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Some lichens and lichenicolous fungi from Majorca (Spain)

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A b s t r a c t : Two hundred taxa of lichens and lichenicolous fungi are reported from the island of Majorca (Balearic Islands).

Collema euthallinum and *Lepraria eburnea* are first records for Spain and several others are rare in Spain or new for Majorca. An annotated list with most interesting or new records for the lichen flora (including lichenicolous fungi) of Majorca is provided.

Key Words : Lichens, lichenicolous fungi, new records, mycoflora of Majorca, Spain.

Introduction

The first publications about lichens of Majorca are by KNOCHÉ (1921) and MAHEU & GILLET (1921-1922), several decades later followed by DELVOSALLE & DUVIGNEAUD (1967). Most publications are from more recent times (TØNSBERG 1980, FONT & FIOL 1984, BREUSS 1988, HOFMANN 1990, FIOL 1984, 1991, 1995, and ETAYO 1996).

Details regarding geology and the vascular plant flora can be found in BOLOSE & MOLINIER (1969), DUVIGNEAUD (1967) and BONNER 1985).

During a field trip through the island of Majorca, lichens and lichenicolous fungi were collected from several kinds of substrata like trees, calcareous rocks and soil. Most collecting sites are located in the western part of the island (fig.1).

About 360 specimens of lichens and lichenicolous fungi were collected from 26 localities and deposited in the private herbarium of the author, however a part of the collections is not yet identified. A total list, including ca. 200 taxa, as a result of this study is given below (table 1). Two species are new for Spain, several taxa are first records for the Balearic Islands and a lot of taxa in the total list are mentioned for the second time for the island and thus they represent additional localities. The specimens have been studied mostly according to PURVIS & al. (1992). Nomenclature follows PURVIS & al. (1993). The most interesting records are listed below, complemented by remarks on habitats, ecology, morphology, chemistry, and distribution. The localities are not cited in full in the annotated list, but are referred to by the following locality numbers.

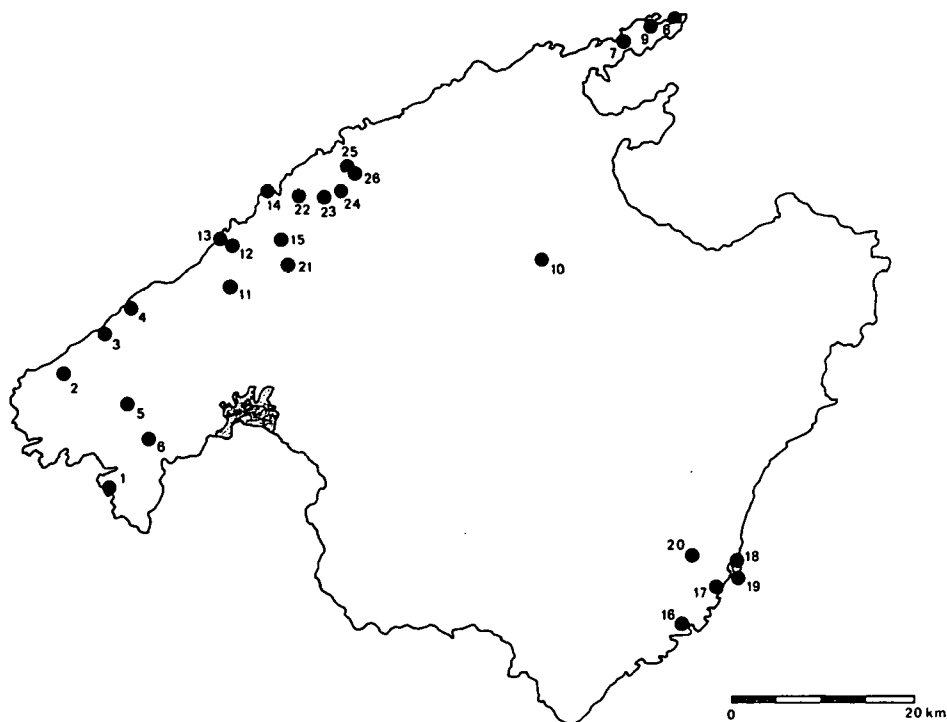


Fig. 1: map of localities visited

Localities

- 1 = SW of Palma, S of Santa Ponça, Punta Engueta Alt. 100 m. 30 April 1997.
- 2 = W of Palma, N of Andratx, 5 km N of Coll de Sa Gremola, W side of road C-710. Alt. 300. 31 April 1997.
- 3 = WNW of Palma, WNW of Estallencs, near puerto de Estallencs. Alt. 50 m. 31 April 1997.
- 4 = NW of Palma, 4 km W of Banyalbufar, E of road to Puerto de Canonge. Alt. 300 m. 31 April 1997.
- 5 = W of Palma, S of Galilea, W sloping wood. Alt. 500m. 31 April 1997.
- 6 = W of Palma, near Calvià, E of road to Palva Nova, NW side of Sierra Burguesa. Alt. 300 m. 31 April 1997.
- 7 = NE of Puerto Pollença, 1 km NE of Torre, N sloping forest. Alt. 300 m. 1 April 1997.
- 8 = NE of Puerto Pollença, Cabo Formentor, coastal area. Alt. 150 m. 1 April 1997.
- 9 = NE of Puerto Pollença, road to Cabo Formentor, 1 km W of tunnel. Alt. 250 m. 1 April 1997.
- 10 = NE of Inca, road to Muro, orchard with various trees. Alt. 100 m. 1 April 1997.
- 11 = N of Palma, along road to Valldemossa, 3 km S of Valldemossa. Alt. 350 m. 2 April 1997.

- 12 = N of Palma, along road C-710, 3 km W of Deia, small orchard. Alt. 200 m. 2 April 1997.
- 13 = N of Deia, small road to bay, sheltered steep rocks along valley. Alt. 100 m. 2 April 1997.
- 14 = W of Puerto de Soller, Cap Gros. Alt. 75 m. 2 April 1997.
- 15 = N of Palma, Coll de Soller, N side of Tunnel, sloping wood. Alt. 495 m. 2 April 1997.
- 16 = E side of island, Porto Petro, small wood. Alt. 50 m. 3 April 1997.
- 17 = Between Cala D'or and Porto Colom, Cala Arsenau, (Cala Sanau) coastal area. Alt. 20 m. 3 April 1997.
- 18 = Porto Colom (E), N of Sa Punta, open coastal area. Alt. 50 m. 3 April 1997.
- 19 = Porto Colom (E), Sa Punta, small open coastal area. Alt. 50 m. 3 April 1997.
- 20 = E side of island, E of Felanitx, Santuario San Salvador, just below the top, S sloping wood. Alt. 250 m. 3 April 1997.
- 21 = N of Palma, road C-711, S side of tunnel, Jardines Alfabia, botanical garden with various trees. Alt. 1000 m. 4 April 1997.
- 22 = N of Soller, Mirador Ses Barques, along road C-710, roadside trees, sloping wood. Alt. 200 m. 5 April 1997.
- 23 = ENE of Soller, Sierra Torrellas, NW of Coll de Puig Major, near tunnel, roadside trees and forest. Alt. 1000 m. 5 April 1997.
- 24 = ENE of Soller, Sierra Torrellas, 0.8 km E of Son Torrella, S slope. Alt. 975 m. 5 April 1997.
- 25 = ENE of Soller, Sierra Torrellas (E), road to Sa Calobra, 1 km W of crossing with road C-710 near Desfiladero, overhanging rocks. Alt. 850 m. 5 April 1997.
- 26 = ENE of Soller, Sierra Torrellas (E), road to Sa Calobra, 0.2 km W of crossing with road C-710 near Desfiladero, N sloping wood. Alt. 850 m. 5 April 1997.

Lichenicolous fungi

Several of the lichenicolous fungi mentioned in the total list below were already published in ETAYO (1996) for the first time for Majorca and are here reported from the following hosts: *Muellerella lichenicola* on *Caloplaca variabilis*, *Opegrapha physciaria* on *Xanthoria parietina*, *Vouauxiella lichenicola* on *Lecidea exigua* (conidia are somewhat smaller than usually), *V. verrucosa* on *Lecanora horiza* and *Xanthoriicola physciae* on *Xanthoria parietina*. The lichenicolous fungi found for the first time on Majorca are mentioned in the annotated list below.

Annotated list

Acrocordia conoidea (FR.) KÖRBER

Loc. 4, 7, 15, on calcareous rock, mostly in sheltered habitats in forests. Recognized by the pinkish tinge of the thallus and the relative large perithecia with outwardly spreading involucrellum. The material is well developed and richly fertile. This species is widely distributed throughout Europe, from northern Norway to Mediterranean regions.

***Arthonia anombrophila* COPPINS & P. JAMES**

Loc. 17, on young *Olea europaea* in an open coastal area with scattered *Pinus halepensis* and *Juniperus phoenicea*.

Chemistry: 'anombrophila unknown' (TLC). This specimen has been tested several times with TLC, also using solvent system A and G, but only one substance has been found so it cannot be *A. zwackhii*, which has a different chemistry. *Arthonia anombrophila* is known from the British Isles where it is rare (PURVIS & al. 1992), and has been published from Spain by BOQUERAS (1993). New to the Balearic Islands.

***Arthonia clemens* (TUL.) TH. FR.**

Loc. 24, 25, in apothecia of *Lecanora albella* and *L. agardhiana*. This lichenicolous fungus gives the infected apothecia a dark brown to black appearance. The asci with 1-septate hyaline ascospores are found in the hymenium of the hosts. New to the Balearic Islands.

***Aspicilia laurensii* B. de LESD.**

Loc. 7, on vertical shaded calcareous outcrop in north sloping *Pinus halepensis* forest. Apothecia pruinose, with 5 ascospores per ascus, hymenium 150 µm, ascospores 21-24 × 17.5-18 µm. New to the Balearic Islands.

***Bacidia arceutina* (ACH.) ARNOLD**

Loc. 17, 22, on *Olea europaea* and on vertical shaded calcareous outcrops in sloping *Pinus* forest, respectively. The saxicolous specimen is accompanied by *Catillaria chalybeia*, *C. lenticularis* and *Protoblastenia rupestris*. Apothecia 0.2-0.5 mm, flat with pale brown to dark brown disk, becoming convex, true exciple thin and dark brown at first, becoming excluded, ascospores 30-35 × 1.5 µm, epithecium hyaline to yellowish, hypothecium hyaline. This species is widely distributed in the subatlantic region. This species is most commonly epiphytic, but more rarely known from calcareous rocks.

***Bacidia auerswaldii* (HEPP ex STIZENB.) MIG.**

Loc. 17, on *Juniperus phoenicea* and *Pistacia lentiscus*. This species was found richly fertile. It is easily recognized by the brownish granular-isidiate thallus in combination with dark brown to black apothecia. This species has a more western distribution pattern in Europe. New to the Balearic Islands.

***Bacidia ignarii* (NYL.) OXNER**

Loc. 1, 23, on *Pistacia* in open *Pinus* forest and on *Quercus ilex* along forest, respectively. This species has relative short, mainly 3-septate ascospores. Probably an overlooked species, but recently more often collected in the Mediterranean region. It is widely distributed in the northern Hemisphere. New to the Balearic Islands.

***Bacidia rosella* (PERS.) DE NOT.**

Loc. 23, on *Quercus ilex* along edge of *Q. ilex* forest. Easily recognized in the field by the pale and relative large apothecia. It is widespread from central to southern Europe where it occurs mainly in mountain areas. New to the Balearic Islands.

***Bagliettoa limborioides* MASSAL.**

Loc. 7, 25, on shaded overhanging calcareous rocks. The relative large perithecia (0.4 mm) have fine fissures radiating from the ostiole, the well developed spores are $15-24 \times 10-12 \mu\text{m}$. The species is known from southern Europe and is most frequent in the Mediterranean region. New to the Balearic Islands.

***Botryolepraria lesdainii* (HUE) CANALS, HERNÁNDEZ-MARINÉ, GÓMEZ-BOLEA & LLIMONA**

Loc. 15, on very shaded crevices in north facing calcareous outcrops. This species is easily recognized by the typical green colour and the leprarioid-cottony appearance and the substance lesdainin, easily identified with MCT. It is widely distributed throughout western and central Europe, but rather few records from southern Europe are known. New to the Balearic Islands.

***Buellia venusta* (KÖRBER) LETTAU**

Loc. 19, on low calcareous outcrop in open coastal situation.

This specimen contains norstictic acid and is well characterized by the rather thick white thallus with bluish pruinose apothecia, abundantly present. Also mentioned in BREUSS (1988) from the northeastern part of the island.

***Caloplaca cerinelloides* (ERICHSEN) POELT**

Loc. 22, on roadside *Olea europaea* along *Pinus* forest. This species was found to be abundant on trunks of medium sized trees. An inconspicuous species with small yellowish apothecia with 8-spored asci. It is most probably an overlooked species which is widespread in Europe. Already published for majorca by HOFMANN (1990).

***Caloplaca fuscoblastidiata* v.d. BOOM & ETAYO**

Loc. 12, on *Olea europaea* in a small orchard along road, on decorticated wood of a trunk. This species is related to *C. herbidella*, but differs in the blastidiate thallus, with brownish to greenish grey isidia and the $\pm$ biatorine dark-brownish apothecia. *Caloplaca fuscoblastidiata* was previously known only from SW Europe (v.d. BOOM & ETAYO 1995). New to the Balearic Islands.

***Caloplaca lucifuga* THOR**

Loc. 10, on decorticated trunk of *Ceratonia siliqua*, in sheltered and shaded habitat, in an orchard. This species is found only sterile, with $\pm$ roundish yellow-orange-brownish soralia (K + violet-red). It is not rare in some parts of Spain and Portugal. New to the Balearic Islands.

***Caloplaca obscurella* (LAHM ex KÖRBER) TH.FR.**

Loc. 12, 22, on mature trunk of *Olea europaea* in small orchard and on base of roadside *O. europaea*. Both the characteristic erose soralia and the pale brown apothecia are abundantly present in the specimens. New to the Balearic Islands.

***Catillaria praedicta* TRETIACH & HAFELLNER**

Loc. 18, on *Olea europaea* in coastal area with scattered small trees. This recently described species is similar in habitus to *C. nigroclavata*, the main difference being the number of spores per ascus. In *C. praedicta* there are 24-32 spores.

It was recently mentioned from Majorca by TRETIACH & HAFELLNER (1998).

***Chromatochlamys muscorum* (FR.) MAYRH. & POELT**

Loc. 12, 26, on moss and soil on calcareous outcrops. *Chromatochlamys muscorum* is an inconspicuous species, often visible as a thin membranous layer over mosses with immersed pale perithecia. It is widespread throughout Europe and was already known from Portugal and Spain. New to the Balearic Islands.

***Cliostomum griffithii* (SM.) COPPINS**

Loc. 9, on shaded *Quercus ilex* in *Q.ilex* forest. Loc. 21, on trunk of *Chamaerops*, moderately shaded, in botanical garden. The apothecia of both specimens lack pigment completely, which is unusual in such habitat conditions. The latter specimen was found growing with *Dimerella tavaresiana*, *Leptogium subtile* and *L. teretiusculum*. New to the Balearic Islands.

***Collema euthallinum* (ZAHLEBR.) DEGEL.**

Loc. 7, 13, 25, on vertical shaded (north facing) calcareous outcrops. In the specimen from locality 7, the apothecia are abundant and the isidia are very scarce. In the two other specimens, apothecia are very rare, but isidia are abundant.

The ascospores in all specimens are of different size and $20-35 \times 12-18$. According to Degelius (1954), this species is related to *C. leptogioides* and *C. fragile*.

This rare saxicolous species was known from Dalmatia and from a few localities in Italy (NIMIS 1993). New to Spain.

***Collema occultatum* BAGL.**

Loc. 23, on *Quercus ilex* along roadside and mixed forest. This inconspicuous species was found in small amount, but richly fertile, growing among *Bacidia rubella*. New to the Balearic Islands.

***Dimerella tavaresiana* VEZDA**

Loc. 10, 21, on *Ceratonia siliqua* and *Chamaerops* sp. At locality 10 it was growing in a very shaded and sheltered situation. This species is characterized by orange-brown apothecia (0.2-0.5 mm in diam.) and 1-septate spores, $9-12 \times 2.5-3.5 \mu\text{m}$. Accompanying species are *Agonimia tristicula* (abundant, small squamules growing directly on bark) and *Biatoridium monasteriense* (at both localities). New to the Balearic Islands.

***Hymenelia similis* (MASSAL.) NYL.**

Loc. 25, on calcareous, overhanging south exposed outcrop. Apothecia immersed in rock, c. 0.3 mm, hymenium $150 \mu\text{m}$, ascospores c. $28 \times 20 \mu\text{m}$. *Hymenelia similis* is known from the Alps, but is frequent also in the Mediterranean region where it has been overlooked (NIMIS 1993). It has been scarcely recorded from mediterranean Spain (J. Etayo, pers. com.). New to the Balearic Islands.

***Lecania turicensis* (HEPP) MULL. ARG.**

Loc. 6, 7, 25, on calcareous outcrops, often in shaded and sheltered habitat. Although this species has a large ecological amplitude, it is easily overlooked, but most probably it is common on Majorca.

***Lecanora agardhiana* ACH.**

Loc. 25, on calcareous outcrop. The immersed thallus with small dark brown-black, blue-grey-pruinose apothecia sunken in pits in the rock resembles *Caloplaca alociza*. However this latter species has polarilocular spores. The specimen is abundantly infected by *Arthonia clemens*. *Lecanora agardhiana* is distributed in central Europe, it is rare in the British Isles and known also from mountain areas of Mediterranean regions. New to the Balearic Islands.

***Lepraria eburnea* LAUNDON**

Loc. 26, on *Quercus ilex* base, in north sloping *Q. ilex* forest.

Chemistry: alectorialic and protocetraric acid proved by TLC. New to Spain.

***Lepraria lobificans* NYL.**

Loc. 11, 12, on *Quercus ilex* shaded among rocks and *Olea europaea*, repectively. Chemistry: atranorin, constictic, stictic, cryptostictic acids, zeorin and a trace of ?norstictic acid (TLC). New to the Balearic Islands.

***Lepraria nivalis* LAUNDON**

Loc. 5, 13, among low sloping calcareous outcrops and on vertical wall, respectively. These specimens are composed of a whitish compact thallus with clearly delimited margin. Chemistry: A tranorin, fumarprotocetraric acid, protocetraric acid and roccellic acid (TLC), in both specimens. *L. nivalis* is distributed from northwestern Europe to the Mediterranean area.

***Leptogium brebissonii* MONT.**

Loc. 25, on calcareous outcrops. This species has usually been found epiphytic, but is rarely collected from rocks. Previously mentioned from Majorca on *Quercus ilex* by FONT & FIOL (1984).

***Leptogium plicatile* (ACH.) LEIGHTON**

Loc. 24, on low calcareous outcrops in a meadow, a small collection. *Leptogium plicatile* resembles *L. schraderi*, but it is easily distinguished by the anatomy of the internal parts; in the former species the hyphae are arranged mainly in the same direction, while in *L. schraderi* the hyphae are irregular. Beside that, the thallus of the latter species is more glossy brown, very distinctly wrinkled and more often abundantly fruiting.

***Leptogium tenuissimum* (DICKSON) KÖRBER**

Loc. 12, on calcareous soil. This species which is easily overlooked was found in small amounts, growing among low vascular plants at an open place in a small *Olea* orchard. New to the Balearic Islands.

***Lichenodiplis lecanorae* (VOUAUX) DYKO et D. HAWKSW.**

Loc. 20, on *Pertusaria*, on *Olea europaea*. This lichenicolous fungus was growing in a south sloping open *Pinus* forest with *Olea europaea* and *Quercus ilex*. New to the Balearic Islands.

***Lobothallia radiosa* (HOFFM.) HAFELLNER**

Loc. 24, on low calcareous outcrops in a meadow, on south slope with mature *Pinus*. This species was abundant in this locality. Probably new to the Balearic Islands.

***Micarea* sp.**

Loc. 14, on gentle slope, among west exposed rocks, on rotting trunk. Thallus very thin to immersed, greenish grey, green algae micareoid, 7-8 µm, apothecia dark greyish to black, up to 0.2 mm, epithecium K + violet, ascospores simple, 6-9 × 2.5-3.5 µm, conidia ca. 5 × 0.8 mm.

***Milospium graphideorum* (NYL.) D. HAWKSW.**

Loc. 10, 16, on *Arthonia* sp., on *Ceratonia siliqua* and *Pinus halepensis* respectively. These specimens were growing on thalli which refer to *Arthonia*. New to the Balearic Islands.

***Muellerella hospitans* STIZ.**

Loc. 17, in apothecia of *Bacidia fraxinea*, on *Juniperus phoenicea* in an open coastal area with young scattered trees. New to the the Balearic Islands.

***Mycobilimbia* aff. *hypnorum* (LIB.) KALB & HAFELLNER**

Loc. 9, on bark of base of mature *Quercus ilex* in *Q. ilex* wood. Apothecia convex, c. 0.5 mm in diam. Ascospores are $9-12 \times 4-5 \mu\text{m}$ with a clear, finely warted episore. Hypothecium dark reddish brown. Hymenium and hypothecium without blue-violet granules. This species which usually grows on bryophytes over calcareous rocks and soil has rarely been found on trees.

***Mycocalicium victoriae* (WILSON) TIBELL**

Loc. 2, 12, 22, all collections are from trunks of *Olea europaea*, on decorticated wood, without accompanying species. This lignicolous *Mycocalicium*, originally described from Australia, was already known from Spain and recently also from Portugal. New to the Balearic Islands.

***Phaeophyscia chloantha* (ACH.) MOBERG**

Loc. 1, on *Ceratonia siliqua*, some scattered lobes where found among *Hyperphyscia adglutinata* and *Phaeophyscia hirsuta*, in a sheltered and shaded habitat. This species is widely distributed in southern Europe, but probably overlooked. New to the Balearic Islands.

***Phaeophyscia hirsuta* (MERESCHK.) ESSL.**

loc. 1, on *Ceratonia siliqua*, abundant, with small sores and larger esorediate lobes, but always with the characteristic hyaline hairs at the margin of the lobes. *Phaeophyscia hirsuta* has a somewhat similar distribution pattern in Europe as *P. chloantha* and often they are found together. New to the Balearic Islands.

***Phyllopsora rosei* COPPINS & P. JAMES**

Loc. 12, on mature *Olea europaea* in a small orchard. This specimen was found sterile, but the small pubescent granules and squamules are very characteristic. *Phyllopsora rosei* is distributed in western Europe from Scotland to Portugal and is also known from southern Italy. New to the Balearic Islands.

***Placynthium subradiatum* (NYL.) ARNOLD**

Loc. 7, 13, 19, 25, on calcareous outcrops. Richly fertile collections. Although this species was not reported from Majorca before, it seems to be not a rare species in this region. New to the Balearic Islands.

***Porina oleriana* (MASSAL.) LETT.**

Loc. 3, 7, 13, vertical shaded, calcareous outcrops in sheltered habitats. *Porina oleriana* is characterized by the endolithic brownish thallus, black perithecia (0.25-0.4 mm) and 7-9-septate ascospores, $30-40 \times 4-4.5 \mu\text{m}$. This species has also been mentioned in BREUSS (1988).

***Rinodina bischoffii* (HEPP) MASSAL.**

Loc. 26, calcareous outcrops. This species is easily recognized by the heavily pigmented ascospores (*Bischoffii*-type), however the hymenium which normally is interspersed with oil droplets lacks this feature.

***Rinodina dalmatica* ZAHLBR.**

Loc. 22, 26, on *Olea europaea* and wood of exposed roots respectively. The specimen from *Olea* is fertile. *Rinodina dalmatica* is characterized by the entirely blastidiate thallus, forming a continuous leprose crust, the content of pannarin, and the *Pachysporaria*-type ascospores. It is a maritime, mediterranean-atlantic species. New to the Balearic Islands.

***Rinodina oleae* BAGL.**

Loc. 22, on roadside *Olea europaea*, along sloping *Pinus* wood.

This rather variable species has often been confused with *R. exigua*, but the presence of atranorin and the *Physcia*-type ascospores are important characters to distinguish this latter species from *R. oleae*, which has *Dirinaria*-type ascospores and lacks atranorin. *Rinodina oleae* is a lowland species, widely distributed in southern Europe, in contrast to *R. exigua* which seems to be confined to mountain areas in southern Europe, where it is rare. Not reported from the Balearic Islands before.

***Rinodina sophodes* (ACH.) MASSAL.**

Loc. 23, on small branches of *Pinus halepensis*. This species is recognized by the areolate thallus which is delimited by a black prothallus; the ascospores are relatively small, constricted at the septum, with a well developed torus. New to the Balearic Islands.

***Skyttea mayrhoferi* INED.**

Loc. 17, on *Pertusaria*, it was growing abundantly on several phorophytes, but only one host. This species is under investigation by J. Etayo & P. Diederich and it will be published with a formal description by these authors.

***Sphinctrina leucopoda* NYL.**

Loc. 4, on *Pistacia* in *Quercus ilex* wood, on *Pertusaria*. This rather inconspicuous lichenicolous species was found in small patches among *Bacidia friesiana*. New to the Balearic Islands.

***Thelidium decipiens* KREMPELH. s.l.**

Loc. 4, on vertical shaded stone on north side of wall, along *Quercus ilex* forest. This specimen has 1-septate spores, c. $20 \times 10 \mu\text{m}$, thallus very thin to endolithic, perithecia $\pm$ immersed, without involucrellum, 0.3 mm in diam.

***Thrombium epigaeum* (PERS.) WALLR.**

Loc. 5, terricolous on disturbed soil, on path in open forest. This specimen has perithecia of $400 \mu\text{m}$ diam., and the non-septate ascospores, measuring $25\text{--}27 \times 14 \mu\text{m}$, are somewhat broader than usually. Scarcely reported from Iberian Peninsula (J. ETAYO, pers. com.). New to the Balearic Islands.

***Tomasellia gelatinosa* (CHEVALL.) ZALBR.**

Loc. 9, abundant on branches of *Pinus halepensis*. The ascomata with several locules in combination with 3-septate spores, constricted at centre, are diagnostic for this species. In Spain previously reported from Navarra only (ETAYO 1989). New to the Balearic Islands.

***Toninia albilabra* (DUF.) H. OLIVIER**

Loc. 6, on calciferous soil together with *Anthracoarpon virescens*. The record of *Toninia albilabra* mentioned in BREUSS (1988) is from the eastern side of the island.

***Toninia diffracta* (MASSAL.) ZAHLBR.**

Loc. 5, terricolous among pebbles, in west sloping *Pinus halepensis* forest, open place. This species is not rare in southern, western and central Europe and was already known from the Balearic Islands (TIMDAL 1991).

***Toninia subfuscae* (ARNOLD) TIMDAL**

Loc. 17, 20, on *Lecanora horiza* on *Juniperus phoenicea*. At loc. 17, this lichenicolous fungus was found abundantly and with the very rare black pycnidia (conidia $4\text{--}5 \times 0.5 \mu\text{m}$). *Toninia subfuscae* is widely distributed in Europe but known from only a few collections (TIMDAL 1991). New to the Balearic Islands.

***Toninia taurica* (SZAT.) OXNER**

Loc. 25, on vertical shaded calcareous outcrops. This species is most common in central Europe, but it is known also from several localities in southern Europe, from Spain to Greece (TIMDAL 1991), however it was not reported from the Balearic Islands before.

***Verrucaria sorbinea* BREUSS**

Loc. 23, on *Quercus ilex*. There are only a few corticolous species known in the genus *Verrucaria*. Moreover, *V. sorbinea* is a very rare species which is only known from the type-locality in Luxemburg and from the locality mentioned here. This record was already published in the original description by BREUSS (1998).

Conclusion

In the present study 149 crustose lichen species are reported. Of these, 30 (= 20 %) are first records for Majorca. Only 39 species of the total list are macrolichens of which 4 (= 10 %) are first records. Macrolichens are relatively well known on the island, but microlichens are underrecorded and most probably overlooked. Lichenicolous fungi are very poorly known in this region. ETAYO (1996) is the first lichenologist who has collected lichenicolous fungi, systematically, during a one-week trip to Majorca. In the present study, 12 species of lichenicolous fungi were collected, of which 7 (= 58 %) represent new records from the island.

Despite of the disturbed woodlands at the highest locality which has been visited (loc. 23), at the western mountains, Majorca is an area of great interest. The rich lichen flora from *Quercus ilex* includes *Bacidia ignarii*, *B. phacodes* (abundant), *B. rosella*, *B. rubella*, *Catinaria atropurpurea*, *Collema occultatum*, *Gyalecta derivata*, *Lecidella achristotera*, *Lepraria eburnea*, *Strigula mediterranea* and *Verrucaria sorbinea*. These species, from one phorophyte, represent first or second records for the island, some of them have been only recently published by BREUSS (1988) or ETAYO (1996). The most interesting lowland (coastal) area is loc. 17. Among the 22 records, *Bacidia arceutina*, *B. auerswaldii*, *B. fraxinea*, *B. phacodes*, *Caloplaca aegatica*, *Gyalecta truncigena*, *Lecania naegelii*, *Lecidea exigua*, *Muellerella hospitans*, *Skyttea mayrhoferi*, *Toninia subfuscae* are new or second records from Majorca (ETAYO 1996).

Phorophyte/substrata

C = <i>Ceratonia siliqua</i>	c = calcareous rock
Ch = <i>Chamaerops</i> sp.	p = stump
E = <i>Euphorbia</i> sp.	t = terricolous
J = <i>Juniperum phoenicea</i>	w = wood
L = <i>Olea europaea</i>	
P = <i>Pinus halepensis</i>	
Ps = <i>Pistacia lentiscus</i>	
Q = <i>Quercus ilex</i>	

Table 1.

<i>Acrocordia conoidea</i>	4c 7c 15c	<i>Chromatochlams muscorum</i>	12c 26t
<i>Acrocordia gemmata</i>	2L 4Q	<i>Clauzadea metzleri</i>	25c
<i>Agonimia tristicula</i>	10C 11c 12L 22L	<i>Cliostomum griffithii</i>	9Q 21Ch
<i>Anema nummularium</i>	25c	<i>Collema coccophorum</i>	12t
<i>Anthracocarpon virescens</i>	6t	<i>Collema crispum</i>	13c
<i>Arthonia anomorphila</i>	17L	<i>Collema euthallinum</i>	7c 13c 25c
<i>Arthonia cinnabarina</i>	17Ps 17L	<i>Collema occultatum</i>	23Q
<i>Arthonia clemens</i>	24c 25c	<i>Collema tenax</i>	19c 25c
<i>Arthonia melanophthalma</i>	4Q 17J, 18L	<i>Cystocoleus ebeneus</i>	26t
<i>Arthonia meridionalis</i>	8c	<i>Dendriscocaulon</i>	26t
<i>Arthonia muscigena</i>	26t	<i>Dimerella tavaresiana</i>	10C 21Ch
<i>Arthonia pruinata</i>	16P	<i>Diploicia canescens</i>	16P 17J
<i>Arthonia punctiformis</i>	14E 16P	<i>Diploschistes muscorum</i>	12c
<i>Arthonia radiata</i>	6P	<i>Dirina ceratoniae</i>	1C, Ps 16P
<i>Arthothelium</i>	1Ps 6P 18P	<i>Dirina massiliensis f.</i>	8c 15c
<i>Aspicilia laurenzii</i>	7c	<i>Evernia prunastri</i>	23P
<i>Bacidia arceutina</i>	17L 22c	<i>Gyalecta derivata</i>	15Q 23Q
<i>Bacidia auerswaldii</i>	17J, Ps	<i>Gyalecta jenensis</i>	15c
<i>Bacidia fraxinea</i>	15Q 17J, Ps	<i>Gyalecta truncigena</i>	4Q 11Q
<i>Bacidia friesianana</i>	4Ps, Q 15Q	<i>Hymenelia similis</i>	25c
<i>Bacidia ignarii</i>	1Ps 23Q	<i>Hyperphyscia adglutinata</i>	15Q
<i>Bacidia phacodes</i>	9Q 11Q 17L, Ps 18L	<i>Lecania cyrtella</i>	22L
<i>Bacidia rosella</i>	23Q	<i>Lecania naegellii</i>	17Ps
<i>Bacidia rubella</i>	23Q	<i>Lecania sylvestris</i>	7c
<i>Bactrospora patellarioides</i>	1Ps 4Q 9Q 16P 17L	<i>Lecania turicensis</i>	6c 7c 25c
<i>Bagliettoa limborioides</i>	7c 25c	<i>Lecanographa grumulosa</i>	8c
<i>Biatorella monasteriensis</i>	2L 21Ch	<i>Lecanora agardhiana</i>	25c
<i>Botryolepraria lesdainii</i>	5c	<i>Lecanora chlorotera</i>	11Q 22L
<i>Buellia alboatrum</i>	6c 14c	<i>Lecanora hagenii</i>	7c 22L
<i>Buellia cf. disciformis</i>	17J	<i>Lecanora horiza</i>	1Ps 15L 17J
<i>Buellia punctata</i>	24P	<i>Lecanora lividocinerea</i>	9P 17J
<i>Buellia venusta</i>	19c	<i>Lecanora muralis</i>	24c
<i>Caloplaca aegatica</i>	16P 17J	<i>Lecanora piniperda</i>	2L 12L 24P
<i>Caloplaca alociza</i>	19c	<i>Lecanora pruinosa</i>	6c 25c
<i>Caloplaca aurantia</i>	14c	<i>Lecanora rubicunda</i>	4Q 117L
<i>Caloplaca cerina</i>	1C 15L	<i>Lecidea erytrophaea</i>	4Ps
<i>Caloplaca cerinelloides</i>	22L	<i>Lecidea exigua</i>	9P, Q 17Ps
<i>Caloplaca chalybaea</i>	24c	<i>Lecidea lurida</i>	24c 25c
<i>Caloplaca conversa</i>	3c 6c 7c 13c 14c	<i>Lecidella achristotera</i>	23Q
<i>Caloplaca dolomiticola</i>	25c	<i>Lecidella elaeochroma</i>	16P 22L
<i>Caloplaca erythrocarpa</i>	19c	<i>Lecidella euphora</i>	23Q
<i>Caloplaca ferruginea</i>	4Ps 23P	<i>Lecidella stigmathea</i>	24c
<i>Caloplaca flavescens</i>	13c	<i>Lepraria eburnea</i>	26Q
<i>Caloplaca fuscoblastidiata</i>	12L	<i>Lepraria lobificans</i>	11Q 12L
<i>Caloplaca holocarpa</i>	1Ps 3w	<i>Lepraria nivalis</i>	13c
<i>Caloplaca lucifuga</i>	10C	<i>Leptogium brebissonii</i>	25c
<i>Caloplaca obscurella</i>	12L 22L	<i>Leptogium cyanescens</i>	26Q
<i>Caloplaca subochracea v.</i>	7c 8c	<i>Leptogium gelatinosum</i>	4c
<i>Caloplaca variabilis</i>	3c 6c	<i>Leptogium lichenoides</i>	11c 24c
<i>Catillaria chalybeia</i>	22c 24c	<i>Leptogium plicatile</i>	24c
<i>Catillaria nigroclavata</i>	4Ps 22L	<i>Leptogium subtile</i>	21Ch
<i>Catillaria praedicta</i>	18L	<i>Leptogium tenuissimum</i>	12t
<i>Catinaria atropurpurea</i>	23Q		

<i>Leptogium teretiusculum</i>	21Ch 26t	<i>Ramalina farinacea</i>	4Q
<i>Lichenodiplis lecanorae</i>	20L	<i>Ramalina fastigiata</i>	4Q
<i>Lobothallia radiosa</i>	24c	<i>Ramalina implectens</i>	20Q
<i>Melanelia subaurifera</i>	22P	<i>Ramalina lacera</i>	1Ps 16P 20L
<i>Micarea</i> sp.	14w	<i>Ramalina pusilla</i>	17L
<i>Milospium graphideorum</i>	10C 16P	<i>Ramonia subsphaeroides</i>	26Q
<i>Muellerella hospitans</i>	17J	<i>Rinodina bischoffii</i>	25c
<i>Muellerella lichenicola</i>	3c 18L 25c	<i>Rinodina dalmatica</i>	22L 26w
<i>Mycobilimbia aff. hypnorum</i>	9Q	<i>Rinodina dubyana</i>	25c
<i>Mycobilimbia sabuletorum</i>	11Q	<i>Rinodina immersa</i>	24c 25c
<i>Mycocalicium victoriae</i>	2L 12L 22L	<i>Rinodina oleae</i>	22L
<i>Nephroma tangeriense</i>	26t	<i>Rinodina pruinella</i>	1Ps 17J, Ps 18L
<i>Opegrapha atra</i>	16P	<i>Rinodina sophodes</i>	23P
<i>Opegrapha ochrocheila</i>	18L	<i>Schismatomma albocinctum</i>	16P 18P
<i>Opegrapha physciaria</i>	1Ps	<i>Schismatomma decolorans</i>	4Q
<i>Opegrapha varia</i>	2L 3w 20L	<i>Schismatomma graphidioides</i>	15L 26Q
<i>Pannaria mediterranea</i>	12L	<i>Schismatomma picconianum</i>	1C, P, Ps, 2L
<i>Pannaria olivacea</i>	23Q	<i>Skyttea mayrhoferi</i>	17J, L
<i>Parmelina quercina</i>	23P	<i>Solenopsora candicans</i>	12c 24c
<i>Parmelina tiliacea</i>	4Q	<i>Solenopsora olivacea</i>	3c 7c 13c 19c
<i>Parmotrema chinense</i>	4Q 22P	<i>Solenopsora olivacea</i> v. <i>olbiensis</i>	8c 19c
<i>Parmotrema hypoleucinum</i>	4Q	<i>Sphinctrina leucopoda</i>	4Ps
<i>Parmotrema reticulatum</i>	4Q	<i>Squamarina cartilaginea</i>	6t 25c
<i>Peltigera praetextata</i>	26t 26Q	<i>Squamarina gypsacea</i>	22c 25c
<i>Pertusaria heterochroa</i>	17L	<i>Staurolemma omphaliarioides</i>	23Q
<i>Pertusaria pertusa</i>	23Q	<i>Strigula mediterranea</i>	23Q
<i>Petractis leutkemuellerei</i>	7c 22c	<i>Tephromela atra</i>	17L
<i>Phaeophyscia chloantha</i>	1C	<i>Thelidium decipiens</i> s.l.	4c
<i>Phaeophyscia hirsuta</i>	1C	<i>Thrombium epigaeum</i>	5t
<i>Phlyctis agelaea</i>	4Q 23Q	<i>Tomasellia gelatinosa</i>	9P
<i>Phyllopsora rosei</i>	12L	<i>Toninia albilabra</i>	6t
<i>Physcia semipinnata</i>	23P	<i>Toninia aromatica</i>	3c 7c 19c 24c
<i>Physcia stellaris</i>	24P	<i>Toninia diffracta</i>	5t
<i>Physconia distorta</i>	23Q	<i>Toninia episema</i>	7c 25c
<i>Placynthiella icmalea</i>	14p	<i>Toninia subfuscae</i>	17J
<i>Placynthium nigrum</i>	5t 24c	<i>Toninia taurica</i>	25c
<i>Placynthium subradiatum</i>	7c 13c 19c 25c	<i>Topelia rosea</i>	3c, roots
<i>Pleurosticta acetabulum</i>	23Q	<i>Verrucaria calciseda</i>	24c
<i>Polyblastia gelatinosa</i>	5t	<i>Verrucaria fuscula</i>	25c
<i>Porina aenea</i>	1C 4Ps 17L 21Ch	<i>Verrucaria lecidoides</i>	6c 25c
<i>Porina linearis</i>	3c 7c 15c	<i>Verrucaria cf. muralis</i>	25c
<i>Porina oleriana</i>	3c 13c	<i>Verrucaria nigrescens</i>	14c
<i>Protoblastenia rupestris</i>	22c	<i>Verrucaria sorbinea</i>	23Q
<i>Psorotichia cf. schaereri</i>	25c	<i>Vezdaea aestivalis</i>	26t
<i>Pyrenula chlorospila</i>	9Q 11Q	<i>Vouauxiella lichenicola</i>	17L
<i>Pyrrhospora querneae</i>	9Q	<i>Vouauxiella verrucosa</i>	20L
<i>Ramalina calicaris</i>	9Q 20Q 23P	<i>Xanthorticola physciae</i>	1Ps
<i>Ramalina canariensis</i>	9P 20L		

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Zusammenfassung

Eine Liste von 200 Arten von Flechten und flechtenbewohnenden Pilzen aus Mallorca (Balearen, Spanien) wird vorgelegt. *Collema euthallinum* und *Lepraria eburnea* stellen Erstfunde für Spanien dar, mehrere weitere Arten sind in Spanien selten gefunden worden oder sind Neufunde für Mallorca. Die interessantesten Funde werden separat aufgelistet und kurz kommentiert.

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