

SHORT COMMUNICATION

ADDITIONS TO THE AZOREAN LICHEN FLORA

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Ongoing lichenological research in the Azores yielded records of 38 new species for the lichen flora of the Archipelago: *Agonimia papillata* (O. Eriksson) Diederich & Aptroot, *Amandinea lecideina* (Mayrh. & Poelt) Scheid. & Mayrh., *Arthonia ilicinella* Nyl., *Arthonia muscigena* Th. Fr., *Arthonia stellaris* Kremp., *Bacidia canariensis* Erichsen, *Buellia dives* (Th. Fr.) Th. Fr., *Caloplaca canariensis* (Follman & Poelt) Breuss, *Cliostomum flavidulum* Hafellner & Kalb, *Collema crispum* (Huds.) Weber ex Wigg., *Dimelaena radiata* (Tuck.) Hale & W. Culb., *Lecania hutchinsiae* (Nyl.) A.L. Sm., *Lecanora cenisia* Ach., *Lecanora hagenii* (Ach.) Ach., *Lecanora leprosa* Fée, *Lecanora orosthea* (Ach.) Ach., *Lecanora pulicaris* (Pers.) Ach., *Lecanora strobilina* (Spreng.) Kieffer, *Leptogium teretiusculum* (Flörke) Arnold, *Ochrolechia androgyna* (Hoffm.) Arnold, *Opegrapha calcarea* Sm., *Opegrapha herbarum* Mont., *Opegrapha multipuncta* Coppins & P. James, *Opegrapha niveoatra* (Borr.) J.R. Laundon, *Opegrapha prosodea* Ach., *Opegrapha varia* Pers., *Parmelinopsis minarum* (Vainio) Elix & Hale, *Pertusaria amarescens* Nyl., *Pertusaria lactea* (L.) Arnold, *Phaeographis smithii* (Leight.) de Lesd., *Phlyctis argena* (Spreng.) Flot., *Placidium squamulosum* (Ach.) Breuss, *Pyrrhospora quercea* (Dicks.) Körb., *Pyxine subcinerea* Stirt., *Ramalina lusitanica* H. Magn., Rinod, *Thelidium pyrenophorum* (Ach.) Mudd, *Verrucaria hydrela* Ach. and *Waynea adscendens* V.J. Rico. The species *Agonimia papillata*, *Caloplaca canariensis*, *Lecanora leprosa*, and *Pyxine subcinerea* do not occur in continental Europe. The first species is also reported here from La Palma (Canary Islands).

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INTRODUCTION

ACHARIUS (1810, 1814) first recorded lichens from the Azores followed much later by the substantial additions by TAVARES (1941, 1942). Sporadic new records (APTROOT 1989; ARVIDSSON 1990; PURVIS & JAMES 1993; PURVIS et al. 1994; BERGER & APTROOT 2001; JØRGENSEN & JAMES 2001; SILANES & BERMÚDEZ 2002) have been made since then.

In this paper, the addition of a large number of common European species underlines the lack of studies on the flora of the Azores Archipelago. Up to now, about 400 lichen species have been recorded from the Azores. In this paper, 38 new species are added.

MATERIAL AND METHODS

A lichen survey was carried out by the second author in 2000 - 2004 on the Azorean Islands, in order to get a better knowledge on the taxa found in the Archipelago. The identification of the lichen species was carried out by the first author. The reported specimens in this paper will be preserved in the Herbarium of the University of the Azores at the Department of Agricultural and Environmental Sciences (DCA) located at Terceira Island (Azores, Portugal), with the studied duplicates in Adviesbureau voor Bryologie en Lichenologie (Utrecht, The Netherlands).

The new taxa pointed in this paper are not

mentioned in the compilation of PURVIS & JAMES (1993), PURVIS et al. (1994), HAFELLNER (1995, 2002), APTROOT (1989), BERGER & APTROOT (2001) and SILANES & BERMÚDEZ (2002). Also some recent monographs (e.g. GIRALT 2001) and various taxonomic papers (e.g. GIRALT et al. 2002) were checked for additional records.

NEW RECORDS FOR THE AZORES

The rare lichen *Agonimia papillata* (O. Eriksson) Diederich & Aptroot, with tiny, thin, greenish grey squamules was observed in São Miguel Island growing on tree bark at Jardim Botânico José do Canto at Ponta Delgada. This species had already been collected and identified in 1992 by the first author on La Palma (Canary Islands), but this record (in ABL) was never published.

Amandinea lecideina (Mayrh. & Poelt) Scheid. & Mayrh. has often been confused with saxicolous specimens of *A. punctata*. It was found on lava rock on Terceira Island (Facho and Grota do Vale).

The corticolous lichen *Arthonia ilicinella* Nyl. is an oceanic element, so far only known with certainty from Great Britain. It is new to the Azores, and it was found on a tree with smooth bark at Grota do Vale on Terceira Island.

The lichen *Arthonia muscigena* Th. Fr. is an oceanic element, only known from continental Europe. It is new to the Azores and was found on volcanic rock at Facho on Terceira Island. The species grows here on bare rock rather than on mosses as is more typical.

The rare corticolous lichen *Arthonia stellaris* Kremp., was found on a smooth barked *Laurus azorica* tree, at São Carlos, and on an unidentified tree at Golf course on Terceira Island.

Bacidia canariensis Erichsen [not to be confused with *Bacidina canariensis* Lumbsch & Vězda] grows on bark of various trees at Pico Island and Terceira Island. On Terceira Island, it was observed growing on *Dracaena draco* bark and different flowering shrub belonging to the genus

Rhododendron, in Terra-Chã, while on Pico Island, it was observed growing on a non-identified tree and on *Erica azorica* in Lajes do Pico. *Bacidia canariensis* is abundant in the mentioned Azorean localities.

The rarely found *Buellia dives* (Th. Fr.) Th. Fr. so far only reported with certainty from Spain and Sweden (GIRALT et al. 2002) was observed in Terra-Chã on Terceira Island, growing on *Cryptomeria japonica* bark.

The rare *Caloplaca canariensis* (Follman & Poelt) Breuss was found on Monte Brasil, in the south of Terceira Island. It was so far only known from the Canary Islands and Madeira Island (Breuss 2001).

The *Cliostomum flavidulum* Hafellner & Kalb, was recorded in the Jardim Botânico José do Canto at Ponta Delgada in São Miguel Island.

Collema crispum (Huds.) Weber ex Wigg. is a common and widespread, probably cosmopolitan cyanophilic lichen. It was found on walls made out of lava rock at Ponta das Contendas and Grota do Vale, both on Terceira Island.

Dimelaena radiata (Tuck.) Hale & W. Culb. is a one of the few mainly American subtropical species that barely reaches Macaronesia. It was found on lava rock on the summit of Pico Island.

Lecania hutchinsiae (Nyl.) A.L. Sm. belongs to a difficult species complex, but seems to be a common and widespread lichen. It was found on lava rock at Achada and Facho, both on Terceira Island.

Lecanora cenisia Ach. grows on Terceira Island and is common on roofs made from old regional tiles in Angra do Heroísmo. Occasionally, it was found on volcanic rocks on the coasts of Terceira (Negrito, Poça dos Frades-São Carlos) and Faial (Monte da Guia). Although rather common on these two sites on these Azorean Islands, the species had never been reported for the Archipelago.

The common *Lecanora chlarotera* Nyl. is widely distributed on deciduous trees and shrubs on Monte Brasil, in Terra-Chã, at Canada de Belém, at Golf course and São Sebastião, all on Terceira island from where it has not been recorded previously. However, the species has already been reported from S. Miguel island by SILANES & BERMÚDEZ (2002).

The equally common *Lecanora hagenii* (Ach.) Ach. was found on volcanic rocks at Paúl da Praia da Vitória on Terceira Island. Although it has a global distribution, the species had never been reported for the Archipelago.

The unexpected *Lecanora leprosa* Fée (TLC: usnic acid and traces of gangaleoidin complex.) was found once on the bark of *Cryptomeria japonica* in the Mata de São José on Santa Maria Island. This pantropical species is often abundant in exposed dry tropical areas.

Lecanora orosthea (Ach.) Ach. is a common and widespread, but often overlooked or simply neglected lichen. It was found on lava rock at Monte Brasil and Grota do Vale on Terceira Island.

Lecanora pulicaris (Pers.) Ach. was found on *Pinus pinaster* tree bark in the Mata de São João on Pico Island and on a tree on Mata da Esperança on Terceira Island.

Lecanora strobilina (Spreng.) Kieffer was found on cones of *Pinus pinaster* at Mata de São João on Pico Island, on *Erica azorica* branches at the crater of Monte Brasil, on Terceira Island and on *Cryptomeria japonica* bark at Lagoa Seca on S. Miguel Island.

Leptogium teretiusculum (Flörke) Arnold was found on unidentified tree at Golf course, center of Terceira Island, and on *Pittosporum undulatum* bark at Monte Brasil, an extinct volcano on the southern coast of Terceira. At the last locality, the species was associated with *Heterodermia leucomelos* (L.) Poelt and *Normandina pulchella* (Borrer) Nyl.

Ochrolechia androgyna (Hoffm.) Arnold was found twice: on *Cryptomeria japonica* bark at Matela site on Terceira Island and on a non-identified tree in the Jardim da Universidade dos Açores on São Miguel Island.

Opegrapha calcarea Sm. is the first of several *Opegrapha* species that are here newly recorded for the Azores. The species was found at Golf Place on Terceira Island, growing on a wall built of volcanic rock.

Opegrapha herbarum Mont. was found in the town of Angra do Heroísmo on Terceira Island, uncharacteristically growing on an acidic volcanic rock (Cantaria).

Opegrapha multipuncta Coppins & P. James with a known distribution in Norway, Ireland and United Kingdom, was found on a *Callistemon* tree at Poça dos Frades –São Carlos on Terceira Island.

The species *Opegrapha niveoatra* (Borr.) J. R. Laundon was collected in the Jardim Botânico José do Canto – Ponta Delgada on São Miguel Island.

Opegrapha prosodea Ach. was recorded on tree bark in the Public Garden of Angra do Heroísmo (Terceira Island).

Opegrapha varia Pers. was collected on *Cryptomeria japonica* tree bark in the Jardim da Universidade dos Açores on São Miguel Island.

Parmelinopsis minarum (Vainio) Elix & Hale is a common pantropical species that reaches Europe only in its most oceanic areas. It was found on *Cryptomeria japonica* tree bark at Velas on São Jorge Island.

Pertusaria amarescens Nyl. is a conspicuous yellow element of the lichen flora of sun-exposed coastal rocks in Europe. It was found on lava rock at Monte Brasil and Grota do Vale on Terceira Island.

Pertusaria lactea (L.) Arnold is common on exposed rocks in continental Europe. It was found also on lava rocks at Terra-Chã, Monte Brasil and Grota do Vale on Terceira Island.

Phaeographis smithii (Leight.) de Lesd. is restricted to atlantic Europe. It was found on a unique tree at São Carlos on Terceira Island.

The usually sterile lichen *Phlyctis argena* (Spreng.) Flot. had never been reported for the Azores Archipelago. It was collected in the Jardim da Universidade dos Açores on São Miguel Island.

Placidium squamulosum (Ach.) Breuss is an inconspicuous brown terricolous species that occurs world-wide in temperate to subtropical areas. It was found on soil between lava rocks at Monte Brasil on Terceira Island.

Pyrrhospora quernei (Dicks.) Körb. is common in continental Europe and also known from Asia. It was collected fertile on *Erica azorica* at Monte Brazil on Terceira Island, and sterile on *Pinus pinaster* at Mata de São João on Pico Island.

The species of the genus *Pyxine* are all essentially tropical. In Europe, they are very rare, and all but one fully restricted to the Azores. Interestingly, so far five species have been reported from the Azores (HAFELLNER 1995), although only four are currently listed (FEUERER 2004). Even more surprising, all four *Pyxine* specimens collected during this research unmistakably belong to *Pyxine subcinerea* Stirt., which was never reported from the Azores. The species is characterized by the yellow medulla, marginal, mostly moon-shaped soredia and the UV+yellow reaction due to cortical lichexanthone. It was found on lava rock at Paúl da Praia da Vitória and Grota do Vale on Terceira Island, and on a tree at São Carlos, also on Terceira Island.

Ramalina lusitanica H. Magn. Has been known as an endemic lichen in mainland Portugal. Although rather common on the Azores, the species had never been reported from there. During this lichen survey, *Ramalina lusitanica* was collected in the Mata de São José on Santa

Maria Island, in the Jardim Botânico José do Canto and Jardim da Universidade dos Açores on São Miguel Island and in Angra do Heroísmo, Monte Brasil, São Carlos, São Sebastião, Ponta das Contendas and Terra-Chã on Terceira Island.

The rarely found *Rinodina biloculata* (Nyl.) Sheard, reported from United Kingdom, Ireland, and Madeira (GIRALT 2001) and S. Miguel Islands (SILANES & BERMÚDEZ 2002), was found on a tree at Posto Santo and at Canada de Belém, both on Terceira Island. It is a new record for Terceira Island, and the second for the Azores.

Thelidium pyrenophorum (Ach.) Mudd grows world-wide on wet or moist siliceous rocks. It was found on a volcanic rock at Ponta das Contendas on Terceira Island.

Verrucaria hydrela Ach. also grows world-wide on wet or moist siliceous rocks. It was found on a volcanic rock at Mata da Esperança on Terceira Island. This species and the previous one have frequently been overlooked or ignored.

The recently described *Waynea adscendens* V.J. Rico, so far only reported from Italy, Portugal (mainland) and Spain in the Mediterranean region of Europe, was found on a *Platanus occidentalis* tree at Canada de Belém on Terceira Island. It grows together with *Rinodina biloculata*, *Lecanora chlarotera* and *Buellia erubescens*.

DISCUSSION

The Azores show on one hand a rather rich lichen flora due to the variation in habitats from dry rocks and soil to moist forest and bogs. On the other hand, the variation is decidedly reduced by the small size and the remoteness of the Islands. Most species are cosmopolitan or occur at least in most or part of Europe. Few species (mostly macrolichens interestingly) are essentially pantropical, and for some of these, the Azores are their only occurrence in Europe. Relatively few species are (near) endemic, and these are mostly restricted to relicts of the original forest or bog vegetation. Even fewer species are shared with subtropical America only.

Up to now, about 400 lichen species have

been recorded from the Azores. In this paper, 38 species (near 10 %) are added. While identifying this material, some further unreported species were recognized, especially in the genus *Caloplaca*, but these have been left out due to the uncertain identity of some of the previously reported taxa.

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