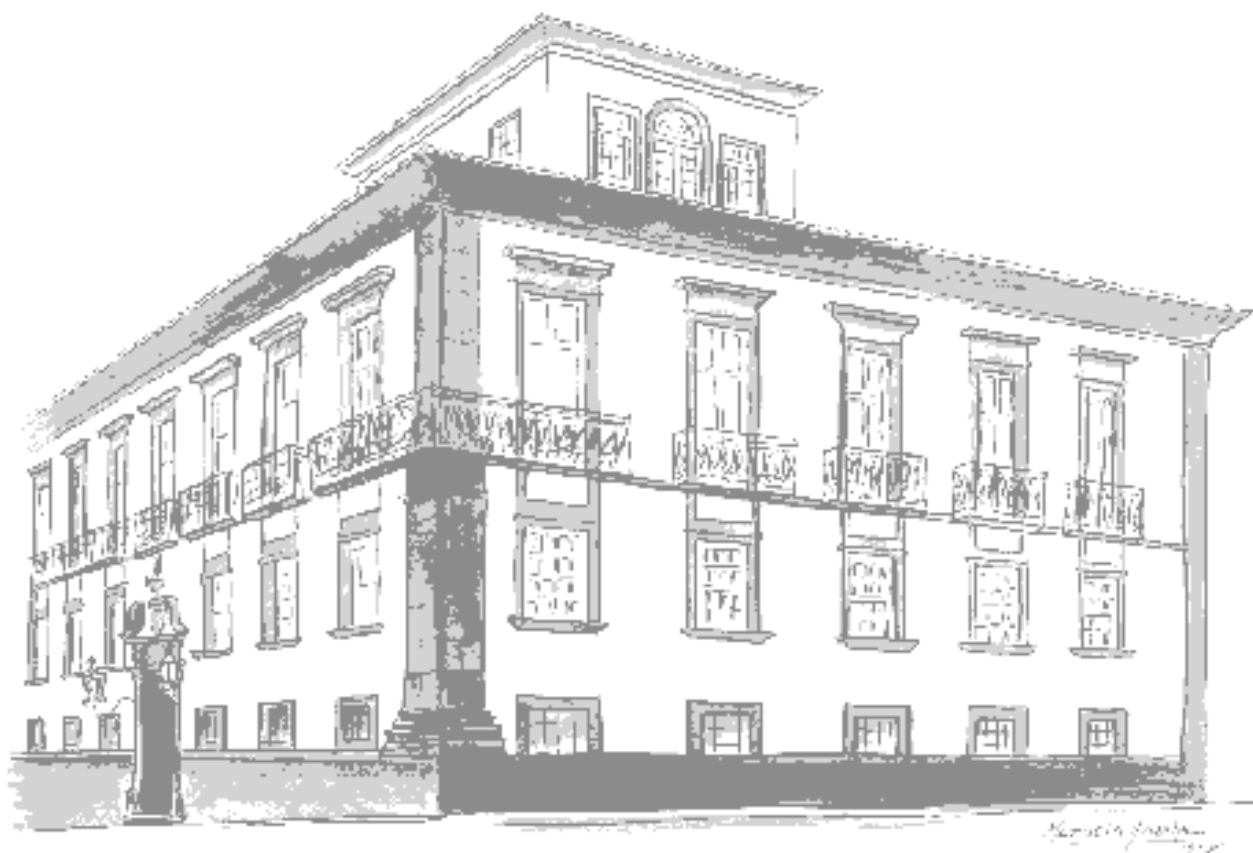


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DISTRIBUTION OF AZOREAN BRYOPHYTES UP TO 1999, THEIR
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CANARY ISLANDS

ERIK SJÖGREN



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DISTRIBUTION OF AZOREAN BRYOPHYTES UP TO 1999, THEIR ISLAND DISTRIBUTION AND INFORMATION ON THEIR PRESENCE ELSEWHERE, INCLUDING MADEIRA AND THE CANARY ISLANDS

By ERIK SJÖGREN¹

With 6 figures and 2 maps

ABSTRACT. The bryoflora of the Azores has about 430 species of mosses and hepatics of which nine are endemic to the archipelago and 18 to Macaronesia. In the 1990's a further 49 species were added to the bryoflora and the presence of 43 previously listed species was questioned and subsequently excluded from the current listing.

With regard to distribution, a greater number of species were reported as new to individual islands and several now show a more even distribution within island groups than earlier studies suggested. However, a high number continued to maintain their restricted distribution pattern due to insularity obstacles.

This observed extension in distribution can be attributed to more comprehensive field work, as localities previously difficult to reach are now more easily accessible. Also, improved communications has precipitated the spontaneous spread to new localities and, of course, there is an improved taxonomic knowledge among bryologists.

This paper also addresses current changes of nomenclature of species and gives synonyms.

RESUMO. A brioflora dos Açores contém cerca de 430 espécies de musgos e hepáticas, das quais 9 são endémicas do arquipélago e 18 da Macaronésia. Na década de 1990, mais 49 espécies foram assinaladas para os Açores e foi questionada a presença de outras 43, as quais foram excluídas da presente lista.

No que respeita à sua distribuição, um maior número de espécies foi assinalado como novo para a individualidade das ilhas e várias mostram agora uma distribuição mais uniforme nos diversos grupos insulares. Contudo, um número elevado de espécies continua a manter um padrão de distribuição muito restrito, devido às barreiras insulares.

Este alargamento da distribuição pode ser atribuído a um melhor trabalho de campo,

¹ Evolutionary Biology Center, Dept. of Plant Ecology, Uppsala University. Villavägen 14, SE - 75236 Sweden.

uma vez que terrenos anteriormente de difícil acesso são agora mais acessíveis. Acresce ainda que o melhoramento das comunicações aumentou de forma espontânea a dispersão das espécies para novas localidades e aumentou também o conhecimento taxonómico no seio dos briologistas.

Neste trabalho são apresentadas também as alterações recentes na nomenclatura das espécies e indicadas as sinónimas.

INTRODUCTION

The first comprehensive studies of the Azorean bryoflora done in the 1930's (ALLORGE & ALLORGE, 1950, 1952; PERSSON, 1949) revealed a high number of species, some of them endemic to the Azores or to Macaronesia. Indeed, these investigations inspired bryologists to take an interest in the Azorean bryoflora and bryovegetation as they were considered not only remarkable for Europe, but also for the world.

Studies initiated in 1965 (SJÖGREN, 1978-1997) focused on bryoecology and bryosociology. These investigations provided a better understanding about the distribution of bryophytes within the nine islands of the Azorean archipelago, especially as the western group of islands is widely separated from those on the eastern side. Also, some of the very small Azorean islands, particularly Graciosa, Santa Maria and Corvo, which were previously ignored from a bryological point of view, were comprehensively investigated.

Several new species were added to the Azorean bryoflora due to extensive sampling by SÉRGIO (1976-1997), who also made several revaluations of the taxonomic status of Azorean bryophytes. DIAS (1996) during the 1980's and 1990's and SJÖGREN (1978, 2000, submitted) endeavoured to link the presence of Azorean bryophytes with certain types of native forests.

In the 1990's, R. SCHUMACKER made several expeditions to the Azores, which greatly added to an improved understanding about the distribution of Azorean hepatics. These investigations, not only resulted in the exclusion of several species of the Azorean bryoflora, but also added new species to the archipelago, clarified synonyms and also established affinities between the Azorean bryoflora with those of the neotropical and central American bryofloras.

CRUNDWELL *et al.* (1994) published a comprehensive list of species new to Macaronesia, to the archipelago and to individual Azorean islands, including species of the families Pottiaceae and Bryaceae. Also, this study greatly advanced our knowledge on the Azorean bryophytes from man-influenced habitats.

In 1982, EGGERS published his valuable checklist of Macaronesian bryophytes. However, since then a large number of additional records of bryophytes, some new to individual islands or to island groups, have been added. Also, there were numerous revaluations of taxonomic status, changes of nomenclature and additions of synonyms.

This present listing of Azorean bryophytes was primarily prompted by the recent extended knowledge on the world-wide distribution of European bryophytes and the publications of DÜLL (1983, 1992) and PATON (1999).

Most of the new records of Azorean bryophytes as new to individual islands were made by E. SJÖGREN between 1965-1997.

Current knowledge shows that several Azorean bryophytes have now a much more even distribution throughout the archipelago than 50 years ago. Yet several species, which were recorded from only one or a few islands, have failed to extend their distribution.

The reasons for the now reported more even distribution of several taxa are: (1) more comprehensive studies in the field, facilitated by new roads making large areas on the islands more easily accessible; (2) better taxonomic knowledge on several species; (3) progressive spontaneous spreading at least of some species to new localities; (4) introduction by man or spreading of certain species, *e.g.* due to better communications between islands, island groups and continents.

Indirectly this paper provides information on the ability of the species to overcome the effects of the double insularity (DIAS, 1996), namely between islands and between the Macaronesian island groups and also between the island groups and the continents. Among the species within the Azores demonstrating rigid and limited distribution are *e.g.* *Hyocomium armoricum*, *Rhytidiadelphus loreus*, *Aulacomnium palustre* and *Trichocolea tomentella*.

The Azorean bryoflora comprising about 430 species (hepatics and mosses) includes now 9 species considered as endemic to the Azores and 18 species endemic to Macaronesia (present also in Madeira and in the Canary Islands, in one or both of these islands groups). Two species have lost their endemic status for the Azores and 9 species for Macaronesia. Among the 27 endemic species mentioned above several must be looked upon as very much endangered (few localities, small populations, presence on few islands). On the other hand some of the endemic species are fortunately fairly frequent and hardly endangered (*cf.* SJÖGREN 1997b).

Synonyms added to the species may facilitate the use of this paper. Appendices 1-3 list species most probably not present in the Azores, species with questionable presence and species actually to be looked upon as endemic (or excluded as endemic), respectively.

ACKNOWLEDGEMENTS

In the 1990's R. SCHUMACKER (Liège) made several expeditions to the Azores, which greatly added to an improved understanding about the distribution of Azorean hepatics. These investigations, not only resulted in the exclusion of several species of the Azorean bryoflora, but also added new species to the archipelago, clarified synonyms and also established affinities between the Azorean bryoflora with those of the neotropical and central American bryofloras. The collaboration of R. SCHUMACKER for hepatics has improved and facilitated the publication of these taxa in the present paper, for which I express my

sincere thanks.

Valuable information on Grimmiaceae species has been provided by H. GREVEN (Wageningen), on Fissidentaceae by M. A. BRUGGEMAN-NANNENGA (Utrecht), on Porellaceae by S. FONTINHA (Funchal), on Lejeuneaceae by T. PÓCS (Felsotarkany) and in general by C. SÉRGIO (Lisbon). Many thanks to all these contributors.

Field work and examination of herbarium material leading to recording of several species new to individual Azorean islands and also some new to the Azores has been generously supported by LIFE B4-3200/94 and LIFE B4-3200/96/540.

Abbreviations

For European countries and for islands and island groups according to "Red Data Book of European Bryophytes" (1995); idem for world-wide distribution (*cf.* Map 1 and 2).

Az. Azores Islands
 Mad. Madeira
 Can. Canary Islands

Azorean islands:

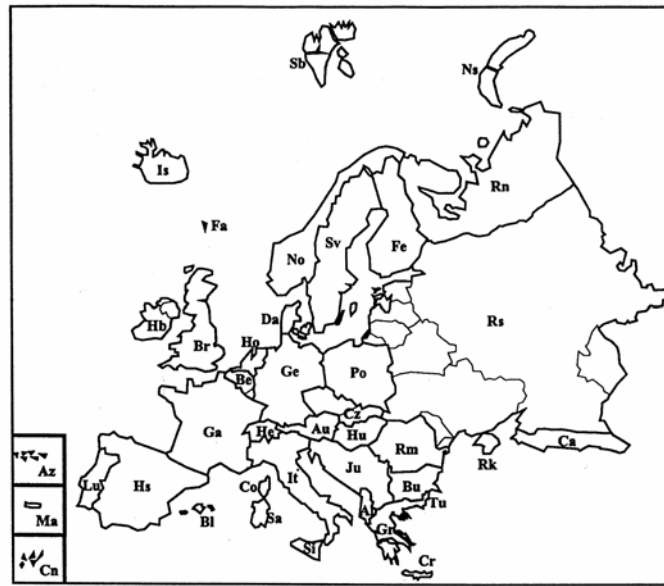
S Santa Maria
 M São Miguel
 T Terceira
 G Graciosa
 J São Jorge
 P Pico
 F Faial
 L Flores
 C Corvo

cosmop. cosmopolitan
det. determined by
 distrib. distribution
 AZU herbarium in Universidade dos Açores, Angra
 incl. including
leg. sampled by

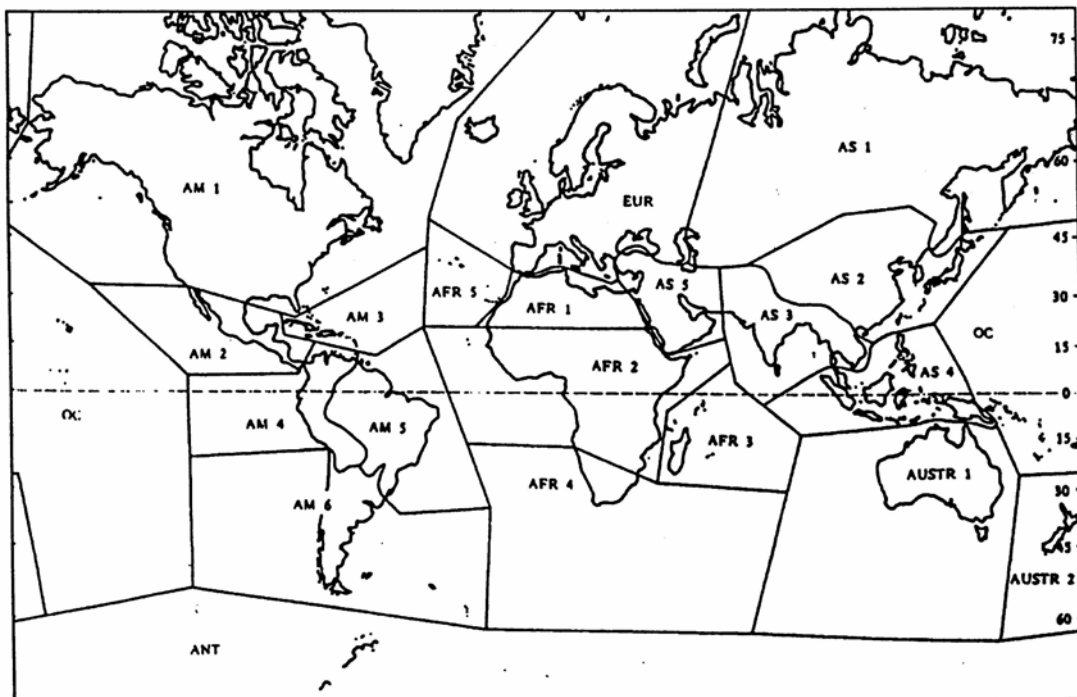
G 90, C 93, JPFL 95, recorded by SJÖGREN, published in 1990,
 S 96, T 97 1993, 1995, 1996, 1997a
 new species not published by EGGERS (1982) or by GABRIEL (1994)

C. S. recorded by CECÍLIA SÉRGIO
 R. S. recorded by RENÉ SCHUMACKER
 R. G. recorded by ROSALINA GABRIEL

Map 1 - Botanical regions (Europe). (see Red Data Book of European Bryophytes, 1995).



Map 2 - Botanical regions (World). (see Red Data Book of European Bryophytes, 1995).



MUSCI

Sphagnaceae

Sphagnum capillifolium (L.) Hedw.

(incl. *S. nemoreum* Scop. and *S. acutifolium* Ehrh. ex Schrad.)

Species not present on Mad. according to DÜLL (1992).

S; T; F (S see GABRIEL, 1994) - Mad. Can. - EUR, AS 1235, AFR 1 (+ tropical Africa, see FRAHM, 1995), AM 1456.

Sphagnum compactum DC. ex Lam. et DC.

See CASAS *et al.* (1996). Uncertain recent presence on M

(leg. GEHEEB & HERZOG, 1910).

M; T (T in herb. AZU) - Mad. Can. - EUR, AS 125, AFR 1, AM 14, ANT, OC.

Sphagnum cuspidatum Ehrh. ex Hoffm.

T (new; T in herb. AZU, leg. C. M. F. MENDES *det.* H. SJÖRS) - EUR, AS 12346, AFR 123, AM 1246, AU 12, OC.

Sphagnum girgensohnii Russ.

L - EUR, AS 12345, AM 1.

Sphagnum imbricatum subsp. *affine* (Ren. et Card.) Flatberg

T; J (new; T see BATES & GABRIEL, 1997; in PC leg. ALLORGE as *S. palustre*, revised by GAUTHIER & BRUGUÉS, 1997) - EUR, AS 123, AM 1236.

Sphagnum lescurii Sull.

(incl. var. *inundatum* Russ.; = *S. auriculatum* Schimp.; also treated as *S. denticulatum* Brid., see DÜLL, 1992)

M; T; J; P; F; L; C (J 95, F 95, C 93) - Mad. - EUR, AS 123, AFR 1, AM 124.

Sphagnum magellanicum Brid.

L (see CASAS *et al.*, 1992) - EUR, AS 1234, AFR 4

(see also FRAHM, 1995), AM 12345, ANT, AU 12.

Sphagnum nitidulum Warnst. ex Warnst.

The taxonomy of this species needs further investigation.

T - *Species endemic to the Azores.*

Sphagnum palustre L.

(incl. *S. centrale* C. Jens.)

See CASAS *et al.* (1992).

M; T; J; P; F; L; C - Can.? - EUR, AS 12345, AFR 1 (+ tropical Africa, see FRAHM, 1995), AM 1245, AU 12, OC.

Sphagnum papillosum Lindb.

See CASAS *et al.* (1992); GAUTHIER & BRUGUÉS (1997).

M; T; P; F; L - EUR, AS 1234, AM 15, AU 2.

Sphagnum pylaesii Brid.

T (new; species new to Macaronesia, recently *leg.* by R. S. on T) - EUR: Ga, Hs, AM 1.

(*Sphagnum rubellum* Wils.)

Also treated as *S. capillifolium* var. *rubellum* (Wils.) Eddy; see DÜLL (1984). Questionable presence in the Azores.

T - EUR, AS 123, AM 1.

Sphagnum squarrosum Crome

See SÉRGIO (1994b), CASAS *et al.* (1996) and MENDES (1998).

M; T; L; C (new; M *leg.* C. S. 1980; C 93, *leg.* SJÖGREN 1978; T in herb. AZU, *leg.* C. M. F. MENDES *teste* H. SJÖRS and I. BACKÉUS) - Mad. - EUR, AS 1235, AM 12.

Sphagnum subsecundum subsp. *inundatum* (Russ.) Eddy

See SÉRGIO (1994b).

M (new; *leg.* C. S. *teste* R. DANIELS) - Mad. - s. l. EUR, AS 1-5, AFR 1, AM 1245.

Sphagnum subnitens Russ. et Warnst. *ex* Warnst.

(= *S. plumulosum* Roell)

M; T; J; P; F; L; C (C 93) - Mad. - EUR, AS 23, AFR 1, AM 6.

Andreaeaceae

Andreaea rupestris Hedw. s. l.

See CASAS *et al.*, 1996.

P; F - Mad. - almost cosmop.

Polytrichaceae

Alophosia azorica (Ren. et Card.) Card.

Species recently extending its distrib. in the Az. (DIAS, 1996). See CASAS *et al.* (1989).

M; T; J; P; F; L; C (C 93) - Mad. - *Species endemic to Macaronesia.*

Atrichum angustatum (Brid.) B. S. G.

Only the var. *muelleri* (Schimp.) Bartr. in the Az., Mad. and Lu (cf. DÜLL, 1992).

S; M; J; P; F; L; C (S 96, P 95, C 93) - Mad. Can. - EUR, AS 5, AM 123, AU 2 (distrib. *A. angustatum* s. l.).

Atrichum undulatum (Hedw.) P. Beauv.

S; M; T; J; P; F; L; C (S 96, C 93) - Mad. Can. - EUR, AS 1235, AFR 1, AM 1.

Pogonatum aloides (Hedw.) P. Beauv.

See CASAS *et al.* (1992).

S; M; T; J; P; F; L; C (P 95, C 93) - Mad. Can. - EUR, AS 135, AFR 12, AU 2.

(*Pogonatum nanum* (Hedw.) P. Beauv.)

Last published record from S (ALLORGE & ALLORGE, 1952).

See also CASAS *et al.* (1992).

S; M - Mad. Can. - EUR, AS 1, AFR 14.

Pogonatum urnigerum (Hedw.) P. Beauv.

See CASAS *et al.* (1992).

M; F (F 95) - Mad. Can. - EUR, AS 12345, AFR 12, AM 13.

Polytrichum commune Hedw.

(incl. var. *perigoniale* (Michx.) Hampe)

S; M; T; J; P; F; L; C - Mad. Can. - EUR, AS 1235, AFR 124, AM 1245, AU 12, OC.

Polytrichum formosum Hedw.

S; M; T; J; P; F; L; C (C 93, S 96, F 95) - Mad. Can. - EUR, AS 12345, AFR 14, AM 12, AU 2.

Polytrichum juniperinum Hedw.

S; M; T; G; J; P; F; L; C (F 95, C 93) - Mad. Can. - almost cosmop.

Polytrichum piliferum Hedw.

S; M; T; G; J; P; L - Mad. Can. - almost cosmop.

Buxbaumiaceae

Diphyscium foliosum (Hedw.) Mohr.

See CASAS *et al.* (1989). In the Azores mostly as epigeic but also as an epiphyte on old trunks of *Juniperus*.

S; M; T; G; J; P; F; L, C (G 90, C 93) - Mad. - EUR, AS 25, AM 123.

Archidiaceae

Archidium alternifolium (Hedw.) Schimp.

See CASAS *et al.* (1992).

S; M; T (S see CRUNDWELL *et al.* 1994; T in herb. AZU, *leg. et det.* C. S. and R. G.) - Mad. Can. - EUR, AS 15, AFR 12, AM 1.

Fissidentaceae

(*Fissidens adianthoides* Hedw.)

F (unlikely presence in the Azores, pers. comm. BRUGGEMAN-NANNENGA in 1998; possible confusion with *F. luisierii* according to SÉRGIO *et al.*, 1997) - Mad. Can. - EUR, AS 125, AFR 12, AM 16, AU 2. (+ tropical AM, see FRAHM, 1995.).

Fissidens asplenioides Hedw.

(= *F. atlanticus* Ren. et Card.)

S; M; T; G; J; P; F; L; C (G 90, C 93) - Mad. Can. - EUR: Lu, Hs, AS 234, AFR 234, AM 123456, AU 12.

Fissidens azoricus (P. Varde) Biz.

(= *F. ovatus* Brid. var. *azoricus* P. Varde)

L - *Species endemic to the Azores.*

Fissidens bryoides Hedw. s. l.

According to CRUM & ANDERSON (1981) no sharp distinction between *F. bryoides*, *viridulus*, *exiguus* and *minutulus* (see also CORLEY, 1980).

S; M; T; G; J; P; F; L (G 90) - Mad. Can. - EUR, AS 1235, AFR 123, AM 126, AU 2, OC.

Fissidens coacervatus Brugg.-Nann.

See BRUGGEMAN-NANNENGA (1985) and DIRKSE *et al.* (1993).

S; T - Mad. Can. - *Species endemic to Macaronesia.*

(*Fissidens crassipes* Wils. ex B. S. G.)

For taxonomy see BRUGGEMAN-NANNENGA (1982). Questionable presence in the Azores.

M; T; J; F; L - Mad. Can. - EUR, AS 235, AFR 12, AU 1.

Fissidens curvatus Hornsch.

(= *F. algarvicus* Solms)

See CASAS *et al.* (1985) and BRUGGEMAN-NANNENGA *et al.* (1995).

L - Mad. Can. - EUR, AFR 12, AS 5, S AM, NAM, AU.

Fissidens dubius P. Beauv.

(= *F. cristatus* Mitt.)

M; T; L (T see CRUNDWELL *et al.* 1994) - Mad. Can. - EUR, AS 12345, AFR 1, AM 12.

Fissidens luisierii P. Varde

See P. VARDE (1955) and SÉRGIO *et al.* (1997).

M; T; F - Mad. Can. - *Species endemic to Macaronesia.*

Fissidens ovatifolius Ruthe in Limpr.

(= *F. canariensis* Bryhn; = *F. perssonii* P. Varde)

See PERSSON (1939) and BRUGGEMAN-NANNENGA (1985). DIRKSE *et al.* (1993) treat *F. perssonii* as = *ovatifolius*.

T; L - Mad. Can. - S EUR, AFR 1.

Fissidens papillosus Lac.

See DIRKSE *et al.* (1993) and SÉRGIO & GABRIEL (1997).

M; T; P; F (new) - Can. - Pantropical species; also present in AM and AS 2.

Fissidens pusillus Wils.

Insufficiently known distrib. in the Azores. - Mad. - EUR, AS 5, AFR 1, AM 1.

Fissidens rivularis (Spruce) B. S. G.

S; M; J; P; C (S 96, J 95, P 95; C *leg.* SJÖGREN, 1978) - Mad. Can. - EUR, AS 25, AFR 12.

Fissidens serrulatus Brid.

S; M; T; G; J; P; F; L; C (G 90, C 93) - Mad. Can. - EUR, AFR 1 (+ tropical AM, see FRAHM, 1995).

Fissidens sublinaefolius (P. Varde) Brugg.-Nann.

See BRUGGEMAN-NANNENGA (1982). Distribution in the Azores needs further investigation. See CRUNDWELL *et al.* (1994).

P - Mad. - *Species endemic to Macaronesia.*

Fissidens taxifolius Hedw. subsp. *taxifolius*

S; M; T; F; L (F 95; T in herb. AZU) - Mad. Can. - EUR, AS 12345, AFR 13 (see FRAHM, 1995), AM 126 (+ tropical AM, op. cit.).

subsp. *pallidicaulis* (Mitt.) Amann

S; M; T; G; J; P; F; L; C (G 90, C 93) - Mad. Can. - EUR, AS?, AFR?, AM 2.

Dicranaceae

For detailed information on the taxonomy of the *Campylopus* species, see publications by J.-P. FRAHM.

Campylopus brevipilus B. S. G.

M; T; C (C leg. SJÖGREN, 1978, *teste* FRAHM; leg. PERSSON, 1937 on T and SCHWAB, 1981 on M. Several samples in herbaria = *C. brevipilus* var. *marginatulus* = *Ditrichum punctulatum*, see FRAHM, 1999) - W EUR, AFR 1.

Campylopus cygnaeus (Hedw.) Brid.

(= *C. setaceus* Card.)

See FRAHM & ISOVIITA (1988).

S; M; T; J; P; F; L; C (C 93) - AM 3.

Campylopus flaccidus Ren. et Card.

See FRAHM (1985a).

M; P (P leg. R. S., 1997) - AFR 24.

Campylopus flexuosus (Hedw.) Brid.

S; M; T; G; J; P; F; L; C (G 90, C 93) - Mad. Can. - EUR, AS 123, AFR 123, AM 12345.

Campylopus fragilis (Brid.) B. S. G.

S; M; T; G; J; P; F; L; C (G 90, C 93, S 96) - Mad. Can. - EUR, AS 235, AFR 2, AM 12346.

Campylopus incrassatus C. Müll.

T; J; P; L; C (C leg. SJÖGREN, 1978; T leg. R. G.; L leg. ALLORGE, *det.* FRAHM; TP leg. R. S., *teste* FRAHM) - Mad. - AFR 24, AM 6.

Campylopus introflexus (Hedw.) Brid.

T; J; P; L (new; T leg. R. S., 1997 and 1999, *det.* FRAHM; J leg. R. S. and C. S. 1999) - EUR, subtropical-subantarctic species, introduced in Europe.

Campylopus pilifer Brid.

(incl. var. *tullgrenii* (Ren. et Card.) Thér.)

See CASAS *et al.* (1989).

S; M; T; G; J; P; F; L; C (C 93) - Mad. Can. - W EUR, AS 5, AFR 1234, AM 1234.

Campylopus pyriformis (Schultz) Brid.

(incl. var. *azoricus* (Mitt.) Corley)

Variable in habitus in different habitats. See FRAHM (1999), ARTS & FRAHM (1990) and CORLEY (1976).

M; T; J; P; F; L; C - Mad. - EUR, AFR 14 (+ tropical AFR), AM 12456, AU 12.

Campylopus shawii Wils. ex Hunt

(= *C. carreiroanus* Card.)

M; T; J; P; F; L (J 95, P 95, L 95) - EUR: Br, Hb, AM 3.

See FRAHM (1985b).

Ceratodon purpureus (Hedw.) Brid.

S; M; T; G; J; P; F; L; C (C 93) - Mad. Can. (+ subsp. *stenocarpus* (B. S. G.) Dix. on Mad.) - cosmop.

Cheilothela chloropus (Brid.) Lindb.

(= *Ceratodon chloropus* (Brid.) Brid.)

S - Mad. Can. - S and W EUR, AS 5, AFR 14.

Leg. ALLORGE, 1937 on S, confirm. SÉRGIO.

Cynodontium bruntonii (Sm.) B. S. G.

(= *Oreoweissia bruntonii* (Sm.) Milde)

F - Can. - EUR, AS 5, AFR 1.

Dicranella heteromalla (Hedw.) Schimp.

S, M; T; P; F; L (S 96) - Mad. Can. - EUR, AS 12345, AFR 12, AM 1234.

Dicranella howei Ren. et Card.

See CRUNDWELL & NYHOLM (1977).

J; L - Mad. Can. - EUR, AS 5, AFR 1, AM 1.

Diranella schreberiana (Hedw.) Hilp. ex Crum et Anders.

T (new; T see CRUNDWELL *et al.*, 1994) - EUR, AS 12, AM 1, AU 12.

(*Dicranoweisia cirrata* (Hedw.) Lindb. ex Milde)

Leg. CUNHA & BARROS (1942); confirmation needed.

T - Mad. Can. - EUR, AFR 1, AM 12.

(*Dicranoweisia crispula* (Hedw.) Lindb. ex Milde)

P; L; C - EUR, AS 1235, AFR 1, AM 1 (+ tropical AM, see FRAHM, 1995), AU 2.

Dicranum bonjeanii De Not.

M; T; J (T in herb. AZU) - EUR, AS 1235, AFR 12, AM 1.

Dicranum flagellare Hedw.

Questionable presence on Mad. and in the Can. In the Azores leg. SÉRGIO, 1976; T leg. P. BORGES.

T; F - EUR, AS 12, AFR 1, AM 12

(+ tropical AM, see FRAHM, 1995).

Dicranum majus Sm.

T (new; T 97) - EUR, AS 1235, AM 1. Small populations recorded by the author in one locality only. Species new to Macaronesia.

Dicranum scoparium Hedw.

M; T; P (T in herb. AZU) - Mad. Can. - EUR, AS 1235, AFR 1, AM 124, AU 2.

Dicranum scottianum Turn. subsp. *scottianum*

(= *Orthodicranum scottianum* (Turn.) Roth.)

S; M; T; J; P; F; L; C (S 96, C 93) - Mad. Can. - EUR, AS 12, AM 1.

var. *canariense* (Hampe ex Müll.) Corb.

M; T (T see CRUNDWELL *et al.*, 1994) - Mad. Can. - EUR: Hs, Lu.

Kiaeria blyttii (Schimp.) Broth.

See SÉRGIO (1976).

P - EUR, AS 123, AM 1.

Leucobryum albidum (P. Beauv.) Lindb.

(= *L. glaucum* var. *albidum* (P. Beauv.) Card.; = *L. madeirense* Schiffn.)

See YAMAGUCHI (1993) and CASAS *et al.* (1996).

M; T; P; F; L - Mad. - Oceanic species. The presence of *L. albidum* as a distinguishable species in Macaronesia needs confirmation.

Leucobryum glaucum (Hedw.) Ångstr.

See CASAS *et al.* (1996). Some samples of *L. juniperoideum* in herbaria are probably misidentified as *L. glaucum*.

M; T; J; P; F; L; C - Mad. - EUR, AS 25, AM 134, OC.

Leucobryum juniperoideum (Brid.) C. Müll.

See DÜLL (1992), CRUNDWELL (1972) and CASAS *et al.* (1996). A complete revision of Azorean samples is needed.

S; M; T; G; J; P; F; L; C (J 95, C 93) - Mad. Can. - EUR, AS 235, AFR 3, AM 5.

Microcampylopus laevigatus (Thér.) Giese et Frahm

(= *Campylopodium euphorocladum* (C. Müll.) Besch.)

var. *laevigatum* (Thér.) Thér. in Luis.)

See GIESE & FRAHM (1985).

S; M; T; P; F; L; C (P 95, F 95, C 93; T see CRUNDWELL *et al.*, 1994) - Mad. Can. - AS 235, AFR 23 (only in tropical parts of AFR according to FRAHM, 1995).

Rhabdoweisia fugax (Hedw.) B. S. G.

L - Mad. Can. - EUR, AS 2, AFR 4, AM 24.

Ditrichaceae

Ditrichum pallidum (Hedw.) Hampe

S, M; T (ST see CRUNDWELL *et al.*, 1994) - EUR, AS 125, AFR 23, AM 1.

Ditrichum subulatum (Bruch) Hampe

S; M - Mad. Can. - EUR, AS 25, AFR 1, AM 1.

Pleuridium acuminatum Lindb.

S; M; T; F; L (T see CRUNDWELL *et al.*, 1994) - Mad. Can. - EUR, AS 25, AFR 1, AM 1, AU 2.

Pseudoephemerum nitidum (Hedw.) Reim.

See CASAS *et al.* (1989).

M; T; L (T see CRUNDWELL *et al.*, 1994) - Mad. Can. - EUR, AS 23, AFR 123, AM 1, AU 2.

Trematodon perssonorum Allorge et Thér.

See ALLORGE, V. (1951).

M - *Species endemic to the Azores.*

Pottiaceae

Aloina ambigua (B. S. G.) Limpr.

(= *A. ericifolia* (Neck.) Lindb.)

Taxonomy treated by CORLEY *et al.* (1981).

S; M (S see CRUNDWELL *et al.*, 1994) - Mad. Can. - EUR, AS 25, AFR 1, AU 1.

Aloina rigida (Hedw.) Limpr.

F (new; see CRUNDWELL *et al.*, 1994) - Mad. Can. - EUR, AS 1235, AFR 14, AM 12, AU 1 (+ tropical AM; see FRAHM, 1995).

Anoetangium angustifolium Mitt.

M - Mad. Can. - *Species endemic to Macaronesia.*

Barbula convoluta Hedw.

(= *Streblotrichum convolutum* (Hedw.) P. Beauv.)

M; T (T in herb. AZU) - Mad. Can. - EUR, AS 1235, AFR 12, AM 12, AU 12.

Barbula unguiculata Hedw.

S; M; G, P; F; L; C (G 90, C 93) - Mad. Can. - EUR, AS 1235, AFR 12, AM 1246, AU 12.

Bryoerythrophyllum inaequalifolium (Tayl.) Zander

T; P (new; TP see CRUNDWELL *et al.*, 1994) - Mad. Can. - EUR: Hs, AS 234, AM 124 (+ tropical AFR; see FRAHM, 1995).

Desmatodon bogosicus C. Müll.

S; T (new; ST see CRUNDWELL *et al.*, 1994) - Can. - AFR 24. - See TOWNSEND & WHITEHOUSE (1979).

Dialytrichia mucronata (Brid.) Broth.

(= *Cinclidotus mucronatus* (Brid.) Mach.)

M; T (T in herb. AZU) - Mad. Can. - EUR, AS 25, AFR 1.

Didymodon acutus (Brid.) Saito

(= *Barbula acuta* (Brid.) Brid.)

M; F (F see CRUNDWELL *et al.*, 1994) - Mad. Can. - EUR, AS 35, AFR 1, AM 12.

Didymodon insulanus (De Not.) M. Hill

(= *D. vinealis* var. *flaccida* (Bruch et Schimp.) Zander; = *Barbula vinealis* var. *cylindrica* (Tayl.) Boul.; = *B. cylindrica* (Tayl.) Schimp.)

Frequently misidentified in herbaria.

S; M; T; C (C 93) - Mad. Can. - EUR, AS 135, AFR 1, AM 12, OC.

Didymodon luridus Hornsch. ex Spreng.

(= *Barbula trifaria* (Hedw.) Mitt.)

M; G; J; F (F see CRUNDWELL *et al.*, 1994) - Mad. Can. - EUR, AS 135, AFR 12, AM 12.

Didymodon rigidulus Hedw.

(= *Barbula rigidula* (Hedw.) Mitt.)

P (new; P see CRUNDWELL *et al.*, 1994) - Mad. Can. - EUR, AS 1235, AFR 12, AM 12, ANT (+ tropical AM, see FRAHM, 1995).

Didymodon tophaceus (Brid.) Lisa

(= *Barbula tophacea* (Brid.) Mitt.)

S; M; T; G; L (G 90) - Mad. Can. - EUR, AS 1235, AFR 14, AM 124.

Didymodon vinealis (Brid.) Zander

(= *Barbula vinealis* Brid.)

See also *Didymodon insulanus*.

S; M; T; P; F (P 95) - Mad. Can. - EUR, AS 2345, AFR 1, AM 123.

Eucladium verticillatum (Brid.) B. S. G.

(incl. var. *dalmaticum* Par., treated as a modification by DÜLL, 1992)

M; T; L (T see CRUNDWELL *et al.*, 1994 and FONTINHA & SÉRGIO, 1994) - Mad.

Can. - EUR, AS 1235, AFR 124, AM 12 (+ tropical AM, see FRAHM, 1995).

Gymnostomum calcareum Nees et Hornsch.

(incl. var. *intermedium* Schimp. and var. *sudeticum* (Boul.) Boul.)

In ZANDER, 1977 = *G. aeruginosum* Sm.

S; M; T; J; F; L (STF see CRUNDWELL *et al.*, 1994) - Mad. Can. - EUR, AS 1235, AFR 124, AM 12 + SAM, OC.

Gymnostomum viridulum Brid.

(= *Gymnostomum luisieri* (Sérgio) Sérgio *ex* Crundwell; = *Gyroweisia luisieri* Sérgio)

M (new; M see CRUNDWELL *et al.*, 1994) - Mad. Can. - EUR, AS 5, AFR 1.

Gyroweisia tenuis (Hedw.) Schimp.

F (new; F see CRUNDWELL *et al.*, 1994; according to DÜLL (1992) with uncertain presence on Mad.) - EUR, AS 5, AFR 1, AM 1.

Leptobarbula berica (De Not.) Schimp.

See ARTS (1989). Fairly recent records in the Az.

M; T; F (F see CRUNDWELL *et al.*, 1994) - Mad. - EUR, AS 5, AFR 1.

Phascum leptophyllum C. Müll.

(= *Tortula rhizophylla* (Saki) Zander)

S; T; P; F (new; STPF see CRUNDWELL *et al.*, 1994; see also ARTS & SOLLMAN, 1991, and for Madeira SÉRGIO *et al.*, 1994a) - Mad. Can. - EUR: Br, Ge, It, AS 2, AM 24, OC.

Pleurochaete squarrosa (Brid.) Lindb.

S; M; P (P see CRUNDWELL *et al.*, 1994) - Mad. Can. - EUR, AS 1235, AFR 12, AM 12.

Pottia truncata (Hedw.) B. S. G.

S; M; T; L (S see CRUNDWELL *et al.*, 1994; L 95; in herb. AZU) - Mad. Can. - EUR, AS 1235, AFR 1, AM 16, AU 12.

Pseudocrossidium hornschuchianum (Schultz) Zander

(= *Barbula hornschuchiana* Schultz)

T - Mad. Can. - EUR, AFR 14, AM 1, AU 1.

Pseudocrossidium revolutum (Brid.) Zander

(= *Barbula revoluta* Brid. in Schrad.)

F (new; F see CRUNDWELL *et al.*, 1994) - Mad. Can. - EUR, AS 35, AFR 14, AM 1.

Rhamphidium purpuratum Mitt.

(= *Dicranella teneriffae* Wint.)

M; T; J; P; F; L; C (P 95, C 93) - Mad. Can. - EUR: Cr, Hs, Lu.

Scopelophila ligulata (Spruce) Spruce

(= *Merceya ligulata* (Spruce) Schimp.)

See PERSSON (1949).

M - EUR, AS 1235, AM 1 (+ tropical AFR and AM, see FRAHM, 1995).

Timmiella barbuloides (Brid.) Moenk.

M; T; J; P; F (P see CRUNDWELL *et al.*, 1994) - Mad. Can. - EUR, AS 135, AFR 12, AM 4.

Tortella flavovirens (Bruch) Broth.

S; M; T; G; J; P; F; C (G 90, P 95, C 93, T see CRUNDWELL *et al.*, 1994) - Mad. Can. - EUR, AS 25, AFR 1, AM 1.

Tortella nitida (Lindb.) Broth.

(= *T. cirrifolia* (Mitt.) Broth.)

See DÜLL (1984) and MAY (1986).

S; M; T; G; J; P; F; L (G 90) - Mad. Can. - EUR, AS 5, AFR 1.

Tortula atrovirens (Smith.) Lindb.

(= *Desmatodon convolutus* (Brid.) Grout.)

M; T - Mad. Can. - EUR, AS 2345, AM 12456, AU 12, OC.

Tortula canescens Mont.

S (new; S see CRUNDWELL *et al.*, 1994) - Mad. Can. - EUR, AS 5, AFR 1, AM 6.

Tortula cuneifolia (Dicks. *ex* With.) Turn.

S; M; T; J; F; L (F see CRUNDWELL *et al.*, 1994) - Mad. Can. - EUR, AS 35, AFR 1.

Tortula laevipila (Brid.) Schwaegr. s. l.
(incl. var. *laevipiliformis* (De Not.) Limpr. and var. *watcheri* J. J. Barkman)
M; T (T see CRUNDWELL *et al.*, 1994) - Mad. Can. - EUR, AS 135, AFR 12, AM 16,
AU 12.

Tortula marginata (B. S. G.) Spruce
S; M; T; F; L - Mad. Can. - EUR, AS 35, AFR 1.

Tortula muralis Hedw.
(incl. several varieties)
S; M; T; G; J; P; F; L; C (G 90, P 95, C 93) - Mad. Can. - EUR, AS 1235, AFR 134,
AM 124, AU 12.

Tortula revolvens (Schimp.) Roth.
F (new; see CRUNDWELL *et al.*, 1994) - Can. - EUR: Ga, Ge, Gr, He, Hs, It, Lu, AS 5.

Tortula ruralis (Hedw.) G. M. S.
T; F (T in herb. AZU) - Mad. Can. - EUR, AS 1235, AFR 124, AM 1246, AU 1, OC.

Tortula solmsii (Schimp.) Limpr.
(= *T. perlimbata* Geh. ex Card.)
M; T; L - Mad. Can. - EUR, AS 5, AFR 1.

Tortula vahliana (Schultz) Mont.
F (new; F see CRUNDWELL *et al.*, 1994) - Can. - EUR, AS 5, AFR 1, AM 6.

Trichostomum brachydontium Bruch s. l.
Several synonyms and varieties (see DÜLL, 1984). The var. *litorale* Mitt. (= *T. mucronatulum* Card.) has no systematic value (SMITH, 1978).
S; M; T; G; J; P; F; L; C (G 90, C 93) - Mad. Can. - EUR, AS 12345, AFR 1234,
AM 1236, AU 2.

Trichostomum crispulum Bruch s. l.
Several varieties (cf. DÜLL, 1984).
S; M; J; F; L; C (S 96, C 93, F see CRUNDWELL *et al.*, 1994) - Mad. Can. - EUR,
AS 1235, AFR 12, AM 12.

Weissia brachycarpa (Nees et Hornsch.) Jur.
(= *W. hedwigii* Crum)
T; G (G 90) - EUR, AS 1235, AFR 1, AM 1.

Weissia condensa (Voit) Lindb.

(= *W. tortilis* (Schwaegr.) C. Müll.)

Presence on Mad. uncertain. Recorded by DURING (1981) in the Can.

T; F - Can. - EUR, AS 35, AFR 1, AM 2 (+ tropical AM; see FRAHM, 1995.)

Weissia controversa Hedw.

(= *W. viridula* Hedw.)

Very much variable species.

S; M; T; G; J; P; F; L; C (G 90, C 93) - Mad. Can. - EUR, AS 12345, AFR 1234, AM 123456, AU 12, OC.

Weissia triumphans (De. Not.) M. Hill

(= *Trichostomum triumphans* De Not. and *T. azoricum* Card.)

See HILL (1981) and CARDOT (1897).

M; T; J; F - EUR, AS 5, AFR 1.

Grimmiaceae

Grimmia elongata Kaulf.

Sampled within the summit area of Pico Mt. above 1500 m a. s. l. by H. PERSSON in 1935, det. H. GREVEN.

P - EUR, AS 1235, AFR 1, AM 1.

(*Grimmia incurva* Schwaegr.)

Specimens of *G. lisae* with contorted leaves may become misidentified as *G. incurva* (pers. comm. GREVEN in 1999). The presence of *G. incurva* in the Azores is questionable.

P - EUR, AS 123, AM 1.

(*Grimmia laevigata* (Brid.) Brid.)

G; J - Mad. Can. - cosmop. Questionable presence in the Azores.

Grimmia lisae De Not.

(e.g. = *G. trichophylla* subsp. *azorica* (Ren. et Card.) Luis.)

S; M; T; G; J; P; F; L; C - Mad. Can. - Worldwide distrib. needs further investigation.

(*Grimmia montana* B. S. G.)

G - Mad. Can. - EUR, AS 125, AFR 1, AM 12.

Presence in the Azores is questionable.

Grimmia pulvinata (Hedw.) Sm.

See SÉRGIO (1997).

M; T; J; L - Mad. Can. - almost cosmop.

Racomitrium aciculare (Hedw.) Brid.

See CASAS *et al.* (1992).

M; T; J; F; L; C (C 93) - Mad. Can. - EUR, AS 25, AFR 14, AM 1

Racomitrium aquaticum (Brid. ex Schrad.) Brid.

See CASAS *et al.* (1992).

S; T; J; L; C (S 96, T see BATES & GABRIEL, 1997, C *leg.* R. S., 1999) - Mad. Can. - EUR, AS 125, AFR 4, AU 2, AM 16.

Racomitrium elongatum Frisv.

See FRISVOLL (1983) and CASAS *et al.* (1992).

M; P; C (C *leg.* SJÖGREN, 1978) - Mad. - Boreal species. Former records of *R. canescens* (Hedw.) Brid. in the Azores may all be *R. elongatum*.

Racomitrium fasciculare (Hedw.) Brid.

Questionable presence on Mad. (LUISIER, 1927).

M; T; J; P; F; C (C 93; T see BATES & GABRIEL, 1997) - Mad. - EUR, AS 12, AM 16, AU 2.

Racomitrium heterostichum (Hedw.) Brid.

See CASAS *et al.* (1992).

M; T; J; P; F; L; C (T in herb. AZU; C *leg.* SJÖGREN, 1978) - Mad. Can. - EUR, AS 1235, AFR 14, AM 126, AU 12.

Racomitrium lanuginosum (Hedw.) Brid.

M; T; P; F - Mad. Can. - cosmop.

(*Schistidium alpicola* (Hedw.) Limpr.)

(= *S. rivulare* (Brid.) Podp.)

Questionable presence in the Azores. See BREMER, 1981, BLOM, 1996.

P; L - Mad. - EUR, AS 1235, AFR 2, AM 16, AU 12, ANT.

Schistidium apocarpum (Hedw.) B. S. G. s. l.

P - Mad. Can. - cosmop.

Ptychomitriaceae

Glyphomitrium daviesii (Dicks.) Brid.

(incl. var. *teotonianum* Allorge et P. Varde)

In FREY *et al.* (1995) also incl. *G. cylindraceum* (Tayl.) Moore.

L - Mad. - W EUR, AS 2.

Ptychomitrium nigrescens (Kunze) Wijk et Marg.

Fertile specimens wanted for determination, to distinguish from *P. polyphyllum* var. *azoricum*.

S; M; T; G; J; P; F; L; C (P 95, C 93) - Mad. Can. - EUR.

Ptychomitrium polyphyllum (Sw.) B. et S.

(incl. *P. azoricum* (Card.) Par.)

P. azoricum not accepted by CORLEY & CRUNDWELL (1991) and DÜLL (1992).
See CASAS *et al.* (1989).

S; M; T; J; P; F; L; C (S 96, C 93) - Mad. Can. - EUR.

Seligeriaceae

Blindia acuta (Hedw.) B. S. G.

(incl. var. *madeirensis* (Geh.) Perss.)

See CASAS *et al.* (1996).

M; T; J; F; L - Mad. - EUR, AS 125, AFR 23, AM 124, AU 1.

Funariaceae

Enthostodon attenuatus (Dicks.) Bryhn

(= *Funaria attenuata* (Dicks.) Lindb.)

See CASAS *et al.* (1996).

S; M; T; J; P; F; L; C (C 93; also *leg.* Gonçalves on C in 1968) - Mad. Can. - EUR,
AFR 1, AM 1 (+ tropical AM, see FRAHM, 1995).

Enthostodon obtusus (Hedw.) Lindb.

(= *Funaria obtusa* (Hedw.) Lindb.; = *F. ericetorum* (Bals. et De Not.) Dix.)

See CASAS *et al.* (1996).

S; M; T; J; P; F; L (S see CRUNDWELL *et al.*, 1994) - Mad. Can. - EUR, AS 5, AFR 1.

(*Funaria convexa* Spruce)

M - Mad. Can. - S EUR, AS 5, AFR 12, AM 4.

Presence in the Azores needs confirmation. Recorded in 1937 by P. & V. ALLORGE.

Funaria hygrometrica Hedw.

M; T (T in herb. AZU) - Mad. Can. - cosmop.

Funaria muhlenbergii Turn.

(= *F. calcarea* Wahlenb.; = *F. mediterranea* Lindb.)

S; M - Mad. Can. - EUR, AS 25, AFR 1, AM 12.

Funaria pulchella Philib.

See CRUNDWELL & NYHOLM (1974) and CASAS *et al.* (1996).

M; F (F *leg.* Gonçalves, 1967) - Mad. Can. - EUR, AS 13, AFR 1, AM 1.

Physcomitrium pyriforme (Hedw.) Brid.

See CASAS *et al.* (1996)

M - Mad. Can. - EUR, AS 15, AFR 1, AM 12 (+ tropical AM, see FRAHM, 1995), AU 12.

Ephemeraceae

Ephemerum cohaerens (Hedw.) Hampe

F (new; F see CRUNDWELL *et al.*, 1994) - EUR, AS 25, AFR 1, AM 1.

Splachnobryaceae

Splachnobryum obtusum (Brid.) C. Müll.

S; M (M *leg.* SCHWAB, 1981, *teste* R. S. 1998; S *leg.* SÉRGIO, *det.* R. S., *conf.* J.-P. FRAHM, in herb. LISU) - EUR: Hu, AS 2, AM 1234, OC. In Hungary like in the Azores close to hot springs. Species introduced from tropical America.

Bryaceae

Anomobryum julaceum (G. M. S.) Schimp.

(= *A. filiforme* (Dicks.) Solms.)

S; M; T; G; J; P; F; L - Mad. Can. - EUR, AS 1235, AFR 1234, AM 1246.

Brachymenium notarisii (Mitt.) Shaw

(= *Haplodontium notarisii* (Mitt.) Broth.)

Described by MITTEN (1965), illustration in GEHEEB & HERZOG (1910). See also SHAW (1987).

M; G; F; L (G 90, F 95; probably still unrecorded in the Azores) - Mad. Can. - *Species endemic to Macaronesia.*

Bryum alpinum Huds. *ex* With.

S; M; T; P; F; L; C (C 93, F 95) - Mad. Can. - EUR, AS 1235, AFR 1234, AM 14.

Bryum argenteum Hedw.

(incl. var. *lanatum* (P. Beauv.) Hampe)

S; M; T; P; F; L; C (C 93) - Mad. Can. - cosmop.

(*Bryum bicolor* Dicks.)

(= *B. barnesii* Wood. *ex* Schimp.; = *B. atropurpureum* B. S. G.)

Revision of Azorean samples needed; consequently still uncertain distrib.

S; M; T; J; L - Mad. Can. - EUR, AS 12345, AFR 1234, AM 12, AU 12, OC.

Bryum caespiticium Hedw.

Highly variable species.

S; M; L (S 96) - Mad. Can. - EUR, AS 1235, AFR 124, AM 1236, AU 12, OC, ANT.

Bryum canariense Brid.

(incl. var. *provinciale* (Philib.) Husn.)

S; M; T; G; J; P; F; L (P see CRUNDWELL *et al.*, 1994) - Mad. Can. - EUR, AFR 24, AM 16 (+ tropical AM, see FRAHM, 1995).

Bryum capillare Hedw.

Information on taxonomy and literature by DÜLL (1984, 1992).

S; M; T; G; P; F; L; C (G 90, C 93, T see CRUNDWELL *et al.*, 1994) - Mad. Can. - EUR, AS 1235, AFR (questionable according to FRAHM, 1995), AU 12, OC. (*B. platyloma* Schwaegr. has been treated as a var. of *B. capillare* (WILCZEK & DEMARET, 1982.)

Bryum creberrimum Taylor

S; M; T; L - EUR, AS 1235, AFR 1, AM 12 (+ tropical AM, see FRAHM, 1995), AU 12.

Bryum donianum Grev.

(= *B. pachyloma* Card.)

S; M; T; G; J; P; L; C (G 90, J 95, C 93, S see CRUNDWELL *et al.*, 1994) - Mad. Can. - EUR, AS 25, AFR 1.

Bryum dunense Smith et Whitehouse

S (new; S see CRUNDWELL *et al.*, 1994). See also SÉRGIO & FONTINHA, 1994/1995. - Mad. Can. - EUR.

Bryum gemmiparum De Not.

S; M; L - Mad. Can. - EUR, AS 35, AFR 1, AM 16.

Bryum microerythrocarpum C. Müll. et Kindb.

(= *B. subapiculatum* Hampe)

Also treated as = *B. rubens* Mitt. (DIRKSE *et al.*, 1989).

T (new; T see CRUNDWELL *et al.*, 1994) - Can. - EUR, AS 5, AFR 24, AM 15, AU 12, OC.

Bryum mildeanum Jur.

M; J; L - Mad. Can. (Mad. var. *bimum*) - EUR, AS 35, AFR 1.

Bryum pseudotriquetrum (Hedw.) B. S. G.

S; M; T; J; P; F; L (S see CRUNDWELL *et al.*, 1994) - Mad. Can. - cosmop.

Bryum radiculosum Brid.

(= *B. murale* Wils. *ex* Hunt.)

S, M; T (ST see CRUNDWELL *et al.*, 1994) - Mad. Can. - EUR, AS 235, AFR 14, AM 12 (+ tropical AM, see FRAHM, 1995), OC.

Bryum rubens Mitt.

S; T (new; ST see CRUNDWELL *et al.*, 1994) See also *B. microerythrocarpum*. - Mad. Can. - EUR, AS 235, AFR 1, AM, AU 12.

Bryum ruderale Crundw. et Nyholm

S; T; F (new; STF see CRUNDWELL *et al.*, 1994) - Mad. Can. - EUR, AS 5, AFR 1, AM 1.

Bryum sauteri B. S. G.

S (new; S see CRUNDWELL *et al.*, 1994) - Mad. Can. - EUR, AU 2.

Bryum tenuisetum Limpr.

S (new; S see CRUNDWELL *et al.*, 1994) - Can. - EUR, AM 1.

Bryum torquescens B. et S.

(= *B. capillare* subsp. *torquescens* (B. et S.) Kindb.)

S; M; J; P; F; L; C (P 95, L 95; C *leg.* SJÖGREN, 1978) - Mad. Can. - EUR, AS 235, AFR 124, AM 12456, AU 12.

Epipterygium tozeri (Grev.) Lindb.

See ARTS & NORDHORN-RICHTER (1986)

S; M; T; G; J; P; F; L; C (G 90, C 93) - Mad. Can. - EUR, AS 2345, AFR 1, AM 1.

Leptobryum pyriforme (Hedw.) Wils.

M - Mad. Can. - cosmop.

(*Pohlia andalusica* (Hoehnel) Broth.)

(= *P. rothii* (Corr. et Limpr.) Broth.)

L - EUR, AS 1, AM 1.

Pohlia annotina (Hedw.) Lindb.

S; P (new; SP see CRUNDWELL *et al.*, 1994) - Mad. Can. - EUR, AS 15, AFR 1, AM 1.

Pohlia bulbifera (Warnst.) Warnst.

M; T (T see BATES & GABRIEL, 1997) - EUR, AS 125, AM 1.

(*Pohlia cruda* (Hedw.) Lindb.)

Not seen by the author on any of the Azorean islands 1965-97.

P - Can. - EUR, AS 1235, AFR 14, AM 12346, AU 12, OC, ANT.

Pohlia melanodon (Brid.) Shaw

(= *Mniobryum delicatulum* (Hedw.) Dix.)

For presence in the Can. see DÜLL (1992).

M - Can. - EUR, AS 1235, AFR 1, AM 1.

Pohlia nutans (Hedw.) Lindb.

P - Mad. - Unexpected rare presence in the Azores, maybe overlooked. In EGGERS (1982) without information on recorder. - almost cosmop.

Pohlia proligera (Kindb. ex Breidl.) Lindb. ex Arnell

M; T; J; F; L - Mad. - EUR, AS 12, AM 1.

Further information on the presence of *Pohlia* spp. in Macaronesia by NORDHORN-RICHTER (1986).

Mniaceae

Mnium hornum Hedw.

M; T; J; P; F; L - EUR, AS 25, AFR 1, AM 1.

Plagiomnium rostratum (Schrad.) Kop.

Uncertain presence in the southern hemisphere (see DÜLL, 1992).

M; L; C (C 93) - Mad. Can. - cosmop. (?)

Plagiomnium undulatum (Hedw.) Kop.

S; M; T; J; P; F; L; C (S 96, C 93) - Mad. Can. - EUR, AS 1235, AFR 1234.

Rhizomnium punctatum (Hedw.) Kop.

H. PERSSON stated already in the 1960s, that specimens of *R. punctatum* from the Azores and Madeira are different from those from the continent (pers. comm.).

M; T; J; P; F (T in herb. AZU, leg. BARCELOS, 1997) - Mad. - EUR, AS 1235, AFR 12, AM 1.

Aulacomniaceae

Aulacomnium palustre (Hedw.) Schwaegr.

See CASAS *et al.* (1989). Still restricted to only three islands although carefully looked for.

M; J; P (M recently found by R. S., J *leg.* E. SJÖGREN in 1982, P *leg.* B. and E. SJÖGREN in 1965). - cosmop.

Bartramiaceae

Bartramia stricta Brid.

S; M; T; G; P; L (G 90, P 95) - Mad. Can. - EUR, AS 5, AFR 12, AM 1, AU 1.

Breutelia azorica (Mitt.) Card.

Still no record from C where habitat conditions are suitable in many localities.

M; T; J; P; F; L (L *leg.* BARCELOS and PEREIRA, 1997, T *leg.* BARCELOS, 1999, *teste* SJÖGREN). - *Species endemic to the Azores.*

Philonotis caespitosa Jur.

Taxonomy uncertain; species close to *P. fontana*.

M; T; L - EUR, AS 135, AM 1, AFR 1.

Philonotis calcarea (B. S. G.) Schimp.

S; M; F - EUR, AS 1235, AFR 12, AM 1.

Philonotis capillaris Lindb.

(= *P. arnellii* Husn.)

T; J (new; see SÉRGIO *et al.*, 1994c; J *leg.* R. S., 1999) - EUR, AS 125, AFR 1, AM 12.

Philonotis fontana (Hedw.) Brid.

M; T; J; F (T see CRUNDWELL *et al.*, 1994). - Mad. Can. - EUR, AS 1235, AFR 12, AM 126.

Philonotis hastata (Dub.) Wijk et Marg.

(= *P. obtusata* C. Müll. *ex* Ren. et Card.)

Synonyms and distrib. in FRAHM (1976). See also CRUM & ANDERSON (1981) and ANDERSON *et al.* (1990).

S; M; T; J; F; L - Mad. - EUR: Hs, AS 2345, AFR 1234, AM 12346, AU 1, OC. (Hs uncertain; see FRAHM, 1995).

Philonotis marchica (Hedw.) Brid.

Cell mamillae distinguish from *P. caespitosa*.

M; T (T *leg.* GABRIEL, 1990, in LISU) - Mad. - EUR, AS 25, AFR 12, AM 14.

Philonotis rigida Brid.

Distrib. in RAEYMACKERS (1983). See also CASAS *et al.* (1989).

S; M; T; G; J; P; F; L; C (C 93) - Mad. Can. - EUR, AS 5, AFR 12.

Philonotis uncinata (Schwaegr.) Brid.

Species *leg.* by CRUNDWELL in 1980, *det.* FRAHM; still some uncertainty about the determination.

S; T - C and SAM; pantropical.

Orthotrichaceae

Amphidium mougeotii (B. S. G.) Schimp.

See CASAS *et al.*, 1989.

T; J; P; F; L (T see BATES & GABRIEL, 1997) - Mad. Can. - EUR, AS 1235, AM 1.

Orthotrichum diaphanum Brid.

S; M; T; F; L (T see CRUNDWELL *et al.*, 1994) - Mad. Can. - EUR, AS 15, AFR 124, AM 12 (+ tropical AM; see FRAHM, 1995), OC. See LEWINSKY (1978).

Orthotrichum tenellum Bruch

M - Mad. Can. - EUR, AS 15, AFR 1, AM 12.

Ulota calvescens Wils. in Rab.

(= *U. vittata* Mitt.)

M; T; P (T in herb. AZU) - Mad. Can. - EUR: Br, Hb, Hs, Lu.

Ulota crispa (Hedw.) Brid.

P (new; *leg.* R. S., 1998) - Mad. Can. - EUR, AS 15, AFR 1; AM 1, AU 1.

Zygodon conoideus (Dicks.) Hook. et Taylor

M; T; F (T and F see CRUNDWELL *et al.*, 1994) - Mad. Can. - EUR, AFR 1 (AFR 3?; see FRAHM 1995), AM 1.

Zygodon viridissimus (Dicks.) Brid.

(incl. subsp. *baumgartneri* (Malta) Düll, syn. *Z. baumgartneri* Malta; also treated as *Z. viridissimus* var. *vulgaris* Malta)

S; M; T; G; J; P; F; L; C (G 90, C 93, P in herb. AZU) - Mad. Can. EUR, AS 1235, AFR 1, AM 124.

Fontinalaceae

Fontinalis antipyretica Hedw.

(incl. var. *azorica* Card.)

See CARDOT, 1897.

S; J; L - Mad. Can. - EUR, AS 1235, AFR 14 (+ tropical AFR; see FRAHM, 1995), AM 1.

Leucodontaceae

(*Cryphaea heteromalla* (Hedw.) Mohr.)

In continental Europe decreasing distrib. due to air pollution. Not recently recorded in the Azores. Record on M by v. HÜBSCHMANN (1973).

M - Mad.? Can. - EUR, AS 5, AFR 1.

(*Leucodon canariensis* (Brid.) Schwaegr.)

M - Mad. Can. - Uncertain presence of *L. canariensis* s. str. in the Azores (HEDENÄS, 1992a). - *Species endemic to Macaronesia*.

(*Leucodon sciuroides* (Hedw.) Schwaegr.)

F - Mad. Can. - EUR, AS 1235, AFR 12 (+ tropical AM, see FRAHM, 1995). Uncertain presence in the Azores; the record on F dates back to RUSSELL (1862).

Leucodon treleasei (Card.) Par.

(= *L. canariensis* var. *treleasei* (Card.) Fleisch.)

See HEDENÄS (1992a).

S; M; T; G; J; P; F; L; C (G 90, C 93) - Mad. Can. - *Species endemic to Macaronesia*.

Pterogonium gracile (Hedw.) Sm.

(= *P. ornithopodioides* (Web. et Mohr.) Lindb.)

M; T; G; J; L; C (C 93, T in herb. AZU) - Mad. Can. - EUR, AS 2? and 5, AFR 1234, AM 1.

Myuriaceae

Myurium hochstetteri (Schimp.) Kindb.

S; M; T; G; J; P; F; L; C (G 90, C 93) - Mad. Can. - EUR: Br, Hb.

Echinodiaceae

Echinodium prolixum (Mitt.) Broth.

S; M; T; G; J; P; F; L; C (S 96, G 90, C 93) - Mad. - *Species endemic to Macaronesia*.

Echinodium renauldii (Card.) Broth.

See GABRIEL (1994) and SÉRGIO *et al.* (1994c).

M; T; J; P; F; L; C (C 93) - *Species endemic to the Azores*.

Neckeraceae

(*Homalia lusitanica* Schimp.)

(= *H. subrecta* (Mitt.) Jaeg.)

See HEDENÄS (1992a) and DIRKSE (1987). Synonymy may need further investigation. Record on M by v. HÜBSCHMANN (1973); uncertain actual presence of the species in the Azores.

M - Mad. Can. - EUR, AS 5, AFR 1.

Homalia webbiana (Mont.) Schimp.

(= *Neckera webbiana* (Mont.) Düll)

See FRAHM (1983).

S; G; J; L (G 90, leg. JONAS SJÖGREN, 1978; J leg. R. S., 1999) - Mad. Can. - EUR: distrib. (Hs) needs further investigation.

Neckera cephalonica Jur. et Ung.

See HEDENÄS (1992a). Treated by DÜLL (1992) as *Neckera pennata* var. *cephalonica* Jur. et Ung.

P - Mad. Can. - (*N. pennata* s. l. is almost cosmop.). *N. cephalonica* has been mentioned by ALLORGE, P. & V. (1952), leg. H. PERSSON on P. This species is probably one of the most rare bryophytes in the Azores. Carefully looked for by the author 1965-97 but never seen - *Species endemic to Macaronesia*.

Neckera complanata (Hedw.) Hüb.

P (new; leg. R. S., 1998) - Mad. Can. - EUR, AS 2? 35, AFR 12, AM 1.

(*Neckera crispa* Hedw.)

Presence in the Azores is questionable. Former record in Can. is *N. intermedia* (DÜLL, 1992).

M - Mad.? - EUR, AS 15, AFR 1.

Neckera intermedia Brid.

S; M; T; G; J; P; F; L; C (G 90, C 93, S leg. PEREIRA, 1996) - Mad. Can. - EUR: Hs.

Hookeriaceae

Cyclodictyon laetevirens (Hook. et Taylor) Mitt.

See CASAS *et al.* (1992).

M; T; J; P (J leg. R. S., 1999, T in herb. AZU) - Mad. Can. - EUR: Br, Hb, Hs, Lu, AS 2, AFR 24.

Daltonia stenophylla Mitt.

Specimens formerly treated as *D. splachnoides* are *D. stenophylla* (pers. comm. SCHUMACKER; confirm. CRUM)

M; T; J; P; F (F see CRUNDWELL *et al.*, 1994) - Mad.? - C AM and S AM.

Hookeria lucens (Hedw.) Sm.

Leg. by LUISIER on M (1945), by ERIK and BERIT SJÖGREN on M in 1965, in UPSV (large fertile population), by I. B. GONÇALVES and E. SJÖGREN on P in 1965, by R. G. on T in 1988. Unexpectedly rare presence both in the Azores and on Madeira.

M; T; P; L - Mad. - EUR, AS 5, AM 1, AFR 1.

Tetrastichium fontanum (Mitt.) Card.

A Leucomiaceae species according to DIRKSE (1989).

S; M; T; G; J; P; F; L; C (G 90, C 93) - Mad. Can. - *Species endemic to Macaronesia.*

Tetrastichium virens (Card.) Churchill

(= *Lepidopilum virens* Card.)

A Hookeriaceae species, see CHURCHILL (1989), DIRKSE (1989), HEDENÄS (1992a).

S; M; T; G; J; P; F; L; C (S 96, G 90, C 93) - Mad. Can. - *Species endemic to Macaronesia.*

Thamnobryaceae*Thamnobryum alopecurum* (Hedw.) Nieuwl.

S; M; T; G; J; P; F; L; C (G 90, S 96, C 93) - Mad. Can. - EUR, AS 1235, AFR 1, AM 1.

Thamnobryum maderense (Kindb.) Hedenäs

Probably still overlooked on some of the Azorean islands. See HEDENÄS (1992b).

T; J; P (J *leg.* R. S., 1999, P see CRUNDWELL *et al.*, 1994) - Mad. Can. - *Species endemic to Macaronesia.*

Thuidiaceae*Heterocladium heteropterum* B. S. G.

Macaronesian specimens treated by HEDENÄS (1992a) as *H. wulfsbergii* I. Hag. have been treated as *H. heteropterum* var. *wulfsbergii* (I. Hag.) T. Jens. et Pers. by DÜLL and SCHUMACKER (see DÜLL, 1992). The var. *macounii* (Best.) Dix. (*H. macounii* Best.) of North America is not present in the Azores.

S; M; T; J; P; F; L; C (S 96) - Mad. Can. - EUR, AS 15, AM 1.

Thuidium tamariscinum (Hedw.) B. S. G.

See CASAS *et al.* (1992).

M; T; G; J; P; F; L; C (G 90, C 93) - Mad. - EUR, AS 25, AFR 123, AM 12345.

Amblystegiaceae

(*Amblystegium humile* (P. Beauv.) Lindb.)

(= *A. kochii* B. S. G.)

Presence in the Azores needs confirmation.

L - Mad. - EUR, AS 125, AM 126.

Amblystegium riparium (Hedw.) B. S. G.

(= *Leptodictyum riparium* (Hedw.) Warnst.)

M; T (T see CRUNDWELL *et al.*, 1994) - Mad. Can. - EUR, AS 1235, AFR 134, AM 123, AU 1, ANT.

Amblystegium serpens (Hedw.) Lindb.

M - Can. - EUR, AS 1235, AFR 12, AM 1246, AU 2.

Amblystegium tenax (Hedw.) C. Jens.

(= *Hygroamblystegium tenax* (Hedw.) Jenn.)

See HEDENÄS (1992a).

M; P - Mad. Can. - EUR, AS 1235, AFR 12, AM 124, OC.

Amblystegium varium (Hedw.) Lindb.

See SÉRGIO *et al.* (1994c).

T; L - Mad. Can. - EUR, AS 1235, AFR 1 (+ tropical AFR, see FRAHM 1995), AM 123.

Calliergonella cuspidata (Hedw.) Loeske

S; M; J; L (J 95) - Mad. Can. - EUR, AS 1235, AFR 1 (+ tropical AFR, see FRAHM, 1995), AM 136, AU 12.

Drepanocladus fluitans (Hedw.) Warnst.

(= *Warnstorfia fluitans* (Hedw.) Loeske)

M; T; P; F; L (P see CRUNDWELL *et al.*, 1994) - Can. - almost cosmop.

Hygrohypnum luridum (Hedw.) Jenn.

Former record by V. HÜBSCHMANN (1973) is *Brachythecium plumosum* (see HEDENÄS 1992a).

T (new; T see CRUNDWELL *et al.* 1994) - EUR, AS 5, AM 12 (+ tropical AM, see FRAHM, 1995).

Brachytheciaceae

Brachythecium albicans (Hedw.) B. S. G.

S; M (S 96) - Mad. - EUR, AS 1235, AFR 1, AM 1, AU 12.

Brachythecium mildeanum Schimp.

M; J; F - Can. - EUR, AS 135, AFR 2, AM 1.

Brachythecium plumosum (Hedw.) B. S. G.

Variable species as to habitus.

S; M; T; G; J; P; F; L; C (G 90, C 93) - Mad. Can. - almost cosmop.

Brachythecium populeum (Hedw.) B. S. G.

S; M; T; G; J; P; F; L; C (G 90; leg. SJÖGREN, 1978) - Can.? - EUR, AS 1235, AFR 124, AM 1.

Brachythecium rivulare B. S. G.

S; M; G; P; F; L; C (S 96, G 90, P 95, L 95, C 93) - Mad. Can. - EUR, AS 1235, AFR 14 (+ tropical AFR, see FRAHM, 1995), AM 16.

Brachythecium rutabulum (Hedw.) B. S. G.

Variable species. On Mad. also var. *atlanticum* Hedenäs.

S; M; T; J; F; L; C (S 96, J 95, C 93, T 97) - Mad. Can. - EUR, AS 1235, AFR 123, AM 12 (+ tropical AM, see FRAHM, 1995), AU 12, OC.

Brachythecium salebrosum (F. Web. et Mohr.) B. S. G.

S; M; T; G; J; P; L (G 90, J 95) - Can. - EUR, AS 1235, AFR 124, AM 12, AU 12, ANT.

Brachythecium velutinum (Hedw.) B. S. G.

M; T; P; F; L; C (L 95, C 93) - Mad. Can. - EUR, AS 1235, AFR 1, AM 1.

Cirriphyllum piliferum (Hedw.) Grout.

Species new to Macaronesia.

F (new; F 95) - EUR, AS 12, AFR 1, AM 1.

Eurhynchium hians (Hedw.) Loeske

S; M; T; G; J; P; F; L; C (G 90, C 93) - Mad. Can. - EUR, AS 1235, AFR 12, AM 1 (+ tropical AM, see FRAHM, 1995).

Eurhynchium meridionale (Schimp. ex Sendt.) De Not.

S; M; T; L; C (S see CRUNDWELL *et al.*, 1994) - Mad. Can. - EUR, AS 5, AFR 1.

Eurhynchium praelongum (Hedw.) Warnst. s. l.

Variable species as to habitus.

S; M; T; G; J; P; F; L; C (C 93) - Mad. Can. - EUR, AS 1235, AFR 12, AM 124, AU 12.

Eurhynchium pumilum (Wils.) Schimp.

(= *Oxyrrhynchium pumilum* (Wils.) Warnst.)

S; M; T; G; J; P; F; L; C (G 90, C 93) - Mad. Can. - EUR, AS 5, AFR 1, AU 1?.

Eurhynchium speciosum (Brid.) Jur.

There are specimens difficult to distinguish from *E. hians*.

M; P; F (P 95, F 95) - Mad. Can. - EUR, AS 5, AFR 1.

(*Eurhynchium striatulum* (Spruce) B. S. G.)

(= *Isothecium striatulum* (Spruce) Kindb.)

See SMITH (1978). Questionable presence in the Az. - Can. - EUR, AS 5, AFR 1.

Eurhynchium striatum (Hedw.) Schimp.

Only one but a large population recorded by SJÖGREN on S in 1996.

S; M (S 96; teste HEDENÄS) - EUR, AS 1235, AFR 1 (only AFR 3 according to FRAHM, 1995).

Homalothecium sericeum (Hedw.) B. S. G.

var. *mandonii* (Mitt.) Ren. et Card.

See GEHEEB & HERZOG (1910). Main distrib. in Macaronesia; also recorded by CASAS (1991) in Hs.

S - Mad. Can. - EUR: Hs.

Isothecium alopecuroides (Dubois) Isov.

(= *I. myurum* Brid.)

M - Can. - EUR, AS 25, AFR 1, AM 1.

Isothecium myosuroides Brid.

M; T; J; P; F; L; C (C 93) - Mad. Can. - EUR, AS 25, AFR 1, AM 1.

Rhynchostegiella curviseta (Brid.) Limpr.

(= *Hypnum teneriffae* Mont.)

S; J; L; C (C 93) - Mad. Can. - EUR, AS 5, AFR 1.

Rhynchostegiella durieui (Mont.) P. et V. Allorge

(= *Orthothecium durieui* (Mont.) Besch.)

See CASAS *et al.* (1985), SÉRGIO & HERBRARD (1982), SÉRGIO & MAGUAS (1992).

M; J; F, L (J *leg.* SCHUMACKER, 1999) - Mad. Can. - EUR, AFR 1.

Rhynchostegiella tenella (Dicks.) Limpr.

(incl. *R. bourgeana* (Mitt.) Broth.)

See DÜLL (1986)

S; M; G; F; C (S 96, G 90; C leg. SJÖGREN, 1978) - Mad. Can. - EUR, AS 25, AFR 12.

Rhynchostegium confertum (Dicks.) B. S. G.

(incl. *Rhynchostegiella pseudosurrecta* Card. et Wint.

and *R. surrecta* (Mitt.) Broth., according to HEDENÄS, 1992a).

See also MITTEN (1865).

S; M; T; J; P; F; L; C (C 93, P see CRUNDWELL *et al.*, 1994) - Mad. Can. - EUR, AS 125, AFR 1.

Rhynchostegium megapolitanum (F. Web. et Mohr.) B. S. G.

S; M; T; J; P; C (J 95, C 93, TP see CRUNDWELL *et al.*, 1994) - Mad. Can. - EUR, AS 5, AFR 1 (+ tropical AM, see FRAHM, 1995).

Rhynchostegium riparioides (Hedw.) Card.

(= *Platyhypnidium rusciforme* Loeske; = *P. riparioides* (Hedw.) Dix.)

S; M; T; G; J; P; F; L; C (S 96, G 90, C 93, T see CRUNDWELL *et al.*, 1994) - Mad. Can. - EUR, AS 1235, AFR 12, AM 12346.

Scleropodium purum (Hedw.) Limpr.

(= *Pseudoscleropodium purum* (Hedw.) Fleisch.)

S; M; T; G; J; P; F; L; C (G 90, C 93) - Mad. Can. - EUR, AS 25, AFR 123, AM 136, AU 2, OC.

Scleropodium touretii (Brid.) L. Koch

S, M; T; G; P; F; C (S 96, G 90, C 93) - Mad. Can. - EUR, AS 25, AFR 1, AM 12.

Scorpiurium circinatum (Brid.) Fleisch. et Loeske

See CASAS *et al.*, 1989.

S; M; T; G; J; P; F; L; C (G 90, C 93) - Mad. Can. - EUR, AS 25, AFR 1.

Plagiotheciaceae

(*Herzogiella striatella* (Brid.) Iwats.)

(= *Dolichotheca striatella* (Brid.) Loeske)

Documentation on F dates back to RUSSELL (1862); recent presence in the Azores is questionable.

F - EUR, AS 1, AM 1.

Isopterygium tenerum (Sw.) Mitt.

(= *Sematophyllum bottinii* (Bridl.) Podp.)

See CRUM & ANDERSON (1981) and SÉRGIO *et al.* (1994c).

M; T (T in herb. AZU and LISU, *leg.* SÉRGIO and DIAS, 1982) - EUR: It, Hs, AM 1.

Plagiothecium nemorale (Mitt.) Jaeg.

(= *P. sylvaticum* (Turn.) B. S. G.)

M; T; J; P; F; L - Mad. Can. - EUR, AS 5.

(*Plagiothecium succulentum* (Wils.) Lindb.)

Macaronesian samples need confirmation. See HEMERIK (1989). Confusion with *P. nemorale* is possible.

G; J; C - Mad. Can.? - EUR, AS 12, AFR 1, AM 1.

Pseudotaxiphyllum elegans (Brid.) Iwats.

(= *Isopterygium elegans* (Brid.) Lindb.)

See IWATSUKI (1987).

S; M; T; J; P; F; L; C (S 95, C 93) - Mad. Can. - EUR, AS 13, AM 1, AU 2, OC.

Pseudotaxiphyllum laetevirens (Koppe et Düll) Hedenäs

(= *Isopterygium elegans* var. *laetevirens* Koppe et Düll)

See HEDENÄS (1992a).

S; M; T; J; P (S 96, J 95, P 95) - Mad. - EUR: Hs.

Sematophyllaceae

Sematophyllum substrumulosum (Hampe) Britt.

Oceanic / Mediterranean species. See CASAS *et al.*, (1985).

S; M; T; G; J; P; F; L; C (G 90, C 93) - Mad. Can. - EUR: Co, Br, Ga, Gr, Hs, It, Ju, Lu, Si, AFR 1.

Hypnaceae

Classification by HEDENÄS (1992a): Hylocomiaceae (*Hylocomium*, *Rhytidiadelphus*, *Pleurozium*), Hyocomiaceae (*Hyocomium*), Ctenidiaceae (*Ctenidium*, *Andoa*).

Andoa berthelotiana (Mont.) Ando

(= *Allorgea berthelotiana* (Mont.) Ando; = *Gollania berthelotiana* (Mont.) Broth.)

S; M; T; G; J; P; F; L; C (G 90, C 93) - Mad. Can. (see CASAS *et al.*, 1989) - *Species endemic to Macaronesia.*

Ctenidium molluscum (Hedw.) Warnst.

A high-pH or calcicolous species, at least in continental Europe (*cf. e.g.* SJÖGREN, 1964), consequently with reduced possibilities to occur in the Azores.

M; J (*cf.* HEDENÄS, 1992a) - Mad.? Can. - EUR, AS 125, AFR 1, AM 12.

Hylocomium brevirostre (Brid.) B. S. G.

M; T; J; F (T see BATES & GABRIEL, 1997; F see CRUNDWELL *et al.*, 1994). - EUR, AS 125, AFR 13, AM 12.

Hylocomium splendens (Hedw.) B. S. G.

The uneven distribution in the Azores and on individual islands of this in continental Europe common species is remarkable.

M; T; J; P; C (C *leg.* R. S., 1999) - Mad. Can. - EUR, AS 1235, AFR 12, AM 123, AU 2.

Hyocomium armoricum (Brid.) Wijk et Marg.

According to SÉRGIO & NÓBREGA (1985) also on Mad.

J (A few large populations in a few localities on J.) - Mad. - EUR.

Hypnum cupressiforme Hedw. s. l.

Taxonomy treated by ANDO (1972 ff.).

S; M; T; G; J; P; F; L; C - Mad. Can. - EUR, AS 1235, AFR 124, AM 12, AU 12, ANT.

Hypnum imponens Hedw.

M; T; P; L (T *leg.* GABRIEL, 1992, confirm. SÉRGIO) - EUR, AS 1235, AFR 1, AM 1.

Hypnum jutlandicum Holmen et Warncke

(= *H. cupressiforme* var. *ericetorum* B. S. G.)

S; M; T; G; J; P; F; L (G 90, J 95, S see CRUNDWELL *et al.*, 1994) - Mad. Can. - EUR, AS 15, AFR 13.

(Hypnum mamillatum (Brid.) Loeske)

(= *H. andoi* Smith)

For taxonomy see ANDO (1987). Uncertain presence in Macaronesia according to HEDENÄS (1992a).

S; M; T; F (T in herb. AZU) - Mad. Can. - EUR, AFR 1, AM 1.

Hypnum resupinatum Taylor in Spruce

(= *H. cupressiforme* subsp. *resupinatum* (Taylor et Spruce) C. Hartm.)

S; M; T; G; J; P; F; L; C (P 95) - Mad. Can. - EUR, AS 5, AM 1.

Hypnum uncinulatum Jur.

(= *H. canariense* (Mitt.) Jaeg.)

S; M; T; G; J; P; F; L; C (C 93) - Mad. Can. - EUR: Lu, Hb.

Pleurozium schreberi (Brid.) Mitt.

M; T; J; P; F; C (J 95, C leg. R. S., 1999, T in herb. AZU) -

Mad. - EUR, AS 1235, AFR 2, AM 1246.

Rhytidiadelphus loreus (Hedw.) Warnst.

One of the European oceanic / suboceanic bryophytes which are unexpectedly rare in the Azores. Until now only one locality on P with a very small population, unchanged since 1965, and two localities on T. Apparently also rare on Mad. (leg. DÜLL, 1987).

T; P (T leg. SJÖGREN and BARCELOS, 1997; see also SÉRGIO *et al.*, 1994c) - Mad. - EUR, AS 2, AM 1.

Rhytidiadelphus squarrosus (Hedw.) Warnst.

M; T; G; J; P; F; L; C (G 90, C 93) - Mad. - EUR, AS 125, AM 1, AU 2.

Rhytidiadelphus subpinnatus (Lindb.) Kop.

(= *R. calvescens* (Lindb.) Roth; = *R. squarrosus* subsp. *calvescens* (Lindb.) Giac.)

See HEDENÄS (1992a); confirmed by SÉRGIO, leg. GABRIEL *et al.*, 1992.

M; T; J; P; F; C (C leg. R. S., 1999) - EUR, AS 125, AM 1.

HEPATICAE

Anthocerotaceae

Anthoceros caucasicus Steph.

(incl. *A. mandonii* Steph.)

See SÉRGIO (1987), SIM-SIM (1999) and CASAS *et al.* (1989).

S; M; T; J; P; F; L; C (TPF leg. R. S., 1997 and on C 1999) - Mad. Can. - EUR: Ca, Hs, Lu, AM 23.

Anthoceros punctatus L. s. str.

(= *A. husnotii* Steph.)

Most ancient samples of *A. punctatus* are *A. caucasicus*.

M; T; F; L (M leg. ALLORGE, *det.* R. S.) - Mad. Can. - EUR, AS 235, AFR 124, AM 134 (distrib. uncertain).

Phaeoceros bulbiculosus (Brot.) Prosk.

(= *Anthoceros dichotomus* Raddi)

See CASAS *et al.* (1996).

M; T; F; L (three new localities on M, *leg.* SÉRGIO, 1996; TFL as a result of revisions of herbarium material by C. S.) - Mad. Can. - EUR, AS 5, AFR 1, AM 12.

Phaeoceros carolinianus (Michx.) Prosk.

P (P *leg.* R. S.; sample in 1894 by TRELEASE on F may be *P. carolinianus*, pers. comm. C. S.) - Mad. Can. - EUR, AS 125, AFR 234, AM 1.

Phaeoceros laevis (L.) Prosk. subsp. *laevis*

(= *Anthoceros laevis* L.)

S; M; T; P; F; L; C (S see CRUNDWELL *et al.*, 1994, P *leg.* R. S., 1997 and LC in 1999) - Mad. Can. - almost cosmop.

Sphaerocarpaceae

Sphaerocarpos texanus Austin

T (see SÉRGIO, 1989) - EUR, AS 5, AFR 1, AM 16.

Targioniaceae

Targionia hypophylla L.

See ZAMORA *et al.* (1989).

S; M; T; G; J; P; F; L; C (G 90; P see CRUNDWELL *et al.*, 1994; C *leg.* SJÖGREN, 1978) - Mad. Can. - almost cosmop.

Aytoniaceae

Asterella africana (Mont.) A. Evans

(= *Fimbriaria africana* Mont.)

M; T; J; F; L; C (C 93) - Mad. Can. - EUR: Co, Ga, Hs, Sa, AFR 1.

Mannia androgyna (L.) A. Evans

(= *Grimaldia dichotoma* Raddi)

Mediterranean distrib. in Europe. See CASAS *et al.* (1996).

S; M; T; J; F; L (T *leg.* C. S., 1996; S *leg.* ALLORGE, 1937, in PC, confirmed) - Mad. Can. - EUR, AS 35, AFR 12.

Plagiochasma rupestre (J. R. Forst. et G. Forst.) Steph.

Mediterranean distrib. in Europe.

M; T (presence needs confirmation; M *leg.* HÜBSCHMANN, 1973) - Mad. Can. - EUR, AS 5, AFR 124, AM 123456, AU 12.

Reboulia hemisphaerica (L.) Raddi

S; M; T; G; J; P; F; L; C (P 95, G 90) - Mad. Can. - almost cosmop.

Conocephalaceae

Conocephalum conicum (L.) Dumort.

S; M; T; G; J; P; F; L; C (G 90, C 93) - Mad. Can. - EUR, AS 1235, AFR 1, AM 1.

Lunulariaceae

Lunularia cruciata (L.) Lindb.

S; M; T; G; J; P; F; L; C (G 90, C 93, P 95; T in herb. AZU) - Mad. Can. - cosmop.

Probably introduced into several countries.

Marchantiaceae

Marchantia paleacea Bertol.

Mediterranean distrib. in Europe.

S; M; T; G; J; P; F; L (G 90, J leg. R. S., 1999) - Mad. Can. - EUR, AS 2345, AFR 1
(probably introduced into some countries).

Marchantia polymorpha L. *sensu lato*

M; P; F (subsp. *polymorpha*, P leg. R. S., 1997) - Mad. Can. - cosmop.

Wiesnerellaceae

Dumortiera hirsuta (Sw.) Nees

See CASAS *et al.* (1989).

M; T; G; J; P; F; L; C (G 90, C 93) - Mad. Can. - cosmop. (*sensu lato*).

Exormothecaceae

Exormotheca pustulosa Mitt.

(= *E. africana* Steph.)

See CASAS *et al.* (1996).

M; T; J; F; L - Mad. Can. - EUR: Ga, Hs, It, Lu, AFR 1234, AM 2.

Corsiniaceae

Corsinia coriandrina (Spreng.) Lindb.

See CASAS *et al.* (1992).

S; M; T; J; P; F; L (J 95, L 95) - Mad. Can. - EUR, AS 5, AFR 1, AM 16.

Ricciaceae

Riccia beyrichiana Hampe *ex* Lehm.

T (new; T see CRUNDWELL *et al.*, 1994) - EUR, AFR 1, AM 1.

Riccia bifurca Hoffm.

M; T (T in herb. AZU) - Mad. Can. - EUR, AS 15, AFR 1, AM 1, AU 12.

(*Riccia ciliifera* Link. ex Lindenb.)

(= *R. biscoffii* Hübener)

Az. - (revision of material *leg.* ALLORGE (1946) is needed) - Mad. Can. - EUR, AS 15, AFR 1.

Riccia crozalsii Levier

See SÉRGIO & GABRIEL (1994).

M; T; J; P; F; L (P *leg.* R. S., 1997 and J 1999) - Mad. Can. - EUR, AS 5, AFR 14, (AU?).

Riccia crystallina L. emend. Raddi

Mediterranean distrib. in Europe.

M; T - Mad. Can. - almost cosmop.

Riccia glauca L.

S; M; T (ST see CRUNDWELL *et al.*, 1994) - Mad. Can. - EUR, AS 25, AFR 1, AM 15, AU 2. - probably introduced into several countries.

Riccia huebeneriana Lindenb.

See SÉRGIO & DIAS (1991) and JOVET-AST (1986).

T (T in herb. AZU) - (*sensu lato*) EUR, AS 2, AFR 1, AM 1.

Riccia ligula Steph.

See SÉRGIO & GABRIEL (1994).

T - Mad. Can. - EUR: Ga, He, It, Sa.

Riccia nigrella DC.

(= *R. minima* (L.) Raddi)

S; M; T; J; F (S see CRUNDWELL *et al.*, 1994, J *leg.* R. S., 1999) - Mad. Can. - EUR, AS 5, AFR 1, AM 12, AU 1.

Riccia sorocarpa Bisch.

S; M; T; J (S see CRUNDWELL *et al.* 1994, J *leg.* R.S. 1999) - Mad. Can. - cosmop.

(*Riccia subbifurca* Warnst. ex Croz.)

(= *R. oelandica* C. Jens.)

See ALLORGE, V. & P. (1946). Questionable recent presence in the Azores. See also JOVET-AST (1986).

Az. - Mad. Can. - EUR, AS 5, AFR 1.

Riccia warnstorffii Limpr. ex Warnst.

M - Mad. - EUR, AFR 14.

Metzgeriaceae

Metzgeria furcata (L.) Dumort.

S; M; T; J; P; F; L; C (S 96, P 95, C 93) - Mad. Can. - EUR, AS 235, AFR 124, AM 1, AU 12. For *M. fruticulosa* see DÜLL (1981).

Metzgeria leptoneura Spruce

(= *M. hamata* Lindb.)

M; T; J; P; F; L - Mad. Can. - EUR: Br, Fa, Hb, AS 234, AFR 234, AM 123456, AU 2.

Pelliaceae

Pellia epiphylla (L.) Corda

M; T; J; P; F; L; C (C leg. R. S., 1999) - Mad. - EUR, AFR 1, AM 1, AS.

Pallaviciniaceae

Pallavicinia lyellii (Hook.) Carruth.

See SIM-SIM (1999).

T; J; P - Mad. - EUR, AS 2, AFR 23, AM 13456, AU 2, OC.

Aneuraceae

Aneura pinguis (L.) Dumort.

(= *Riccardia pinguis* (L.) Gray)

M; T; J; P; L (P 95, J leg. R. S., 1999) - Mad. Can. - almost cosmop.

Riccardia chamedryfolia (With.) Grolle

(= *R. sinuata* (Hook.) Trevis)

R. chamedryfolia is the most common of the *Riccardia* species in the Azores (pers. comm. SCHUMACKER). Some specimens of *R. multifida* in herbaria, determined on dry material, are most probably *R. chamedryfolia*.

S; M; T; J; P; F; L (P leg. R. S., 1997) - Mad. Can. - EUR, AS 1235, AFR 1, AM 14, OC.

Riccardia latifrons (Lindb.) Lindb.

S; M; T; G; J; P; F; L; C (G 90; S leg. R. S., recently) - EUR, AS 1, AFR 1, AM 13.

Riccardia multifida (L.) Gray

S; M; T; J; P; F; L; C (S 96, C 93) - Mad. Can. - EUR, AS 1235, AFR 13, AM 14, AU 2, OC. - Revision of Azorean herbarium samples needed. Distrib. in the Azores uncertain (see *R. chamedryfolia*).

Riccardia palmata (Hedw.) Carruth.

M; T; J; P; F; L (J 95, L 95; P see CRUNDWELL *et al.*, 1994) - Mad. - EUR, AS 125, AM 1234.

Codoniaceae

Fossombronia angulosa (Dicks.) Raddi

S; M; T; G; J; P; F; L; C (C 93, S see CRUNDWELL *et al.*, 1994, J *leg. R. S.*, 1999) - Mad. Can. - W EUR, AS 5, AFR 12, AM 13.

Fossombronia caespitiformis De Not. *ex* Rabenh.

S; M; T; J - Mad. Can. - W EUR, AS 5, AFR 12, AU 1.

Fossombronia echinata MacVicar

T (new; see SÉRGIO, 1994a) - Mad. Can. - EUR, AFR 1.

Fossombronia husnotii Corb.

S; M; T; G; F (S see CRUNDWELL *et al.*, 1994) - Mad. Can. - W EUR, AFR 124.

Fossombronia pusilla (L.) Nees

(incl. var. *decipiens* Corb.)

G; L - Mad. Can. - almost cosmop.

Fossombronia wondraczekii (Corda) Lindb.

(incl. var. *loitlesbergii* (Schiffn.) Calaud)

T (new; see SÉRGIO, 1994a) - EUR, AS 135, AFR 13, AM 1, AU 1.

Herbertaceae

Herbertus azoricus (Steph.) P. W. Richards

M; T; J; P; F; L; C (C 93) - *Species endemic to the Azores.* (Recent investigations on the taxonomic status of *H. azoricus* by N. HODGETTS suggest a close relationship to the neotropical species *H. juniperoideus* (Sw.) Grolle but also the presence in the Azores of a *Herbertus* taxon with close relation to *H. borealis* Crundw.)

Pseudolepicoleaceae

Blepharostoma trichophyllum (L.) Dumort. var. *trichophyllum*

S; M; T; J; P; F; L; C (S 96, C 93) - EUR, AS 1235, AFR 2, AM 124.

Trichocoleaceae

Trichocolea tomentella (Ehrh.) Dumort.

The restricted presence of this species in the Azores is worth attention. Recorded by the author in 1965 and 1982 (same locality). Large population but within just a small area.

M - Can.? - EUR, AS 234, AFR 1, AM 14.

Lepidoziaceae

Bazzania azorica H. Buch et Perss.

According to ALLORGE, P. & V. (1950) not in Madeira. See also PERSSON (1973) and GROLLE (1972b). *B. trilobata* (L.) Gray, suggested to occur on five of the Azorean islands (EGGERS, 1982), is most probably not an Azorean species. The presence in Madeira needs confirmation.

M; T; J; P; F; L - *Species endemic to the Azores.*

Kurzia pauciflora (Dicks.) Grolle

M; T; F; L (T in herb. AZU, *leg.* DIAS and SÉRGIO; F *leg.* R. S., 1998) - Mad. - EUR, AM 1.

Lepidozia azorica H. Buch et Perss.

See BUCH & PERSSON (1941).

M; T; J; P; C (C *leg.* R. S., 1999) - Can. - *Species endemic to Macaronesia.*

Lepidozia cupressina (Sw.) Lindenb.

(= *L. pinnata* (Hook.) Dumort.)

See CASAS *et al.* (1985).

M; T; J; P; F; L - Mad. Can. - EUR: Be, Br, Ga, Ge, Hb, Hs, No, AS 23, AFR 2 (*sensu lato*), AM 34.

Lepidozia reptans (L.) Dumort.

S; M; T; J; P; F; L (S 96) - Mad. - EUR, AS 12345, AM 14.

Telaranea nematodes (Gottsche ex Austin) M. Howe

S; M; T; J; P; F; L; C (C 93, S see CRUNDWELL *et al.*, 1994) - Mad. Can. - EUR: Br, Ga, Hb, Hs, Lu, AFR 234, AM 12345.

Calypogeiaceae

Calypogeia arguta Nees et Mont.

See CASAS *et al.* (1992)

S; M; T; G; J; P; F; L; C (S 96, G 90, F 95, C 93) - Mad. Can. - EUR, AS 2345, AFR 1234, OC.

Calypogeia azorica Bischl.

See BISCHLER (1970).

Recently recorded also in Madeira (MÜLLER & SCHÄFER-VERWIMP, 1999).

M; T; J; P; F; L (PL leg. R. S., 1999) - Mad. - *Species endemic to Macaronesia*.

Calypogeia fissa (L.) Raddi

S; M; T; G; J; P; F; L; C (G 90, C 93) - Mad. Can. - EUR, AS 5, AFR 1, AM 1.

Calypogeia fusca (Lehm.) Steph.

(= *C. allorgei* H. Buch et Perss. = *Mnioloma fuscum* (Lehm.) R. M. Schust, which will become adopted as the correct name according to GROLLE & LONG (2000).

See BISCHLER (1970) and BUCH & PERSSON (1941).

M; T; J; P; F; L - AS 4, AFR 234.

Calypogeia integristipula Steph.

(= *C. meylanii* H. Buch)

This species was formerly excluded from the Azorean bryoflora (BISCHLER, 1970).

M; T; P; L (P leg. R. S., 1997) - Mad. - EUR, AS 1, AM 1.

Calypogeia muelleriana (Schiffn.) Müll. Frib.

S; M; T; J; P; F; L; C (S 96, C 93) - Mad. - EUR, AS 1, AFR 1, AM 1.

Calypogeia neesiana (C. Massal. et Carestia) Müll. Frib.

Confusion with *C. integristipula* may occur.

M; T; J; L - EUR, AS 12, AM 1.

Calypogeia sphagnicola (H. Arnell et J. Perss.) Warnst. et Loeske

Species recorded on Flores by ALLORGE, V. & P. (1948). Since then farreaching changes of the mire biotopes on Flores. Not recorded by the author during excursions in 1995 on that island.

T; L (T see SÉRGIO *et al.*, 1994b) - Mad. Can. - EUR, AS 125, AM 16, AU 2, OC.

Calypogeia suecica (H. Arnell et J. Perss.) Müll. Frib.

M; J; L (L leg. C. S. det R. S.) - Can. - EUR, AM 1

Adelanthaceae*Adelanthus decipiens* (Hook.) Mitt.

See GROLLE (1972a).

M; T; P; F; L (L 95) - Mad. - EUR: Br, Ga, Hb, Hs, AFR 24, AM 34.

Cephaloziaceae

Cephalozia bicuspidata (L.) Dumort.

(incl. *C. lammersiana* (Hübener) Spruce)

S; M; T; J; P; F; L; C (C 93) - Mad. Can. - EUR, AS 135, AFR 1, AM 124.

Cephalozia connivens (Dicks.) Lindb.

(= *C. compacta* Warnst.)

M; P (P leg. SCHWAB, 1981) - Mad. - EUR, AS 12, AFR, AM 14, OC.

Cephalozia crassifolia (Lindenb. et Gottsche) Fulford

(= *C. hibernica* Spruce ex Pearson)

Euoceanic species in Europe. For taxonomy see VÁNA (1988).

M; T; J; P; F; L - Mad. - EUR: Hb, Hs, AM 234.

Cephalozia lunulifolia (Dumort.) Dumort.

(= *C. media* Lindb.)

M; T; J; P; F (T see BATES & GABRIEL, 1997; F leg. R. S., 1998) - Mad. - EUR, AS 125, AFR 1, AM 13.

The distribution of the *Cephalozia* species in the Azores needs revision; a lot of misidentified specimens occur in herbaria.

Cladopodiella francisci (Hook.) Joerg.

M; T (T in herb. AZU) - Mad. - EUR, AS 12, AM 1.

Hygrobiella laxifolia (Hook.) Spruce

T; P; F (new; leg. R. S., 1998 and 2000) - EUR, AS 2, AM 1.

Nowellia curvifolia (Dicks.) Mitt.

See CASAS *et al.* (1985).

M; T; J; P; F; L (L leg. R. S., 1999) - Mad. - EUR, AS 12345, AM 124.

Odontoschisma denudatum (Mart.) Dumort.

M; T; J; P; L - Mad. - EUR, AS 123, AM 1235.

Odontoschisma prostratum (Sw.) Trevis

This species also occurs in C AM. Azorean specimens formerly identified as *O. sphagni* should be treated as *O. prostratum*. However, the taxonomic status of this taxon needs further investigation (pers. comm. SCHUMACKER).

S; M; T; J; P; F; L; C (S 96, C 93) - Mad. - C AM and S AM.

Cephaloziellaceae

Cephaloziella baumgartneri Schiffn.

T; F (T see CRUNDWELL *et al.*, 1994) - Mad. Can. - EUR, AS 5, AFR 1.

Cephaloziella calyculata (Durieu et Mont.) Müll. Frib.

S (new; S see CRUNDWELL *et al.*, 1994) - Can. - EUR, AFR 1.

Cephaloziella divaricata (Sm.) Schiffn.

S; M; T; G; L (T 97, G 90) - Mad. Can. - EUR, AS 15, AFR 1, AM 14, AU 2.

Cephaloziella hampeana (Nees) Schiffn.

T; J (new; T see CRUNDWELL *et al.*, 1994; J *leg. R. S.*, 1999) - Mad. Can. - EUR, AS 25, AM 12.

Cephaloziella rubella (Nees) Warnst.

See SÉRGIO *et al.* (1994c).

T (new; T *leg. R. S.*, 1997) - Mad. Can. - EUR, AS 12, AM 1.

Cephaloziella turneri (Hook.) Müll. Frib.

S; M - Mad. Can. - EUR, AS 5, AFR 1, AM 1.

Lophoziaceae

Anastrophyllum minutum (Schreb.) R. M. Schust.

(= *Sphaenolobus minutus* (Schreb.) Berggr.)

Confusion with xeroforms of *Marsupella* spp. is possible.

S; M; T; J; P; F; L; C (S 96, F 95, L 95, C 93) - EUR, AS 12, AFR 24, AM 124, AU 2.

Barbilophozia attenuata (Mart.) Loeske

(= *B. gracilis* (Schleich. ex Meyl.) Müll. Frib.)

S; M; T; J; P; F (S 96) - EUR, AS 25, AM 1.

Gymnocolea inflata (Huds.) Dumort.

M; T; (T *leg. R. S.*, recently) - Can. - EUR, AS 125, AFR 1, AM 1.

(*Lophozia bicrenata* (Schmidel ex Hoffm.) Dumort.)

(= *Isopaches bicrenatus* (Schmidel ex Hoffm.) H. Buch)

S; J (questionable presence in the Azores) - Mad. Can. - EUR, AS 15, AFR 1, AM 1.

Lophozia incisa (Schrad.) Dumort. subsp. *incisa*

M; T; P; F; L; C (TP see CRUNDWELL *et al.*, 1994; C *leg. R. S.*, 1999) - EUR, AS 1235, AFR 2, AM 124.

Lophozia longiflora (Nees) Schiffn.
 (= *L. guttulata* (Lindb. et Arnell) Grolle)
 P; L (P leg. SCHWAB, 1981 det. VÁNA; L leg. R. S.) - EUR, AM 12, AS.

Lophozia ventricosa (Dicks.) Dumort.
 T; J; P; F; L - EUR, AS 15, AM 1.

Jungermanniaceae

Jamesoniella rubricaulis (Nees) Grolle
 One of the most remarkable species in the Azorean bryoflora. Since the 1960s not found by the author on any other island than Pico (until now three localities). In 1999 also recorded by R. S. on M (one small population in one locality).
 M; P - AM 23456.

Jungermannia atrovirens Dumort.
 (= *Solenostoma atrovirens* (Dumort.) Müll. Frib. non Steph.)
 M; T; J; P; F; L; C (C 93, PT leg. R. S. 1997, on J in 1999) - Mad. Can. - EUR, AS 125, AFR 1, AM 1.

Jungermannia callithrix Lindenb. et Gottsche
 Azorean specimens formerly treated as *J. hyalina* shall be treated as *J. callithrix* (pers. comm. SCHUMACKER and VÁNA in 1998).
 S; M; T; J; P; F; L; C (S 96, LC leg. R. S., 1999) - Mad.? Can.? - AM 2 (also in S AM).

Jungermannia gracillima Sm.
 (= *Solenostoma crenulata* (Sm.) Mitt.)
 S; M; T; J; P; F; L; C (T 96, S see CRUNDWELL *et al.*, 1994, P leg. R. S., 1997 and C in 1999) - Mad. Can. - EUR, AS 135, AFR 1, AM 13.

Jungermannia pumila With.
 (= *Solenostoma pumilum* (With.) Müll. Frib.)
 S; M; T (ST see CRUNDWELL *et al.*, 1994) - Mad. Can. - EUR, AS 12, AFR 2, AM 1.

Nardia geoscyphus (De Not.) Lindb.
 M; T; P; F; L; C (F 95, L 95, C 93; T see CRUNDWELL *et al.*, 1994); P leg. R. S., 1997) - Mad. - EUR, AS 12, AM 1.

Nardia scalaris S. Gray
 S; M; T; G; J; P; F; L; C (S 96, G 90, C 93) - Mad. Can. - EUR, AS 12, AM 1.

Gymnomitriaceae

Marsupella adusta (Nees emend. Limpr.) Spruce

M; P (the sample from the summit of Pico Mt. collected by H. PERSSON has been recently confirmed by SCHUMACKER and VÁNA) - Mad. (cf. SÉRGIO *et al.*, 1992) - EUR, AS 2.

Marsupella emarginata (Ehrh.) Dumort.

(incl. var. *aquatica* Lindenb.) Highly variable species.

S; M; T; J; P; F; L; C (S 96, C 93) - Mad. Can. - EUR, AS 125, AFR 2, AM 1.

Marsupella funckii (F. Weber et D. Mohr) Dumort.

M; T; P; F; L; C (T 97; T see BATES & GABRIEL, 1997; PF *leg.* R. S. *teste* VÁNA; C *leg.* R. S., 1999) - Mad. Can. - EUR, AS 15, AM 1.

Marsupella profunda Lindb.

S (new; S see CRUNDWELL *et al.*, 1994). See also PATON (1990). - Mad. Can. - EUR: Br, Lu.

Marsupella sparsifolia (Lindb.) Dumort.

T; J; P (P *leg.* R. S., 1997 *teste* VÁNA; J *leg.* H. SÉRGIO det. R. S.) - EUR, AFR 24, AS, AM 1, AU 2.

Marsupella sphacelata (Gieseke *ex* Lindenb.) Dumort.

Confusions with *M. emarginata* are numerous in herbaria.

J; L (recorded by PALHINHA and SOBRINHA, *teste* R. S. and VÁNA; L *leg.* R. S., 1999) - EUR, AS 2, AM 1.

Scapaniaceae

Diplophyllum albicans (L.) Dumort.

S; M; T; J; P; F; L; C (C 93) - Mad. Can. - EUR, AS 125, AFR 1, AM 1, OC.

Scapania compacta (A. Roth) Dumort.

S; T; J; F (T *leg.* R. G. *teste* R. S.) - Mad. Can. - EUR, AFR 1.

Scapania curta (Mart.) Dumort.

Confusion with small young specimens of *S. gracilis* var. *integrifolia* is possible. Revision of Azorean samples needed.

J; P; F; L; C (C 93) - Mad. Can. - EUR, AS 125, AFR 1, AM 1.

Scapania gracilis Lindb.(incl. var. *integrifolia* Lindb. and *jonesii* (Schiffn.) Müll. Frib.)Small specimens of *S. gracilis* may have been treated as *S. umbrosa* by ADE & KOPPE (1942), pers. comm. SCHUMACKER.

M; T; J; P; F; L; C (C 93) - Mad. Can. - EUR, AFR 1, AM 3.

Scapania nemorea (L.) Grolle(= *S. nemorosa* (L.) Dumort.)

M; T; J; P; L (P 95, L 95, T leg. R. S., 1998) - Mad. Can. - EUR, AS 15, AM 1.

Scapania scandica (H. Arnell et H. Buch) MacVicar

See ALLORGE, V. & P. (1946) and ALLORGE, P. & V. (1950).

P - EUR, AS 13, AM 1.

Scapania undulata (L.) Dumort.(incl. var. *dentata* (Dumort.) Müll. Frib.)

S; M; T; J; P; F; L; C (S 96, C 93) - Mad. Can. - EUR, AS 125, AFR 1, AM 12.

Geocalycaceae*Chiloscyphus polyanthos* (L.) Corda(incl. var. *pallescens* (Ehrh. ex Hoffm.) Hartm.)

S; M; T; J; P; F; C (S 96, C 93) - Mad. - EUR, AS 1235, AFR 1, AM 1.

Geocalyx graveolens (Schrad.) Nees

S; T; J; P; F; L (S leg. R. S., recently) - Mad. - EUR, AS 1, AM 1.

Heteroscyphus denticulatus (Mitt.) Schiffn.(= *Chiloscyphus denticulatus* Mitt.)M; T; G; J; P; F; C (G 90, C 93, T in herb. AZU) - Mad. Can. - *Species endemic to Macaronesia.**Leptoscyphus azoricus* (H. Buch et Perss.) GrolleThe two *Leptoscyphus* species are remarkable members of the Azorean bryoflora, both fairly rare in the archipelago. A revision of the taxonomic status of *L. azoricus*, with close affinity to *L. porphyrius* (Nees) Grolle = *L. liebmannianus* (Lindenb. et Gottsche) Mitt. of C and S AM (see GROLLE, 1962) may eventually become carried out provided specimens with perianths get available (pers. comm. SCHUMACKER). The status of *L. azoricus* as endemic to the Azores has been provisionally withdrawn (see APPENDIX 3).

M; T; J; P; L (L leg. R. S., 1999).

Leptoscyphus cuneifolius (Hook.) Mitt.

(= *Mylia cuneifolia* (Hook.) Mitt.)

T; J; P (T leg. R. G., T leg. R. S., 1997) - Mad. - EUR: Br, Hb, No, AFR 4, AM 13456.

Lophocolea bidentata (L.) Dumort.

(= *Chiloscyphus coadunatus* (Sw.) Engel et R. M. Schust.; = *L. cuspidata* (Nees) Limpr.; = *L. latifolia* Nees)

S; M; G; J; P; F; L; C (S 96, P 95, F 95, G 90, C 93) - Mad. Can. - EUR, AS 1235, AFR 1, AM 14.

Lophocolea fragrans (Moris et De Not.) GOTTSCHÉ *et al.*

(= *Chiloscyphus fragrans* (Moris et De Not.) Engel et R. M. Schust.)

S; M; T; G; J; P; F; L (S 96, G 90) - Mad. Can. - EUR: Be, Br, Co, Ga, Hb, Hs, It, Lu, No, AFR 123, AS 2.

Lophocolea heterophylla (Schrad.) Dumort.

(= *Chiloscyphus profundus* (Nees) Engel et R. M. Schust.)

S; M; T; G; J; P; F; L (S 96, G 90, J leg. R.S. 1999) - Mad. Can. - EUR, AS 1235, AFR 1, AM 13.

Saccogyna viticulosa (L.) Dumort.

Euoceanic / submediterranean species in Europe.

S; M; T; G; J; P; F; L; C (G 90, C 93) - Mad. Can. - EUR.

Plagiochilaceae

Plagiochila allorgei Herzog et Perss.

See HERZOG (1945). Very rare and scattered, small populations. According to GROLLE & LONG (2000) = *P. longispina* Lindenb. et Gottsche, a species of C AM. The former endemic status to the Azores has consequently become withdrawn (see APPENDIX 3).

S; M; T; J; P; F; L; C (S 96, P 95, T in herb. AZU).

Plagiochila bifaria (Sw.) Lindenb.

See HEINRICHS *et al.* (1998). Azorean samples of *P. spinulosa* and *P. killarniensis* in herbaria are most probably *P. bifaria*.

S; M; T; G; J; P; F; L; C (S 96, G 90, C 93) - Mad. Can. - EUR, Neotropics.

Plagiochila exigua (Taylor) Taylor

(= *P. corniculata* (Dumort.) Dumort.; = *P. tridenticulata* (Hook.) Dumort.)

Euoceanic species in Europe.

S; M; T; G; J; P; F; L; C (G 90, C 93; S leg. R. S., recently) - Mad. Can. - EUR: Br, Fa, Ga, Hb, He, Hs, It, No, AS 23, AFR 234, AM 123 + S AM.

Plagiochila punctata (Taylor) Taylor

S; P (P leg. SJÖGREN, 1975; *teste* GROLLE and PATON; confirm. SCHUMACKER; S leg. R. S., recently) - EUR.

Azorean distrib. still uncertain due to difficulties to identify and to separate from small specimens of *P. bifaria*. Consequently the presence of *P. punctata* on Mad. and in the Can. also has to become confirmed.

Plagiochila retrorsa Gottsche

(= *P. sharpii* H. L. Blomquist)

P. retrorsa, a species new to Europe, was first recorded on the Azorean island of Terceira (BATES & GABRIEL, 1997) then also on Madeira (see RYCROFT *et al.*, 2001). *P. retrorsa* is conspecific with *P. sharpii* also present in AM 1 (SCHUSTER, 1980) and with *P. tricarinata* Carl and *P. permista* Spruce var. *subintegerrima* Herzog of AM 2 (Mexico, Costa Rica) (see RYCROFT *et al.*, in press).

T (new; species new to Macaronesia and Europe) - Mad. - AM 12.

Plagiochila solmsii Steph.

Species new to Europe; leg. E. DIAS in phytosociological sample on the Azorean island of Pico; found by SJÖGREN in 1999 during work within LIFE-project in AZU (*det.* HEINRICHS). - *P. solmsii*, a species of S AM (Bolivia), and *P. retrorsa* may be looked upon as two of the most remarkable recent bryophyte findings in the Azores. These two species strengthen the phytogeographical affinity of the Azorean bryoflora to the Neotropical one.

P - AM 4.

Arnelliaceae*Gongylanthus ericetorum* (Raddi) Nees

S; M; T; J; P; F; L (P leg. R. S., 1997, on J in 1999) - Mad. Can. - EUR, AS 5, AFR 1234.

Acrobolbaceae*Acrobolbus wilsonii* Nees

Euoceanic species in Europe. In the Azores very rare, scattered and with small populations.

M; J; P (J 95) - Mad. - EUR: Br, Fa, Hb.

Tylimanthus azoricus Grolle et Perss.

Scattered and easily overlooked. *T. madeirensis* is endemic to Madeira.

M; T; J; P; F; L - *Species endemic to the Azores.*

Radulaceae

Radula aquilegia (Hook. f. et Taylor) Gottsche *et al.*

Euoeceanic species in Europe.

M; T; J; P; F; L; C (C 93) - Mad. Can. - EUR: Br, Fa, Hb, Hs, No, AS 23.

Radula carringtonii J. B. Jack

Euoeceanic species in Europe.

S; M; T; G; J; P; F; L; C (G 90, C 93) - Mad. Can. - EUR: Br, Hb, AM 2.

Radula holtii Spruce

Fertile specimens are easily determined (*cf.* BOUMAN & DIRKSE 1990).

M; T; J; P; F; L; C (F 95; C *leg.* SJÖGREN, 1978) - Mad. Can. - EUR: Hb, Hs, Lu.

Radula lindenbergiana Gottsche *ex* C. Hartman

Several Azorean specimens in herbaria are probably misidentified as *R. complanata*, a species most probably not present in the Azores (see APPENDIX 1).

S; M; T; G; J; P; F; L (G 90) - Mad. Can. - EUR, AS 235, AFR 1234, AM 1.

Radula nudicaulis Steph.

Euoeceanic / tropical species; a remarkable member of the Azorean bryoflora, considering its world distrib. Few localities and small populations.

M; T; P; F (T in herb. AZU) - Mad. - AM 45.

Radula wichurae Steph.

(= *R. limbata* Schiffn.)

Specimens in herbaria misidentified as *R. complanata* or *R. lindenbergiana* occur.

S; M; T; G; J; P; F; L; C (F 95, C 93) - Mad. Can. - *Species endemic to Macaronesia.*

Porellaceae

Porella canariensis (F. Weber) Underw.

S; M; T; G; J; P; F; L; C (G 90, C 93) - Mad. Can. - EUR: Hs, Lu, Sa. The taxonomic status of this species may eventually become revised.

Porella obtusata (Taylor) Trevis.

Azorean specimens of *Porella* spp. should become carefully revised.

M; T; G; J; P; L; C (G 90, C 93, PT *leg.* R. S., 1997 and ML in 1999) - Mad. Can. - EUR, AS 3, AFR 1.

Frullaniaceae

Frullania azorica Sim-Sim *et al.*

See BISANG *et al.* (1989), CASAS *et al.* (1996), KRAUT *et al.* (1993), SIM-SIM *et al.* (1995). Former records of *F. dilatata* in the Azores are probably *F. azorica*.
S; M; T; G; J; P; F; L; C (S 96, L 95, G 90, C 93; PFTJ leg. R.S.) - Mad. Can. - EUR: Lu.

Frullania microphylla (Gottsche) Pearson
(incl. var. *deciduiifolia* Grolle)

S; M; T; G; J; P; F; L; C (G 90, C 93) - Mad. Can. - EUR: Br, Fa, Ga, Ge, Hb, Hs, Lu.

Frullania tamarisci (L.) Dumort var. *tamarisci*

For taxonomy see *e.g.* HATTORI (1972).

S; M; T; G; J; P; F; L; C (G 90) - Mad. Can. - EUR, AS 125, AFR 1, AM 1 (*sensu lato*).

Frullania teneriffae (F. Weber) Nees

S; M; T; G; J; P; F; L; C (C 93, S leg. P. ALLORGE, *det.* R. S.) - Mad. Can. - EUR: Br, Fa, Ga, Hb, Hs, Lu, AFR 1.

Jubulaceae

Jubula hutchinsiae Hook. Dumort. subsp. *hutchinsiae*

(incl. var. *integrifolia* Lindb. p.p.)

M; T; J; P; F; L; C (C 93) - Mad. Can. - EUR: Br, Fa, Ga, Hb, Hs, AFR 2. Another subsp. in AS and AM (*cf.* PATON, 1999).

Lejeuneaceae

Acanthocoleus aberrans (Lindenb. et Gottsche) Kruijt

(formerly as *Dicranolejeunea johnsoniana* (Mitt.) Grolle or *Marchesinia johnsoniana* (Mitt.) Herzog)

See GROLLE (1966), JONES (1970) and KRUIJT (1988). Species formerly treated as endemic to Macaronesia.

J; P (P 95) - Mad. Can. - AFR 23, AM 2345.

Aphanolejeunea azorica (V. Allorge et Ast) Pócs et Bernecker (Fig. 1)

(= *Cololejeunea azorica* V. Allorge et Ast)

See ALLORGE & JOVET-AST (1955), SJÖGREN, 1975, 1997b). According to PÓCS and BERNECKER (pers. comm. 1999) *A. azorica* should no longer be treated as endemic to Macaronesia.

S; M; T; G; J; P; F; L; C (S 96, G 90, C 93, T in herb. AZU) - Mad. - S and C AM.

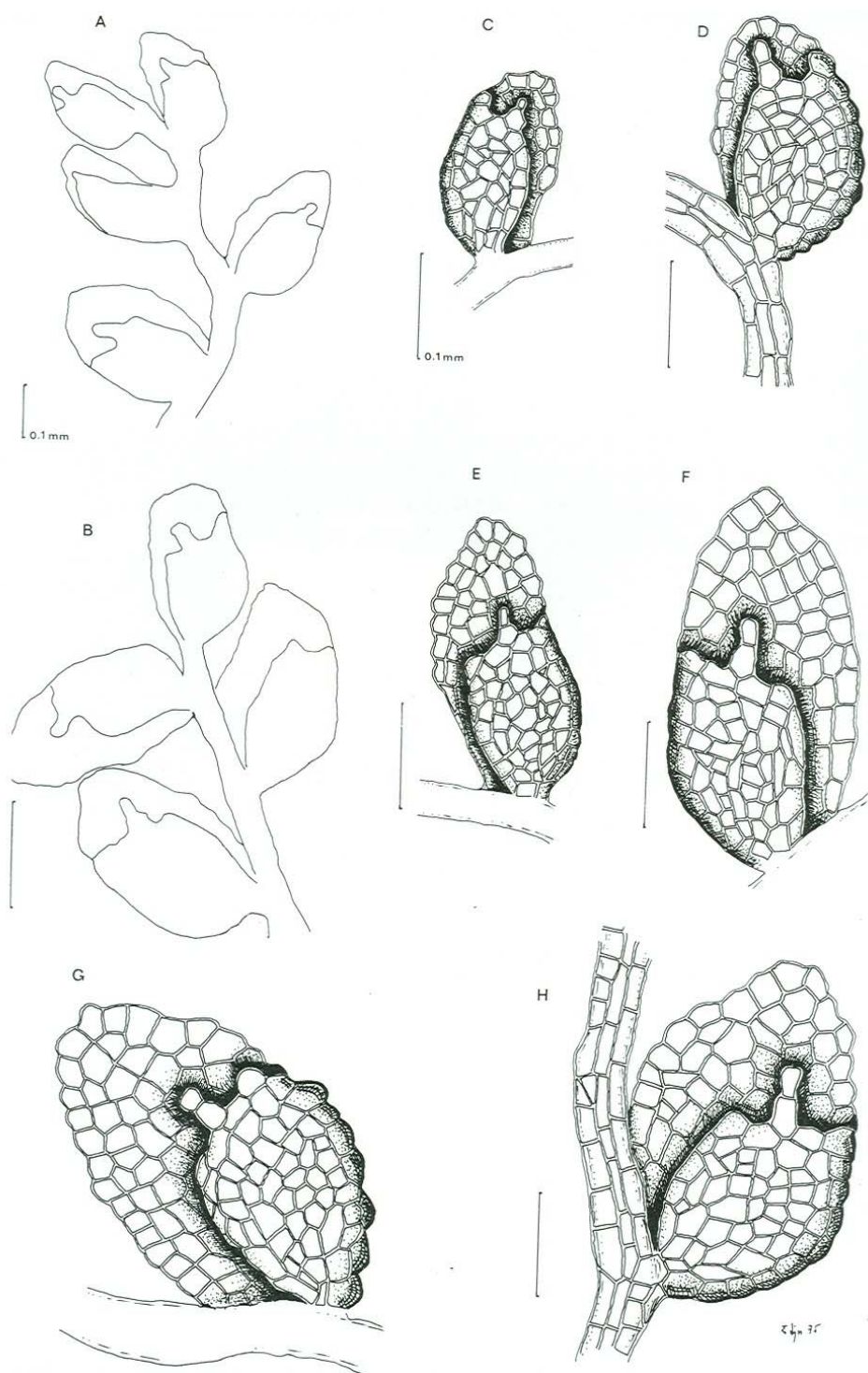


Fig. 1 - *Aphanolejeunea azorica*: (A, B) Apex of two fairly mature shoots; (C, D) Juvenile shoots with postical lobes only slightly shorter than antical lobes; (E, F) Almost mature leaves with unusually narrow and pointed antical lobes; (G, H) Mature leaves with normal size and shape of the lobes. (after Sjögren, 1975).

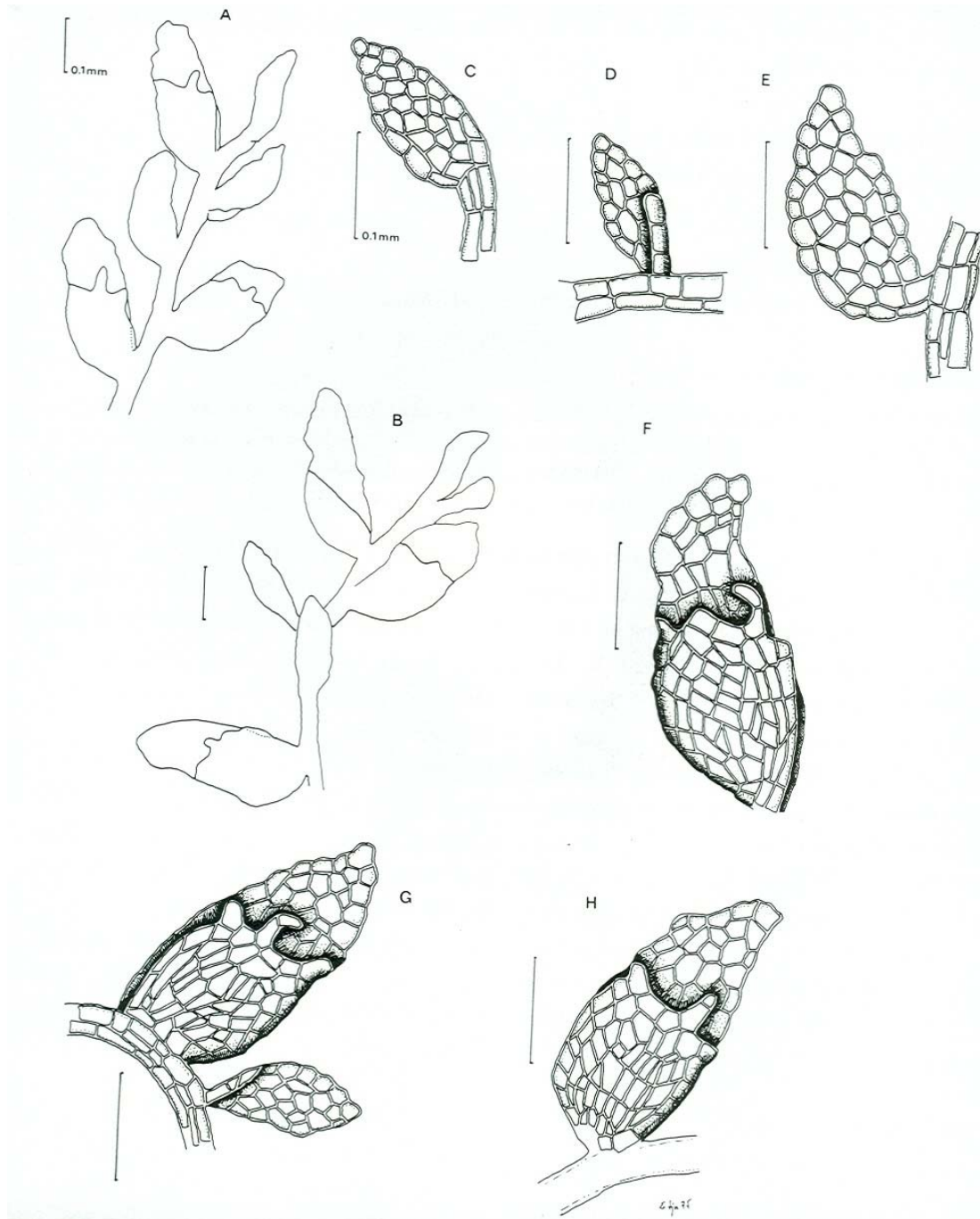


Fig. 2 - *Aphanolejeunea madeirensis*: (A) Apex of mature shoot; (B) Apex of juvenile shoot; (C, D, E) Juvenile leaves; (F) Mature somewhat abnormal leaf; (G) Normal leaf with small rudimentarily developed leaf beside. The normal leaf with characteristically pointed antical lobe, with typical 2-celled slightly curved tooth about midway between the free angle and the keel; (H) Mature leaf; (A-H) Postal view of shoots and leaves. (after Sjögren, 1975).

Aphanolejeunea madeirensis (Schiffn.) Grolle (Fig. 2)

(= *Cololejeunea madeirensis* Schiffn.)

T; J; P; F - Mad. - *Species endemic to Macaronesia.*

Aphanolejeunea microscopica (Taylor) A. Evans

(= *Cololejeunea microscopica* (Taylor) Schiffn. = *Aphanolejeunea exigua* A. Evans)

Synonymy with *A. exigua* according to PÓCS & LÜCKING (1997).

S; M; T; J; P; F; L (S 96) - Mad. Can. - EUR: Be, Br, Ga, Ga, Hb, Hs, AS 4 (+ AFR and C AM, S AM. op. cit.)

Aphanolejeunea sintenisii (Steph.) Steph.

(formerly as *Aphanolejeunea teotonii* Jovet-Ast et V. Allorge)

New synonymy is being prepared by PÓCS & BERNECKER.

S; M; T; G; J; P; F; L; C (S 96, G 90, C 93) - Mad. Can. - AM. *A. teotonii* was formerly treated as endemic to Macaronesia (see ALLORGE & JOVET-AST, 1950).

Cheilolejeunea cedercreutzii (H. Buch et Perss.) Grolle

(= *Euosmolejeunea cedercreutzii* H. Buch et Perss.)

Rare species, easily overlooked when growing among other species of the Lejeuneaceae.

M; T; P; F - *Species endemic to the Azores.*

Cololejeunea minutissima (Sm.) Schiffn. (Fig. 3)

See CASAS *et al.* (1985).

S; M; T; G; J; P; F; L; C (S 96, G 90, C 93) - Mad. Can. - EUR: Be, Br, Ga, Gr, Hb, Ho, Hs, It, Ju, Lu, AS 23, AFR 1234, AM 13, AU 1.

Colura calyptrifolia (Hook.) Dumort. (Fig. 4)

Euoceanic species in Europe. See SCHWAB *et al.* (1986).

S; M; T; J; P; F; L; C (C 93; S leg. R. S., recently) - Mad. Can. - EUR: Br, Ga, Hb, Hs, AFR 234, AM 3456.

Drepanolejeunea hamatifolia (Hook.) Schiffn. (Fig. 5)

Euoceanic species in Europe.

M; T; G; J; P; F; L; C (G 90, C 93) - Mad. Can. - EUR: Br, Ga, Hb, Hs, Lu, AFR 24 (+ AM 235?).

Harpalejeunea molleri (Steph.) Grolle

(= *Harpalejeunea ovata* auct., non (Hook.) Schiffn.)

See CASAS *et al.* (1992).

S; M; T; G; J; P; F; L; C (G 90, C 93) - Mad. Can. - EUR: Br, Co, Fa, Ga, Hb, He, Hs, It, Lu, No.

Lejeunea eckloniana Lindenb.

(= *L. holtii* Spruce)

Remarks on taxonomy by DIRKSE *et al.* (1993) and PATON (1999).

S; M; T; G; J; P; F; L; C - Mad. Can. - EUR: Br, Hb, AFR 234.

Lejeunea flava (Sw.) Nees subsp. *moorei* (Lindb.) R. M. Schust.

S; M; T; J; P; F; L; C (S 96, C 93) - Mad. Can. - EUR: Hb, AFR, AM 12345, AS, AU 12
(*sensu lato*).

Lejeunea hibernica Bischl. *et al. ex* Grolle

(= *Microlejeunea diversiloba* (Spruce) K. Müll.)

M; T; P; L - Mad. Can. - EUR: Hb.

Lejeunea lamacerina (Steph.) Schiffn. (Fig. 6)

(= *L. azorica* Steph.)

Habitus very much variable according to habitat.

S; M; T; G; J; P; F; L; C (S 96, G 90, C 93) - Mad. Can. - EUR: Be, Br, Fa, Ga, Hb,
He, Hs, It, Lu, AS 5, AFR 2 (+ AM 1, other subsp.).

Lejeunea patens Lindb.

Frequently confused with *L. lamacerina*; revision of distrib. needed.

S; M; T; J; P; F; L; C (S 96, C 93) - Mad. - W EUR, AS 5, AM 1.

Lejeunea ulicina (Taylor) Gottsche *et al.*

(= *Microlejeunea ulicina* (Taylor) A. Evans subsp. *ulicina*)

M; T; G; J; P; L (G 90) - Mad. Can. - EUR, AS 235, AFR 24.

Marchesinia mackaii (Hook.) S. Gray

See CASAS *et al.* (1989).

S; M; T; G; J; P; F; L; C (G 90, C 93) - Mad. Can. - EUR: Br, Ga, Hb, Hs, It, Ju, Lu,
AFR 2.

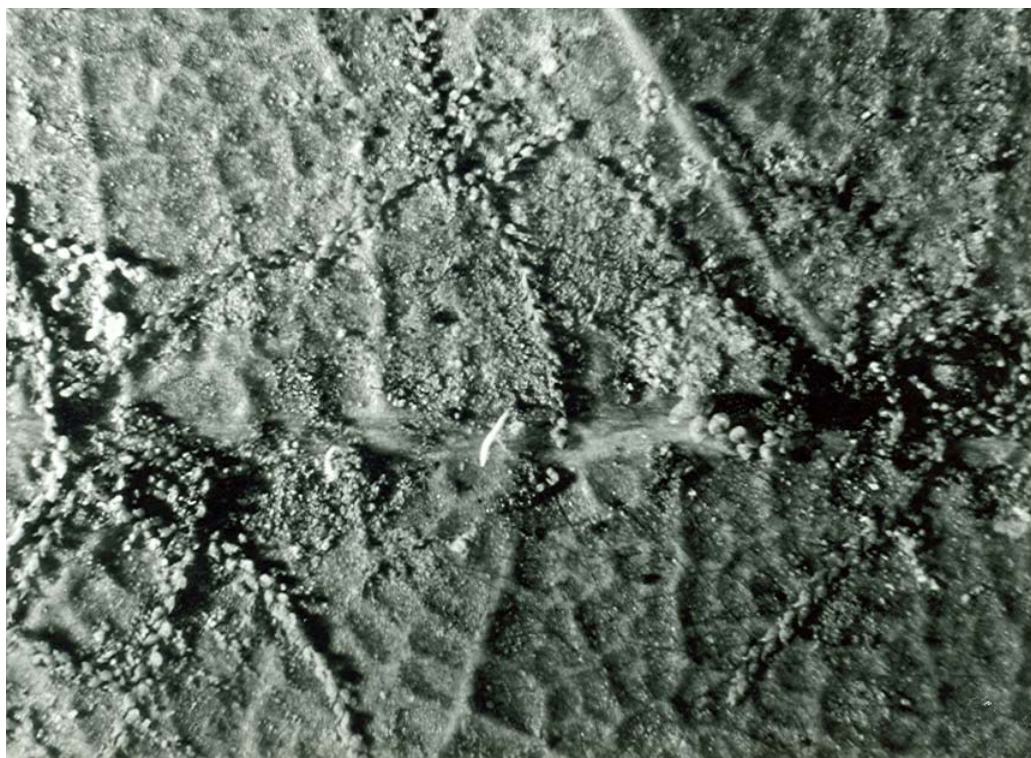


Fig. 3 - *Cololejeunea minutissima* and *Drepanolejeunea hamatifolia* on leaf of *Laurus azorica*.



Fig. 4 - *Colura calyptrifolia* on *Blechnum spicant*.



Fig. 5 - *Drepanolejeunea hamatifolia* on *Elaphoglossum semicylindricum*, between fimbriate scales.



Fig. 6 - *Lejeunea lamacerina* on frond of *Trichomanes speciosum*.

REFERENCES

ADE, A. & KOPPE, F.:

1942. Beitrag zur Kenntnis der Moosflora der atlantischen Inseln und der pyrenaischen Halbinsel. *Hedwigia*, **81**: 1-36.

ALLORGE, P. & ALLORGE, V.:

1950. Hépatiques récoltées par P. et V. Allorge aux îles Açores en 1937. *Rev. Bryol. Lichénol.*, **19**: 90-118.
1952. Mousses récoltées par P. et V. Allorge aux îles Açores en 1937. *Rev. Bryol. Lichénol.*, **21**: 50-95.

ALLORGE, V.:

1951. *Trematodon perssonorum* Allorge et Thériot sp. nov. des Açores. *Rev. Bryol. Lichénol.*, **20**: 170.

ALLORGE, V. & ALLORGE, P.:

1946. Les étages de végétation muscinale aux îles Açores et leurs éléments. *Mem. Soc. Biogéogr.*, **8**: 369-386.
1948. Végétation bryologique de l'île de Flores (Açores). *Rev. Bryol. Lichenol.*, **17**: 126-164.

ALLORGE, V. & JOVET-AST, S.:

1950. *Aphanolejeunea teotonii* nov. sp., hépatique des Açores. *Rev. Bryol. Lichénol.*, **19**: 19-24.
1955. *Cololejeunea azorica* V. All. et Jovet-Ast, Lejeunéacée nouvelle de l'île San Miguel. *Mitteil. Thüring. Bot. Ges.*, **1**: 17-22.

ANDO, H.:

1972. Studies on the genus *Hypnum* Hedw. (I). *J. Sci. Hiroshima Univ.*, Ser. B, Div. 2, **14**: 53-73.
1987. Studies on the genus *Hypnum* Hedw. (V). *Hikobia*, **10**: 43-54.

ANDERSON, L. E., CRUM, H. A. & BUCK, W. R.:

1990. List of the mosses of North America north of Mexico. *Bryologist*, **93**: 448-449.

ARTS, T.:

1989. *Leptobarbula berica* (De Not.) Schimp. (Pottiaceae) in Belgie en aangrenzende gebieden. *Dumortiera*, **45**: 5-9.

ARTS, T. & FRAHM, J.-P.:

1990. *Campylopus pyriformis* new to North America. *Bryologist*, **93**: 290.

ARTS, T. & NORDHORN-RICHTER, G.:

1986. *Epipterygium tozeri* in Europe, its distribution and vegetative propagation. *J. Bryol.*, **14**: 91-97.

ARTS, T. & SOLLMAN, P.:

1991. Remarks on *Phascum leptophyllum* C. Müll., an earlier name for *Tortula rhizophylla* (Sak.) Iwats. & K. Saito. *Lindbergia*, **17**: 20-27.

BATES, J. W. & GABRIEL, R.:

1997. *Sphagnum cuspidatum* and *S. imbricatum* ssp. *affine* new to Macaronesia, and other new island records for Terceira, Azores. *J. Bryol.*, **19**: 645-648.

BISANG, I., SCHUMACKER, R., SÉRGIO, C. & GROLLE, R.:

1989. Clé d'identification des espèces du genre *Frullania* Raddi (Hepaticae) en Europe et en Macaronésie. *Giorn. Bot. ital.*, **122**: 255-266.

BISCHLER, H.:

1970. Les espèces du genre *Calypogeia* sur le continent africain et les îles africaines. *Rev. Bryol. Lichénol.*, **37**: 63-134.

BLOM, H. H.:

1996. A revision of the *Schistidium apocarpum* complex in Norway and Sweden. *Bryophytorum Bibliotheca*, **49**: 1-133.

BOUMAN, A. C. & DIRKSE, G. M.:

1990. The genus *Radula* in Macaronesia. *Lindbergia*, **16**: 119-127.

BREMER, B.:

1981. A taxonomic revision of *Schistidium* (Grimmiaceae, Bryophyta) 3. *Lindbergia*, **7**: 73-90.

BRUGGEMAN-NANNENGA, M. A.:

1982. The section *Pachylomidium* (genus *Fissidens*). III. The *F. crassipes*-subcomplex (*F. bryoides* complex), *F. sublinaefolius* (P. Varde) Brugg.-Nann. and *F. fluitans* (P. Varde) Brugg.-Nann. *Proc. Koninkl. Nederl. Akad. Wetensch., Ser. C.*, **85**: 59-104.
1985. The section *Pachylomidium* (genus *Fissidens*). IV. Further species from Europe, the Mediterranean and the Atlantic African islands. *Proc. Koninkl. Nederl. Akad. Wetensch., Ser. C.*, **88**: 183-207.

BRUGGEMAN-NANNENGA, M. A. & PURSELL, R. A.:

1995. Notes on *Fissidens*. V. *Lindbergia*, **20**: 49-55.

BUCH, H. & PERSSON, H.:

1941. Bryophyten von den Azoren und Madeira. *Commentat. Biol.*, **8** (7): 1-15.

CARDOT, J.:

1897. The mosses of the Azores. *Ann. Rep. Missouri Bot. Garden*, **8**: 51-72.

CASAS, C.:

1991. New checklist of Spanish mosses. *Orsis*, **6**: 3-26.

CASAS, C., BRUGUÉS, M., CROS, R. M. & SÉRGIO, C.:

1985. *Cartografia de Briòfits. Péninsula Ibèrica i les Illes Balears, Canàries, Açores i Madeira*. Part I. Institut d'Estudis Catalans. Barcelona.
1989. *Idem*. Part II.
1992. *Idem*. Part III.
1996. *Idem*. Part IV.

CHURCHILL, S. P.:

1989. Transfer of *Lepidopilum virens* Cardot to *Tetrastichium* (Leucomiaceae). *J. Bryol.*, **15**: 537-541.

CORLEY, M. F. V.:

1976. The taxonomy of *Campylopus pyriformis* (Schultz) Brid. and related species. *J. Bryol.*, **9**: 193-212.
1980. The *Fissidens viridulus* complex in the British Isles and Europe. *J. Bryol.*, **11**: 191-208.

CORLEY, M. F. V., CRUNDWELL, A. C., DÜLL, R., HILL, M. O. & SMITH, A. J. E.:

1981. Mosses of Europe and the Azores; an annotated list of species, with synonyms from the recent literature. *J. Bryol.*, **11**: 609-689.

CORLEY, M. F. V. & CRUNDWELL, A. C.:

1991. Additions and amendments to the mosses of Europe and the Azores. *J. Bryol.*, **16**: 337-356.

CRUM, H. & ANDERSON, L. E.:

1981. *Mosses of eastern North America*. 1, 2. New York. 1328 pp.

CRUNDWELL, A. C.:

1972. *Leucobryum juniperoideum* (Brid.) C. Muell. in Britain. *J. Bryol.*, **7**: 1-5.

CRUNDWELL, A. C., GREVEN, H. C. & STERN, R. C.:

1994. Some additions to the bryophyte flora of the Azores. *J. Bryol.*, **18**: 329-337.

CRUNDWELL, A. C. & NYHOLM, E.:

1974. *Funaria muehlenbergii* and related European species. *Lindbergia*, **2**: 222-229.
1977. *Dicranella howei* Ren. et Card. and its relationship to *D. varia* (Hedw.) Schimp. *Lindbergia*, **4**: 35-38.

CUNHA, A. G. & BARROS, G.:

1942. Algumas espécies de Musgos de Terceira novas para os Açores ou para a ilha. *Bol. Soc. Port. Ciências Nat.*, **13** (suppl. II): 156-157.

DIAS, E.:

1996. *Vegetação natural dos Açores. Ecologia e sintaxonomia das florestas naturais*. Universidade dos Açores. Departamento de Ciências Agrárias. Angra do Heroísmo (unpublished thesis).

DIRKSE, G. M.:

1987. *Homalia subrecta* (Mitt.) Jaeg., a new synonym of *H. lusitanica* Schimp. *Lindbergia*, **13**: 63-66.
1989. The systematic position of *Lepidopilum virens* Card. (Musci). *Lindbergia*, **14**: 147-150.

DIRKSE, G. M., BOUMAN, A. C. & LOSADA-LIMA, A.:

1993. Bryophytes of the Canary Islands, an annotated checklist. *Cryptogamie, Bryol. Lichénol.*, **14**: 1-47.

DIRKSE, G. M., MELICK, H. van & TOUW, A.:

1989. Checklist of Dutch bryophytes. *Lindbergia*, **14**: 167-175.

DÜLL, R.:

1981. Zur Verbreitung und Ökologie von *Metzgeria fruticulosa* (Dicks.) Evans und *M. temperata* Kuwah. in Mitteleuropa. *Herzogia*, **5**: 535-546.
1983. Distribution of the European and Macaronesian Liverworts (Hepaticophytina). *Bryol. Beitr.*, **2**: 1-115.
1984-85. Distribution of the European and Macaronesian Mosses (Bryophytina). I and II. *Bryol. Beitr.*, **4/5**: 1-232.
1986. Revision of *Rhynchostegiella* and closely related taxa in Macaronesia with reference to their occurrence in Europe. *Bryol. Beitr.*, **6**: 91-105.
1992. Distribution of the European and Macaronesian Mosses (Bryophytina). Annotations and Progress. *Bryol. Beitr.*, **8/9**: 1-223.

DURING, H. J.:

1981. Bryophyte flora and vegetation of Lanzarote, Canary Islands. *Lindbergia*, **7**: 113-125.

EGGERS, J.:

1982. Artenliste der Moose Macaronesiens. *Cryptogamie, Bryol., Lichénol.*, **3**: 283-335.

FONTINHA, S. & SÉRGIO, C.:

1994. *Eucladium verticillatum* (Brid.) B. S. G. Novo musgo para a brioflora da Ilha Terceira (Açores). Notulae Bryoflorae Macaronesicae. III: 11. *Revista de Biologia*, **15**: 189.

FRAHM, J.-P.:

1976. *Philonotis hastata* (Dub.) Wijk et Marg. neu für Europa. *J. Bryol.*, **9**: 17-19.
1983. The taxonomic status of *Neckera besseri* (Lob.) Jur. and *Homalia webbiana* Mont. *J. Bryol.*, **12**: 337-341.
1985 a. Afrikanische *Campylopus* Arten (Dicranaceae, Musci). *Bryophytorum Bibliotheca*, **31**: 1-216.
1985 b. The world-wide range of *Campylopus shawii* Wils. *J. Bryol.*, **13**: 329-332.
1995. Correlations between the European, tropical African and tropical American moss floras. *Fragm. Flor. Geobot.*, **40** (1): 235-250.
1999. A survey of the *Campylopus* species from the Azores. *Cryptogamie, Bryol. Lichénol.*, **20**: 145-152.

FRAHM, J.-P. & ISOVIITA, P.:

1988. Type revision of European mosses. 2. *Atractylocarpus*, *Campylopus* and *Paraleucobryum*. *Lindbergia*, **14**: 89-96.

FREY, W., FRAHM, J.-P., FISCHER, E. & LOBIN, W.:

1995. *Kleine Kryptogamenflora. IV. Die Moos - und Farnpflanzen Europas*. Stuttgart. 426 pp.

FRISVOLL, A. A.:

1983. A taxonomic revision of the *Racomitrium canescens* group (Bryophyta, Grimmiiales). *Gunneria*, **41**: 1-181.

GABRIEL, R.:

1994. *Briófitos da Ilha Terceira (Açores). Ecologia, distribuição e vulnerabilidade de espécies seleccionadas*. Universidade dos Açores, Departamento de Ciências Agrárias. Angra do Heroísmo (unpublished thesis).

GAUTHIER, R. & BRUGUÉS, M.:

1997. Notes sur la présence de *Sphagnum affine* Ren. et Card., *Sphagnum centrale* G. Jens. et *Sphagnum papillosum* aux Açores. *Cryptogamie, Bryol. Lichénol.*, **18** (2): 121-125.

GEHEEB, A. & HERZOG, Th.:

1910. *Bryologia Atlantica*. Stuttgart. Pp. 71.

GIESE, M. & FRAHM, J.-P.:

1985. A revision of *Microcampylopus* (C. Müll.) Fleisch. *Lindbergia*, **11**: 125-133.

GROLLE, R.:

1962. Monographie der Lebermoosgattung *Leptoscyphus* Mitt. *Nova Acta Leopoldina*, NF, **25** (161): 1-143.
1966. *Dicranolejeunea* auf den atlantischen Inseln. *Trans. Brit. Bryol. Soc.*, **5**: 95-99.
1972 a. Zur Kenntnis von *Adelanthus* Mitt. *J. Hattori Bot. Lab.*, **35**: 325-370.
1972 b. *Bazzania* in Europa und Makaronesien. Zum Taxonomie und Verbreitung. *Lindbergia*, **1**: 193-204.
1983. Hepatics of Europe including the Azores; an annotated list of species, with synonyms from the recent literature. *J. Bryol.*, **12**: 403 -459.

GROLLE, R. & LONG, D. G.:

2000. An annotated checklist of the Hepaticae and Anthocerotae of Europe and Macaronesia. *J. Bryol.*, **22**: 103-140.

GROLLE, R. & PERSSON, H.:

1966. Die Gattung *Tylimanthus* auf den atlantischen Inseln. *Svensk Bot. Tidskr.*, **60**: 164-174.

HATTORI, S.:

1972. *Frullania tamarisci* complex and the species concept. *J. Hattori Bot. Lab.*, **35**: 202-251.

HEDENÄS, L.:

- 1992 a. Flora of Madeiran pleurocarpous mosses (Isobryales, Hypnobryales, Hookeriales). *Bryophytorum Bibliotheca*, **44**: 1 -165.
1992 b. Notes on the genus *Thamnobryum* in Macaronesia (excluding the Cape Verde Islands). *J. Bryol.*, **17**: 119-125.

HEINRICHS, J., GROLLE, R. & DREHWALD, U.:

1998. The conspecificity of *Plagiochila killarniensis* Pearson and *P. bifaria* (Sw.) Lindb. (Hepaticae). *J. Bryol.*, **20**: 495-497.

HEMERIK, L.:

1989. On the distinction between *Plagiothecium succulentum* (Wils.) Lindb. and *P. nemorale* (Mitt.) Jaeg.: a statistical analysis. *Lindbergia*, **15**: 2-7.

HERZOG, Th.:

1945. Eine neue *Plagiochila*-Art auf den Azoren. *Rev. Bryol. Lichénol.*, **14** (1944): 161-162.

HILL, M. O.:

1981. New combinations in European mosses. I. Pottiaceae. - *J. Bryol.* **11**: 599-602.

HODGETTS, N. G.:

1995. *Red Data Book of European Bryophytes. 3. Bryophyte Site Register for Europe including Macaronesia.* European Committee for Conservation of Bryophytes. Trondheim. Pp. 197-291.

HÜBSCHMANN, A. von:

1973. Bryosoziologische Studien auf der Azoreninsel São Miguel. *Rev. Fac. Ciências. Lisboa. Sér. 2 C.*, **17**: 627-702.

IWATSUKI, Z.:

1987. Notes on *Isopterygium* Mitt. (Plagiotheciaceae). *J. Hattori Bot. Lab.*, **63**: 445-451.

JONES, E. W.:

1970. African Hepatics. *Trans. Brit. Bryol. Soc.*, **6**: 72-81.

JOVET-AST, S.:

1986. Les *Riccia* de la région méditerranéenne. *Cryptogamie, Bryol. Lichénol.*, **7**: 287-431.

KRAUT, L., MÜES, R. & SIM-SIM, M.:

1993. Acylated flavone and glycerol glucosides from two *Frullania* species. *Phytochemistry*, **34**: 211-218.

KRUIJT, R. C.:

1988. A monograph of the genera *Dicranolejeunea* and *Acanthocoleus*. *Bryophytorum Bibliotheca*, **36**: 1-136.

LEWINSKY, J.:

1978. The genus *Orthotrichum* Hedw. (Musci) in Africa south of the Tropic of Cancer. *Bot. Tidskr.*, **72**: 61-86.

LUISIER, A.:

1927. Les mousses de L'Archipel de Madère et en général des Îles Atlantiques. *Brotéria*, Sér. Bot. **23** (1-3): 5-53; 129-145.
1930. *Idem.* *Brotéria*, Sér. Bot., **24** (1-3): 18-47; 66-96; 119-140.
1931. *Idem.* *Brotéria*, Sér. Bot., **25** (1-3): 5-20; 123-139.
1932. *Idem.* *Brotéria*, Sér. Ciências Nat., **1** (4): 164-182.
1938. *Idem.* *Brotéria*, Sér. Ciências Nat., **7** (2-3): 78-95; 110-131.

1942. *Idem. Brotéria*, Sér. Ciências Nat., **11** (1): 29-41.
1945. *Idem. Brotéria*, Sér. Ciências Nat., **14** (2-4): 78-94; 112-127; 156-176.
- MAY, R.:
1986. Notes on some Macaronesian *Tortella* species. *Bryol. Beitr.*, **6**: 58-66.
- MENDES, C.:
1998. *Contributo para a caracterização de turfeiras de Sphagnum spp. na ilha Terceira*. Universidade dos Açores. Departamento de Ciências Agrárias. Angra do Heroísmo (unpublished thesis).
- MITTEN, W.:
1865. Contributions to the cryptogamic flora of the Atlantic Islands. *J. Linn. Soc. Bot.*, **8**: 1-10.
- MÜLLER, F. & SCHÄFER-VERWIMP, A.:
1999. New bryophyte taxon records for tropical countries. III. *Tropical Bryology*, **6**: 195-201.
- NIEUWKOOP, J. & ARTS, T.:
1995. Additions to the bryophyte flora of Madeira. *Lindbergia*, **20**: 35-39.
- NORDHORN-RICHTER, G.:
1986. Die Gattung *Pohlia* in Makaronesien. *Bryol. Beitr.*, **6**: 85-90.
- PATON, J.A.:
1990. *Marsupella profunda* Lindb. in Cornwall, new to the British Isles. *J. Bryol.*, **16**: 1-4.
1999. *The liverwort flora of the British Isles*. Harley Books, Colchester. 626 pp.
- PERSSON, H.:
1939. Bryophytes from Madeira. *Bot. Not.*, **4**: 566-590.
1949. On the discovery of *Merceya ligulata* in the Azores with a discussion of the so-called "copper-mosses". *Rev. Bryol. Lichénol.*, **17**: 75-78.
1973. The Azorean bryophytes collected by P. Dansereau and A.R. Pinto da Silva in 1964. *Agron. Lusit.*, **35**: 5-19.
- PÓCS, T. & LÜCKING, A.:
1997. The genus *Aphanolejeunea* in the Guianas. *Hausknechtia*, **7**: 26-27.
- POTIER de la VARDE, R.:
1955. Nouveau *Fissidens* aux Açores. *Mitt. Thüring. Bot. Ges.*, **1**: 15-16.
- RAEYMACKERS, G.:
1983. *Philonotis rigida* Brid. in Europe. *Lindbergia*, **9**: 29-33

RED DATA BOOK OF EUROPEAN BRYOPHYTES:

1995. Edited by The European Committee for Conservation of Bryophytes. *Trondheim.*, pp. 1-291.

RUSSELL, J. L.:

1862. Some notes on the cryptogamic vegetation of Faial, Azores. *Proc. Essex Inst. Salem*, **2**: 134-137.

RYCROFT, D. S., HEINRICHS, J., COLE W. J. & ANTON, H.:

2001. A phytochemical and morphological study of the liverwort *Plagiochila retrorsa* Gottsche 1863 (= *P. sharpii* H. L. Blomq. 1940, *syn. nov.*), new to Europe. *J. Bryol.*, **23**: 23-34.

SCHUMACKER, R. & MARTINY, Ph.:

1995. *Red Data Book of European Bryophytes. 2. Threatened bryophytes in Europe including Macaronesia.* Edited by The European Committee for Conservation of Bryophytes. - Trondheim. pp. 31-193.

SCHWAB, G., SCHÄFER-VERWIMP, R., LUBENAU-NESTLE, R. & VERWIMP, I.:

1986. Beitrag zur Kenntnis der Moosflora der Kanareninsel La Gomera. *Bryol. Beitr.*, **6**: 1-31.

SÉRGIO, C.:

1976. Deux nouveautés pour la flore bryologique des Açores. *Kiaeria blyttii* (B.S.G.) Broth. et *Orthodicranum flagellare* (Hedw.) Loeske. *Bol. Soc. Brot.*, **50**: 99-105.
1978. *Lejeunea eckloniana* Lindenb. (hépatique) dans la Macaronésie. *Bol. Soc. Port. Ciencias Naturais*, **18**: 39-41.
1987. Contribuição para estudo taxonómico e fitogeográfico de *Anthoceros caucasicus* Steph. na Península Ibérica e Macaronésia. *Actas do VI. Simpósio Nacional de Botânica Criptógamica*, 605-614.
1989. *Sphaerocarpos texanus* Aust. nova hépatica para a flora da Macaronésia. *Notulae Bryoflorae Macaronesicae. II. Portug. Acta Biol.*, Sér. B, **15**: 419.
- 1994 a. Duas novas espécies de *Fossombronina* para a brioflora dos Açores. *Notulae Bryoflorae Macaronesicae. III: 5. Revista de Biologia*, **15**: 183.
- 1994 b. Notas sobre o género *Sphagnum* no arquipélago dos Açores. *Notulae Bryoflorae Macaronesicae. III: 8. Revista de Biologia*, **15**: 185.
1997. *Grimmia pulvinata* (Hedw.) Sm. um novo musgo para a Ilha Terceira (Açores). *Notulae Bryoflorae Macaronesicae. IV: 3. - Portug. Acta Biol.*, Sér. B, **17**: 268.

SÉRGIO, C. & DIAS, E.:

1991. Algumas Ricciaceae e Anthocerotaceae novas para a ilha Terceira. *Notulae*

Bryoflorae Macaronesicae. II: 4. *Portug. Acta Biol.*, Sér. B, **15**: 421-423.

SÉRGIO, C. & FONTINHA, S.

1994-95. Significado biogeográfico de briófitos novos ou pouco conhecidos para a Ilha da Madeira. *Studia Botanica*, **13**: 195-198.

SÉRGIO, C., FONTINHA, S. & NÓBREGA, M.:

1994 a. Três Pottiaceae novas ou raras para a brioflora da Ilha da Madeira, *Phascum leptophyllum* C. Müll., *Tortula bolanderi* (Lesq. et James) Howe e *Gyroweisia reflexa* (Brid.) Schimp. *Notulae Bryoflorae Macaronesicae*. III: 1. *Revista de Biologia*, **15**: 181.

SÉRGIO, C. & GABRIEL, R.:

1994. Novos dados para os Açores sobre o genero *Riccia*. *Notulae Bryoflorae Macaronesicae*. III: 7. *Revista de Biologia*, **15**: 184-185.

1997. *Fissidens papillosus* Lac. um novo musgo para a brioflora Açoreana. *Notulae Bryoflorae Macaronesicae*. IV: 2. *Portug. Acta Biol.*, Sér. B, **17**: 267.

SÉRGIO, C., GABRIEL, R. & DIAS, E.:

1994 b. Hepáticas novas para a flora da Ilha Terceira (Açores). *Notulae Bryoflorae Macaronesicae* III: 9. *Revista de Biologia*, **15**: 186-187.

SÉRGIO, G. & HERBRARD, J. P.:

1982. *Orthothecium duriaei* (Mont.) Besch. Étude systématique, écologique et phytogéographique. *Collectanea Botanica*, **13**: 247-255.

SÉRGIO, C., IWATSUKI, Z. & EDERRA, A.:

1997. *Fissidens luisierii* P. Varde (Fissidentaceae, Musci), a neglected species from Macaronesia. *J. Hattori Bot. Lab.*, **83**: 237-249.

SÉRGIO, C. & MAGUAS, C.:

1992. *Orthothecium durieui* (Mont.) Besch. nova para a flora portuguesa. *Notulae Bryoflorae Lusitanicae*. III. *Portug. Acta Biol.*, Sér. B., **15**: 409-411.

SÉRGIO, C. & NÓBREGA, M.:

1985. Novos elementos para a flora briológica da Madeira. *Notulae Bryoflorae Macaronesicae*. I. *Portug. Acta Biol.*, Sér. B., **14**: 176-179.

SÉRGIO, C., SCHUMACKER, R., FONTINHA, S. & SIM-SIM, M.:

1992. Evaluation of the status of the bryophyte flora of Madeira with reference to endemic and threatened species. *Biol. Conserv.*, **59**: 223-231.

SÉRGIO, C., VÁNA, J. & FONTINHA, S.:

- 1994 c. Novas espécies para a brioflora da Madeira, *Cephaloziella rubella* (Nees) Warnst. e *Gymnocola inflata* (Huds.) Dum. *Notulae Bryoflorae Macaronesicae*. III: 3. *Revista de Biologia*, **15**: 182.

SHAW, A. J.:

1887. Systematic studies on the Bryaceae. *Mem. New York Bot. Garden*, **45**: 682-690.

SIM-SIM, M., SÉRGIO, C., MUES, R. & KRUIT, L.:

1995. A new *Frullania* species (Trachycolea) from Portugal and Macaronesia: *Frullania azorica* sp. nov. *J. Bryol.*, **16**: 111-123.

SIM-SIM, M.:

1999. The genus *Frullania* Raddi (Hepaticae) in Portugal and Madeira. *Cryptogamie, Bryol. Lichénol.*, **20**: 83-144.

SJÖGREN, E.:

1964. Epilittische und epigäische Moosvegetation in Laubwäldern der Insel Öland. *Acta Phytogeogr. Suec.*, **48**: 1-184.
1975. Epiphyllous bryophytes of Madeira. *Svensk Bot. Tidskr.*, **69**: 217-288.
1978. Bryophyte vegetation in the Azores Islands. *Mem. Soc. Brot.*, **26**: 1-273.
1990. Bryophyte flora and vegetation on the island of Graciosa (Azores), with remarks on floristic diversity of the Azorean islands. *Arquipélago. Life and Earth Sciences*, **8**: 63-96.
1993. Bryophyte flora and vegetation on the island of Corvo (Azores). *Arquipélago. Ciências Biológicas e Marinhas*, **11A**: 17-48.
1995. *Report on investigations of the bryoflora and bryovegetation in 1995 on the Azorean islands of Faial, S. Jorge, Pico and Flores*. LIFE-project. Angra do Heroísmo. 30 pp. (mimeogr.).
1996. *Report on investigations of the bryoflora and bryovegetation on the Azorean island of Santa Maria*. LIFE-project. Angra do Heroísmo. 24 pp. (mimeogr.).
- 1997 a. *Report on investigations of the bryoflora and bryovegetation in 1997 on the Azorean island of Terceira*. LIFE-project. Angra do Heroísmo. 26 pp. (mimeogr.).
- 1997 b. Epiphyllous bryophytes in the Azorean islands. *Arquipélago. Life and Marine Sciences*, **15A**: 1-49.
2000. Aspects on the biogeography of Macaronesia from a botanical point of view. *Arquipélago. Life and Marine Sciences*. Supplement 2 (Part A): 1-9.
- submit. Azorean bryophyte communities - a revision of differential species. *Arquipélago. Life and Marine Sciences*.

SMITH, A. J. E.:

1978. *The mossflora of Britain and Ireland*. Cambridge. 706 pp.

1990. *The liverworts of Britain and Ireland*. Cambridge. 362 pp.
- STEWART, N.:
1995. *Red Data Book of European Bryophytes*. 1. *Introductory section & background*. Edited by The European Committee for the Conservation of Bryophytes. Trondheim. Pp. 1-27.
- TOWNSEND, C. C. & WHITEHOUSE, H. I. K.:
1979. *Desmatodon bogosicus* (C. Müll.) Hal., an earlier name for *Tortula khartoumensis* Pettet. *J. Bryol.*, **10**: 475-478.
- VÁNA, J.:
1988. *Cephalozia* (Dum.) Dum. in Africa, with notes on the genus. *Beiheft zur Nova Hedwigia*, **90**: 179-198.
- WIJK, R. Van Der, MARGADANT, W. D. & FLORSCHÜTZ, P. A.:
1959-69. *Index Muscorum*. 1-5. - Utrecht.
- WILCZEK, R. & DEMARET, F.:
1982. Étude des types de huit espèces de groupe *Bryum capillare* Hedw. *Bull. Jardin Bot. National Belg.*, **52**: 439-462.
- YAMAGUSCHI, T.:
1993. A revision of the genus *Leucobryum* (Musci) in Asia. *J. Hattori Bot. Lab.*, **73**: 1-223.
- ZAMORA, P. G., ROS, R. M. & GUERRA, J.:
1989-90. Taxonomía numerica en *Targionia* L. (Hepaticae). *Anal. Jard. Bot. Madrid*, **46**: 393-404.
- ZANDER, R. H.:
1977. The tribe Pleuroweisieae (Pottiaceae, Musci) in Middle America. *Bryologist*, **80**: 233-269.

INDEX

(Including excluded species and species with questionable recent presence in the Azores; see APPENDICES 1 and 2 respectively).

MUSCI

- Allorgea
 (berthelotiana
 see Andoa b.)
 Aloina
 aloides (APPENDIX 1)
 -ambigua
 (ericifolia
 see ambigua)
 -rigida
 Alophosia
 -azorica
 Andoa
 -berthelotiana
 Amblystegium
 -humile (APPENDIX 2)
 (kochii
 see humile)
 -riparium
 -serpens
 -tenax
 -varium
 Amphidium
 -mougeotii
 Andreaea
 -rupestris
 Anoetangium
 -angustifolium
 Anomobryum
 (filiforme
 see julaceum)
 -julaceum
 Archidium
 -alternifolium
 Atrichum
 -angustatum
 -undulatum
 Aulacomnium
 -palustre
 Barbula
 (acuta
 see Didymodon a.)
 -convoluta
 (cylindrica
 see Didymodon insulanus)
 (hornschuchiana
 see Pseudocrossidium h.)
 (revoluta
 see Pseudocrossidium r.)
 (rigidula
 see Didymodon r.)
 (tophacea
 see Didymodon t.)
 (trifaria
 see Didymodon luridus)
 -unguiculata
 (vinealis
 see Didymodon v.)
 Bartramia
 pomiformis (APPENDIX 1)
 -stricta
 Blindia
 -acuta
 Brachymenium
 -notarisii
 Brachythecium

- albicans
- mildeanum
- plumosum
- populeum
- rivulare
- rutabulum
- salebrosum
- velutinum
- Breutelia
- azorica
- Bryoerythrophyllum
- inaequalifolium
- Bryum
- alpinum
- argenteum
 - (atropurpureum
 - see bicolor)
 - (barnesii
 - see bicolor)
- bicolor (APPENDIX 2)
- caespitium
- canariense
- capillare
 - (capillare subsp.
 - torquescens
 - see B. torquescens)
- creberrimum
- donianum
- dunense
- gemmaiparum
- microerythrocarpum
- mildeanum
 - (murale
 - see radiculosum)
 - (pachyloma
 - see donianum)
 - (platyloma
 - see capillare)
- pseudotriquetrum
- radiculosum
- rubens
- ruderale
- sauteri
 - (subapiculatum
 - see microerythrocarpum)
- tenuisetum
- torquescens
- Calliergonella
- cuspidata
- Campylopodium
 - (euphorocladum
 - see Microcampylopus
 - laevigatus)
- Campylopus
- atrovirens (APPENDIX 1)
- brevipilus
 - (carreiroanus
 - see shawii)
- cygneus
- flaccidus
- flexuosus
- fragilis
- incrassatus
- introflexus
- piliifer
- pyriformis
 - (setaceus
 - see cygneus)
- shawii
- Ceratodon
 - (chloropus
 - see Cheilothela c.)
- purpureus
- Cheilothela
- chloropus
- Chenia
 - (rhizophylla

- see *Phascum leptophyllum*)
Cinclidotus
 (mucronatus
 see *Dialytrichia m.*)
Cirriphyllum
 -piliferum
Cryphaea
 -heteromalla (APPENDIX 2)
Ctenidium
 -molluscum
Cyclodictyon
 -laetevirens
Cynodontium
 -bruntonii

Daltonia
splachnoides (APPENDIX 1)
 -stenophylla
Desmatodon
 -bogosicus
 (convolutus
 see *Tortula atrovirens*)
Dialytrichia
 -mucronata
Dichodontium
pellucidum (APPENDIX 1)
Dicranella
 -heteromalla
 -howei
 -schreberiana
 (teneriffae
 see *Rhamphidium*)
Dicranoweisia
 -cirrata (APPENDIX 2)
 -crispula
Dicranum
 -bonjeanii
 -flagellare
 -majus

 -scoparium
 -scottianum
Didymodon
 -acutus
 -insulanus
 -luridus
 -rigidulus
 -tophaceus
 -vinealis
Diphyscium
 -foliosum
Ditrichum
 -pallidum
 (punctulatum
 see *Campylopus brevipilus*)
 -subulatum
Dolichotheca
 (striatella
 see *Herzogiella s.*)
Drepanocladus
 -fluitans

Echinodium
 -prolixum
 -renauldii
Enthostodon
 -attenuatus
 -obtusus
Ephemerum
 -cohaerens
Eipterygium
 -tozeri
Eucladium
 -verticillatum
Eurhynchium
 -hians
 -meridionale
 -praelongum
 -pumilum

- speciosum
- striatulum (APPENDIX 2)
- striatum

- Fissidens
- adanthoides (APPENDIX 2)
 - (algarvicus
 - see curvatus)
- asplenioides
 - (atlanticus
 - see asplenioides)
- azoricus
- bryoides
 - (canariensis
 - see ovatifolius)
- coacervatus
- crassipes (APPENDIX 2)
 - (cristatus
 - see dubius)
 - (curnowii
 - see bryoides)
- curvatus
- dubius
 - (exiguus
 - see bryoides)
 - (incurvus
 - see bryoides)
- luisierii
 - (minutululus
 - see bryoides)
 - (obductus
 - see ovatifolius)
- osmundoides (APPENDIX 1)
- ovatifolius
 - (ovatus var. azoricus
 - see azoricus)
- papillosus
 - (perssonii
 - see ovatifolius)

- pusillus
- rivularis
- serrulatus
- sublinaefolius
- taxifolius subsp. taxifolius
- taxifolius subsp. pallidicaulis
 - (viridulus
 - see bryoides)
- Fontinalis
- antipyretica
- Funaria
 - (attenuata
 - see Enthostodon a.)
 - (calcareo
 - see muehlenbergii)
- convexa (APPENDIX 2)
 - (ericetorum
 - see Enthostodon obtusus)
- hygrometrica
 - (mediterranea
 - see muehlenbergii)
- muehlenbergii
 - (obtusata
 - see Enthostodon obtusus)
- pulchella

- Glyphomitrium
 - (cylindraceum
 - see daviesii)
- daviesii
- Gollania
 - (berthelotiana
 - see Andoa b.)
- Grimmia
 - elongata
 - incurva (APPENDIX 2)
 - laevigata (APPENDIX 2)
 - lisae
 - montana (APPENDIX 2)

- pulvinata
(trichophylla
see lisae; APPENDIX 1)
- Gymnostomum
(aeruginosum
see calcareum)
- calcareum
(luisieri
see viridulum)
- viridulum
- Gyroweisia
(luisieri
see Gymnostomum viridulum)
- tenuis

- Haplodontium
(notarisii
see Brachymenium n.)
- Hedwigia
ciliata (APPENDIX 1)
- Herzogiella
-striatella (APPENDIX 2)
- Heterocladium
-heteropterum
(wulfsbergii
see heteropterum)
(macounii
see heteropterum)
- Homalia
-lusitanica (APPENDIX 2)
(subrecta
see lusitanica)
- trichomanoides (APPENDIX 1)
- webbiana
- Homalothecium
lutescens (APPENDIX 1)
- sericeum var. mandonii
- Hookeria
-lucens

- Hygroamblystegium
(tenax
see Amblystegium t.)
- Hygrohypnum
-luridum
- Hylocomium
-brevirostre
-splendens
- Hyocomium
-armoricum
- Hyophila
treleasii (APPENDIX 1)
- Hypnum
(andoi
see mamillatum)
(canariense
see uncinulatum)
- cupressiforme
(cupressiforme
var. ericetorum
see jutlandicum)
(cupressiforme
subsp. resupinatum
see resupinatum)
- imponens
- jutlandicum
- mamillatum (APPENDIX 2)
- resupinatum
- uncinulatum

- Isopterygium
(elegans
var. laetevirens
see Pseudotaxiphyllum e.)
- tenerum
- Isothecium
-alopescuroides
-myosuroides
(myurum)

- see alopecuroides)
 (striatulum
 see Eurhynchium s.)
- Kiaeria
 -blyttii
- Lepidopilum
 (virens
 see Tetrastichium v.)
- Leptobarbula
 -berica
- Leptobryum
 -pyriforme
- Leptodictyum
 (riparium
 see Amblystegium r.)
- Leucobryum
 -albidum
 -glaucum
 -juniperoideum
- Leucodon
 -canariensis (APPENDIX 2)
 -sciuroides (APPENDIX 2)
 -treleasei
- Merceya
 (ligulata
 see Scopelophila 1.)
- Microcampylopus
 -laevigatus
- Mniobryum
 (delicatulum
 see Pohlia melanodon)
- Mnium
 -hornum
- Myurium
 -hochstetteri
- Neckera
 -cephalonica
- complanata
 -crispa (APPENDIX 2)
 -intermedia
 (webbiana
 see Homalia w.)
- Oreoweisia
 (bruntonii
 see Cynodontium b.)
- Orthodicranum
 (scottianum
 see Dicranum s.)
- Orthothecium
 (durieui
 see Rhynchostegiella d.)
- Orthotrichum
 -diaphanum
 -tenellum
 urnigerum (APPENDIX 1)
- Oxyrrhynchium
 (pumilum
 see Eurhynchium p.)
- Phascum
 -leptophyllum
- Philonotis
 (arnellii
 see capillaris)
- caespitosa
 -calcareo
 -capillaris
 -fontana
 -hastata
 -marchica
 (obtusata
 see hastata)
- rigida
 -uncinata
- Physcomitrium

- pyriforme
- Plagiomnium
- rostratum
- undulatum
- Plagiothecium
- denticulatum (APPENDIX 1)
- nemorale
- succulentum (APPENDIX 2)
 - (sylvaticum
 - see nemorale)
- Platyhypnidium
 - (riparioides
 - see Rhynchostegium r.)
 - (rusciforme
 - see Rhynchostegium rip.)
- Pleurochaete
- squarrosa
- Pleurozium
- schreberi
- Pogonatum
- aloides
- nanum (APPENDIX 2)
- urnigerum
- Pohlia
- andalusica (APPENDIX 2)
- annotina
- bulbifera
- cruda (APPENDIX 2)
- melanodon
- nutans
- proligera
 - (rothii
 - see andalusica)
- Polytrichum
- commune
- formosum
- juniperinum
- piliferum
- Pottia
 - truncata
- Pseudocrossidium
 - hornschuchiana
 - revolutum
- Pseudoephemerum
 - nitidum
- Pseudoscleropodium
 - (purum
 - see Scleropodium p.)
- Pseudotaxiphyllum
 - elegans
 - laetevirens
- Pterogonium
 - gracile
 - (ornithopodioides
 - see gracile)
- Ptychomitrium
 - (azoricum
 - see polyphyllum)
- nigrescens
- polyphyllum
- Racomitrium
 - aciculare
 - aquaticum
- canescens (APPENDIX 1)
- elongatum
- fasciculare
- heterostichum
- lanuginosum
- Rhabdoweisia
 - fugax
- Rhamphidium
 - purpuratum
- Rhizomnium
 - punctatum
- Rhynchostegiella
 - (bourgeana
 - see tenella)

- curviseta
- durieui
 - (pseudosurrecta
 - see Rhynchostegium
 - confertum)
 - (surrecta
 - see Rhynchostegium
 - confertum)
- tenella
- Rhynchostegium
 - confertum
 - megapolitanum
 - riparioides
- Rhytidiadelphus
 - (calvescens
 - see subpinnatus)
- loreus
- squamosus
 - (squamosus subsp.
 - calvescens see
 - subpinnatus)
- subpinnatus

- Schistidium
 - alpicola (APPENDIX 2)
 - apocarpum
 - (rivulare
 - see alpicola)
- Scleropodium
 - purum
 - touretii
- Scopelophila
 - ligulata
- Scorpiurium
 - circinatum
- Sematophyllum
 - (bottinii
 - see Isopterygium
 - tenerum)

- substrumulosum
- Sphagnum
 - (acutifolium
 - see capillifolium)
 - (auriculatum
 - see lescurii)
- capillifolium
 - (capillifolium var.
 - rubellum see rubellum)
 - (centrale
 - see palustre)
- compactum
- cuspidatum
 - (denticulatum
 - see lescurii)
- girgensohnii
- imbricatum subsp. affine
- lescurii
- magellanicum
 - (nemoreum
 - see capillifolium)
- nitidulum
- palustre
- papillosum
 - (plumulosum
 - see subnitens)
- pylaesii
- rubellum (APPENDIX 2)
- squamosus
- subsecundum subsp. inundatum
- subnitens
- Splachnobryum
 - obtusum
- Streblotrichum
 - (convolutum
 - see Barbula c.)

- Tetrastichium
 - fontanum

- virens
- Thamnobryum
- alopecurum
- maderense
- Thuidium
- tamariscinum
- Timmiella
- barbuloides
- Tortella
- (cirrifolia
- see nitida)
- flavovirens
- nitida
- Tortula
- atrovirens
- canescens
- cuneifolia
- laevipila
- marginata
- muralis
- (perlimbata
- see solmsii)
- (rhizophylla
- see Phascum leptophyllum
- revolvens
- ruralis
- solmsii
- vahliana
- Trematodon
- perssonorum
- Trichostomum
- (azoricum
- see Weissia triumphans)
- brachydontium
- crispulum
- (mucronatulum
- see brachydontium)
- (triumphans
- see Weissia t.)
- Ulotia
- calvescens
- (vittata
- see calvescens)
- crispa
- Warnstorfia
- (fluitans
- see Drepanocladus f.)
- Weissia
- brachycarpa
- condensa
- controversa
- (tortilis
- see condensa)
- triumphans
- (viridula
- see controversa)
- Zygodon
- (baumgartneri
- see viridissimus)
- conoideus
- viridissimus
- HEPATICAE**
- Acanthocoleus
- aberrans
- Acrobolbus
- wilsonii
- Adelanthus
- decipiens
- Anastrophyllum
- minutum
- Aneura
- pinguis
- Anthoceros
- caucasicus

- (dichotomus
see Phaeoceros
bulbiculosus)
(husnotii
see punctatus)
(laevis
see Phaeoceros 1.)
(mandonii
see caucasicus)
-punctatus
Aphanolejeunea
-azorica
 (exigua
 see microscopica)
-microscopica
-sintenisii
 (teotonii
 see sintenisii)
-madeirensis
Asterella
-africana
gracilis (APPENDIX 1)
- Barbilophozia
-attenuata
floerkei (Appendix 1)
 (gracilis
 see attenuata)
Bazzania
-azorica
tricrenata (APPENDIX 1)
trilobata (APPENDIX 1)
Blepharostoma
-trichophyllum
- Calypogeia
 (allorgei
 see fusca)
-arguta
- azorica
azurea (APPENDIX 1)
-fissa
-fusca
-integristipula
 (meylanii
 see integristipula)
-muelleriana
-neesiana
-sphagnicola
-suecica
Cephalozia
-bicuspidata
 (compacta
 see connivens)
-connivens
-crassifolia
 (hibernica
 see crassifolia)
 (lammersiana
 see bicuspidata)
-lunulifolia
 (media
 see lunulifolia)
Cephaloziella
-baumgartneri
-calyculata
-divaricata
-hampeana
-rubella
-turneri
Cheilolejeunea
-cedercreutzii
Chiloscyphus
 (coadunatus
 see Lophocolea
 bidentata)
 (denticulatus
 see Heteroscyphus d.)

- (palescens
 see polyanthos)
 -polyanthos
 (profundus
 see Lophocolea
 heterophylla)
 Cladopodiella
 fluitans (APPENDIX 1)
 -francisci
 Cololejeunea
 (azorica
 see Aphanolejeunea a.)
 calcarea (APPENDIX 1)
 (madeirensis
 see Aphanolejeunea m.)
 (microscopica
 see Aphanolejeunea m.)
 -minutissima
 (teotonii
 see Aphanolejeunea
 sintenisii)
 Colura
 -calyptrifolia
 Conocephalum
 -conicum
 Corsinia
 -coriandrina

 Diplophyllum
 -albicans
 Dicranolejeunea
 (johnsoniana
 see Acanthocoleus
 aberrans)
 Drepanolejeunea
 -hamatifolia
 Dumortiera
 -hirsuta

 Euosmolejeunea
 (cedercreutzii

 see Cheilolejeunea c.)
 Exormotheca
 (africana
 see pustulosa)
 -pustulosa

 Fimbriaria
 (africana
 see Asterella a.)
 Fossombronina
 -angulosa
 -caespitiformis
 -echinata
 -husnotii
 (loitlesbergii
 see wondraczekii)
 -pusilla
 -wondraczekii
 Frullania
 -azorica
 dilatata (APPENDIX 1)
 fragilifolia (APPENDIX 1)
 -microphylla
 polysticta (APPENDIX 1)
 -tamarisci
 -teneriffae

 Geocalyx
 -graveolens
 Gongylanthus
 -ericetorum
 Grimaldia
 (dichotoma
 see Mannia androgyna)
 Gymnocolea
 -inflata

 Harpalejeunea
 (ovata

- see mollerii)
 -mollerii
 Herbertus
 -azoricus
 (borealis
 see azoricus)
 (juniperoideus
 see azoricus)
 Hygrobiella
 -laxifolia

 Isopaches
 (bicrenatus
 see Lophozia b.)

 Jamesoniella
 autumnalis (APPENDIX 1)
 -rubricaulis
 Jubula
 -hutchinsiae
 Jungermannia
 -atrovirens
 -callithrix
 -gracillima
 (hyalina
 see callithrix; APPENDIX 1)
 -pumila
 -profunda

 Kurzia
 -pauciflora

 Lejeunea
 cavifolia (APPENDIX 1)
 -eckloniana
 -flava subsp. moorei
 -hibernica
 (holtii
 see eckloniana)

 -lamacerina
 -patens
 -ulicina
 Lepidozia
 -azorica
 -cupressina
 (pinnata
 see cupressina)
 -reptans
 Leptosecyphus
 -azoricus
 (liebmannianus
 see azoricus)
 (porphyrus
 see azoricus)
 Lophocolea
 -bidentata
 (cuspidata
 see bidentata)
 -fragrans
 -heterophylla
 (latifolia
 see bidentata)
 minor (APPENDIX 1)
 Lophozia
 -bicrenata (APPENDIX 2)
 (guttulata
 see longiflora)
 -incisa
 -longiflora
 (porphyroleuca
 see longiflora)
 Lunularia
 -cruciata

 Mannia
 -androgyna
 Marchantia
 -paleacea

- polymorpha
- Marchesinia
 - (johnsoniana
 - see Acanthocoleus)
- mackaii
- Marsupella
 - adusta
 - emarginata
 - funkii
 - sparsifolia
 - sphacelata
- Metzgeria
 - conjugata (APPENDIX 1)
 - fruticulosa (APPENDIX 1)
 - furcata
 - (hamata
 - see leptoneura)
 - leptoneura
- Microlejeunea
 - (diversiloba
 - see Lejeunea hibernica)
 - (ulicina
 - see Lejeunea ulicina)
- Mnioloma
 - (fusca
 - see Calypogeia fusca)
- Mylia
 - taylorii (APPENDIX 1)

- Nardia
 - geoscyphus
 - scalaris
- Nowellia
 - curvifolia

- Odontischisma
 - denudatum
 - prostratum
 - sphagni (APPENDIX 1)

- Pallavicinia
 - lyellii
- Pellia
 - epiphylla
- Phaeoceros
 - bulbiculosus
 - carolinianus
 - laevis
- Plagiochasma
 - rupestre
- Plagiochila
 - allorgei
- asplenioides (APPENDIX 1)
 - bifaria
 - (corniculata
 - see exigua)
 - exigua
 - (killarniensis
 - see bifaria)
 - (longispina
 - see P. allorgei)
 - punctata
 - retrorsa
 - (sharpii
 - see retrorsa)
 - solmsii
- spinulosa (APPENDIX 1)
 - (tridenticulata
 - see exigua)
- Porella
 - arboris-vitae (APPENDIX 1)
 - canariensis
 - obtusata
- platyphylla (APPENDIX 1)
- Preissia
 - quadrata (APPENDIX 1)

- Radula
 - aquilegia

- carringtonii
- complanata (APPENDIX 1)
- holtii
 - (limbata
 - see wichurae)
- lindenbergiana
- nudicaulis
- wichurae
- Reboulia
- hemisphaerica
- Riccardia
- chamedryfolia
- latifrons
- multifida
- palmata
 - (pinguis
 - see Aneura p.)
 - (sinuata
 - see chamedryfolia)
- Riccia
- beyrichiana
- bifurca
 - (bischoffii
 - see ciliifera)
- ciliifera (APPENDIX 2)
- crozalsii
- crystallina
- glauca
- huebeneriana
- ligula
 - (minima
 - see nigrella)
- nigrella
- (oelandica
- see subbifurca)
- perennis (APPENDIX 1)
- sorocarpa
- subbifurca (APPENDIX 2)
- warnstorffii
- Scapania
- compacta
- curta
- gracilis
- nemorea
 - (nemorosa
 - see nemorea)
- scandica
- umbrosa (APPENDIX 1)
- undulata
- Solenostoma
 - (atrovirens
 - see Jungermannia a.)
 - (crenulata
 - see Jungermannia
 - gracillima)
 - (pumilum
 - see Jungermannia p.)
- Southbya
- tophacea (APPENDIX 1)
- Sphaenolobus
 - (minutus
 - see Anastrophyllum m.)
- Sphaerocarpos
- texanus
- Targionia
- hypophylla
- lorbeeriana (APPENDIX 1)
- Telaranea
- nematodes
- Trichocolea
- tomentella
- Tylimanthus
- azoricus

APPENDIX 1

Species considered as not present in the Azores and therefore suggested to become excluded

Musci

- Aloina aloides* (Schultz) Kindb.
Bartramia pomiformis Hedw.
Campylopus atrovirens De Not.
Daltonia splachnoides (Sm.) Hook. et Taylor
Dichodontium pellucidum (Hedw.) Schimp.
Fissidens osmundoides Hedw.
Grimmia trichophylla Grev.
Hedwigia ciliata (Hedw.) Ehrh.
Homalia trichomanoides (Hedw.) B. S. G.
Homalothecium lutescens (Hedw.) B. S. G.
Hyophila treleasii Card.
Orthotrichum urnigerum Myr.
Plagiothecium denticulatum (Hedw.) B. S. G.
Racomitrium canescens (Hedw.) Brid.

Hepaticae

- Asterella gracilis* (F. Web.) Underw.
Barbilophozia floerkei (F. Web. et Mohr.) Loeske
Bazzania tricrenata (Wahlenb.) Lindb.
Bazzania trilobata (L.) S. Gray
Calypogeia azurea Stotler et Croz.
Cladopodiella fluitans (Nees) Buch
Cololejeunea calcarea (Libert.) Schiffn.
Frullania dilatata (L.) Dumort.
Frullania fragilifolia (Taylor) Gottsche et al.
Frullania polysticta Lindenb.
Jamesoniella autumnalis (DC.) Steph.
Jungermannia hyalina Lyell
Lejeunea cavifolia (Ehrh.) Lindb.
Lophocolea minor Nees
Metzgeria conjugata Lindb. (questionable?)
Metzgeria fruticulosa (Dix.) A. Evans
Mylia taylorii (Hook.) Grav.

Odontoschisma sphagni (Dicks.) Dumort.
Plagiochila asplenoides (L.) Dumort.
Plagiochila spinulosa (Dicks.) Dumort.
Porella arboris-vitae (With.) Grolle
Porella platyphylla (L.) Pfeiff.
Preissia quadrata (Scop.) Nees
Radula complanata (L.) Dumort.
Riccia perennis Steph.
Scapania umbrosa (Schrad.) Dumort.
Southbya tophacea Spruce
Targionia lorbeeriana K. Müll.

APPENDIX 2

Species with questionable recent presence (since the 1950's) in the Azores. (shown in brackets in the text)

Musci

Amblystegium humile (P. Beauv.) Lindb.
Bryum bicolor Dicks.
Cryphaea heteromalla (Hedw.) Mohr.
Dicranoweisia cirrata (Hedw.) Lindb. ex Milde
Eurhynchium striatulum (Spruce) B. S. G.
Fissidens adianthoides Hedw.
Fissidens crassipes Wils. ex B. S. G.
Funaria convexa Spruce
Grimmia incurva Schwaegr.
Grimmia laevigata (Brid.) Brid.
Grimmia montana B. S. G.
Herzogiella striatella (Brid.) Iwats.
Homalia lusitanica Schimp.
Hypnum mamillatum (Brid.) Loeske
Leucodon canariensis (Brid.) Schwaegr.
Leucodon sciuroides (Hedw.) Schwaegr.
Neckera crispa Hedw.
Plagiothecium succulentum (Wils.) Lindb.
Pogonatum nanum (Hedw.) P. Beauv.
Pohlia andalusica (Hoehnel) Brotherus

Pohlia cruda (Hedw.) Lindb.
Schistidium alpicola (Hedw.) Limpr.
Sphagnum rubellum Wils.

Hepaticae

Lophozia bicrenata (Schmied. ex Hoffm.) Buch
Riccia ciliifera Link. ex Lindenb.
Riccia subbifurca Warnst. ex Croz.

APPENDIX 3

Species endemic to the Azores (I) or to Macaronesia (II). (h = hepatic).

- I. *Breutelia azorica* (Mitt.) Card.
Echinodium renauldii (Card.) Broth.
Fissidens azoricus (P. Varde) Biz.
Trematodon perssonorum Allorge et Thér.
Sphagnum nitidulum Warnst. ex Warnst.
- h *Bazzania azorica* H. Buch et Perss.
h *Cheilolejeunea cedercreutzii* (H. Buch et Perss.) Grolle
h *Tylimanthus azoricus* Grolle et Perss.
h *Herbertus azoricus* (Steph.) Richards
- II. *Alophosia azorica* (Ren. et Card.) Card.
Anoetangium angustifolium Mitt.
Andoa berthelotiana (Mont.) Ando
Brachymenium notarisii (Mitt.) Shaw
Echinodium prolixum (Mitt.) Broth.
Fissidens coacervatus Brugg.-Nann.
Fissidens luisierii P. Varde
Fissidens sublinaefolius (P. Varde) Brugg.-Nann.
Leucodon treleasii (Card.) Par.
Neckera cephalonica Jur. et Ung.
Tetrastichium fontanum (Mitt.) Card.
Tetrastichium virens (Card.) Churchill
Thamnobryum maderense (Kindb.) Hedenäs
- h *Aphanolejeunea madeirensis* (Schiffn.) Grolle
h *Calypogeia azorica* Bischl.
h *Heteroscyphus denticulatus* (Mitt.) Schiffn.

- h *Lepidozia azorica* H. Buch et Perss.
- h *Radula wichurae* Steph.

Species formerly treated as endemic to the Azores (I) or to Macaronesia (II), recently reported as present also in other parts of the world (h = hepatic; synonym within brackets).

- I. *Campylopus shawii* Wils. ex Hunt. (= *C. carreiroanus* Card.)
 - h *Plagiochila longispina* Lindenb. et Gottsche
(= *Plagiochila allorgei* Herzog et Perss.)
- II. *Grimmia lisae* De Not. (= *G. trichophylla* subsp. *azorica* (Ren. et Card.) Luis.)
 - Neckera intermedia* Brid.
 - h *Acanthocoleus aberrans* (Lindenb. et Gottsche) Kruijt
(= *Dicranolejeunea johnsoniana* (Mitt.) Grolle)
 - h *Aphanolejeunea azorica* (V. Allorge et Ast) Pócs et Bernecker
(= *Cololejeunea azorica* V. Allorge et Ast)
 - h *Aphanolejeunea sintenisii* (Steph.) Steph.
(= *Aphanolejeunea teotonii* Jovet-Ast et V. Allorge)
 - h *Calypogeia fusca* (Lehm.) Steph.
(= *Calypogeia allorgei* H. Buch et Perss.)
 - h *Lejeunea hibernica* Bischl. et al. ex Grolle
(= *Microlejeunea diversiloba* (Spruce) K. Müll.)
 - h *Leptoscyphus porphyrius* (Nees) Grolle
(= *L. azoricus* (H. Buch et Perss.) Grolle)

ERIK SJÖGREN

DISTRIBUTION OF AZOREAN BRYOPHYTES UP TO 1999,
THEIR ISLAND DISTRIBUTION
AND INFORMATION ON THEIR PRESENCE ELSEWHERE,
INCLUDING MADEIRA AND THE CANARY ISLANDS

BOLETIM DO MUSEU MUNICIPAL DO FUNCHAL SUPL. Nº 7, 2001