversity in one of outstanding lichenological habitat to conserve.

Biodiversity / dunes / Ionian Coast / Italy / lichen flora

INTRODUCTION

Sand dune habitats are subject to several kinds of human impact that are highly detrimental for biodiversity (Ruffo, 2002; Blasi *et al*., 2007). In the last teen years, the intense tourist impact and the agricultural exploitation have drastically altered the vegetation landscape of littoral but consequences on lichen communities are very poorly known.

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The Ionian coasts of Southern Italy, between Puglia and Calabria Regions, are characterized by ancient coastal dune system showing a typical zonation of vegetation types, from the pioneer communities on the younger dunes to deciduous woods in the interior. By now, fragments of the original vegetation are still present only in few sites.

The coast in Basilicata Region including several Site of Community Importance (SCI) according to the Habitat Directive, is a typical example of well preserved fossil dune system. A few studies in Italy (e.g. Tosco, 1959; Migliaccio, 1965; Nimis & Schiavon, 1986; Nimis, 1988; Zedda & Sipman, 2001; Durini & Medagli, 2002, 2004; Fascetti *et al*., 2005; Ravera, 2006) have been dealt with lichens in these habitats.

First aims of this paper is to contribute to the knowledge of lichen flora of the sea dunes of the Mediterranean coasts and to evaluate their importance for lichen conservation.

MATERIAL AND METODS

A floristic survey was carried out in three Natura 2000 Sites lying along the coast line (Fig. 1.):

– IT9220095 "Costa jonica Foce Cavone", Matera province, UTM-WGS 84 33T XE 50.60, altitude 0 m a.s.l., Mediterranean vegetation type.
– IT9220090 "Costa jonica Foce Bradano", Matera province, UTM-WGS 84 33T XE 56.72, altitude 0 m a.s.l., Mediterranean vegetation type.
– IT9220055 "Bosco Pantano di Policoro e Costa jonica Foce Sinni", Matera province, UTM-WGS 84 33T XE 42.46, altitude 0 m a.s.l., Mediterranean vegetation type.

The Ionian coast is in the bioclimatic Mediterranean region, type mesotermo xeric with a hot and dry period from April to September (Biondi *et al*., 1991; Blasi, 1994).

The mean yearly temperature and rainfall are 16°C and 500 mm respectively. Other important features are the almost constant westerly winds and salt spray from the sea (Fascetti *et al*., 2007).

The speciments were collected in a discontinuous Mediterranean maquis, on dunes sandy coastlines, subcoastlines and in slimy-sandy damp environments dunes mostly belonging to the habitats named, according to the data of the Ministry of the Environment and of the Pro-

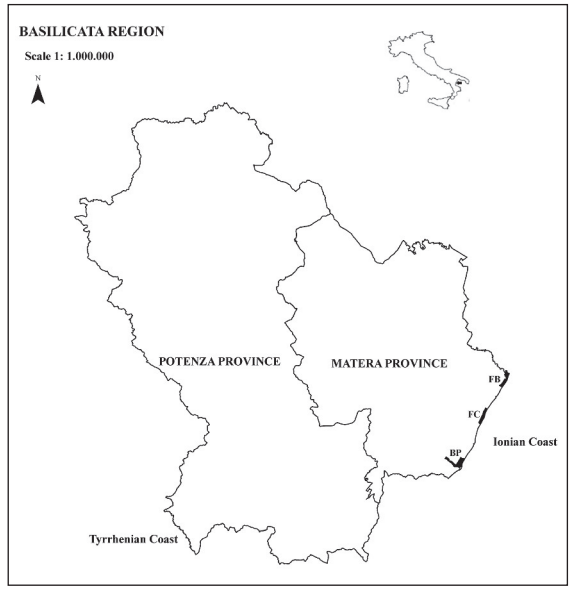

Fig. 1. Map of the Region: sampling stations as in the test.

tection of the Territory and Sea: Coastal dunes with *Juniperus* spp. (2250, prioritary), Riparian mixed forests of *Quercus robur*, *Ulmus laevis* and *Ulmus minor*, *Fraxinus excelsior* or *Fraxinus angustifolia*, along the great rivers, (*Ulmenion minoris*) (91F0) and Arborescent matorral with *Juniperus* spp. (5210).

RESULTS

Taxa are reported in alphabetic order in Table 1. An asterisk (*) indicates the first record for the Basilicata region (Potenza, 2006 Ph.D Thesis). Nomenclature of lichens follows Nimis & Martellos (2003; 2008), of vascular plants Conti *et al*., (2005).

Substrate is abbreviated as follow: S = sandy dunes, G = intradunal depression; Fa = *Fraxinus angustifolia* Vahl ssp. *oxycarpae* (Willd.) Franco et Rocha Afonso, Jo = *Juniperus oxycedrus* L.subsp. *macrocarpa* Ball., Pc = *Populus canescens* (Aiton) Sm., Ph = *Pinus halepensis* Miller, Pl = *Pistacia lentiscus* L., Py = *Phyllirea latifolia* L., Qr = *Quercus robur* L. subsp. *robur*. The abbreviations for the Sites are: FC = Costa jonica Foce Cavone, FB = Costa jonica Foce Bradano, BP = Bosco Pantano di Policoro e Costa jonica Foce Sinni.

Table 1. Lichen species collected along the Ionian coast

Species	*Substrate*	*SCI*
Acrocordia gemmata (Ach.) A. Massal.	Fa	BP
Arthonia calabrella Puntillo	Fa	BP
**Arthonia didyma* Körb.	Pc	BP
**Arthonia excipienda* (Nyl.) Leight.	Py, Pl	BP
Arthonia radiata (Pers.) Ach.	Pc	BP
Arthopyrenia cinereopruinosa (Schaer.) A. Massal.	Pc	BP
**Arthopyrenia salicis* A. Massal.	Pl	BP
**Arthothelium ruanum* (A. Massal.) Körb.	Ph	FC
Bacidia rosella (Pers.) De Not.	Jo	BP
Bacidina phacodes (Körb.) Vězda	Jo, Ph	BP, FC
Caloplaca cerinella (Nyl.) Flagey	Jo, Ph	BP, FC
Caloplaca ferruginea (Huds.) Th.Fr.	Jo	FC
Caloplaca obscurella (Körb.) Th.Fr.	Jo, Ph	BP, FC
Candelariella xanthostigma (Ach.) Lettau	Ph	FC
Catillaria nigroclavata (Nyl.) Schuler	Ph	BP, FC
**Cladonia coniocraea* (Flörke) Spreng.	S	FC
Cladonia convoluta (Lam.) Anders	S	BP, FB, FC
Cladonia foliacea (Huds.) Willd.	S, G	BP, FB, FC
**Cladonia furcata* (Huds.) Schrad.	S	BP
Cladonia pyxidata (L.) Hoffm.	Jo, S	BP, FB, FC
Cladonia rangiformis Hoffm.	S	BP, FB, FC
Cladonia squamosa Hoffm. v. *squamosa*	S	BP, FB, FC
Collema cristatum (L.) F. H. Wigg.	G	BP

Table 1. Lichen species collected along the Ionian coast *(continued)*

Species	*Substrate*	*SCI*
Collema tenax (Sw.) Ach.	S	BP
Collema undulatum Flot.	S	BP
Diploicia canescens (Dicks.) A.Massal.	Jo	FC
**Diploicia subcanescens* (Werner) Hafellner & Poelt	Ph	FC
Diplotomma alboatrum (Hoffm.) Flot.	Qr	BP
Evernia prunastri (L.) Ach.	Jo, Ph	FC
Flavoparmelia caperata (L.) Hale	Ph	FC
Flavoparmelia soredians (Nyl.) Hale	Ph	FC, BP
Fulgensia fulgens (Sw.) Elenkin f. *fulgens*	G, S	BP
Fulgensia fulgida (Nyl.) Szatala	G, S	FC, BP
Gyalecta truncigena (Ach.) Hepp	Fa	BP
Graphis scripta (L.) Ach.	Ph	FC
Hyperphyscia adglutinata (Flörke) H.Mayrhofer & Poelt	Jo, Pc, Ph	BP, FB, FC
**Hypogymnia farinacea* Zopf	Ph	FC
Hypogymnia tubulosa (Schaer.) Hav.	Ph	FC
**Lecanographa amylacea* (Pers.) Egea & Torrente	Jo, Ph	BP, FC
Lecanora chlarotera Nyl.	Jo, Pl	BP, FC
Lecanora expallens Ach.	Jo, P, Ph, Pl	BP, FC
Lecanora horiza (Ach.) Linds.	Jo, Pl	BP, FC
Lecidella elaeochroma (Ach.) M.Choisy	Jo	BP, FB, FC
Melanohalea elegantula (Zahlbr.) O.Blanco, A.Crespo, Divakar, Essl., D.Hawksw. & Lumbsch	Jo, Ph, Fa	BP, FB, FC
Melanelixia glabra (Schaer.) O. Blanco, A. Crespo, Divakar, Essl., D. Hawksw. & Lumbsch	Jo, Ph, Fa	BP, FB, FC
**Micarea prasina* Fr.	Jo	FC
Naetrocymbe punctiformis (Pers.) R. C. Harris	Pl	BP
Opegrapha celtidicola (Jatta) Jatta	Ph	FC
Opegrapha rufescens Pers.	Pc	BP
Opegrapha varia Pers.	Fa	BP
Opegrapha vulgata Ach.	Jo, P	FC
Parmelia sulcata Taylor	Ph	FC
* *Parmotrema perlatum* (Huds.) M.Choisy	Ph	FC, FB
Parmotrema hypoleucinum (J. Steiner) Hale	Ph	FC
* *Parmotrema reticulatum* (Taylor) M.Choisy	Ph	FC
**Peltigera elisabethae* Gyeln.	S	FC
Pertusaria leioplaca DC.	Pl	BP
Phaeophyscia orbicularis (Neck.) Moberg	Fa, Jo, Ph,	FC, FB, BP
Physcia adscendens (Fr.) H. Oliver	Jo, Ph, Pc	FC, FB, BP
Physcia leptalea (Ach.) D. C.	Jo, Ph, Pc	FC, FB, BP
Physcia stellaris (L.) Nyl.	Ph	FC
Physcia tenella (Scop.) DC.	P, Pc	BP
Physconia distorta (With.) J. R. Laundon	Jo, Ph,	FC
Physconia grisea (Lam.) Poelt subsp. *grisea*	Ph	FC
Physconia servitii (Nádv.) Poelt	Ph	FC
Placidium squamulosum (Ach.) Breuss	G	BP

Table 1. Lichen species collected along the Ionian coast *(continued)*

Species	*Substrate*	*SCI*
**Placidiopsis tenella* (Nyl.) Zahlbr.	G	BP
Pleurosticta acetabulum (Neck.) Elix & Lumbsch	Ph	FC
Porina aenea (Wallr.) Zahlbr.	Pl	BP
Psora decipiens (Hedw.) Hoffm.	S	FC, FB, BP
Punctelia subrudecta (Nyl.) Krog	Ph	FC
Pyrenula chlorospila Arnold	Fa	BP
Ramalina canariensis J. Steiner	Jo, Ph, Pl	BP, FC
Ramalina farinacea (L.) Ach.	Ph	FC
**Ramalina lacera* (With.) J.R.Laundon	Jo	FC
Ramalina subgeniculata Nyl.	Jo	FC
Schismatomma decolorans (Sm.) Clauzade & Vězda	Jo, Ph, Pl	BP, FC
Squamarina cartilaginea (With.) P.James	G, S	FC, FB, BP
Squamarina lentigera (Weber) Poelt	G	FC, FB, BP
Staurothele hymenogonia (Nyl.) Th. Fr.	G	BP
Strigula stigmatella (Ach.) R. C. Harris	Ph	FC
Teloschistes chrysophthalmus (L.) Th. Fr.	Py, Pl	BP
**Thelopsis isiaca* Stizenb.	Jo	BP
Toninia physaroides (Opiz) Zahlbr.	S	BP, FC
**Thrombium epigaeum* (Pers.) Wallr.	G	BP
Toninia sedifolia (Scop.) Timdal.	S	BP, FC
Xanthoria parietina (L.) Th. Fr.	Ph, Fa, Pc, Pl, Jo	BP, FB, FC

DISCUSSION

The coastal dunes seem to include important habitats for lichen biodiversity: nearly 20% of Regional flora – 471 species, according to Nimis (2003) – has been recorded in the Sites. The list includes 87 infrageneric *taxa*, 16 of which are new for the Region; among them, *Arthopyrenia salicis* is new for Southern Italy, *Thelopsis isiaca* and *Diploicia subcanescens* are strictly coastal species and the last was known only for the Tyrrhenian side. *Parmotrema hypoleucinum*, *Ramalina subgeniculata* e *R. canariensis* have been first recorded out of Tyrrhenian coast, too; *Cladonia squamosa* (last record by Jatta in 1889) and *C. furcata* (last record by Gavioli in 1934) have been confirmed in Basilicata.

Compared with flora from the Tyrrhenian coast of the Region (Bartoli & Puntillo, 1998) the amount is similar but substrate drastically change, mostly increasing terricolous species (20 vs. 5) which are usually very common in intradunal depressions (eg. Durini & Medagli, 2002, 2004; Nimis, 1988; Nimis & Martellos, 2004).

Both mesoclimate and geomorphology of the two coasts explain the difference in climate element, particularly notable in the Tyrrhenian side. Maratea coast is characterized by high mountains running along the coastline with perpendicular valleys exposed to the sea winds, average rainfall is 1246 mm/year: it is included in the submediterranean subregion of the Tyrrhenian Italy (Nimis &

Tretiach, 1999). The Ionian Coast is characyerized by the ancient coastal dune system and the mean yearly rainfall is 500 mm but important features are the almost constant salt spray from the sea and air humidity that explain the numbers of suboceanic species found in the study area (25 vs. 29 in the Tyrrhenian coast in Basilicata region).

In comparison with collections from S Italy, lichen colonization on *Juniperus oxycedrus* subsp. *macrocarpa* (preferred bark together with *Pinus halepensis*) is very poor compared to the *taxa* found (27 vs. 68) on the same species of tree in Sardinia on 800 m a. s. l. (Zedda & Sipman, 2001) while lichens on *Fraxinus* agree with species on this tree in similar environment in Calabria (Puntillo, 1996). According to Nimis & Tretiach (1999) a higher altitude plays an important role in determining lichen diversity because of a more frequent formation of fog explaining differences about *Juniperus*.

Lichen diversity is different from Site to Site: 59 *taxa* (28 exclusive) were found in Costa jonica Foce Cavone, 58 (28 exclusive) in Bosco Pantano di Policoro e Costa jonica Foce Sinni, but 17 without exclusive in Costa jonica Foce Bradano, subject to an intense touristic impact.

Both "Costa jonica Foce Cavone" and "Bosco Pantano di Policoro e Costa jonica Foce Sinni" host *taxa* listed in the European Red List (Sérusiaux, 1989) as well in the unofficial Italian red list (Nimis, 1992): *Teloschistes chrysophthalmus*, extinct in many Northern regions, *Parmotrema hypoleucinum* usually growing in undisturbed Mediterranean maquis vegetation, and the cited *Diploicia subcanescens*.

The conservative role of Policoro's forest is also underlined through the presence of a few indicators of long ecological continuity (according to Nimis, 2003): *Arthonia calabrella*, *Bacidia rosella, Gyalecta truncigena* and *Lecanographa amylacea* which, together with *Arthothelium ruanum* in Foce Cavone, contribute to clear the important function of these coastal habitats to conservation of rare and characteristic lichen flora.

This study about lichen flora and sandy dunes habitats represent the only one research carried out on the Ionian Coast to conserve lichen biodiversity.

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An annotated checklist and bibliography of lichens and lichenicolous fungi of Libya

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Abstract – All literature about lichens and lichenicolous fungi in Libya is presented. A checklist compiled from literature up to 1950 includes 151 taxa. Based on field work in 1982 and 1983 conducted by A. Anderberg and G. Thor, an additional 54 species new to Libya were collected of 46 are reported here as new, *Acarospora nodulosa*, *Arthonia calcicola*, *A. pruinata*, *Arthrosporum populorum*, *Aspicilia cheresina*, *Caloplaca cerinelloides*, *C. haematites*, *C. marmorata*, *C. oasis*, *C. polycarpoides*, *C. tenuata*, *C. ulcerosa*, *Candelariella reflexa*, *C. senior*, *Catillaria detractula*, *Cladonia firma*, *C. foliacea*, *Clypeococcum epicrassum*, *Collema coccophorum*, *Diploicia canescens*, *Fulgensia subbracteata*, *Intralichen lichenicola*, *Lecania cyrtella*, *L. turicensis*, *Lecanora argentata*, *L. hagenii, L. horiza*, *Lecidella laureri*, *Lichenoconium lecanorae*, *Milospium graphideorum*, *Ochrolechia turneri*, *Physcia abscendens*, *P. biziana, Physciona grisea*, *Placopyrenium trachyticum*, *Pyrrhospora quernea*, *Rinodina oleae*, *R. pyrina*, *Sagiolechia protuberans*, *Sphaerellothecium parietinarium*, *Stigmidium tabacinae*, *Toninia subfuscae*, *Xanthoria calcicola*, *X. mediterranea*, *Xanthoriicola physciae* and *Zwackhiomyces coepulonus*. Given the large territory, the geological heterogeneity, the long coastline, the presence of up to 900 m high mountains near the coast, the at least seminatural lichen habitats still present, the high percentage of species new to Libya in the collections made in 1982 and 1983 (54 out of 87 = 62%) as well as field experience suggest that a realistic estimate of the total number of Libyan lichens and lichenicolous fungi exceeds 1,000 species.

Africa / Italian lichenologists / lichen biota / semidesert / desert

INTRODUCTION

The knowledge of lichen diversity differs widely between regions. The general pattern is that exhaustive checklists of lichens are available for most European Countries (Feuerer, 2009), North America (e.g. Esslinger, 2008) and Australia (McCarthy, 2009), whereas extensive areas of Asia and Africa remain unexplored (Feuerer, 2009). The interest in lichens from arid areas like deserts and semideserts has been faint, despite their importance in forming the biological soil crust crucial to life and soil protection in these habitats (e.g. Belnap & Lange, 2003). Libya is one of the largest countries of North Africa (1.78 million km^2). Its territory is mainly covered by deserts or semideserts, whereas the mediterranean vegetation is restricted to the coastal areas. As in other countries in northern Africa, which all include parts of the Saharan Desert, its lichen biota – which is

likely to be affected by the high aridity – is far from being exhaustively known. As a contribution to the knowledge of the lichen biota of this poorly known region, the aim of this paper is to summarize all previous publications dealing with the lichens and lichenicolous fungi of Libya. It also includes the collections made by A. Anderberg (AA) and G. Thor (GT) in 1982 and 1983 respectively. The scope has not been to revise the collections included in publications before 1983. We hope that this compilation will facilitate further studies of the Libyan lichen flora, and invite incorporation of the present material in future taxonomic revisions.

MATERIALS AND METHODS

Bibliographical survey

Old literature was searched for by Juri Nascimbene (JN) at the biological-medical library "A. Vallisneri", University of Padova (viale Colombo, 3, I-35121 Padova, Italy; http://www-fog.bio.unipd.it/library/) and at the Botanic Garden of Padova (Via Orto Botanico, 15, I-35121 Padova, Italy; biblioteca.ortobotanico@unipd.it). A hard copy of each cited text was stored in the personal libraries of both GT and JN.

Field surveys and vegetation

A. Anderberg and G. Thor visited the Cyrenaica Peninsula south of the mountainious region as well as the area south and southwest of the Peninsula in the capacity of employes at the consultant firm SWECO. They worked with a vascular plant sociological and species inventory, but they also collected a few lichens. The Cyrenaica Peninsula harbours a vascular plant flora including, e.g. the endemic species *Cyclamen rohlfsianum*. AA visited the area in the spring of 1982, whereas. GT spent one month there in the autumn of 1982, and another month in the spring of 1983. On one occasion AA collected lichens in a coastal area (Wadi Derna 25 km SW of the town Derna). Also GT collected lichens in a coastal area once (the Greek colony Cyrene established 631 BC). Otherwise, inland areas composed of flat semideserts without mountains were investigated. Virtually the entire area was heavily grazed by sheep. The ground was predominately gravelly, with sparse vascular plant vegetation. Partly, small shrubs of Chenopodiaceae, e.g. the genus *Anabasis*, dominated the vegetation. Lichen rich habitats were only found on certain shaded rocks in the few deep wadis (ravines occasionally filled with rain water), and in the few places where scattered *Juniperus phoenicea* and *Olea europaea* were found and provided habitats for corticolous species. Otherwise, trees were lacking. Lichens were sometimes also found on the soil near *Sarcopoterium spinosum* shrubs and *Artemisia herba-alba*. World War II affected the area heavily and still harbours numerous artefacts.

Nomenclature

The nomenclature mainly follows Nimis & Martellos (2008) for species occurring in Italy except e.g. *Fulgensia subbracteata*. For other species various literatures are used, e.g. *Lecania proteiformis* follows Naesborg (2007), and

Xanthoria parietina var. *subgranulosa* follows Seaward & Sipman (2006). Lichenicolous fungi follow Ihlen & Wedin (2008) except *Stigmidium tabacinae* which follow Triebel (1989).

Geographical names

In early literature, the names "Tripolitania" or "Tripolitana" (below Tripolitania) and "Cyrenaica" are frequently used. Tripolitania was formerly used both for the province with this name and the city of Tripoli (now often Tarabulus). Libya is divided into three provinces; Tripolitania in the western coastal area, Fezzan south of this province and Cyrenaica east of these two provinces. The Cyrenaica province includes the entire area from the coast down to the respective borders of Chad and the Sudan in the south. "Cyrenaica", when referred to in literature, may thus include a larger area than only the Cyrenaica Peninsula in the north. The largest town in Cyrenaica, Benghazi, was in the early publications spelled Bengasi.

RESULTS

Literature up to 1950

Stizenberger (1891) mentions "Pacho" as a collector of lichens in Libya. We have, however, been unable to clarify if any collections of that person are included in any publication or stored in any herbarium. Except Szatala (1929), Durrand & Baratte (1910) and Reichert (1936), all literature up to 1950 is written in Italian, and it is therefore presented here. No reference is given to publications like Zahlbruckner's Catalogus, which mainly includes literature citations. Most of the information on Libyan lichens was provided by Italian authors who published several contributions during the end of the 19: th century and the first half of the 20: th century. Interestingly, most of them were strictly speaking not lichenologists, and it was only in a few cases they provided relevant contributions to Italian lichenology (Nimis, 1993). In this period, Italian lichenology was declining dramatically, and only a few botanists or amateurs dedicated any effort to lichenology (Nimis, 1993). In accordance with this general situation, the contributions from Italian authors to the knowledge of the Libyan lichen biota are generally poor and fragmentary, lacking a comprehensive approach. This fragmented situation also sometimes renders it difficult to identify accurately the herbaria where the specimens included in the publications mentioned below are stored.

The first contribution with reported lichens from Libya was that of Baroni (1892), in which a list of 14 species collected by Prof. Raffaello Spigai in localities near Tripoli is reported. It is unclear if these collections are preserved and if so, in which herbarium. This paper was followed by a contribution provided by two Swiss authors (Durand & Barrate, 1910) including a list of 15 lichens which were identified by Müller Argoviensis. The material was mainly collected by P.H. Taubert in 1887, both in Cyrenaica and Tripolitania. The collections should be stored in herbarium G, where the Taubert collections are located. Libya became an Italian Colony in 1911. Several Italian botanists were

enthusiastically involved in the exploration of the area, especially the coastal regions, which were the most promising from an agricultural perspective. Two years after the Italian colonization C. Zanfrognini, assistant at the Botanic Garden of Modena, published two papers (Zanfrognini, 1913a, b). The first was based on the identification of material collected by Prof. F. Cavara in Tripolitania (37 lichens). In the second paper he reported 23 lichens, studying the material collected by two Italian militaries in several localities both in Tripolitania and Cyrenaica. According to Tretiach & Dallai (1990), the lichen herbarium of C. Zanfrognini is included in the Herbarium Baglietto, which is stored in the Herbarium of the University of Modena (MOD) (see also below). In the same year, E. Mameli (Botanic Institute, University of Pavia) published a list of 19 species which were collected in 1912 by Prof. R. Pampanini in Tripolitania (Mameli, 1913). The lichens studied by E. Mameli may be included both in the herbarium of the University of Pavia (PAV) and in that of the University of Cagliari (CAG) (Tretiach & Valcuvia Passadore, 1990). Romano (1914) summarized the previous literature on Libyan lichens and added a list of 34 species collected by Prof. A. Trotter, who was a member of the national committee for agricultural studies in Tripolitania. For information about his herbarium, see below. A more comprehensive contribution was provided by Zanfrognini (1915), who reported c. 60 species collected in several localities both in Tripolitania and Cyrenaica by two doctors of the Italian army (A. Vaccari and F. Testi) and by A. Riccobono (Palermo). Two specimens of *Arthonia albopulverea* collected by A. Vaccari in Libya and published by Zanfrognini (1915) and Pampanini (1931) were, by chance, found in herbarium S. This supports the hypothesis that the collections treated by Zanfrognini are in Herbarium Baglietto (see above), as some duplicates of Herbarium Baglietto were sent to the Swedish lichenologist E. P. Vrang, and his herbarium is now incorporated in herbarium S. The collections of *A. albopulverea* in herbarium S are marked "Herb. Erik P. Vrang". Italy was involved in World War I from 1915 to 1918, during which time only one paper was published (Pampanini, 1917), including 18 species which were collected by the reverend Vito Zanon in 1916 near Benghazi. This paper was mainly focused on the vascular plant flora, and the list of lichens was edited by E. Mameli as may be inferred from the foot note ("Cur. cl. Prof. Eva Mameli") at the beginning of the section dedicated to lichens (page 167). As E. Mameli determined the material, the collections might be stored in herbarium PAV or CAG (see above). During his third mission in Tripolitania (1914), A. Trotter collected several specimens which were studied and published in 1918 (Romano, 1918). This paper includes 51 lichens and 2 lichenicolous fungi. These collections may have been stored in herbarium Trotter (see below). Pampanini & Zanon (1919) published a list of 22 additional lichens, which were collected by reverend Vito Zanon in January 1917 in Cyrenaica. Analogously to their previous contribution, these lichens were identified by E. Mameli. Later, E. Mameli published almost the same species list again (Mameli, 1920). In this paper, 25 species are included. A minor collection was made by Armando Maugini at "Sidi Jahia (Cyrene)" and is included in Maugini (1921). The paper is on the vegetation of Cyrenaica and list seven lichens, four of which were previously cited in Mameli (1920). The year of field work of A. Maugini is unknown. Pampanini & Zanon (1922) published a second contribution, which includes only 5 lichens collected in May 1917 at "El Abiar" (Cyrenaica) on *Juniperus phoenicea*. Despite the fact that the name of the collector is not reported, it can be hypothesized that the specimens were collected by V. Zanon. As usual, these lichens were identified by E. Mameli,

who in 1928 published her last contribution to the knowledge of the lichen biota of Libya, comprising a list of 19 lichens (Mameli, 1928). Szatala (1929) published new lichen observations from several countries in northern Africa collected by G. de Andreanszky. Six of these species were from Libya (as "Tripolitania-occid." and "Tripolitania sept.-occid."). There is no information on when the collections were made, but they should be housed in the Hungarian Natural History Museum (BP) where the specimens of both G. de Andreanszky and Ö. Szatala are located. Cengia Sambo (1928) described *Ramalina maciformis* var. *marmarica*, and a long description of this taxon is also included in Pampanini (1931). The material was collected by F. Cavara in Libya in March 1924. The collections by Cengia Sambo are stored in the herbarium of Firenze (FI) (Foggi *et al*., 1990). In his last publication, R. Pampanini presented a checklist of the lichens of Cyrenaica (Pampanini, 1931). In the first part of this paper (pp. 59-68) he summarized the records provided by himself (Pampanini, 1917; Pampanini & Zanon, 1919, 1922), Mameli (1920, 1928), Durand & Barrate (1910), and Maugini (1921). It is not clear why the last contribution was cited as "Pampanini, 1921". In the second part of the paper (pp. 491-496), he compiled the records included in two contributions by Zanfrognini (1913a, 1915). Twenty years of exploration had increased the number of known lichen species in Cyrenaica from 15 (Durand and Barratte, 1910) to 75. Reichert (1937) made a phytogeographic outline of Libya based on the available knowledge on lichen distribution and ecology. He had previously published a phytogeographic outline of North Africa (Reichert, 1936), indicating some lichens which he considered typical elements of each of the five phytogeographical regions which he described. This author, who was a botanist at Tel Aviv, presented a contribution to the phytogeography of Libya during a national meeting of the Italian Botanic Society on January 30, 1937. Probably for this event, he prepared a modified version of his previous paper (Reichert, 1936), mainly focusing on Libya due to the Italian interest on this country. For each of the three phytogeographical regions into which he divided the Libyan territory he presented a list of associated lichens indicative of their climatic conditions. The last Italian contribution to the knowledge of the lichen biota of Libya was that made by Trotter (1950). Despite the fact that this paper was published in 1950, it was written already in 1940 in the form of a technical report intended for the Italian authorities. At the end of World War II, Italy lost all its colonies, and the interest in the lichens of Libya faded completely. Libya then passed to UN administration and achieved independence in 1951. From the introduction by Trotter (1950), his nostalgic attitude is evident when he claims the high quality and quantity of the scientific studies conducted by Italian botanists in Libya. In his opinion, the knowledge of Libyan lichens might be considered exhaustive, especially in the coastal areas. He summarized the presence of 120 lichens (based on earlier publications; no species list is included), including c. 90% saxicolous-terricolous and c. 10% epiphytic taxa. On the basis of the available knowledge, Trotter (1950) commented on the first biogeographic outline of the lichen biota of Libya proposed by Reichert (1937), including additional contributions based on his own field experience. Interestingly, he includes a note on the role of lichens in covering the soil in desertic areas. In this paper he also indicated that his collections were hosted in the Laboratory of Plant pathology of the Institute for agriculture in Avellino (Campania). Unfortunately, on the basis of the information provided by the administration of this Institute in 2009 (JN, pers. comm.), these collections were lost in 1980 during an earthquake.

Literature from 1983

From 1951 to 1982 nothing was, to our knowledge, published on Libyan lichens. All literature from 1983 onwards, except Crum (1993) and Thell & Feuerer (2008), is based upon material collected by A. Anderberg and G. Thor. Material of *Ramalina maciformis* was distributed in *Lichenes Selecti Exsiccati no. 1940* (Vězda, 1983). Tehler (1983) reported *Dirina cretacea*, *D. immersa* and *D. massiliensis* f. *sorediata* from Libya. Material of *Seirophora lacunosa* was distributed in *Lichenes Selecti Exsiccati no. 2086* (Vězda, 1985). Thor (1985) described the new species *Lichenostigma rugosum* with the type material selected from Libyan material. *Diploschistes diacapsis* (as *D. steppicus*) was mentioned as host of the species. Material of *Sphinctrina turbinata* from Libya was distributed in *Caliciales Exsiccatae no. 149* (Tibell, 1986). Egea & Torrente (1993) reported *Bactrospora patellarioides* from Libya. Crum (1993) reported *Aspicilia esculenta* and *A. jussuffii* from Libya. His material should be located in herbarium MICH. Tibell (2001) included *Sphinctrina turbinata* from Libya. Timdal (1991) indicated the presence of one collection of *Toninia sedifolia* from Libya in herbarium S. *Diplotomma alboatrum* (as *Buellia alboatra*) was reported from Libya by Nordin (2000). Trinkaus & Mayrhofer (2000) reported *Buellia zoharyi* from Libya. Litterski & Ahti (2004) included one locality for *Cladonia rangiformis* from Libya in a distribution map, but there is no additional information about this record. Vondrák & Šoun (2006) included one collection of *Candelariella senior* from Libya, but refrained from formally reporting it as new to Libya. A checklist of the lichens and lichenicolous fungi of Libya including 72 taxa, based on some of the publications cited above, was published on the internet by Thell & Feuerer (2008).

Species list

The species list compiled from literature up to 1950 includes 151 taxa. In a few cases, old determinations are doubtful. The reason for this is in those cases stated. It was sometimes not possible to clarify to what currently valid name an old name refers to. If so, the sentence "further studies are needed to clarify which taxon this name refers to" is included. In some cases where there is some uncertainty "might refer to" is included before the current name. In cases where the uncertainty is slight, "probably refers to" is included before the current name. It is unclear whether or not duplicates of the collections made by Italian lichenologists in Libya are present in herbaria outside Italy, except for the two collections of *Arthonia albopulverea* found in herbarium S (see above).

GT and AA collected a total of 87 species. Of these 49 (61%) were new to Libya, 46 of which which are reported here as new to Libya (Table 1). Lichen collections by A. Anderberg (AA) and G. Thor (GT) are included with the respective collecting numbers. Their collections are deposited in herbarium S and searched for and redetermined by GT during 2008 and 2009. All but 14 collections by GT, earlier determined only to a genus or as "lichen" or "lichenicolous fungus", were found. These collections may have been redetermined and will hopefully turn up in the future. A few species were not possible to determine to species. These species are listed at the end. The collections found in herbarium S 2008 and 2009 are searchable via the internet (http://www.nrm.se/forskningochsamlingar/vaxter/kryptogambotanik.33.html). Here, e.g. information on the localities and substrate can be found. A few duplicates have been sent to

other herbaria, mainly UPS. The collections in herbarium UPS were also searched for and redetermined by GT during 2008 and 2009. The collections found in herbarium UPS 2008 and 2009 are searchable via the internet (http://www-hotel.uu.se/evolmuseum/fytotek/). Some vascular plants and a few fungi collected by AA and GT are also housed in herbarium S, but are not included here.

Species marked by an asterisk (*) are reported as new to Libya, while (!) denotes lichenicolous species. Current names are in bold. Literature citations are given under the current names. If not otherwise stated, the collections by AA and GT are housed in S.

Table 1. The 87 species of lichens and lichenicolous fungi collected by A. Anderberg and G. Thor in 1982 and 1983. Of the species 49 (61%) are new to Libya of which 41 are reported here as new. Those marked in bold are reported here as new to Libya and those marked "*" have been reported as new to Libya in other publications.

Acarospora nodulosa
Arthonia calcicola
Aspicilia farinosa
Arthonia pruinata
Arthrosporum populorum
Aspicilia cheresina
**Bactrospora patellarioides*
Bagliettoa baldensis
**Buellia zoharyi*
Caloplaca aurantia
Caloplaca cerinelloides
Caloplaca citrina
Caloplaca erythrocarpa
Caloplaca haematites
Caloplaca marmorata
Caloplaca oasis
Caloplaca polycarpoides
Caloplaca tenuata
Caloplaca ulcerosa
Caloplaca variabilis
Candelariella aurella
Candelariella reflexa
Candelariella senior
Catillaria detractula
Cladonia firma
Cladonia foliacea
Cladonia pocillum
**Cladonia rangiformis*
Clypeococcum epicrassum
Collema coccophorum
Collema tenax
Diploicia canescens
Diploschistes diacapsis
Diplotomma alboatrum
Diplotomma venustum
**Dirina cretacea*
**Dirina immersa*
**Dirina massiliensis* f. *sorediata*
Fulgensia subbracteata
Intralichen lichenicola
Lecania cyrtella
Lecania rabenhorstii
Lecania turicensis
Lecanora albescens
Lecanora argentata
Lecanora crenulata
Lecanora hagenii
Lecanora horiza
Lecidella laureri
Lichenoconium lecanorae
**Lichenostigma rugosum*
Milospium graphideorum
Ochrolechia turneri
Opegrapha physciaria
Opegrapha rupestris
Opegrapha varia
Physcia adscendens
Physcia biziana
Physcia tenella
Physconia grisea
Placopyrenium trachyticum
Protoparmeliopsis muralis
Psora decipiens
Pyrrhospora quernea
Ramalina lacera
Ramalina maciformis
Rinodina bischoffii var. *bischoffii*
Rinodina dubyana
Rinodina oleae
Rinodina pyrina
Sagiolechia protuberans
Seirophora lacunosa
Sphaerellothecium parietinarium
**Sphinctrina turbinata*
Squamarina cartilaginea
Squamarina periculosa
Stigmidium tabacinae
Tephromela atra
Toninia sedifolia
Toninia subfuscae
Toninia verrucarioides
Verrucaria nigrescens
Xanthoria calcicola
Xanthoria mediterranea
Xanthoria parietina
Xanthoriicola physciae
Zwackhiomyces coepulonus

!*Abrothallus parmeliarum* (Sommerf.) Arnold: Romano 1914: 354, as *Abrothallus smithii* (on *Squamarina cartilaginea*, as *Squamarina crassa*). As *A. parmeliarum* is only reported to grow on *Parmelia* spp., the determination is probably incorrect. Further studies are needed to clarify which taxon this name refers to

!*Abrothallus smithii* Tul. = *Abrothallus parmeliarum*

"*Acarospora albissima* Bagl.": Further studies are needed to clarify which taxon this name in Romano 1918: 73 refers to

Acarospora cervina A. Massal.: Romano 1918: 73, as *Acarospora cervina* var. *percaena*

Acarospora cervina var. *percaena* (Fr.) A. Massal. = *Acarospora cervina*

Acarospora chlorophana (Wahlenb.) A. Massal. = *Pleopsidium chlorophanum*

Acarospora chlorophana var. *oxytona* (Ach.) Jatta = *Pleopsidium flavum*

Acarospora fuscata var. *smaragdula* (Wahlenb.) Arnold = *Acarospora smaragdula* ssp. *smaragdula*

Acarospora percaenoides (Nyl.) Flagey = *Acarospora umbilicata*

Acarospora scabra (Pers.) Th. Fr.: Zanfrognini 1915: 1082, as *Glypholecia candidissima*; Pampanini 1931: 492, as *Glypholecia candidissima*

****Acarospora nodulosa*** (Dufour) Hue: GT 2985

Acarospora schleicheri (Ach.) A. Massal.: Zanfrognini 1915: 1082, as "*Acarospora schleicheri* var. *dealbata*"

"*Acarospora schleicheri* var. *dealbata* (Dur.) Hue" might refer to *Acarospora schleicheri*

Acarospora smaragdula (Wahlenb.) A. Massal. ssp. ***smaragdula***: Romano 1918: 73, as *Acarospora fuscata* var. *smaragdula*

Acarospora umbilicata Bagl.: Romano 1918: 73, as *Acarospora percaenoides*

Acarospora versicolor Bagl. & Carestia: Romano 1918: 73, as "*Sarcogyne eucarpa* var. *carestiae*"

Anaptychia ciliaris (L.) Körb.: Mameli 1919: 177; Maugini 1921: 379; Pampanini & Zanon 1922: 6, as "*Anaptychia ciliaris* var. *albida*"; Pampanini 1931: 61, as *Anaptychia ciliaris* and "*Anaptychia ciliaris* var. *albida*"

"*Anaptychia ciliaris* var. *albida* Muell." might refer to *Anaptychia ciliaris*

Anaptychia ciliaris var. *crinalis* (Schleich.) Rabenh. = *Anaptychia crinalis*

Anaptychia crinalis (Schleich.) Vězda: Mameli 1919: 177, as *Anaptychia ciliaris* var. *crinalis*; Maugini 1921: 379, as *Anaptychia ciliaris* var. *crinalis*; Pampanini 1931: 61, as *Anaptychia ciliaris* var. *crinalis*. This species occur in humid montane forests (Nimis, 1993) and the finding of this species is unlikely. The material probably refers to narrow-lobed forms of *A. ciliaris*

Anaptychia hypoleuca auct. medit. p.max.p. = *Heterodermia obscurata*

Anaptychia (sometimes "*Anaptichia*") *intricata* (Dufour) A. Massal. = *Tornabea scutellifera*

Anaptychia speciosa (Wulfen) A. Massal. = *Heterodermia speciosa*

Anema nummularium (Durieu & Mont.) Nyl.: Romano 1918: 70

Arthonia albopulverea Nyl.: Zanfrognini 1915: 1074, as *Arthothelium xylographoides*; Pampanini 1931: 496, as *Arthothelium xylographoides*. Tobruk, 20 Jan. 1914, A. Vaccari (S); Ad ramos prope Tobruk (Tripolitania), A. Vaccari, Jan. 1920 (S)

****Arthonia calcicola*** Nyl.: AA 945 (in collection of *Caloplaca erythrocarpa*)

****Arthonia pruinata*** (Pers.) A.L. Sm.: GT 3288

!*Arthonia varia* (Tul.) Jatta = *Opegrapha physciaria*

Arthothelium xylographoides Müll. Arg. = *Arthonia albopulverea*

****Arthrosporum populorum*** A. Massal.: GT 2888c.

Aspicilia calcarea (L.) Mudd: Zanfrognini 1913b: 199, as *Lecanora calcarea*; Zanfrognini 1915: 1083, as *Lecanora calcarea* var. *concreta*; Romano 1918: 72, as *Lecanora calcarea* and *Lecanora calcarea* var. *concreta*; Mameli 1919: 177, as *Lecanora calcarea* var. *concreta*; Pampanini & Zanon 1919: 220, as *Lecanora calcarea* var. *concreta*; Pampanini 1931: 62 & 491, as *Lecanora calcarea* var. *concreta*

****Aspicilia cheresina*** var. ***microspora*** (Arnold) Clauzade & Cl. Roux: GT 3001b

Aspicilia cinerea (L.) Körb.: Zanfrognini 1913b: 199, as *Lecanora cinerea*; Romano 1914: 351, as *Lecanora cinerea*; Romano 1918: 72, as *Lecanora cinerea*; Zanfrognini 1913: 199, as *Lecanora cinerea*

Aspicilia contorta (Hoffm.) Kremp. ssp. ***contorta***: Romano 1918: 72, as "*Lecanora calcarea* var. *contorta* f. *bullosa*"

Aspicilia esculenta (Pall.) Flagey: Durand & Barrate 1910: 287, as *Lecanora esculenta*; Reichert 1937: 193; Crum 1993

Aspicilia farinosa (Flörke) Arnold: Romano 1914: 351, as "*Lecanora calcarea* var. *concreta* f. *farinosa*"; Zanfrognini 1915: 1083, as "*Lecanora calcarea* var. *concreta* f. *farinosa*"; Szatala 1929: 164; Pampanini 1931: 492, as "*Lecanora calcarea* var. *farinosa*", GT 2946b (dupl. in UPS)

Aspicilia jussuffii (Link) Meresch.: Crum 1993, as *A.* "*jussufii*"

Aspicilia viridescens (A. Massal.) Hue: Zanfrognini 1915: 1083, as "*Lecanora calcarea* var. *viridescens*"; Pampanini 1931: 492, as "*Lecanora calcarea* var. *viridescens*"

Bactrospora patellarioides (Nyl.) Almq. var. ***patellarioides***: Egea & Torrente 1993: 248. GT 3289

Bagliettoa baldensis (A. Massal.) Vězda: Pampanini 1917: 169, as *Verrucaria baldensis*; Pampanini 1931: 68 & 496, as *Verrucaria baldensis*. GT 3311 (in collection of *Caloplaca oasis*)

Bagliettoa limborioides A. Massal.: Mameli 1919: 183; Pampanini & Zanon 1919: 219; Pampanini 1931: 68

Biatora albilabra Dufour in Fr. = *Toninia albilabra*

"*Biatora coroniformis* (Kremp.) Jatta": Further studies are needed to clarify which taxon this name in Romano 1914: 353 and Romano 1918: 76 refers to (see also *Lecidea coroniformis*)

Biatora decipiens (Hedw.) Fr. = *Psora decipiens*

"*Biatora decipiens* var. *dealbata* A. Massal." probably refers to *Lecidea decipiens* f. *dealbata* (A. Massal.) Jatta = *Psora decipiens*

"*Biatora lenticularis* var. *acrustacea* Körb." probably refers to *Biatorina lenticularis* f. *acrustacea* Hepp = *Catillaria minuta*

"*Biatora lenticularis* var. *vulgaris* Körb." probably refers to *Catillaria lenticularis* var. *vulgaris* (Körb.) Th. Fr. = *Catillaria chalybeia*

Biatora lurida (Ach.) Fr. = *Mycobilimbia lurida*

Biatora opaca (Fr.) Jatta = *Placolecis opaca*

"*Biatora vesicularis* (Hoffm.)" probably refers to *Biatorina vesicularis* (Hoffm.) Jatta = *Toninia sedifolia*

Buellia alboatra (Hoffm.) Th. Fr. (in Zanfrognini 1913b: 203 as "*Buellia atroalba*") = *Diplotomma alboatrum*

"*Buellia alboatra* f. *epipolia* (Ach.)" probably refers to *Buellia alboatra* var. *epipolia* (Ach.) Rostr. = *Diplotomma alboatrum*

"*Buellia alboatra* var. *epipolia* f. *paucina* A. Massal." might refer to *Diplotomma alboatrum*

Buellia alboatra var. *venusta* (Körb.) Th. Fr. = *Diplotomma venustum*

"*Buellia atroalba*": see *Buellia alboatra*

Buellia dispersa A. Massal.: Zanfrognini 1915: 1099; Romano 1918: 77; Mameli 1919: 183; Pampanini & Zanon 1919: 219; Pampanini 1931: 67 & 495

Buellia epigaea (Pers.) Tuck.: Romano 1918: 77, as "*Buellia epigaea* f. *intermedia*". Trinkhaus & Mayrhofer (2000) report no finding of this species from North Africa. Instead they write that earlier reports of this species from North Africa belong to *B. zoharyi*. Further studies are needed to clarify which taxon this name refers to

"*Buellia epigaea* f. *intermedia* (Schaer.)" probably refers to *Buellia epigaea* var. *intermedia* (Wallr.) Anzi = *Buellia epigaea*

!*Buellia saxatilis* (Schaer.) Körb. = *Dactylospora saxatilis*

Buellia zoharyi Galun: Trinkaus & Mayrhofer 2000: 307 (GT 3314). AA 1098, GT 2983, 3314

"*Callopisma aurantiacum* var. *erythrellum* Ach." probably refers to *Caloplaca erythrella* (Ach.) Kieff. = *Caloplaca flavovirescens*

Callopisma (as *Caloplaca*) *aurantiacum* var. *gyalectoides* (in Pampanini 1931: 64 as "*gyalectroides*") A. Massal. sensu Jatta = *Caloplaca irrubescens*

Callopisma aurantiacum var. *holocarpum* (Ach.) A. Massal. = *Caloplaca holocarpa*

Caloplaca agardhiana auct. non *Pyrenodesmia agardhiana* (Ach.) A. Massal. = *Caloplaca albopruinosa*

Caloplaca albopruinosa (Arnold) H. Olivier: Zanfrognini 1915: 1093, as "*Caloplaca albopruinosa* var. *agardhiana*"; Romano 1918: 75, as *Caloplaca agardhiana*; Pampanini 1931: 493

"*Caloplaca albopruinosa* var. *agardhiana* (Schaer.)" probably refers to *Caloplaca agardhiana* auct. non *Pyrenodesmia agardhiana* (Ach.) A. Massal. = *Caloplaca albopruinosa*

Caloplaca aurantia (Pers.) Hellb.: Zanfrognini 1913b: 202, as *Caloplaca callopisma*; Romano 1914: 352, as *Caloplaca callopisma*; Zanfrognini 1915: 1095; Pampanini 1917: 167, as *Caloplaca callopisma*; Romano 1918: 74, as *Caloplaca callopisma*; Mameli 1919: 180, as *Caloplaca callopisma*; Pampanini & Zanon 1919: 219, as *Caloplaca callopisma*; Mameli 1928: 576, as *Caloplaca callopisma*; Pampanini 1931: 64, as *Caloplaca callopisma.* AA 947, GT 2915b, GT 2944 (in collection of *Squamarina cartilaginea*), GT 2946 (in collection of *Candelariella senior*, UPS)

"*Caloplaca aurantia* f. *detrita* (A. Massal.)" probably refers to *Physcia murorum* var. *detrita* A. Massal. = *Caloplaca flavescens*

"*Caloplaca aurantia* var. *centrifuga* (A. Massal.)" probably refers to *Gasparrinia aurantia* f. *centrifuga* (A. Massal.) Szatala = *Caloplaca flavescens*

"*Caloplaca aurantia* var. *centroleuca* (A. Massal.)" probably refers to *Physcia callopisma* var. *centroleuca* A. Massal. = *Caloplaca flavescens*

"*Caloplaca aurantia* var. *exalbata* (A. Massal.)" in Zanfrognini 1915: 1096 could refer to *Caloplaca ferruginea* (Huds.) Th. Fr. or *Caloplaca flavorubescens* (Huds.) J.R. Laundon. Further studies are needed to clarify which taxon this name refers to

"*Caloplaca aurantiaca* Fr.": Further studies are needed to clarify which taxon this name in Pampanini 1931: 492 and Zanfrognini 1915: 1092 refers to

"*Caloplaca aurantiaca* f. *detrita* A. Massal." probably refers to *Physcia murorum* var. *detrita* A. Massal. = *Caloplaca flavescens*

"*Caloplaca aurantiaca* f. *flavovirens* Schaer." in Pampanini 1931: 493 could refer to *Caloplaca ferruginea* (Huds.) Th. Fr. or *Caloplaca flavorubescens* (Huds.) J.R. Laundon. Further studies are needed to clarify which taxon this name refers to

"*Caloplaca aurantiaca* var. *centroleuca* A. Massal." probably refers to *Physcia callopisma* var. *centroleuca* A. Massal. = *Caloplaca flavescens*

Caloplaca aurantiaca var. *erythrella* (Ach.) Th. Fr. = *Caloplaca flavovirescens*

"*Caloplaca aurantiaca* var. *exalbata* Müll. Arg." in Pampanini 1931: 493 could refer to *Caloplaca ferruginea* (Huds.) Th. Fr. or *Caloplaca flavorubescens* (Huds.) J.R. Laundon. Further studies are needed to clarify which taxon this name refers to

"*Caloplaca*" (should be *Callopisma*) *aurantiaca* var. *gyalectoides* (sometimes "*gyalectroides*") A. Massal. sensu Jatta = *Caloplaca irrubescens*

Caloplaca aurantiaca var. *holocarpa* (Ach.) Th. Fr. = *Caloplaca holocarpa*

Caloplaca aurantiaca var. *inalpina* (Ach.) H. Magn = *Caloplaca flavovirescens*

Caloplaca aurantiaca var. *polycarpa* (A. Massal.) Jatta = *Caloplaca polycarpa*

Caloplaca bracteata (Hoffm.) Jatta = *Fulgensia bracteata*

Caloplaca callopisma (Ach.) Th. Fr. = *Caloplaca aurantia*

****Caloplaca cerinelloides*** (Erichsen) Poelt: GT 3286c

Caloplaca chalybaea (Fr.) Müll. Arg.: Romano 1918: 75

Caloplaca citrina (Hoffm.) Th. Fr.: Zanfrognini 1913b: 201. GT 3009, 3267, 3309

Caloplaca elegans (Link) Th. Fr. = *Xanthoria elegans* var. *elegans*

"*Caloplaca elegans* var. *compacta* Nyl." probably refers to *Physcia elegans* var. *compacta* Arnold ex Nyl. = *Xanthoria sorediata*

Caloplaca elegans var. *tenuis* (Wahlenb.) Th. Fr. = *Xanthoria elegans* var. *elegans*

Caloplaca erythrocarpa (Pers.) Zwackh: Romano 1918: 74; Mameli 1919: 180; Pampanini & Zanon 1919: 219; Mameli 1928: 576; Pampanini 1931: 64. AA 945

Caloplaca flavescens (Huds.) J.R. Laundon: Romano 1914: 352, as *Placodium heppianum*; Zanfrognini 1915: 1096 & 1097, as "*Caloplaca aurantia* f. *detrita*", "*Caloplaca aurantia* var. *centrifuga*" and "*Caloplaca aurantia* var. *centroleuca*"; Mameli 1919: 179, as "*Caloplaca murorum* var. *centrifuga*"; Pampanini & Zanon 1919: 219, as "*Caloplaca murorum* var. *centrifuga*"; Pampanini 1931: 65 & 493, as "*Caloplaca murorum* var. *centrifuga*"; Pampanini 1931: 493, as "*Caloplaca aurantiaca* var. *centroleuca*" and "*Caloplaca aurantiaca* f. *detrita*"

Caloplaca flavorubescens (Huds.) J.R. Laundon: Thell & Feuerer (2008) with reference to *Callopisma aurantiacum* in Baroni (1892: 242). However, Baroni report *Callopisma aurantiacum* var. *holocarpum* = *Caloplaca holocarpa*, and not *C. flavorubescens*. *C. flavorubescens* should be excluded from the the Libyan checklist

Caloplaca flavovirescens (Wulfen) Dalla Torre & Sarnth.: Mameli 1913: 159, as "*Callopisma aurantiacum* var. *erythrellum*"; Zanfrognini 1915: 1091; Pampanini 1917: 167, as *Caloplaca aurantiaca* var. *inalpina*; Romano 1918: 74, as *Caloplaca aurantiaca* var. *erythrella*; Pampanini 1931: 64, as *Caloplaca aurantiaca* var. *inalpina*

Caloplaca fulva (Anzi) J. Steiner = *Caloplaca variabilis*

****Caloplaca haematites*** (St.-Amans) Zwackh: GT 2920, 3286, 3022 (in collection of *Caloplaca polycarpoides*)

Caloplaca holocarpa (Ach.) A.E. Wade: Baroni 1892: 242, as *Callopisma aurantiacum* var. *holocarpum*; Zanfrognini 1913: 201, as *Caloplaca aurantiaca* var. *holocarpa*

Caloplaca irrubescens (Arnold) Zahlbr.: Pampanini 1917: 167, as "*Caloplaca aurantiaca* var. *gyalectoides*"; Mameli 1928: 576, as "*Caloplaca aurantiaca* var. *gyalectoides*" ("*gyalectroides*"); Pampanini 1931: 64, as "*Caloplaca aurantiaca* var. *gyalectoides*" ("*gyalectroides*")

****Caloplaca marmorata*** (Bagl.) Jatta: GT 3005

Caloplaca murorum (Ach.) Th. Fr. = *Caloplaca saxicola*

"*Caloplaca murorum* var. *centrifuga* A. Massal." probably refers to *Physcia murorum* var. *centrifuga* A. Massal. = *Caloplaca flavescens*

"*Caloplaca murorum* var. *decipiens* f. *leprosogranulosa* ("*leprosa-granulosa*") Arnold": Further studies are needed to clarify which taxon this name in Zanfrognini 1915: 1095 and Pampanini 1931: 493 refers to

Caloplaca murorum var. *pulvinata* (A. Massal.) Jatta = *Caloplaca saxicola*

"*Caloplaca murorum* var. *subcitrina* Nyl.": Further studies are needed to clarify which taxon this name in Mameli 1919: 180, Pampanini & Zanon 1919: 220 and Pampanini 1931: 65 refers to

****Caloplaca oasis*** (A. Massal.) Szatala: GT 2946 (in collection of *Candelariella senior*, S (only three apothecia), UPS (many apothecia)), 3311

Caloplaca ochracea (Schaer.) Flagey: Zanfrognini 1915: 1090; Pampanini 1931: 494

Caloplaca pollinii (A. Massal.) Jatta: Pampanini & Zanon 1922: 6; Pampanini 1931: 65

Caloplaca polycarpa (A. Massal.) Zahlbr.: Mameli 1919: 180, as *Caloplaca aurantiaca* var. *polycarpa*; Pampanini & Zanon 1919: 219, as *Caloplaca aurantiaca* var. *polycarpa*; Pampanini 1931: 64, as *Caloplaca aurantiaca* var. *polycarpa*

****Caloplaca polycarpoides*** (J. Steiner) M. Steiner & Poelt: GT 3022

"*Caloplaca pusilla* var. *turgida* A. Massal." probably refers to *Physcia pusilla* var. *turgida* A. Massal. = *Caloplaca saxicola*

"*Caloplaca pyracea* f. *rupestris* Nyl.": Further studies are needed to clarify which taxon this name in Zanfrognini 1915: 1092 and Pampanini 1931: 493 refers to

"*Caloplaca pyracea* var. *rupestris* (Scop.) Malbr.": Further studies are needed to clarify which taxon this name in Romano 1918: 74 refers to

Caloplaca rubelliana (Ach.) Lojka: Romano 1914: 352; Zanfrognini 1915: 1094; Pampanini 1931: 493

Caloplaca saxicola (Hoffm.) Nordin: Baroni 1892: 240, as "*Gasparrinia murorum* var. *lobulata*"; Zanfrognini 1913b: 203, as *Caloplaca murorum*; Zanfrognini 1915: 1095, as *Caloplaca murorum* var. *pulvinata*; Romano 1918: 74, as *Caloplaca murorum* and "*Caloplaca pusilla* var. *turgida*"; Mameli 1919: 179, as *Caloplaca murorum*; Pampanini & Zanon 1919: 219, as *Caloplaca murorum*; Pampanini 1931: 65, as *Caloplaca murorum*; Pampanini 1931: 493 as *Caloplaca murorum* var. *pulvinata*

Caloplaca subsimilis Th. Fr. = *Candelariella aurella*

****Caloplaca tenuata*** (Nyl.) Zahlbr.: GT 3305

****Caloplaca ulcerosa*** Coppins & P. James: GT 3317, 3320

Caloplaca variabilis (Pers.) Müll. Arg.: Zanfrognini 1913b: 202; Zanfrognini 1915: 1092; Pampanini 1917: 167, as *Caloplaca fulva*; Mameli 1919: 181 & 182, as *Caloplaca fulva* and *C. variabilis*; Pampanini & Zanon 1919: 219 & 220, as *Caloplaca fulva* and C. *variabilis*; Pampanini 1931: 64, as *Caloplaca fulva*; Pampanini 1931: 65 & 492. AA 947b, GT 3306 (in collection of *Tephromela atra*), 3311 (in collection of *Caloplaca oasis*)

"*Caloplaca vitellinula* (Nyl.) J. Harm." in Zanfrognini 1915: 1094 and "*Caloplaca vitellinula* J. Harm." in Pampanini 1931: 493 certainly do not refer to *Caloplaca vitellinula* (Nyl.) H. Olivier as this species has a northern distribution in Europe (Arup, 2009). Further studies are needed to clarify which taxon this name refers to

Candelariella aurella (Hoffm.) Zahlbr.: Zanfrognini 1915: 1094, as *Caloplaca subsimilis*; Romano 1918: 74, as *Caloplaca subsimilis*. AA 947c

Candelariella medians (Nyl.) A.L. Sm.: Mameli 1913: 158, as "*Physcia parietina* var. *granulata*"

****Candelariella reflexa*** (Nyl.) Lettau: GT 3320c

****Candelariella senior*** Poelt: GT 2946 (dupl. in UPS and GZU), 3304

Catapyrenium cinereum (Pers.) Körb.: Durand & Barrate 1910: 286, as *Endopyrenium hepaticum*; Zanfrognini 1913a: 138, as *Dermatocarpon cinereum*; Zanfrognini 1913b: 195, as *Dermatocarpon hepaticum*; Romano 1914: 354, as *Endopyrenium hepaticum*; Zanfrognini 1915: 1074, as *Dermatocarpon hepaticum*; Romano 1918: 77, as *Endopyrenium hepaticum*; Pampanini 1931: 67, as *Endopyrenium hepaticum*

Catillaria chalybeia (Borrer) A. Massal.: Zanfrognini 1915: 1078, as *Catillaria lenticularis* var. *vulgaris*; Pampanini 1931: 494, as "*Biatora lenticularis* var. *vulgaris*"

****Catillaria detractula*** (Nyl.) H. Olivier: AA 945 (in collection of *Caloplaca erythrocarpa*)

Catillaria lenticularis (Ach.) Th. Fr.: Zanfrognini 1915: 1078, as "*Catillaria lenticularis* var. *nigricans*"

"*Catillaria lenticularis* var. *acrustacea* (Körb.) Arnold" probably refers to *Catillaria lenticularis* f. *acrustacea* (Hepp) Hasse = *Catillaria minuta* (but it might also refer to *Catillaria acrustacea* Arnold = *Toninia athallina* (Hepp) Timdal)

"*Catillaria lenticularis* var. *nigricans* Arnold" probably refers to *Biatorina lenticularis* f. *nigricans* Arnold = *Catillaria lenticularis*

Catillaria lenticularis var. *vulgaris* (Körb.) Th. Fr. = *Catillaria chalybeia*

Catillaria minuta (A. Massal.) Lettau: Zanfrognini 1915: 1078, as *Catillaria lenticularis* var. *acrustacea*; Pampanini 1931: 494, as "*Biatora lenticularis* var. *acrustacea*"

Cladonia convoluta (Lam.) Anders: Durand & Barrate 1910: 286, as *Cladonia endiviaefolia*; Zanfrognini 1913a: 141, as *Cladonia endiviaefolia*; Maugini 1921: 379, as *Cladonia endiviaefolia*; Mameli 1928: 577, as *Cladonia endiviaefolia*; Pampanini 1931: 59, as *Cladonia endiviaefolia*; Reichert 1937: 192, as *Cladonia endiviifolia* ("*endivifolia*")

Cladonia endiviaefolia auct. p.p. = *Cladonia convoluta*

Cladonia endiviifolia ("*endivifolia*") auct. p.p. = *Cladonia convoluta*

****Cladonia firma*** (Nyl.) Nyl.: GT 3338

****Cladonia foliacea*** (Huds.) Willd.: GT 2914, 3338

Cladonia pocillum (Ach.) O.J. Rich.: Zanfrognini 1913a: 141, as *Cladonia pyxidata* var. *pocillum*; Romano 1918: 75, as *Cladonia pyxidata* var. *pocillum*. GT 2945

Cladonia pyxidata var. *pocillum* (Ach.) Fr. = *Cladonia pocillum*

Cladonia rangiformis Hoffm.: Litterski & Ahti 2004: 233. GT 2977

"*Cladonia turgida* f. *sterilis* Rabenh." in Mameli 1913: 158 might refer to *Cladonia turgida* Hoffm., but the identification is unlikely to be correct (T. Ahti, pers. comm.). Further studies are needed to clarify which taxon this name refers to

*!***Clypeococcum epicrassum*** (H. Olivier) Nav.-Ros. & Cl. Roux: GT 2902b (on *Squamarina lentigera*), 2993b (on *Squamarina lentigera*), 3418b (on *Squamarina lentigera*)

"*Collema cheileum* ("*cheilum*") (Ach.) Nyl." probably refers to *Lichen cheileus* Ach. = *Collema crispum var. crispum*

"*Collema cheileum* ("*cheilum*") f. *metzleri* (Ach.) Nyl." probably refers to *Collema cheileum* var. *metzleri* Arnold = *Collema crispum* var. *metzleri*

Collema cheileum ("*cheilum*") var. *metzleri* ("*netzleri*") Arnold = *Collema crispum* var. *metzleri*

***Collema coccophorum** Tuck.: AA 1041

Collema crispum (Huds.) F.H. Wigg (incl. var. *crispum* and var. *metzleri* (Arnold) Degel.): Zanfrognini 1915: 1082, as "*Collema cheileum*"; Zanfrognini 1915: 1082, as "*Collema cheileum* f. *metzleri*"; Zanfrognini 1915: 1083; Pampanini 1931: 491, as *Collema crispum* and "*Collema cheileum* var. *metzleri*"

Collema cristatum (L.) F.H. Wigg.: Durand & Barrate 1910: 288; Zanfrognini 1913a: 141; Pampanini 1931: 60 & 491

Collema pulposum (Bernh.) Ach. = *Collema tenax*

"*Collema pulposum* var. *granulatum* (Ach.) Körb.": Further studies are needed to clarify which taxon this name in Zanfrognini 1913a: 142 and Romano 1918: 70 refers to

Collema pulposum var. *vulgare* (Schaer.) Degel. = *Collema tenax* var. *vulgare* (Schaer.) Degel

Collema tenax (Sw.) Ach. var. ***vulgare*** (Schaer.) Degel.: Baroni 1892: 242, as *Collema pulposum*; Zanfrognini 1913a: 141, as *Collema pulposum* var. *vulgare*; Pampanini 1931: 491, as *Collema pulposum* var. *vulgare*. GT 2903, 2983 (in collection of *Buellia zoharyi*), 3296, 3418 (in collection of *Squamarina periculosa*)

"*Collema turgidum* Ach." and "*C. turgidum* Nyl." probably refers to *Leptogium schraderi*

!***Dactylospora saxatilis*** (Schaer.) Hafellner: Zanfrognini 1913b: 203, as *Buellia saxatilis* (on "*Lecanora cinerea* var. *calcarea*"; further studies are needed to clarify which taxon this name refer to); Zanfrognini 1915: 1100, as *Buellia saxatilis*; Romano 1918: 78, as *Karschia saxatilis* (on *Aspicilia calcarea*, as *Lecanora* (*Aspicilia*) *calcarea*)

Dermatocarpon cinereum (Pers.) Th. Fr. = *Catapyrenium cinereum*

Dermatocarpon hepaticum (Ach.) Th. Fr. non auct. = *Catapyrenium cinereum*

Dermatocarpon rufescens (Ach.) Th. Fr. = *Placidium rufescens*

"*Diphratora cesatii* var. *olivacea* Bagl." probably refers to *Ricasolia olivacea* (Fr.) Bagl. = *Solenopsora olivacea* ssp. *olivacea*

"*Diphratora spadicea* var. *gennarii* Bagl." probably refers to *Lecania spadicea* var. *gennarii* (Bagl.) Steiner = *Lecania spadicea*

Diploicia canescens (Dicks.) A. Massal.: GT 3288b, 3295 (in collection of *Xanthoria parietina*)

Diploschistes actinostomus (Ach.) Zahlbr.: Mameli 1919: 182, as *Urceolaria actinostoma*; Pampanini & Zanon 1919: 220, as *Urceolaria actinostoma*; Mameli 1928: 576, as *Urceolaria actinostoma*; Pampanini 1931: 65, as *Urceolaria actinostoma*

"*Diploschistes actinostomus* var. *calcareus* ("*calcarea*") Müll. Arg." probably refers to *Urceolaria actinostoma* var. *calcarea* Müll. Arg. = *Diploschistes candidissimus*

Diploschistes candidissimus (Kremp.) Zahlbr.: Zanfrognini 1913b: 196, as "*Diploschistes actinostomus* var. *calcarea*"; Zanfrognini 1915: 1076, as "*Diploschistes actinostomus* var. *calcarea*"; Pampanini 1917: 169, as *Urceolaria actinostoma* var. *tectorum*; Mameli 1919: 182, as *Urceolaria actinostoma* var. *farinosa*; Pampanini & Zanon 1919: 220, as *Urceolaria*

actinostoma var. *farinosa*; Mameli 1928: 576, as *Urceolaria actinostoma* var. *farinosa*; Pampanini 1931: 66 & 494, as *Urceolaria actinostoma* var. *farinosa*, *Urceolaria actinostoma* var. *tectorum* and *Urceolaria actinostoma* var. *calcarea*

Diploschistes diacapsis (Ach.) Lumbsch: Baroni 1892: 242, as *Urceolaria scruposa* var. *albissima*; Zanfrognini 1913a: 139, as *Diploschistes scruposus* var. *albissimus*; Zanfrognini 1913b: 196, as *Diploschistes scruposus* var. *albissimus*; Thor 1985: 272, as *Diploschistes steppicus*. AA 927; GT 2899, 2900, 3457

Diploschistes gypsaceus (Ach.) Zahlbr.: Mameli 1913: 159, as *Urceolaria scruposa* var. *gypsacea*; Romano 1914: 353, as *Urceolaria scruposa* var. *gypsacea*; Zanfrognini 1915: 1075, as "*Diploschistes scruposus* var. *gypsaceus*"; Pampanini 1917: 169, as *Urceolaria scruposa* var. *gypsacea*

Diploschistes muscorum (Scop.) R. Sant.: Zanfrognini 1913b: 196, as "*Diploschistes scruposus* var. *bryophilus*" ("*bryophila*"); Romano 1918: 75, as "*Urceolaria scruposa* var. *bryophila*"

Diploschistes ocellatus (Vill.) Norman: Mameli 1913: 159, as *Urceolaria ocellata*; Romano 1914: 353, as *Urceolaria ocellata*; Mameli 1928: 576, as *Urceolaria ocellata*; Pampanini 1931: 66, as *Urceolaria ocellata*

Diploschistes scruposus (Schreb.) Norman: Durand & Barrate 1910: 288; Zanfrognini 1913b: 196; Pampanini 1931: 66, as *Urceolaria scruposa*

Diploschistes scruposus var. *albissimus* (Ach.) Dalla Torre & Sarnth. = *Diploschistes diacapsis*

"*Diploschistes scruposus* var. *bryophilus* ("*bryophila*") (Ehrh.) Th. Fr." probably refers to *Diploschistes scruposus* var. *bryophilus* (Ach.) Müll. Arg. = *Diploschistes muscorum*

"*Diploschistes scruposus* var. *gypsaceus* (Sommerf.)" probably refers to *Diploschistes gypsaceus*

Diploschistes steppicus Reichert = *Diploschistes diacapsis*

Diplotomma alboatrum (Hoffm.) Flot.: Zanfrognini 1913b: 203, as "*Buellia atroalba*"; Romano 1914: 353, as "*Diplotomma alboatrum* var. *ambiguum*", *D. alboatrum* var. *corticola* and *D. alboatrum* var. *epipolium*; Zanfrognini 1915: 1100, as "*Buellia alboatra* f. *epipolia*" and "*Buellia alboatra* var. *epipolia* f. *paucina*"; Romano 1918: 76, as *Diplotomma alboatrum*, *Diplotomma alboatrum* var. *epipolium* and *Diplotomma alboatrum* var. *murorum*; Mameli 1919: 183, as "*Diplotomma alboatrum* var. *ocellatum*"; Pampanini & Zanon 1919: 220, as "*Diplotomma alboatrum* var. *ocellatum*"; Pampanini 1931: 67 & 495, as "*Diplotomma alboatrum* var. *ocellatum*" and *Diplotomma alboatrum* var. *epipolium* ("*epilobium*) and "*Diplotomma alboatrum* var. *epipolium* f. *paucinum*"; Nordin 2000: 51, as *Buellia alboatra*. The species is here accepted in a broad sense and include *D. murorum* (A. Massal.) Coppins. GT 2920 (in collection of *Caloplaca haematites*), 3022 (in collection of *Caloplaca polycarpoides*), 3283

"*Diplotomma alboatrum* var. *ambiguum* Ach." probably refers to the basionym *Lecidea ambigua* Ach. = *Diplotomma alboatrum*

"*Diplotomma alboatrum* var. *corticola* Schaer." probably refers to the basionym *Lichen corticola* Ach. = *Diplotomma alboatrum*

Diplotomma alboatrum var. *epipolium* (sometimes "*epilobium*") A. Massal. = *Diplotomma alboatrum*

"*Diplotomma alboatrum* var. *epipolium* ("*epilobium*") f. *paucinum* A. Massal." might refer to *Diplotomma alboatrum*

Diplotomma alboatrum var. *murorum* A. Massal. = *Diplotomma alboatrum*
"*Diplotomma alboatrum* var. *ocellatum* A. Massal." probably refers to *Diplotomma alboatrum*
Diplotomma alboatrum var. *venustum* Körb. in Rabenh. = *Diplotomma venustum*
Diplotomma chlorophaeum (Leight.) Szatala: Romano 1914: 353, as *Diplotomma porphyricum*
Diplotomma pharcidium (Ach.) Choisy: Romano 1918: 76, as *Diplotomma zaboticum*
Diplotomma porphyricum Arnold = *Diplotomma chlorophaeum*
Diplotomma venustum (Körb.) Körb.: Zanfrognini 1915: 1100, as *Buellia alboatra* var. *venusta*; Pampanini 1931: 495, as *Diplotomma alboatrum* var. v*enustum*. GT 3313 (in collection of *Lecania rabenhorstii*; starting as parasite on this species)
Diplotomma zaboticum Körb. = *Diplotomma pharcidium*
Dirina cretacea (Zahlbr.) Tehler: Tehler 1983: 45. AA 1000
Dirina immersa Müll. Arg.: Tehler 1983: 43. AA 1051
Dirina massiliensis f. ***sorediata*** (Müll. Arg.) Tehler: Tehler 1983: 34. GT 2926

Endocarpon rufescens Ach. = *Placidium rufescens*
Endopyrenium hepaticum (Ach.) Körb. = *Catapyrenium cinereum*
Evernia prunastri (L.) Ach.: Pampanini & Zanon 1922: 6; Mameli 1928: 576; Pampanini 1931: 60

Fulgensia bracteata (Hoffm.) Räsänen: Mameli 1913: 159, as *Caloplaca bracteata*; Romano 1918: 74, as *Caloplaca bracteata*
Fulgensia fulgens (Sw.) Elenkin f. ***fulgens***: Baroni 1892: 241, as *Placodium fulgens*; Zanfrognini 1913a: 146, as *Lecanora fulgens*; Zanfrognini 1913b: 200, as *Lecanora fulgens*; Zanfrognini 1915: 1084, as *Lecanora fulgens*; Pampanini 1917: 168, as *Lecanora fulgens*; Romano 1918: 71, as *Lecanora fulgens*; Pampanini 1931: 63, as *Lecanora fulgens*
****Fulgensia subbracteata*** (Nyl.) Poelt: GT 2984, 3315

Gasparrinia candicans (Dicks.) Syd. = *Solenopsora candicans*
"*Gasparrinia murorum* var. *lobulata* Ach." might refer to *Caloplaca saxicola*. Thell & Feuerer (2008) incorrectly give this name as *Gasparrinia murorum*
Gloeoheppia turgida (Ach.) Gyeln.: Zanfrognini 1913b: 199, as *Heppia endocarpea*
Glypholecia candidissima Nyl. = *Acarospora scabra*
"*Glypholechiella trachitica* Jatta": Further studies are needed to clarify which taxon this name in Zanfrognini 1913b: 198 refers to

Heppia endocarpea (Fr.) Hue = *Gloeoheppia turgida*
Heppia reticulata (Dufour) Nyl. = *Heppia solorinoides*
Heppia solorinoides (Nyl.) Nyl.: Zanfrognini 1913a: 142, as *Heppia reticulata*
Heterodermia obscurata (Nyl.) Trevis.: Mameli 1928: 576, as *Anaptychia hypoleuca*; Pampanini 1931: 61, as *Anaptychia hypoleuca*
Heterodermia speciosa (Wulfen) Trevis.: Mameli 1919: 177, as *Anaptychia speciosa*; Pampanini & Zanon 1919: 219, as *Anaptychia speciosa*; Pampanini 1931: 62, as *Anaptychia speciosa*

Imbricaria prolixa (Ach.) Arnold = *Xanthoparmelia pulla*
*!***Intralichen lichenicola*** (M.S. Christ. & D. Hawksw.) D. Hawksw. & M.S. Cole: GT 2946 (on *Candelariella senior* in collection of this species, dupl. in UPS)

!*Karschia saxatilis* (Schaer.) Rehm = *Dactylospora saxatilis*

****Lecania cyrtella*** (Ach.) Th. Fr.: GT 2920b (in collection of *Arthonia* sp.)

Lecania erysibe (Ach.) Mudd: Pampanini 1931: 494

"*Lecania erysibe* f. *nigra* B. de Lesd.": Further studies are needed to clarify which taxon this name in Szatala 1929: 165 refers to

Lecania erysibe var. *rabenhorstii* (Hepp) Mudd = *Lecania rabenhorstii*

Lecania proteiformis (A. Massal.) Arnold: Romano 1914: 352, as "*Lecaniella proteiformis*"; Romano 1918: 75, as "*Lecaniella proteiformis*"

Lecania rabenhorstii (Hepp) Arnold: Zanfrognini 1915: 1085, as *Lecania erysibe* var. *rabenhorstii*. GT 3313

Lecania spadicea (Flot.) Zahlbr.: Zanfrognini 1915: 1086, as "*Placolecania spadicea* var. *gennarii*"; Pampanini 1931: 494, as "*Diphratora spadicea* var. *gennarii*"

****Lecania turicensis*** (Hepp) Müll. Arg.: GT 2946 (in collection of *Candelariella senior*, S (one apothecium), UPS (several apothecia)), 3313b

"*Lecaniella proteiformis* (A. Massal.)" probably refers to the basionym *Biatorina proteiformis* A. Massal. = *Lecania proteiformis*

Lecanora agardhiana Ach.: Szatala 1929: 164

Lecanora albescens (Hoffm.) Branth & Rostr.: Baroni 1892: 241, as "*Placodium albescens* var. *galactina*"; Romano 1914: 351, as *Lecanora galactina* and "*Lecanora galactina* var. *muralis*"; Romano 1918: 71, as *Placodium albescens*; Mameli 1928: 576, as *Lecanora galactina*; Pampanini 1931: 63, as *Lecanora galactina*. GT 3267 (in collection of *Caloplaca citrina*), 3311 (in collection of *Caloplaca oasis*)

****Lecanora argentata*** (Ach.) Malme: GT 3320d

Lecanora atra (Huds.) Ach. = *Tephromela atra* var. *atra*

Lecanora caesioalba (Flörke) Körb. = *Lecanora crenulata*

Lecanora calcarea (L.) Sommerf. = *Aspicilia calcarea*

"*Lecanora calcarea* f. *ochracea* Körb.": Further studies are needed to clarify which taxon this name in Romano 1918: 72 refers to

Lecanora calcarea var. *concreta* Schaer. = *Aspicilia calcarea*

"*Lecanora calcarea* var. *concreta* f. *farinosa* Flörke" (in Romano 1914: 351) and "*Lecanora calcarea* var. *concreta* f. *farinosa* (Flörke) Jatta" (in Zanfrognini 1915: 1083) probably refers to *Aspicilia calcarea* var. *farinosa* (Flörke) Hazsl. = *Aspicilia farinosa*

"*Lecanora calcarea* var. *concreta* f. *ochracea* (Körb.) Jatta": Further studies are needed to clarify which taxon this name in Zanfrognini 1915: 1083 refers to

"*Lecanora calcarea* var. *contorta* f. *bullosa* A. Massal." probably refers to *Aspicilia calcarea* f. *bullosa* (A. Massal.) Arnold = *Aspicilia contorta* ssp. *contorta*

"*Lecanora calcarea* var. *farinosa* Flörke" probably refers to *Lecanora farinosa* (Flörke) Nyl. = *Aspicilia farinosa*

"*Lecanora calcarea* var. *ochracea* Körb.": Further studies are needed to clarify which taxon this name in Zanfrognini 1915: 1083, Pampanini 1917: 167 and Pampanini 1931: 492 & 492 refers to

"*Lecanora calcarea* var. *viridescens* (A. Massal.) Jatta" in Zanfrognini 1915: 1083 and "*Lecanora calcarea* var. *viridescens* A. Massal." in Pampanini 1931: 492 probably refers to *Aspicilia calcarea* var. *viridescens* (A. Massal.) Körb. = *Aspicilia viridescens*

Lecanora campestris (Schaer.) Hue: Romano 1918: 72, as *Lecanora subfusca* var. *campestris*

Lecanora chlarotera Nyl.: Pampanini & Zanon 1922: 6, as "*Lecanora subfusca* var. *rugosa*"; Pampanini 1931: 64, as "*Lecanora subfusca* var. *rugosa*"

Lecanora cinerea (L.) Sommerf. = *Aspicilia cinerea*

"*Lecanora circinata* var. *albopulverulenta* Bagl." probably refers to *Lecanora muralis* var. *albopulverulenta* (Schaer.) Rabenh. = *Protoparmeliopsis muralis*

Lecanora crassa (Huds.) Ach. = *Squamarina cartilaginea*

Lecanora crassa f. *dealbata* (A. Massal.) Mig. = *Psora decipiens*

"*Lecanora crassa* f. *periculosa* (Del.) Schaer." probably refers to *Lecanora crassa* var. *periculosa* Dufour = *Squamarina periculosa*

Lecanora crassa var. *caespitosa* (Vill.) Rabenh. = *Squamarina cartilaginea*

"*Lecanora crassa* var. *caespitosa* f. *periculosa* (Ach.) Jatta" in Zanfrognini 1913a: 145, "*Lecanora crassa* var. *caespitosa* f. *periculosa* Del." in Zanfrognini 1915: 1084 and "*Lecanora crassa* var. *caespitosa* f. *periculosa* Schaer." in Pampanini 1931: 63 & 492 probably refers to *Lecanora crassa* var. *periculosa* Dufour = *Squamarina periculosa*

Lecanora crassa var. *cetrarioides* (A. Massal.) Jatta might refer to *Lecanora crassa* (Huds.) Ach. = *Squamarina cartilaginea*

"*Lecanora crassa* var. *deserti* Müll. Arg." might refer to *Lecanora crassa* (Huds.) Ach. = *Squamarina cartilaginea*

"*Lecanora crassa* (sometimes "*crassum*") var. *dufourii* ("*dufouri*") (with the authors "Schaer.", "(Fr.) Zahlbr." and "(Fr.) Schaer."): Further studies are needed to clarify which taxon this name in Mameli 1913: 159; Zanfrognini 1913b: 200, Mameli 1919: 177, Pampanini & Zanon 1919: 220 and Pampanini 1931: 63 refers to

Lecanora crenulata Hook.: Romano 1918: 72, as *Lecanora caesioalba*. AA 945 (in collection of *Caloplaca erythrocarpa*), GT 3267 (in collection of *Caloplaca citrina*)

Lecanora esculenta (Pall.) Eversm. = *Aspicilia esculenta*

Lecanora fulgens (Sw.) Ach. = *Fulgensia fulgens* f. *fulgens*

"*Lecanora fulgens* f. *leprosa* Fr.": Further studies are needed to clarify which taxon this name in Zanfrognini 1915: 1084 refers to

Lecanora galactina Ach. = *Lecanora albescens*

"*Lecanora galactina* var. *muralis* A. Massal." might refer to *Lecanora galactina* Ach. = *Lecanora albescens*

Lecanora gypsacea (Sm.) Müll. Arg. = *Squamarina gypsacea*

Lecanora hagenii (Ach.) Ach: GT 2888d

****Lecanora horiza*** (Ach.) Linds.: GT 2922, 3292

Lecanora intricata (Ach.) Ach.: Zanfrognini 1915: 1085; Pampanini 1931: 492

Lecanora lamarckii (DC.) Rabenh. = *Squamarina lamarckii*

Lecanora lentigera (Weber) Ach. = *Squamarina lentigera*

"*Lecanora lentigera* var. *deserti* " (no author is stated) might refer to *Squamarina lentigera*

Lecanora lithofraga (A. Massal.) anon. = *Hymenelia lithofraga* A. Massal. Further studies are needed to clarify which taxon this name in Romano 1918: 72 refers to

Lecanora populicola (DC.) Duby: Romano 1914: 351, as "*Lecanora subfusca* var. *chlarona* f. *distans*". This species has a cool-temperate to circumboreal-montane distribution and is found especially on *Populus tremula* and *Alnus*. The finding of this species is unlikely and further studies are needed to clarify which taxon this name refers to

"*Lecanora saxicola* var. *versicolor* Pers." probably refers to *Lecanora muralis* var. *versicolor* (Pers.) Tuck. = *Protoparmeliopsis muralis*

"*Lecanora saxicola* var. *versicolor* f. *albopulverulenta* (Schaer.) Jatta" and "*Lecanora saxicola* var. *versicolor* f. *albopulverulenta* Schaer." probably

refers to *Lecanora muralis* var. *albopulverulenta* (Schaer.) Rabenh. = *Protoparmeliopsis muralis*

Lecanora subfusca var. *campestris* (Schaer.) Rabenh. = *Lecanora campestris*

"*Lecanora subfusca* var. *chlarona* f. *distans* (Ach.) D. Dietr." probably refers to *Lecanora subfusca* var. *distans* (Ach.) D. Dietr. = *Lecanora populicola*

"*Lecanora subfusca* var. *leucolepis* Hepp": Further studies are needed to clarify which taxon this name in Pampanini 1917: 168 and Pampanini 1931: 63 refers to

"*Lecanora subfusca* var. *rugosa* Nyl." probably refers to *Lecanora subfusca* f. *rugosa* Nyl. = *Lecanora chlarotera*

Lecidea albilabra auct. = *Psora vallesiaca*

"*Lecidea coroniformis* Kremp.": Further studies are needed to clarify which taxon this name in Zanfrognini 1913b: 197 and Zanfrognini 1915: 1076 refers to (see also *Biatora coroniformis*)

Lecidea decipiens f. *dealbata* (Rabenh.) Jatta = *Psora decipiens*

Lecidea decipiens var. *dealbata* (A. Massal.) Jatta = *Psora decipiens*

Lecidea lucida (Ach.) Ach. in Mameli 1913: 159 = *Psilolechia lucida* (Ach.) M. Choisy. However, the species is reported to grow on soil and therefore unlikely incorrect. Further studies are needed to clarify which taxon this name refers to

Lecidea lurida Ach. = *Mycobilimbia lurida*

Lecidea opaca (Duf.) Zahlbr. = *Placolecis opaca*

"*Lecidea tabacina* Schaer." probably refers to *Toninia tristis* (see discussion under *Toninia tabacina*)

****Lecidella laureri*** (Hepp) Körb.: GT 2923, 3293, 3316

Leciographa parasitica A. Massal. = *Opegrapha rupestris*

Leptogium schraderi (Bernh.) Nyl.: Durand & Barrate 1910: 288, as "*Collema turgidum*"; Pampanini 1931: 60, as "*Collema turgidum*"

****Lichenoconium lecanorae*** (Jaap) D. Hawksw.: GT 3292b (on *Lecanora horiza* in collection of *Toninia subfuscae*)

!***Lichenostigma rugosum*** ("*rugosa*") G. Thor: Thor 1985: 269. AA 927 (in collection of *Diploschistes diacapsis*); GT 2899 (in collection of *Diploschistes diacapsis*), 3458 (on *Diploschistes diacapsis*; dupl. in BM, GZU, UPS)

*!***Milospium graphideorum*** (Nyl.) D. Hawksw.: GT 2926 (on *Dirina massiliensis* f. *sorediata* in collection of that species)

Mycobilimbia lurida (Ach.) Hafellner & Türk: Zanfrognini 1915: 1076, as *Lecidea lurida*; Romano 1918: 76, as *Biatora lurida*; Pampanini 1931: 494, as *Biatora lurida*

Ochrolechia parella (L.) A. Massal.: Zanfrognini 1913b: 201; Romano 1918: 72

****Ochrolechia turneri*** (Sm.) Hasselrot: GT 3318 (in collection of *Pyrrhospora quernea*)

!***Opegrapha physciaria*** (Nyl.) D. Hawksw. & Coppins: Romano 1914: 354, as *Arthonia varia*. GT 2907, UPS (on *Xanthoria parietina* in collection of *Seirophora lacunosa* distributed in Vězda 1985: 3, *Lichenes Selecti Exsiccati no. 2086*, as *Teloschistes lacunosus*, UPS)

Opegrapha rupestris Pers.: Zanfrognini 1915: 1101, as *Leciographa parasitica*; Pampanini 1931: 495, as *Leciographa parasitica*. AA 1051 (in collection of *Dirina immersa*)

Opegrapha varia Pers.: Pampanini 1917: 168; Pampanini 1931: 67. GT 2987, 3290

Parmelia conspersa (Ach.) Ach. = *Xanthoparmelia conspersa*
Parmelia prolixa (Ach.) Carroll = *Xanthoparmelia pulla*
Phaeophyscia orbicularis (Neck.) Moberg: Pampanini 1917: 168, as "*Physcia obscura*"; Pampanini 1931: 62, as "*Physcia obscura*"
!***Pharcidia glebarum*** (Arnaud) Sacc. & D. Sacc.: Romano 1918: 78 (on *Toninia sedifolia*, as *Thalloidima* ("*Thalloedema*") *vesiculare*)
Phylliscum demangeonii (Moug. & Mont.) Nyl.: Zanfrognini 1913b: 199, as *Phylliscum endocarpoides*; Romano 1918: 70, as *Phylliscum endocarpoides*
Phylliscum endocarpoides (Ach.) Nyl. = *Phylliscum demangeonii*
****Physcia adscendens*** H. Olivier: GT 2888
****Physcia biziana*** (A. Massal.) Zahlbr. var. ***biziana***: GT 2986 (dupl. in UPS), 3302 (dupl. in UPS)
Physcia caesia (Hoffm.) Fürnr. var. ***caesia***: Zanfrognini 1913b: 204, as *Physcia caesia*
"*Physcia obscura* Fr." in Pampanini 1917: 168 and Pampanini 1931: 62 probably refers to *Parmelia obscura* (Ehrh.) Fr. = *Phaeophyscia orbicularis*
Physcia parietina (L.) De Not. = *Xanthoria parietina*
"*Physcia parietina* f. *livida* Dnrs" probably refers to *Xanthoria parietina* f. *livida* (De Not.) Jatta = *Xanthoria parietina*
"*Physcia parietina* var. *granulata* Schaer." probably refers to *Parmelia parietina* var. *granulata* Schaer. = *Candelariella medians*
Physcia tenella (Scop.) DC.: Romano 1918: 70 (as "*Phiscia*"). GT 2944 (in collection of *Squamarina cartilaginea*)
Physcia villosa (Ach.) Duby = *Seirophora villosa*
****Physconia grisea*** (Lam.) Poelt: GT 3303
Placidium rufescens (Ach.) A. Massal.: Durand & Barrate 1910: 285, as *Endocarpon rufescens*; Zanfrognini 1913a: 138, as *Dermatocarpon rufescens*; Zanfrognini 1913b: 195, as *Dermatocarpon rufescens*; Romano 1914: 354, as *Endopyrenium rufescens*; Pampanini 1931: 67, as *Endocarpon rufescens*
Placodium albescens (Hoffm.) A. Massal. = *Lecanora albescens*
"*Placodium albescens* var. *galactina* Ach." probably refers to *Lecanora galactina* Ach. = *Lecanora albescens*
Placodium crassum (Huds.) Th. Fr. = *Squamarina cartilaginea*
Placodium crassum var. *deserti* (Nyl.) Müll. Arg. = *Squamarina cartilaginea*
"*Placodium crassum* var. *dufouri* ("*dufourei*") (Fr.) Hepp": Further studies are needed to clarify which taxon this name in Baroni 1892: 241 refers to
Placodium fulgens (Sw.) DC. = *Fulgensia fulgens* f. *fulgens*
Placodium gypsaceum (Sm.) Trevis. = *Squamarina gypsacea*
Placodium heppianum (Müll. Arg.) Flagey = *Caloplaca flavescens*
Placodium lentigerum (Weber) Gray = *Squamarina lentigera*
"*Placolecania cesatii* var. *olivacea* (Bagl.)" probably refers to *Solenopsora olivacea* ssp. *olivacea*
"*Placolecania spadicea* var. *gennarii* (Bagl.)" probably refers to *Lecania spadicea* var. *gennarii* (Bagl.) Steiner = *Lecania spadicea*
Placolecis opaca (Fr.) Hafellner: Zanfrognini 1915: 1076, as *Lecidea opaca*; Pampanini 1931: 494, as *Biatora opaca*
****Placopyrenium trachyticum*** (Hazsl.) Breuss: GT 2944b
Placynthium corallinoides (Hoffm.) Jatta = *Placynthium nigrum*
Placynthium nigrum (Huds.) Gray: Romano 1914: 350, as *Placynthium corallinoides*

Pleopsidium chlorophanum (Wahlenb.) Zopf: Zanfrognini 1913b: 198, as *Acarospora chlorophana*; Romano 1914: 351, as *Acarospora chlorophana*; Romano 1918: 72, as *Acarospora chlorophana*. *P. chlorophanum* is an arctic-alpine species (Nimis, 1993), and the finding of this species is unlikely. This material might refer to the similar species *Acarospora hilaris*, the distribution of which is centred in the Mediterranean region. Further studies are needed to clarify which taxon this name refers to

Pleopsidium flavum (Bellardi) Körb.: Romano 1918: 72, as *Acarospora chlorophana* var. *oxytona*

Polyblastia cinerea (A. Massal.) Jatta: Pampanini 1917: 168; Pampanini 1931: 68

Polyblastia cupularis A. Massal.: Romano 1918: 77, as *Polyblastia* ("*Poliblastia*") *intercedens*

Polyblastia ("*Poliblastia*") *intercedens* (Nyl.) Lönnr. non sensu Th. Fr. = *Polyblastia cupularis*

Protoparmeliopsis muralis (Schreb.) M. Choisy: Zanfrognini 1915: 1084, as "*Lecanora saxicola* var. *versicolor* f. *albopulverulenta*"; Romano 1918: 71, as "*Lecanora circinata* var. *albopulverulenta*" and "*Lecanora saxicola* var. *versicolor* f. *albopulverulenta*"; Mameli 1919: 177, as "*Lecanora saxicola* var. *versicolor*"; Pampanini & Zanon 1919: 220, as "*Lecanora saxicola* var. *versicolor*"; Pampanini 1931: 63 & 492, as "*Lecanora saxicola* var. *versicolor* and "*Lecanora saxicola* var. *versicolor* f. *albopulverulenta*". GT 3312

Psora decipiens (Hedw.) Hoffm.: Baroni 1892: 242, as "*Psora decipiens* f. *dealbata*"; Mameli 1913: 159, as *Lecidea decipiens* var. *dealbata* and *Lecanora crassa* f. *dealbata*; Zanfrognini 1913a: 139, as *Lecidea decipiens* var. *dealbata*; Zanfrognini 1913b: 197, as *Lecidea decipiens* var. *dealbata*; Romano 1914: 353, as "*Biatora decipiens* var. *dealbata*"; Pampanini 1917: 167, as "*Biatora decipiens* var. *dealbata*"; Romano 1918: 76, as *Biatora decipiens*; Maugini 1921: 379, as "*Biatora decipiens* var. *dealbata*"; Mameli 1928: 577, as *Biatora decipiens* and "*Biatora decipiens* var. *dealbata*"; Szatala 1929: 163, as *Lecidea decipiens* f. *dealbata*; Pampanini 1931: 59, as *Biatora decipiens* and "*B. decipiens* var. *dealbata*". AA 928; GT 2905, 2983 (in collection of *Buellia zoharyi*)

"*Psora decipiens* f. *dealbata* A. Massal." probably refers to *Psora decipiens* var. *dealbata* A. Massal. ex Rabenh. = *Psora decipiens*

Psora vallesiaca (Schaer.) Timdal: Mameli 1913: 159, as *Lecidea albilabra*

****Pyrrhospora quernea*** (Dicks.) Körb.: GT 3318

Ramalina crispatula Despr. ex Nyl. = *Ramalina maciformis*

Ramalina duriaei (De Not.) Bagl. = *Ramalina lacera*

Ramalina evernioides Nyl. non auct. = *Ramalina maciformis*

Ramalina fraxinea (L.) Ach.: Mameli 1913: 158; Maugini 1921: 379; Pampanini 1931: 59

Ramalina lacera (With.) J.R. Laundon: Romano 1914: 350, as *Ramalina duriaei*; Pampanini 1931: 59, as *R. duriaei*. GT 2912

Ramalina maciformis (Delile) Nyl.: Durand & Barrate 1910: 286 & 287, as *Ramalina crispatula* and *R. evernioides*; Zanfrognini 1915: 1087; Romano 1918: 70; Pampanini 1931: 59 & 60, as *Ramalina crispatula* and "*Ramalina maciformis* var. *marmarica*"; Pampanini 1931: 491; Reichert 1937: 193, as *Ramalina crispatula*; Vězda 1983: 5 (*Lichenes Selecti Exsiccati no. 1940*). GT 2949 (exs.), 3001

"*Ramalina maciformis* var. *marmarica* Cengia-Sambo" might refer to *Ramalina maciformis*

Ramalina pollinaria (Westr.) Ach.: Durand & Barrate 1910: 286; Romano 1914: 350

Ramalina scopulorum (Retz.) Ach. = *Ramalina siliquosa*

Ramalina siliquosa (Huds.) A.L. Sm.: Zanfrognini 1915: 1087, as *Ramalina scopulorum*; Pampanini 1931: 491, as *Ramalina scopulorum*

Rinodina bischoffii (Hepp) A. Massal. var. ***bischoffii***: Romano 1918: 75, as *Rinodina bischoffii* var. *protuberans.* GT 2915b (in collection of *Caloplaca aurantia*), AA943

Rinodina bischoffii var. *immersa* Körb. = *Rinodina immersa*

Rinodina bischoffii var. *leucomelas* Müll. Arg. = *Rinodina dubyana*

Rinodina bischoffii var. *protuberans* Körb. = *Rinodina bischoffii* var. *bischoffii*

Rinodina calcarea (Arnold) Arnold: Pampanini 1917: 168; Pampanini 1931: 65

Rinodina dubyana (Hepp) J. Steiner: Szatala 1929: 166, as *Rinodina bischoffii* var. *leucomelas,* AA944

Rinodina exigua (Ach.) Gray: Mameli 1919: 182, as *Rinodina metabolica*; Pampanini & Zanon 1919: 220, as *Rinodina metabolica*; Pampanini 1931: 65, as *Rinodina metabolica*

Rinodina immersa (Körb.) Zahlbr.: Romano 1918: 75, as *Rinodina bischoffii* var. *immersa*

Rinodina metabolica (Ach.) Anzi is a synonym of *Amandinea insperata* (Nyl.) H. Mayrhofer & Ropin. This species occur in subtropical to tropical forests, and the presence in Libya is not to be expected. However, *Rinodina metabolica* auct. p.p. = *Rinodina exigua* and *R. metabolica* therefore probably refers to this species

****Rinodina oleae*** Bagl.: GT 2923 (in collection of *Lecidella laureri*), 3286b, 3295 (in collection of *Xanthoria parietina*)

****Rinodina pyrina*** (Ach.) Arnold: GT 2888b

Rinodina roboris (Nyl.) Arnold: Romano 1914: 353

Roccella fucoides Vain. = *Roccella phycopsis*

Roccella phycopsis Ach.: Durand & Barrate 1910: 288; Zanfrognini 1913a: 139, as *Roccella fucoides*; Mameli 1928: 577; Pampanini 1931: 67

****Sagiolechia protuberans*** (Ach.) A. Massal.: GT 3305 (in collection of *Caloplaca tenuata*), 3311 (in collection of *Caloplaca oasis*)

Sarcogyne clavus (DC.) Kremp.: Romano 1918: 73, as *Sarcogyne eucarpa*

Sarcogyne eucarpa Hellb. = *Sarcogyne clavus*

"*Sarcogyne eucarpa* var. *carestiae* De Not." probably refers to the basionym *Acarospora carestiae* Bagl. = *Acarospora versicolor*

Sarcogyne pruinosa auct. non (Ach.) Mudd nom. illeg. = *Sarcogyne regularis var. regularis*

Sarcogyne regularis Körb. var. ***regularis***: Romano 1914: 351, as *Sarcogyne pruinosa*

Seirophora lacunosa (Rupr.) Frödén: Vězda 1985: 3 (*Lichenes Selecti Exsiccati no. 2086*), as *Teloschistes lacunosus.* GT 2907 (exs.), 2915c

Seirophora villosa (Ach.) Frödén: Baroni 1892: 240, as *Physcia villosa*; Mameli 1913: 158, as *Physcia villosa*; Zanfrognini 1913a: 147, as *Teloschistes* ("*Theloschistes*") *villosus* f. *brevior*; Romano 1914: 350, as *Teloschistes* ("*Theloschistes*") *villosus*

Solenopsora candicans (Dicks.) J. Steiner: Baroni 1892: 241, as *Gasparrinia candicans*

Solenopsora olivacea (Fr.) H. Kilias ssp. ***olivacea***: Zanfrognini 1915: 1086, as "*Placolecania cesatii* var. *olivacea*"; Pampanini 1931: 494, as "*Diphratora cesatii* var. *olivacea*"

*!***Sphaerellothecium parietinarium*** (Linds.) Hafellner: GT 3304 (on *Xanthoria* cf. *parietina*, in collection of *Candelariella senior*)

Sphinctrina turbinata (Pers.: Fr.) De Not.: Tibell 1986: 8 (*Caliciales Exsiccatae no. 149*) and Tibell 2001: 739. GT 3291, 3294 (exs.)

Squamarina cartilaginea (With.) P. James: Durand & Barrate 1910: 287, as *Placodium crassum* and *Placodium crassum* var. *deserti*; Mameli 1913: 158 & 159, as *Lecanora crassa* and *Lecanora crassa* var. *caespitosa*; Zanfrognini 1913a: 143 & 144, as *Lecanora crassa* and *Lecanora crassa* var. *caespitosa*; Romano 1914: 351, as *Lecanora crassa*; Pampanini 1917: 167 & 168, as *Lecanora crassa* and *Lecanora crassa* var. *caespitosa*; Romano 1918: 71, as *Lecanora crassa*; Mameli 1928: 576, as *Lecanora crassa* var. *caespitosa* and *L. crassa* var. *cetrarioides*; Szatala 1929: 165, as *Placodium crassum*; Pampanini 1931: 62 & 492, as *Lecanora crassa*, *Lecanora crassa* var. *caespitosa* and "*Lecanora crassa* var. *deserti*"; Pampanini 1931: 63, as *Lecanora crassa* var. *cetrarioides*; Reichert 1937: 192, as *Lecanora crassa*. Thell & Feuerer (2008) incorrectly state that Baroni (1890: 241) reports this species (as *Placodium crassum*). However, Baroni reports *Placodium crassum* var. *dufouri* ("*duforei*"), the nomenclatural status of which is unclear. GT 2944, 3004

Squamarina gypsacea (Sm.) Poelt: Baroni 1892: 241, as *Placodium gypsaceum*; Durand & Barrate 1910: 287, as *Placodium gypsaceum*; Zanfrognini 1913a: 145, as *Lecanora gypsacea*; Pampanini 1931: 63 & 492, as *Lecanora gypsacea*

Squamarina lamarckii (DC.) Poelt: Romano 1918: 71, as *Lecanora lamarckii*

Squamarina lentigera (Weber) Poelt: Baroni 1892: 241, as *Placodium lentigerum*; Zanfrognini 1913a: 146, as *Lecanora lentigera*; Zanfrognini 1913b: 200, as *Lecanora lentigera*; Romano 1914: 351, as *Lecanora lentigera*; Zanfrognini 1915: 1084, as *Lecanora lentigera*; Reichert 1937: 193, as "*Lecanora lentigera* var. *deserti*"

Squamarina periculosa (Schaer.) Poelt: Zanfrognini 1913a: 145, as "*Lecanora crassa* var. *caespitosa* f. *periculosa*"; Zanfrognini 1915: 1084, as "*Lecanora crassa* var. *caespitosa* f. *periculosa*"; Romano 1918: 71, as "*Lecanora crassa* f. *periculosa*"; Mameli 1928: 576, as *Lecanora crassa* f. *periculosa*; Pampanini 1931: 63 & 492, as "*Lecanora crassa* var. *caespitosa* f. *periculosa*". AA 929; GT 2902, 3418

*****Stigmidium tabacinae*** (Arnold) Triebel: GT 2982 (on *Toninia sedifolia* in collection of that species)

Synalissa symphorea (Ach.) Nyl.: Romano 1914: 350; Romano 1918: 70

Teloschistes lacunosus (Rupr.) Savicz = *Seirophora lacunosa*

Teloschistes ("*Theloschistes*") *villosus* (Ach.) Norman = *Seirophora villosa*

Teloschistes ("*Theloschistes*") *villosus* f. *brevior* Müll. Arg. = *Seirophora villosa*

Tephromela atra (Huds.) Hafellner var. ***atra***: Zanfrognini 1913a: 146, as *Lecanora atra*; Zanfrognini 1913b: 200, as *Lecanora atra*; Romano 1914: 351, as *Lecanora atra*; Pampanini 1931: 492, as *Lecanora atra*. GT 3306 (on calcareous rock)

Thalloidima caeruleonigricans auct. = *Toninia sedifolia*

Thalloidima ("*Thalloedema*") *candidum* (Weber) A. Massal. = *Toninia candida*

"*Thalloidima* ("*Thalloedema*") *carbonacea* Anzi" probably refers to *Toninia carbonacea* Anzi = *Toninia verrucarioides*

Thalloidima ("*Thalloedema*") *diffractum* (A. Massal.) A. Massal. = *Toninia diffracta*

"*Thalloidima* ("*Thalloedema*") *tabacinum* A. Massal." probably refers to *Toninia tabacina* sensu A. Massal. = *Toninia tristis* (Nimis & Martellos, 2008). See also *Toninia tabacina*

Thalloidima ("*Thalloedema*") *vesiculare* (Hoffm.) Boistel = *Toninia sedifolia*

Toninia albilabra (Dufour) H. Olivier: Romano 1914: 353, as *Biatora albilabra*

Toninia aromatica (Sm.) A. Massal.: Zanfrognini 1913b: 198; Romano 1914: 353; Zanfrognini 1915: 1081; Romano 1918: 77; Mameli 1919: 183; Pampanini & Zanon 1919: 220; Mameli 1928: 577, as *Toninia sanguinaria*; Pampanini 1931: 67 & 495, as *T. aromatica* and *T. sanguinaria*

Toninia caeruleonigricans auct. non (Lightf.) Th. Fr. = *Toninia sedifolia*

"*Toninia caeruleonigricans* var. *glebosa* Ach." probably refers to the basionym *Lecidea glebosa* Ach. = *Toninia sedifolia*

Toninia candida (Weber) Th. Fr.: Mameli 1928: 577; Pampanini 1931: 66, as *Thalloidima* ("*Thalloedema*") *candidum*

Toninia carbonacea Anzi = *Toninia verrucarioides*

Toninia diffracta (A. Massal.) Zahlbr.: Pampanini 1917: 169, as *Thalloidima* ("*Thalloedema*") *diffractum*; Pampanini 1931: 66, as *Thalloidima* ("*Thalloedema*") *diffractum*

Toninia sanguinaria Bagl. = *Toninia aromatica*

Toninia sedifolia (Scop.) Timdal: Baroni 1892: 242, as *Thalloidima caeruleonigricans*; Durand & Barrate 1910: 288, as *Thalloidima caeruleonigricans*; Mameli 1913: 159, as "*Biatora vesicularis*"; Zanfrognini 1913a: 139 & 141, as "*Toninia caeruleonigricans* var. *glebosa*" and *Toninia caeruleonigricans*; Zanfrognini 1913b: 197, as *Toninia caeruleonigricans*; Romano 1914: 353, as *Thalloidima* ("*Thalloedema*") *vesiculare*; Zanfrognini 1915: 1080, as *Toninia caeruleonigricans*; Romano 1918: 76, as *Thalloidima* ("*Thalloedema*") *vesiculare*; Mameli 1919: 182, as *Thalloidima* ("*Thalloedema*") *vesiculare*; Pampanini & Zanon 1919: 220, as *Thalloidima* ("*Thalloedema*") *vesiculare*; Pampanini 1931: 66 & 495, as *Thalloidima* ("*Thalloedema*") *vesiculare*; Timdal 1991: 97. GT 2904 (no ap.), 2982

*!***Toninia subfuscae*** (Arnold) Timdal: GT 3292b (on *Lecanora horiza*)

Toninia tabacina (Ramond ex DC.) Flagey non auct. = *Lecidea silacea* Ach. but the presence of this species in Libya is not to be expected, as it has a mainly montane distribution. However, *Toninia tabacina* sensu A. Massal. is a synonym of *Toninia tristis* (Nimis & Martellos, 2008), and the record of *Toninia tabacina* probably refers to this species

Toninia tristis (Th. Fr.) Th. Fr.: Zanfrognini 1913b: 197, as *Toninia tabacina*; Romano 1914: 353, as "*Thalloidima* ("*Thalloedema*") *tabacinum*"; Zanfrognini 1915: 1076, as "*Lecidea tabacina*"; Pampanini 1931: 495, as "*Thalloidima* ("*Thalloedema*") *tabacinum*"

Toninia verrucarioides (Nyl.) Timdal: Zanfrognini 1915: 1081, as *Toninia carbonacea*; Pampanini 1931: 495, as *Thalloidima* ("*Thalloedema*") *carbonacea*. GT 3308

Tornabea scutellifera (With.) J.R. Laundon: Mameli 1919: 177, as *Anaptychia intricata*; Maugini 1921: 379, as *Anaptychia intricata*; Pampanini 1931: 62, as *Anaptychia intricata*; Reichert 1937: 192, as *Anaptychia* ("*Anaptichia*") *intricata*

Urceolaria actinostoma (Ach.) Ach. = *Diploschistes actinostomus*
Urceolaria actinostoma var. *calcarea* Müll. Arg. = *Diploschistes candidissimus*
Urceolaria actinostoma var. *farinosa* Anzi = *Diploschistes candidissimus*
Urceolaria actinostoma var. *tectorum* (A. Massal.) Jatta = *Diploschistes candidissimus*
Urceolaria ocellata (Vill.) DC. = *Diploschistes ocellatus*
Urceolaria scruposa (Schreb.) Ach. = *Diploschistes scruposus*
Urceolaria scruposa var. *albissima* Ach. = *Diploschistes diacapsis*. Thell & Feuerer (2008) incorrectly refer this name to *Diploschistes scruposus*
"*Urceolaria scruposa* var. *bryophila* Schaer." probably refers to *Diploschistes scruposus* var. *bryophilus* (Ach.) Müll. Arg. = *Diploschistes muscorum*
Urceolaria scruposa var. *gypsacea* (Ach.) Flot. = *Diploschistes gypsaceus*

Verrucaria aethiobola Wahlenb.: Zanfrognini 1915: 1072, as "*Verrucaria margacea* var. *aethiobola*"; Pampanini 1931: 496, as "*Verrucaria margacea* var. *aethiobola*"
Verrucaria baldensis A. Massal. = *Bagliettoa baldensis*
Verrucaria calciseda DC.: Zanfrognini 1913b: 194; Zanfrognini 1915: 1072; Romano 1918: 77, as "*Verrucaria rupestris* var. *calciseda*"; Pampanini 1931: 496
Verrucaria dolomitica A. Massal. = *Verrucaria foveolata*
Verrucaria foveolata (Flörke) A. Massal.: Pampanini 1917: 169; Pampanini 1931: 68, as *Verrucaria dolomitica*
"*Verrucaria fuscoatra* var. *controversa* (A. Massal.) Jatta" probably refers to *Verrucaria controversa* A. Massal. = *Verrucaria nigrescens*
Verrucaria hochstetteri Fr.: Zanfrognini 1915: 1073
Verrucaria macrostoma DC.: Zanfrognini 1915: 1073
"*Verrucaria margacea* var. *aethiobola* (as "*aethioloba*") Th. Fr." = *Verrucaria aethiobola*
Verrucaria marmorea (Scop.) Arnold: Zanfrognini 1913b: 194, as *Verrucaria purpurascens* var. *rosea*
Verrucaria muralis Ach.: Zanfrognini 1913b: 194, as *Verrucaria rupestris* and "*V. rupestris* var. *muralis*"
Verrucaria nigrescens Pers.: Zanfrognini 1915: 1074, as "*Verrucaria fuscoatra* var. *controversa*"; Pampanini 1931: 496, as "*Verrucaria fuscoatra* var. *controversa*". GT 2944 (in collection of *Squamarina cartilaginea*)
Verrucaria purpurascens var. *rosea* A. Massal. = *Verrucaria marmorea*
Verrucaria rupestris Schrad. non (Scop.) F.H. Wigg. = *Verrucaria muralis*
"*Verrucaria rupestris* var. *calciseda* Schaer." probably refers to *Verrucaria calciseda*
"*Verrucaria rupestris* var. *muralis* Nyl." probably refers to *Verrucaria muralis*
"*Verrucaria rupestris* var. *orbicularis* Garov.": Further studies are needed to clarify which taxon this name in Mameli 1919: 183, Pampanini & Zanon 1919: 220 and Pampanini 1931: 68 refers to

Xanthoparmelia conspersa (Ach.) Hale: Zanfrognini 1913b: 201, as *Parmelia conspersa*
Xanthoparmelia pulla (Ach.) O. Blanco, A. Crespo, Elix, D. Hawksw. & Lumbsch: Mameli 1913: 158, as *Imbricaria prolixa*; Romano 1918: 70, as *Parmelia prolixa*
Xanthoria aureola (Ach.) Erichsen: Zanfrognini 1913a: 147, as *Xanthoria parietina* var. *aureola*; Zanfrognini 1915: 1098, as *Xanthoria parietina* var. *aureola*; Pampanini 1931: 491, as *Xanthoria parietina* var. *aureola*
****Xanthoria calcicola*** Oksner: GT 2906

Xanthoria elegans (Link) Th. Fr. var. ***elegans***: Zanfrognini 1915: 1098, as *Caloplaca elegans* var. *tenuis*; Zanfrognini 1913b: 202, as *Caloplaca elegans*

****Xanthoria mediterranea*** Giralt, Nimis & Poelt: GT 2915b (in collection of *Caloplaca aurantia*)

Xanthoria parietina (L.) Th. Fr.: Baroni 1892: 240; Durand & Barrate 1910: 286; Mameli 1913: 158, as *Physcia parietina* and "*Physcia parietina* f. *livida*"; Zanfrognini 1913a: 147, as "*Xanthoria parietina* var. *chlorina*"; Zanfrognini 1913b: 203; Romano 1914: 351; Pampanini 1917: 169, as "*Xanthoria parietina* var. *livida*"; Maugini 1921: 379; Pampanini & Zanon 1922: 7; Mameli 1928: 576, as *Xanthoria parietina* and *X. parietina* var. *ectanea*; Pampanini 1931: 61, as *Xanthoria parietina* and *X. parietina* var. *ectanea*; Pampanini 1931: 61, as *X. parietina* and "*Xanthoria parietina* var. *livida*". GT 2913, 3295, 3304 (cf. *X. parietina*, saxicolous in collection of *Candelariella senior*)

Xanthoria parietina var. *aureola* auct. non (Ach.) J.J. Kickx = *Xanthoria aureola*

"*Xanthoria parietina* var. *chlorina* (Chev.) Olivier" might refer to *Xanthoria parietina*

Xanthoria parietina var. *ectanea* (Ach.) J.J. Kickx = *Xanthoria parietina*

"*Xanthoria parietina* var. *livida* De Not." probably refers to *Xanthoria parietina* f. *livida* (De Not.) Jatta = *Xanthoria parietina*

Xanthoria parietina var. ***subgranulosa*** (Nyl.) Zahlbr.: Mameli 1919: 177; Pampanini & Zanon 1919: 220; Mameli 1928: 576; Pampanini 1931: 61

Xanthoria polycarpa (Hoffm.) Th. Fr. ex Rieber: Zanfrognini 1915: 1098

Xanthoria sorediata (Vain.) Poelt: Zanfrognini 1915: 1098, as "*Caloplaca elegans* var. *compacta*"; Pampanini 1931: 494, as "*Caloplaca elegans* var. *compacta*".

****Xanthoriicola physciae*** (Kalchbr.) D. Hawksw.: GT 3302 (on *Xanthoria parietina* in collection of *Physcia biziana*, dupl. in UPS)

****Zwackhiomyces coepulonus*** (Norman) Grube & Hafellner: AA 947 (on *Caloplaca aurantia*), GT 2946 (on *Caloplaca aurantia* in collection of *Candelariella senior*, dupl. in UPS)

Undetermined species

Arthonia sp.: GT 2920b. On *Juniperus phoenicea*
Caloplaca sp.: GT3319. On *Juniperus phoenicea*
Melaspilea sp.: GT 3295 (in collection of *Xanthoria parietina*). On *Juniperus phoenicea*
Rinodina sp.: GT 3320b. On *Juniperus phoenicea*
Sclerococcum sp.: GT 3292 (on *Lecanora horiza* in collection of that species)
Sclerococcum sp.: GT 3306 (on *Tephromela atra* in collection of that species)
Stigmidium sp.: GT 3313b (on *Caloplaca* sp. in collection of *Lecania turicensis*)
Xanthoparmelia sp.: GT 2948. On soil.

DISCUSSION

Despite the fact that a considerable number of floristic papers were published, mainly by Italian authors, between 1892 and 1950, the lichen biota of Libya probably remains largely unknown. This situation is shared with several nearby countries. 163 lichens and lichenicolous fungi have been reported from

Egypt (Seaward & Sipman, 2006). The Egyptian landscape is, however, more altered by man (at least in the lowland), and there are no mountains near the coast. From Tunisia, a checklist has been published (Seaward, 1996). While some information is available from Algeria, the lichen biota of the other neighboring countries, Chad, Niger and the Sudan are poorly known (Hawksworth & Ahti, 1990). Further investigation of the lichen biota of Libya is overdue. Coastal areas subjected to a mediterranean climate, and high mountains, certainly harbour a more diverse lichen biota than the area visited by GT and AA. Like in other mediterranean regions (e.g. SW Italy), the coastal areas are likely to be species rich because of the higher precipitation and humidity as well as the salt spray from the sea. The highest mountain is 2,286 m. However, it is located in the south, in the Sahara desert, where there probably are no lichens at all in extensive areas. It is unknown if the mountain harbours a rich lichen flora as it has never been visited by any lichenologist. However, some lichens have been reported from the high Ahaggar Mts. in South Algeria (Faurel *et al*., 1953), which might indicate that lichens may be present in the mountains of South Libya as well. Trotter (1950) summarized the presence of 120 lichens from Libya. Thell & Feuerer (2008) write that "about 400 species are expected for this country". Given the large territory, the geological heterogeneity, the long coastline, the presence of up to 900 m high mountains near the coast, the at least semi natural lichen habitats still present, the high percentage of species new to Libya in the collections by AA and GT (62%) as well as the field experience by GT suggest that a realistic estimate of the total number of Libyan lichens and lichenicolous fungi exceeds 1,000 species. The field work by GT and AA was not dedicated to lichens. A more intensive field work focused on lichens, e.g. along a transect from the Sahara desert to the coast as well as field work in the mountains near the coast, would create a more realistic picture of the Libyan lichen biota.

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