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Additions to the lichen flora of the Azores

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Abstract: Fifty-four taxa (including two lichenicolous fungi) are discussed, with 35 being new to the Azores. Of these, 7 are new records for Europe, viz. *Coccocarpia palmicola* (Spreng.) L. Arvidss. & D. Galloway, *Erioderma chilense* Mont., *Graphis insidiosa* (Knight & Mitten) J. D. Hook., *Hypotrachyna costaricensis* (Nyl.) Hale, *H. pseudosinuosa* (Asah.) Hale, *Parmotrema mellissii* (Dodge) Hale, and *P. subsidiosum* (Müll. Arg.) Hale. 7 species are new to Macaronesia.

INTRODUCTION

The Azorean archipelago is situated in the Atlantic Ocean, midway between Portugal and Newfoundland. The topography of the nine islands is dissected by a number of river valleys, deeply cut into the easily eroded volcanic deposits. Most of the islands have one large or several small caldeiras. The highest crater is that on Pico (2350 m). On Faial and Sao Miguel the mountains reach only somewhat above 900 m. The climate of the Azores is oceanic with small variations of temperature, large amounts of precipitation and high air humidity. For further details see SJÖGREN (1984) and literature cited in that work.

The cloud-zone forest (500-1300 m.s.m.) is of special interest. This zone contains the largest number of Azorean and Macaronesian endemics as regards vascular plants. Forests here are often dominated by narrow-leaved trees and bushes (*Juniperus brevifolia* and *Erica azorica*). Such vegetation (Fig. 1A) was seen in the localities 16, 19, 23, 25 and 26. Another shrub-forest (Fig. 1B), is composed of broad-leaved trees, viz. *Ilex perado*, *Laurus azorica*, *Myrsine africana*, *Viburnum tinus* and *Frangula azorica* (in locs. 16, 23 and 25). Special attention was paid to this zone and many of the interesting



Fig. 1: Shrub-forests in the Azores. A: Narrow-leaved shrub of *Erica arzorica* on Faial, Cabeço dos Trinta (loc. 16). B: Broad-leaved shrubbery on Pico, Mistério de Prainha (loc. 25). Photo: L. Arvidsson, June 1986.

findings reported below originate from these relict forests.

The effects of man's activities in the cloud-zone forest have decreased its area considerably. In many places there are only small remnants, located to lavafields ("mistérios"), caldeiras and deep ravines. Many species here are endangered and in urgent need of preservation.

THE LICHEN FLORA

The lichen flora of the Azores is known from a series of papers, viz. NAVAS (1909), DEGELIUS (1941), DES ABBAYES (1947), TAVARES (1952, 1958), and most recently APTROOT (1989). Several taxa appear to be endemic to the Azores (TAVARES 1952, JAMES & WHITE 1987) and many tropical lichens occur here in their only outposts in Europe (APTROOT 1989). Most of the additions to the European lichen flora presented below are pantropical elements, viz. *Coccocarpia palmicola*, *Hypotrachyna costaricensis*, *H. pseudosinuosa*, *Parmotrema mellissii* and *P. subisidiosum*. Two species, viz. *Physcia atrostriata* and *Ph. erumpens* have an interesting African-Macaronesian distribution, which parallels that of the genus *Canarina* (Campanulaceae) and *Adiantum reniforme* (Adiantaceae). The new records for the Azores belong to various phytogeographical groups. Some are Western European, viz. *Buellia ambigua*, *Catinaria pulverea* and *Solenopsora holophaea*. *Caloplaca irrubescens* and *Rinodina confinis* represent Mediterranean elements, and some are widely distributed, viz. *Caloplaca citrina*, *Lecanora badia* and *Pannaria pezizoides*.

MATERIAL AND METHODS

The material cited below was collected by the author and Prof. GUNNAR DEGELIUS during two weeks in June and July 1986. LA and GD indicates leg. L. Arvidsson and leg. G. Degelius respectively, followed by the collection number. The material is held in our private herbaria. The excursion included three islands, viz. Sao Miguel, Faial and Pico. A list of the localities visited is given in Table 1., and they are referred to by their numbers. The material is fertile unless otherwise stated (= "ster."). In all, more than 600 specimens were collected. Some of these were investigated chemically using standardized t.l.c. techniques (WHITE & JAMES 1985). The determination work was assisted by several specialists who are acknowledged below. Our collection of pyrenolichens from the Azores has proved to be of special interest, with several undescribed taxa (R. HARRIS, pers. comm.). These will be treated elsewhere. Several genera (*Arthonia*, *Lecidea*, *Usnea* etc.) still remain unidentified.

NO.	Locality	Altitude (m)
SAO MIGUEL		
1.	Ponta Delgada, Mae de Deus Church	50
2.	Ponta Delgada, near the University Park	50
3.	Ponta Delgada, the University Park	50
4.	Caldeira das Sete Cidades, Vista do Rei	300
5.	Ponta de Santo António	100
6.	1 km N of Lagoa do Fogo	650
7.	Lombadas	550
8.	1 km NW of Lombadas	300
9.	2 km NW of Lombadas	200
10.	Ponta de Santa Iria	50
11.	Furnas, view-point west of the city	400
12.	Furnas, the Botanical Garden	300
13.	Northern side of Lagoa das Furnas	300
14.	Ponta Delgada; Largo da Matriz	15
FAIAL		
15.	Horta, near the harbour	10
16.	Western slopes of the Caldeira, Cabeço dos Trinta	650
17.	Horta, Monte da Guia	25-100
18.	Southern slopes of the Caldeira, near the view-point	900
19.	Inside the Caldeira, below the view-point	900
20.	Above Flamengos	350
21.	Horta, Porto Pim	0-10
22.	Horta, Conceição	20
PICO		
23.	North slopes of Pico mountain, Cerrado de Sonicas	900
24.	Madalena	30
25.	Mistério de Prainha	600
26.	Cabeço da Cruz	750

Tab. 1: List of localities visited in the Azores in June and July 1986 (in geographical order). Some localities were visited on more than one occasion.

ANNOTATED LIST OF SPECIES

Species are reported as being new to the Azores if no published records were found in TAVARES (1952, 1958, 1964), POELT (1969), POELT & VEZDA (1977, 1981) APTROOT (1989) and various recent monographs. When this work was in manuscript, APTROOT (1989) published a list of additions to the lichen flora of the

Azores. His list included 17 species found also by us. Our collections of these are also mentioned here. Additional specimens of two *Physcia*-species recently recorded for the first time from Europe (MOBERG 1989) are also presented.

Bacidia subacerina Vain.

Loc: 17. On bark of cult. *Robinia*, associated with *Dirinaria applanata* and *Pyxine subcinerea* (GD 92). - New to the Azores. In Macaronesia previously known from the Canary Islands (TAVARES 1952). The material belongs to var. *brachysporella* (Vain.) Vain. (Det. GD).

Buellia ambigua (Ach.) Malme

Loc: 21. On rocks (lava) near the sea (GD 226). - New to Macaronesia. A western, maritime species in Europe (NIMIS & POELT 1987).

Byssoloma leucoblepharum (Nyl.) Vain em. R. Sant.

Loc: 8. On shaded, basal parts of trunks of cult. *Acacia* sp. Associated with *Dimerella pinetii* (LA 35, 39). - A pantropical lichen recently recorded for the first time from the Azores (APTROOT 1989).

Caloplaca chrysophthalma Degel.

Loc: 17. On bark of cult. *Tamarix* sp. at the road side (LA 115, det. GD). - New to Macaronesia. A species of wide distribution in central and south Europe. According to NIMIS & POELT (1987), this species is probably extinct in large parts of its former area.

Caloplaca citrina (Hoffm.) Th.Fr.

Locs: 1. On walls of Mae de Deus Church, associated with *C. aurantia*, *Diploicia canescens* and *Pyxine subcinerea* (LA 1); 15. On cult. *Ulmus* sp., associated with *Pyxine subcinerea* (LA 72, 73, GD 212); 21. On lava boulders associated with *Diploicia canescens* and *Pyxine subcinerea* (LA 275, GD 220). All determinations confirmed by I. NORDIN. - New to the Azores. A widely distributed species, in Macaronesia previously known from the Canary Islands (TAVARES 1952).

Caloplaca saxicola (Hoffm.) Nordin

Locs: 1. On walls of Mae de Deus Church (not collected); 21. On rock by the road (GD 218). - New to the Azores. A species of wide distribution in Europe (NORDIN 1972). In Macaronesia previously recorded from Madeira (TAVARES 1952) and the Canary Islands (KLEMENT 1965).

Caloplaca irrubescens (Nyl.) Zahlbr.

Loc: 10. On exposed stone walls at the view-point (LA 47). - New to the Azores. A Mediterranean species. In Macaronesia also

ary Islands (TOPHAM & WALKER 1982).

Catinarina pulverea (Borr.) Vezda & Poelt

Locs: 6. On mosses on rocks at the road side (LA 30); 16. On bark of *Erica azorica*, associated with *Catinarina albocincta* (GD 59, 70); 25. On bark of *Ilex perado* associated with *Megalospora tuberculosa* and *Nephroma hensseniae* (LA 200b). - New to the Azores. A species found in the oceanic parts of western and northern Europe and in the Alps. In Macaronesia previously recorded from Madeira (TAVARES 1952).

Cladonia nana Vain.

Loc: 8. On rocks by the levada, associated with *Leprocaulon microscopicum* (LA 34, det. T. AHTEI). - A South American species recently recorded for the first time from the Azores (APTROOT 1989).

Coccocarpia palmicola (Spreng.) L. Arvidss. & D. Galloway

Locs: 16. On bark of *Erica azorica* (LA 102); 23. On bark of *Juniperus brevifolia* (LA 166, GD 130, 137); 25. On bark of *Juniperus b.* (LA 210); 26. On bark of *Juniperus b.* (LA 222). All specimens ster. - New to Europe. *C. palmicola* has a wide distribution in the tropics and subtropics (ARVIDSSON 1983), and the nearest localities are those in Newfoundland and the Cape Verde Islands. In the Azores it is restricted to the cloud forest zone, particularly in forests with *Juniperus* and *Erica*. Here it associates with e.g. *Hypotrachyna laevigata*, *H. endochlora*, *H. microblasta*, *Megalospora tuberculosa*, *Parmeliella atlantica*, *Parmelina horrescens*, *Pseudocyphellaria intricata*, *Normandina pulchella*, *Erioderma chilense*, *E. mollissimum*, *Catinarina albocincta* and other taxa demanding on oceanic climate.

Collema furfuraceum (Arn.) Du Rietz

Loc: 12. On cult. *Quercus robur*, rather sparse and ster. Associated with *Caloplaca ferruginea* (LA 60, det. GD). - New to the Azores. A suboceanic species of wide distribution (DEGELIUS 1954, 1974). In Macaronesia previously recorded from Madeira (TAVARES 1952), and the Canary Islands (KLEMENT 1965).

Dactylospora parasitica (Spreng.) Zopf.

Loc: 23. On a sterile crust on *Juniperus brevifolia* (GD 119, det. R. SANTESSON). - New to Macaronesia. This lichenicolous fungus has a wide distribution in Europe (HAFELLNER 1979).

Dimerella lutea (Dicks.) Trev.

Locs: 3. On shaded trunks of cult. *Robinia pseudacacia*, associated with *Collema subflaccidum* (LA 11, GD 11); 25. On bark and over epiphytic mosses on *Ilex perado*, shaded. Associated with *Nephroma hensseniae* (LA 198). Abundant in both localities.

NEW TO THE AZORES: An essentially pantropical species. In Macaronesia previously recorded from Madeira (TAVARES 1952).

Dimerella pinetii (Schrad.) Vezda

Locs: 8. On bark (base) of cult. *Acacia* sp., shaded. Associated with *Byssoloma leucoblepharum* (LA 42); 22. On basal parts of a trunk of cult. *Robinia*, shaded (LA 297). - A temperate, easily overlooked lichen. Recently reported for the first time from the Azores (APTROOT 1989).

Dirina insulana (C. Tav.) Tehler f. *sorediata* Tehler

Loc: 22. On stone walls, shaded (LA 290, 291, 293, det. A. THELER). All specimens ster. - This taxon was recently recorded for the first time from the Azores (APTROOT 1989).

Erioderma chilense Mont.

Loc. 23. On mosscovered trunks and branches of *Juniperus brevifolia* (LA 175, GD 134, 145). T.l.c.: Pannarin, argospin, norpannarin, nordechelopannarin, norargospin (ELIX et al. 1986; from material collected from this locality by P. JAMES, BM). - New to Europe. The fertile, non-sorediate *Erioderma* species recorded from the Azores by DEGELIUS (1941) and later authors belongs to *E. chilense* and not to *E. wrightii*. The former species has ascending lobe margins and a naked lower surface with marginal tufts of black rhizo-hyphae. In *E. wrightii* the lobe margins are deflexed and the lower surface covered with continuous, brownish, felt-like rhizo-hyphae. In addition, the chemistry of this latter species is very different (unidentified substance, 4-6 terpenes). *E. wrightii* is the fertile counterpart of *E. mollissimum*. - This essentially Southern Hemisphere lichen was associated with *Erioderma mollissimum*, *Nephroma venosum*, *N. helveticum*, *Coccocarpia palmicola*, *Pseudocyphellaria intricata*, *Hypotrachyna endochlora*, *H. microblasta*, *Dictyonema interruptum*, *Sticta dufouri*, *Pannaria rubiginosa*, *Leptogium cyanescens*, *Parmelia saxatilis*, *Platismatia glauca* and *Megalospora tuberculosa*.

Graphis elegans (Sm.) Ach.

Locs: 4. On bark of *Myrica faya* (GD 14); 12. On bark of cult. *Quercus* sp., associated with *Glyphis cicatricosa* (LA 303a); 13. On bark of *Alnus glutinosa*, associated with *Graphis scripta*, *Phaeographis dendritica*, *Pertusaria pustulata* and *Glyphis cicatricosa* (GD 263, LA 316, 317b); 20. On cult. *Platanus* sp. at the road side, associated with *Glyphis cicatricosa* (LA 262). - Recently recorded for the first time from the Azores (APTROOT 1989).

Graphis insidiosa (Knight & Mitten) J.D. Hook.

Locs: 16. On smooth bark of *Ilex perado*, associated with *Pyrenula* spp. and *Melaspilea diplaciospora* (GD 83, LA 78, 80); on

of *Ilex perado*, associated with *Thelotrema lepadinum* (LA 141). - New to Europe. This species is known from North America, the West Indies (WIRTH & HALE 1978), and New Zealand (GALLOWAY 1985). It is closely related to *G. triticea* (see below), but differs in lacking stictic acid (PD -), and having lower ascocarps and a less elaborate exciple. The fruit bodies are mostly seen as fissurine cracks in the thallus. *G. insidiosa* and *G. triticea* both have characteristic, 4-celled spores.

Graphis scripta (L.) Ach.

Locs: 8. On trunk of cult. *Acacia* sp. (LA 41); 12. On bark of cult. *Quercus* sp. (A 311); 13. On bark of *Alnus glutinosa* (GD 264, LA 317a); 20. On bark of cult. *Platanus* sp. at the road side, associated with *Glyphis cicatricosa* and *Heterodermia speciosa* (LA 264, 252, 253). - Recently recorded for the first time from the Azores (APTROOT 1989).

Graphis triticea Nyl.

Locs: 16. On bark (and over epiphytic bryophytes) of *Erica azorica* (GD 56, 58, LA 92, 93); 23. On bark (and over epiphytic bryophytes) of *Juniperus brevifolia* (GD 117). - This tropical species was recently recorded for the first time from Europe (APTROOT 1989). See also under *G. insidiosa*.

Heterodermia japonica (Sato) Swinsc. & Krog

Locs: 12. On trunk of cult. *Araucaria* sp., associated with *Agonimia tristicula* and *Normandina pulchella* (LA 295); 25. On mossy trunk of *Ilex perado* (LA 208). Both specimens ster. - Recently recorded for the first time from the Azores (APTROOT 1989).

Hyperphyscia adglutinata (Flörke) Mayrh. & Poelt

Locs: 15. On cult. *Ulmus* sp. (LA 71, 269b); 22. On cult. *Eleagnus* sp. (LA 285a). All specimens ster. Det. R. MOBERG. - A cosmopolitan species recently recorded for the first time from the Azores (APTROOT 1989).

Hypocenomyce scalaris (Ach.) Choisy

Loc: 3. On bark of cult. *Robinia* sp. Sparse and ster. (LA 20c). - Recently recorded for the first time from the Azores (APTROOT 1989).

Hypotrachyna costaricensis (Nyl.) Hale

Locs: 16. On trunks of *Erica azorica*, associated with *H. endochlora* (LA 113); 23. On trunks of *Juniperus brevifolia* (GD 125, LA 151) All specimens ster. T.l.c.: Atranorin, fatty acids (det. M. HALE). - New to Europe. A species of pantropical distribution (HALE 1975, SWINSCOW & KROG 1988).

Loc: 26. On trunk of *Juniperus brevifolia* (GD 165b). Associated with *Parmelinopsis horrescens*. Ster. T.l.c.: "Barbatic acid group" (det. M. HALE) - This American element was recently recorded for the first time from the Azores (APTROOT 1989).

Hypotrachyna microblasta (Vain.) Hale

Locs: 16. On trunks of *Erica azorica*, associated with *H. endochlora*. (LA 111); 19. On trunks of *Juniperus brevifolia* (LA 236); 23. On trunks of *Juniperus b.*, associated with *Coccocarpia palmicola* (GD 129, LA 167); 25. On trunks of *Juniperus b.*, associated with *Hypotrachyna endochlora* and *Parmelinopsis horrescens* (LA 190, 193). All specimens ster. T.l.c.: Usnic acid, galbinic acid, norstictic acid, salazinic acid (det. M. HALE). - This pantropical lichen was recently recorded for the first time from the Azores (APTROOT 1989).

Hypotrachyna pseudosinuosa (Asah.) Hale

Loc: 13. On trunks of *Alnus glutinosa* near the lake, associated with *Glyphis cicatricosa* (GD 261, LA 319). T.l.c.: Atranorin, protocetraric acid (det. M. HALE) - New to Europe. A pantropical lichen, in Macaronesia previously recorded from the Canary Islands (ÖSTHAGEN & KROG 1976).

Lecanora badia (Pers.) Ach.

Loc: 17. On exposed rocks (LA 114). - New to the Azores. A species of wide distribution in Europe. In Macaronesia previously recorded from the Canary Islands (TAVARES 1952).

Lecanora pallida (Schreb.) Rabenh.

Loc: 17. On twigs of *Vaccinium cylindraceum* (LA 124); on bark of *Erica azorica* (GD 96). - New to the Azores. In Macaronesia previously recorded from Madeira and the Canary Islands (TAVARES 1952).

Lepraria incana (L.) Ach.

Loc: 25. On mosses on trunk of *Vaccinium cylindraceum* (GD 179). Ster. Seen in several other localities, but not collected. - Recently recorded for the first time from the Azores (APTROOT 1989).

Leptogium corticola (Tayl.) Tuck.

Loc: 12. On trunk of cult. *Liriodendron tulipifera*, rather shaded (LA 300, det. M. LINDSTRÖM). - New to Macaronesia. This taxon has a very restricted distribution in Europe, and JÖRGENSEN & JAMES (1983) record only a few localities in Italy and Yugoslavia.

Additional material: Canary Islands, La Palma, Los Tilos, on *Laurus canariensis*, 1 April 1974, leg. T. HALLINGBÄCK (herb LA; det. M. LINDSTRÖM).

Neaspilea dipliciospora (Nyl.) null. Arg.
Locs: 16. On smooth bark of *Ilex perado*, associated with *Graphis insidiosa* (GD 72, 84, LA 77b); 23. On smooth bark of *Ilex perado* (GD 118). - New to Macaronesia. In Europe previously known from Ireland and the United Kingdom (SMITH 1926).

Moelleropsis nebulosa (Hoffm.) Gyeln.

Loc: 17. On naked, sandy soil in a road cutting. Ster. (LA 132, conf. P.M. JØRGENSEN). - New to the Azores. A western species in Europe, in Macaronesia previously known from Madeira (TAVARES 1952) and the Canary Islands (KLEMENT 1965).

Opegrapha atra Pers.

Locs: 5. On cult. species of Cupressaceae (GD 24); 9. On branches of *Robinia pseudacacia* (GD 19); 13. On trunk of *Alnus glutinosa*, associated with *Pertusaria pustulata* (LA 321a); 17. On twigs of cult. *Tamarix* sp. (LA 127); 22. On trunk of cult. *Ailanthus altissima*, associated with *Pertusaria pustulata* (LA 278, 288a). - New to the Azores. In Macaronesia previously recorded from Madeira and the Canary Islands (TAVARES 1952).

Pannaria pezizoides (Web.) Trev.

Loc: 19. On mossy trunks (basal parts) of *Vaccinium cylindraceum*, associated with *Megalospora tuberculosa* (LA 227). - New to the Azores. A species of wide distribution in the Northern Hemisphere. In Macaronesia previously recorded from Madeira (TAVARES 1952).

Parmelinopsis horrescens (Tayl.) Elix & Hale

Locs: 16. On mossy trunks of *Erica azorica*, associated with *Coccocarpia palmicloa*, *Hypotrachyna endochlora* and *Parmotrema robustum* (GD 66, LA 106); 19. On mossy trunks of *Juniperus brevifolia* (LA 231); 25. On mossy trunks of *Juniperus b.* (LA 212, 215); 26. On mossy trunks of *Juniperus b.* (GD 165a, LA 220). T.l.c.: Atranorin, gyrophoric acid and "horrescens unknown" (det. M. HALE). - New to the Azores. A species of wide distribution, in Macaronesia previously known from the Canary Islands (ØSTHAGEN & KROG 1976), and Madeira (ARVIDSSON & WALL 1985).

Parmotrema mellissii (Dodge) Hale

Loc: 16. On trunk of *Erica azorica*. Ster. Associated with *Heterodermia obscurata* (LA 112) T.l.c.: Atranorin, α -collatolic acid, alectoronic acid (det. M. HALE). - New to Europe. A pantropical lichen with the nearest locality in the Canary Islands (ØSTHAGEN & KROG 1976).

Parmotrema stuppeum (Tayl.) Hale

Loc: 3. On trunk of cult. *Eucalyptus*. Ster. (GD 7, LA 20b). - New to the Azores. A species of wide distribution (HALE 1965). In Macaronesia previously recorded from the Canary Islands (TA-

VARES 1952, as *Parmelia trichotera* var. *claudelii*).

Parmotrema subisidiosum (Müll. Arg.) Hale

Loc: 25. On trunks of *Juniperus brevifolia*. Ster. (LA 202, 214): T.l.c.: Atranorin, salazinic acid (det. M. HALE). - New to Europe. A species of wide distribution in tropical and subtropical regions (SWINSCOW & KROG 1988).

Peltigera lactucifolia (With.) Laund.

Loc: 16. On soil at the road side. Ster. Associated with *Cladonia azorica*, *Cladonia stereoclada*, *Stereocaulon azoreum* and *St. vulcani* (GD 87, det. O. VITIKAINEN). - Recently recorded for the first time from the Azores (APTROOT 1989).

Pertusaria pseudocorallina (Liljebl.) Arn.

Loc: 17. On exposed rocks by the road. Ster. (GD 105). - New to the Azores. A Submediterranean-Subatlantic species (WIRTH 1972). In Macaronesia previously recorded from the Canary Islands (TAVARES 1952).

Pertusaria pustulata (Ach.) Duby

Locs: 13. On smooth bark of *Alnus glutinosa*, associated with *Glyphis cicatricosa*, *Opegrapha atra* and species of *Arthonia* and *Graphis* (GD 265, LA 315a, 321b); 15. On cult. *Ulmus* (GD 48); 22. On cult. *Ailanthus altissima* (LA 288b). - New to the Azores. A species of Mediterranean-Atlantic distribution. In Macaronesia previously recorded from the Canary Islands and Madeira (TAVARES 1952).

Phaeophyscia chloantha (Ach.) Moberg

Loc: 15. On bark of cult. *Ulmus*. Ster. (LA 269, det. R. MOBERG). - Recently recorded for the first time from the Azores (APTROOT 1989).

Phaeophyscia hirsuta (Mereschk.) Moberg

Locs: 1. On stone wall and basement of Mae de Deus Church (LA 3); 2. On cult. *Ulmus*, associated with *Xanthoria parietina* (LA 8); 15. On cult. *Ulmus* (LA 69b). All specimens ster. Det. R. MOBERG. - Recently recorded for the first time from the Azores (APTROOT 1989).

Physcia atrostriata Moberg.

Locs: 2. On cult. *Ulmus*, associated with *Physcia erumpens* (LA 7b); 3. On cult. *Cupressus* sp., associated with *Ph. erumpens* (LA 13a, 13b); on cult. *Robinia pseudacacia* (LA 26); 15. On cult. *Ulmus*, associated with *Ph. erumpens* and *Ph. tribacoides* (GD 49b). All specimens ster. Det. R. MOBERG. - This rather recently described species (MOBERG 1986), was lately recorded for the first time from the Azores (MOBERG 1989).

Physcia caesia (HORM.) FURNROHR
Loc. 1. On walls of Mae de Deus Church. Ster. (Not collected).
- New to the Azores. A species of wide distribution. In Macaronesia previously recorded from Madeira and the Canary Islands (TAVARES 1952).

Physcia erumpens Moberg

Locs: 2. On cult. *Ulmus*, associated with *Physcia atrostriata* (LA 7b); 3. On cult. *Cupressus* sp., associated with *Ph. atrostriata* (LA 13a, 13b); 12. On cult. *Quercus robur* (LA 59b); 15. On cult. *Ulmus*, associated with *Ph. atrostriata* (GD 49a, LA 70, 270). All specimens ster. Det R. MOBERG. - This rather recently described species (MOBERG 1986), was lately recorded for the first time from the Azores (MOBERG 1989).

Physcia tribacoides Nyl.

Locs: 15. On cult. *Ulmus*, associated with *Physcia atrostriata* and *Ph. erumpens* (GD 49c); 17. On cult. *Robinia pseudacacia* (LA 133). Det. R. MOBERG. - This species was recently recorded for the first time from the Azores (APTROOT 1989).

Plectocarpon lichenum (Sommerf.) D. Hawksw.

Loc: 20. On the thallus of *Lobaria pulmonaria* var. *meridionalis*, on cult. *Platanus* sp. (GD 210). Det. R. SANTESSON. - New to the Azores. A widely distributed parasite. In Macaronesia previously recorded from the Canary Islands (KLEMENT 1965, as *Celidium lichenum*).

Rinodina confinis Samp.

Loc: 12. On cult. *Araucaria* sp., associated with *Pannaria mediterranea*, *Agonimia tristicula*, *Leprocaulon microscopicum* (epiphytic!) and *Leptogium cyanescens* (LA 299); on trunk of *Quercus rubra* (GD 39). - New to Macaronesia. This characteristic species was previously known only from the mainland of Portugal and Sardinia (NIMIS & POELT 1987).

Solenopsora holophaea (Mont.) Samp.

Loc: 21. On exposed rocks near the sea (LA 277) - New to the Azores. A species found in coastal areas in south west Europe. In Macaronesia previously known from the Canary Islands (NIMIS & POELT 1987).

Thelopsis rubella Nyl.

Loc: 22. On basal trunks of cult. *Robinia pseudacacia*, shaded (LA 286). - New to Macaronesia. This species has a wide distribution in Europe (VEZDA 1968). The nearest localities are in Ireland and France.

Trapelia coarctata (Sm. & Sow.) Choisy

Locs: 6. On rocks at the road side (LA 29); 8. On rocks by the

levada (LA 33). - New to the Azores. A species of wide distribution (HERTEL 1970). In Macaronesia previously recorded from Madeira (TAVARES 1952), and the Canary Islands (TOPHAM & WALKER 1982).

Xanthoria candelaria (L.) Th.Fr.

Loc: 24. On a stone wall, associated with *Parmotrema ultralucens*, *Pyxine subcinerea*, *P. sorediata*, *Dirinaria applanata* and *Coccocarpia erythroxyli*. Ster. (Not collected). - New to the Azores. A species of wide distribution. In Macaronesia previously recorded from the Canary Islands (TAVARES 1952).

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