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Bryophyte flora of the Canary Islands: an updated compilation of the species list with an analysis of distribution patterns in the context of the Macaronesian Region

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Abstract – An updated compilation of the species list of the Canary Islands has been carried out, based only on published data. It includes 499 species: 141 liverworts, 6 hornworts and 352 mosses (7 strictly endemic to the Canary Islands, 19 endemic to Macaronesia and 6 Ibero-Macaronesian endemics). More than 150 new reports for particular islands and many nomenclatural and taxonomical changes have increased the total number of recorded species in comparison with the formerly published checklists. An analysis of species frequency on the seven islands shows that distribution patterns defined as restricted (presence in 1 or 2 islands) and localised (3, 4 or 5 islands) occur to a similar degree in the Canary Islands (38% and 36%, respectively), while the percentage of species with a general distribution (6 or 7 islands) is slightly lower (27%). Detrended correspondence analysis shows that altitude (in conjunction with heterogeneity and climatic conditions) and island age are the most important factors influencing bryophyte richness in the Canary Islands. On the other hand, species composition in these islands is mainly correlated with distance from the mainland and levels of precipitation. Two island groups can be distinguished according to the bryophyte flora. The driest islands Lanzarote and Fuerteventura show greater affinities with Deserta and some Cape Verde Islands than the other Canary Islands (especially in liverworts). The western Canary Islands (Hierro, La Palma, La Gomera, Tenerife and Gran Canaria) show a greater similarity with the island of Madeira (especially in mosses). Detrended correspondence analysis for all Macaronesian islands shows that latitudinal position (correlated with precipitation), longitude and distances from the mainland are the main factors influencing species composition. Bryophyte richness in the Macaronesian islands is most strongly correlated with vascular plant richness, altitude and precipitation.

Bryophytes / Canary Islands / Checklist / Macaronesia / distribution patterns

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INTRODUCTION

The bryophyte flora of the Canary Islands has been relatively well studied in floristic terms, since many researchers have published data records from these islands during the last 190 years. The list of the Macaronesian bryophytes compiled by Eggers (1982) included 712 species in the Canaries (485 mosses and 227 liverworts and hornworts). A major revision of the species distribution in these islands was subsequently performed by Dirkse *et al.* (1993), who reduced the total number of species to 449 (309 mosses and 140 liverworts and hornworts). Since then two further lists have been published (Losada-Lima *et al.*, 2001a, 2004), the latter increasing the number of species to 473. During the last years, many nomenclatural and taxonomical changes and new records, as well as some exclusions, have produced significant changes to the latest bryophyte list published.

The Canary Islands are situated in the subtropical zone between 28° 06'N, 15° 24'W, within the south-western limit of the Mediterranean area. They are included in the Macaronesian region, which is recognized as an important floristic area for conservation within the European-Mediterranean climate region (Médail & Quézel, 1997). Variations in characteristics between islands include size, altitude, age and distance from the mainland. Climatic conditions are highly influenced by topography, due to the prevailing NE winds, which provide more or less constant conditions of high humidity (mist precipitation) throughout the year in north-eastern areas over 700-1200 m a.s.l. These factors give rise to large inter-island differences in species richness (González-Mancebo *et al.*, 2001), which is reflected in species distribution patterns among the islands.

In view of compiling data from the recent advances in taxonomy and distribution of the Canarian bryophytes, and in order to facilitate the preparation of a bryophyte red list of these islands, an updated compilation of the species list is carried out in this paper. In addition, the distribution patterns of the species on the different islands and the relationships of this archipelago with other Macaronesian archipelagos are analysed through multivariate analyses.

METHODS

Data sets

Despite the existence of two recent checklists (Losada-Lima *et al.*, 2001a, 2004), that of Dirkse *et al.* (1993) has been taken as a reference point for the present list, because neither of the two more recent lists contains any literature references, synonyms, details of specimens revised or explanations of deletions and additions. Therefore, we have considered new nomenclatural and taxonomic changes and included references for all new records published after Dirkse *et al.* (1993).

Only published reports have been considered in the compilation. Species occurring exclusively in greenhouses are not included.

The names of the species are written in bold italics except in the case of taxa doubtful for the Canary Islands. The main source for the systematic

arrangement and nomenclature of hornworts and liverworts is Grolle & Long (2000) updated by Ros *et al.* (2007). For the arrangement and nomenclature of mosses Hill *et al.* (2006) has been followed. A few exceptions have been made to take into account recently published papers, which are mentioned under the appropriate taxon. Synonyms are only mentioned in cases where they deviate from Dirkse *et al.* (1993), Grolle & Long (2000), Hill *et al.* (2006), or Ros *et al.* (2007) or in some other cases where it is considered appropriate. Liverworts and hornworts are treated separately. The names of the species follow a systematic order. Only reports of species and subspecies have been compiled. Records before Dirkse *et al.* (1993) have only been included when the species or the record was not considered by these authors. New island records published after Dirkse *et al.* (1993) are indicated in bold characters. In both cases literature references are provided. Species present in Macaronesia and in some isolated areas of the Iberian Peninsula (Ibero-Macaronesian endemic species) are indicated with one asterisk, Macaronesian endemic species with two asterisks and Canarian endemic with three.

The names of the islands, in geographical order from west to east, have been abbreviated as follows: **H** (El Hierro), **P** (La Palma), **G** (La Gomera), **T** (Tenerife), **C** (Gran Canaria), **F** (Fuerteventura), **L** (Lanzarote). New records for the small islets near Fuerteventura and Lanzarote (Lobos, Graciosa, Alegranza and Montaña Clara) are included within these islands and islets are indicated between brackets.

Distribution patterns

In analysing species frequency in relation to the geographical position of the islands with respect to the mainland and their physical characteristics, nine groups (a-i) of species distribution patterns were distinguished. These were later reduced to three groups:

1) General distribution. Species occurring on more than five islands: a) Present on all islands, b) Only absent on the driest island of Lanzarote and c) only absent on the youngest island of El Hierro.

2) Localised distribution. Species occurring on three, four or five islands: d) Absent from the drier islands (Lanzarote and Fuerteventura), e) growing exclusively on the western islands (Hierro, La Palma, La Gomera and Tenerife), f) on all western islands with the exception of El Hierro (the youngest), g) absent from the driest (Lanzarote and Fuerteventura) and youngest (Hierro) islands, h) growing exclusively on the highest islands (La Palma, Tenerife and Gran Canaria).

3) Restricted distribution, i) species occurring only on one or two islands.

Data analysis

Detrended correspondence analysis (DCA) (Hill & Gauch, 1980) was used to analyze island and species composition, both in the Canary Islands separately and all Macaronesian islands together (for all bryophytes, and mosses and liverworts separately). We performed these analyses with the CANOCO package (Ter Braak & Smilauer, 2002), entering data as presence/absence of each bryophyte species on each island. Only islands with at least 10 species were included. The analyses were performed with downweighting for rare species. DCA results were interpreted by correlating the sample ordination scores of the

main axes with island characteristics (longitude, latitude, altitude, area, distance from the mainland, age, mean precipitation, number of vascular plant species and number of bryophytes). For these correlations (Pearson index) the SPSS (2005) program was used. The references used for these variables were Carracedo (1984), Nicolás *et al.* (1989), Torres (1998), Marzol (2001), Plesner *et al.* (2002) and Françaz Cruz *et al.* (2005) and Borges *et al.* (2008).

The references used for the other Macaronesian archipelagos included Gabriel *et al.* (2005) for the Azores, Patiño Llorente & González Mancebo (2005) for Cape Verde, and Sérgio *et al.* (2008) for Madeira, Porto Santo, Deserta and the Salvagem Islands. To analyse similarity between islands within the Canaries, cluster analyses were performed using presence-absence data, previously generating a non-parametric permutation procedure applied to the Bray-Curtis rank similarity matrix. This analysis was performed by PRIMER (Clarke & Corley, 2006).

RESULTS

After applying the latest taxonomic changes and adding new records from recent years, the Canary Islands bryophyte flora includes 499 species (141 liverworts, 6 hornworts and 352 mosses). Endemic species from the Canaries, Macaronesia and Ibero-Macaronesia are listed in Table 1. Compared with Dirkse *et al.* (1993), this species list includes 61 additional species (incorporating both new discoveries and new taxonomic concepts), whilst eleven deletions have been made, of which six are recognised species that are not present in the Canary Islands (*Frullania cesatiana*, *Frullania obscurifolia*, *Plagiochila dubia* and *Telaranea nematodes* among the liverworts, and *Rhynchostegiella curviseta* and *R. durieui* among the mosses). Other taxa have been excluded because they are now accepted only at infraspecific level. Compared with the species list of Losada-Lima *et al.* (2004), the new list has increased by 32 species, whereas 10 have been eliminated, and there are 91 new reports for particular islands. There are 6 species whose presence in the Canary Islands is doubtful (included without bold characters in the species list). In addition there are 45 species (not marked in the list) that have not been recorded during the last 30 years. The 499 species belong to 30 families of liverworts, 2 of hornworts and 45 of mosses. The following families, as recognized by Grolle & Long (2000) for liverworts and hornworts and Hill *et al.* (2006) for mosses, are represented by five or more genera: Lophoziaceae (6 genera) and Lejeuneaceae (6) in the liwerworts and Bryaceae (5 genera), Amblystegiaceae (5), Hypnaceae (5), Neckeraceae (5), Funariaceae (6), Ditrichaceae (6), Brachytheciaceae (13) and Pottiaceae (23) in the mosses. Pottiaceae is the most species-rich family with 88 species.

Species number per island is given in Table 2. Richness (defined as the total number of species) was highest on Tenerife (84% of the total number of the species in the Canaries) and La Palma (68%) and lowest on Lanzarote, Fuerteventura and El Hierro (23, 25 and 39% respectively). Richness was greater on the highest islands, Tenerife and La Palma, both with three mountain bioclimatic belts above the xeric infra-Mediterranean area. Other factors, e.g. island area, island age and distance from the mainland, seem to have less influence on richness than altitude. Tenerife is the island with the highest number of exclusive species (57) followed by La Palma and Gran Canaria (23 and 22 each).

Table 1. Canary Islands, Macaronesian and Ibero-Macaronesian endemic species present in the Canary Islands. These endemisms are indicated in the species list by three, two and one asterisks respectively.

Canary Islands	*Macaronesian*	*Ibero-Macaronesian*
Liverworts	Liverworts	Liverworts
Riccia teneriffae	*Cololejeunea schaeferi*	*Frullania azorica*
	Frullania polysticta	*Porella canariensis*
Mosses	*Heteroscyphus denticulatus*	
Aloina humilis	*Lejeunea canariensis*	Mosses
Grimmia curviseta	*Plagiochila maderensis*	*Isothecium algarvicum*
Orthotrichum handiense	*Radula carringtonii*	*Neckera intermedia*
Rhynchostegiella bourgaeana	*Radula jonesii*	*Tetrastichium fontanum*
Rhynchostegiella trichophylla	*Radula wichurae*	*Tetrastichium virens*
Tortula ampliretis	*Telaranea azorica*	
	Mosses	
	Andoa berthelotiana	
	Cryptoleptodon longisetus	
	Echinodium spinosum	
	Entosthodon krausei	
	Fissidens coacervatus	
	Leucodon canariensis	
	Leucodon treleasei	
	Pelekium atlanticum	
	Rhynchostegiella macilenta	
	Tortella limbata	

Table 2. Geographical characteristics of the Canary Islands and the total number of bryophyte species, and the number of exclusive species (those present only on one island in the archipelago) for each island.

Island	*Area (km^2)*	*Distance to mainland*	*Age (Myr)*	*Altitude (m)*	*Total species*	*Exclusive species*
El Hierro	268	376	0.8	1520	191	1
La Palma	707	402	2	2423	339	23
La Gomera	368	320	12.5	1484	294	8
Tenerife	2033	288	12	3718	416	57
Gran Canaria	1558	196	14	1950	299	22
Fuerteventura	1657	98	21	807	125	1
Lanzarote	845	116	15.5	670	113	2

The analysis of distribution patterns indicates that 188 species (38%) have a restricted distribution (occurring only on 1 or 2 islands). Localised species (175) occur in similar proportion (36%) and slightly fewer (26%) have a general distribution pattern. A general distribution pattern of "present on all islands"

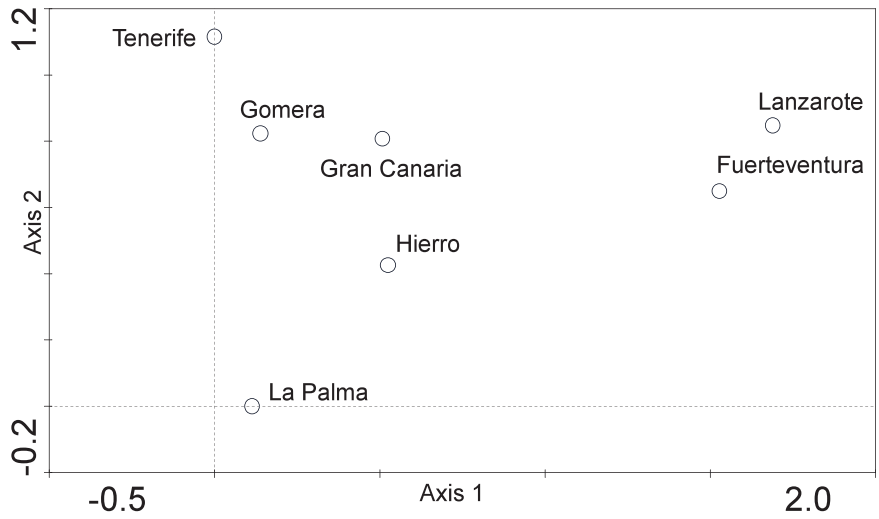

Fig. 1. Detrended Correspondence Analysis for the Canary Islands. Data for the species was presence/absence (eigenvalues axis 1: 0.472, axis 2: 0.297). Lengths of gradient for the first two axes: 4.885 and 5.012.

occurs in 91 species, the most frequent pattern after restricted distribution on 1 or 2 islands. This is followed by the west-central distribution (64 species) and central distribution patterns (41). Other patterns have a much lower number of constituent species. Twenty six species have a general distribution without Lanzarote (the driest island) and 18 occur on all islands with the exception of the youngest (Hierro). Twenty one species occur only on the four western islands, and 23 were recorded on all these, with the exception of Hierro. Only 16 species occur exclusively on the highest islands and 10 occur exclusively on the four eastern islands. One hundred and twenty one species (24% of the total species number in the archipelago) have been reported only from a single island in the Canaries.

The results from the Detrended Correspondence Analysis across all Canary Islands and species are shown in Figure 1. Axis 1 separates two island groups. The western islands (Tenerife, La Gomera, Gran Canaria, Hierro and La Palma) are in a different group from Lanzarote and Fuerteventura (right of the graph). Island positions in the left-hand group do not correspond with geographical situation. Two subgroups can be distinguished in the western islands on axis 1, one comprising Gran Canaria and Hierro, and the other, La Palma and La Gomera. Tenerife is located separately at the upper left of the graph. Samples scores for axis 1 were negatively correlated ($p \leq 0.01$) with longitude, precipitation, distance from the mainland and number of bryophyte species. Axis 2 indicates a greater distance between La Palma and the other western islands; however, we found no correlation between the variables considered for axis 2. The results of the cluster analysis (Fig. 2) also clearly show a low level of similarity between Lanzarote and Fuerteventura and the western Canary Islands. This last group is further divided into the youngest island (Hierro) and the other western islands. La Palma, La Gomera and Tenerife appear to have high levels of similarity. Gran Canaria was also separated from these more humid islands.

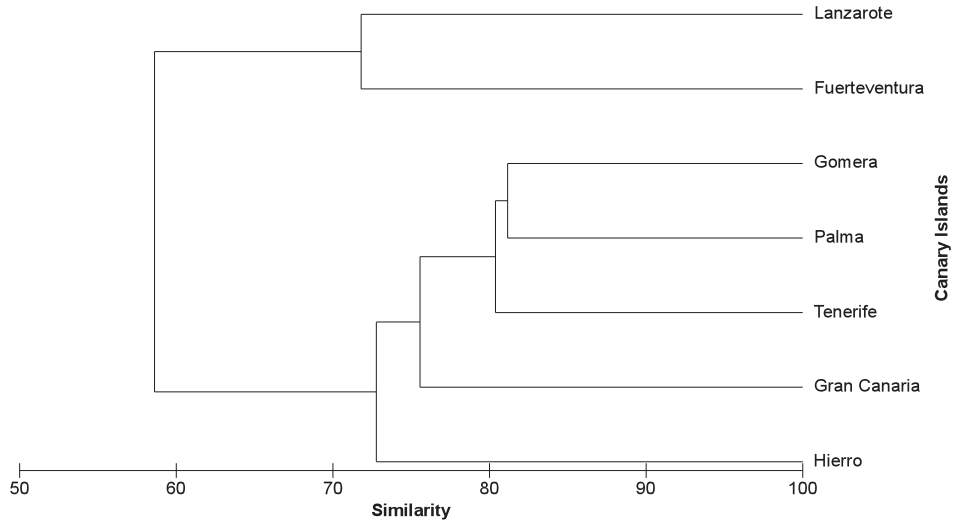

Fig. 2. Cluster analysis results in a dendrogram showing the similarity between islands in the Canaries.

The results of the DCA analysis including islands from all the Macaronesian archipelagos are shown in Figure 3, for all bryophytes (upper graph) and for liverworts and mosses separately (left and right graphs). Axis 1 (in all three graphs) is correlated ($p \leq 0.01$) with the latitudinal position of the islands, distance from the mainland, precipitation and number of bryophyte species. Island age and longitude are only correlated with a significance level of $p \leq 0.05$. Axis 2 seems mainly correlated with different island characteristics within each latitudinal area and is not correlated with any of the variables considered. However, when the analyses were repeated without downweighting (not shown), for the mosses axis 2 is negatively correlated with longitude, distance from the mainland, precipitation and island age. Four island groups are discernible in the upper graph in relation to axis 1: Cape Verde islands to the right, a second group formed by the driest Canary Islands (Lanzarote and Fuerteventura) together with the Salvagem Islands and Deserta. All the western Canary Islands are included in a third group, together with Porto Santo and Madeira. A subgroup formed by Tenerife, La Palma, and La Gomera can be also distinguished in this third group. The last group was formed by the Azores islands.

In the analysis of mosses (Fig. 3, right), the latitudinal gradient (axis 1) was slightly wider than that obtained with liverworts (left), and there is a greater distance between the islands of Cape Verde and the other Macaronesian islands. In the analysis of liverworts, Lanzarote and Fuerteventura are in the same area with respect to axis 1, together with Deserta, the Salvagem Islands and some of the Cape Verde islands (Fogo, Santiago and Santo Antão); while the other Canary Islands are separated into two groups: Hierro and Gran Canaria (to the right) and Tenerife, La Palma and La Gomera to the left together with Porto Santo. In this analysis the Azores islands are grouped together with Madeira. For mosses, all Canary Islands, with the exception of Lanzarote and Fuerteventura,

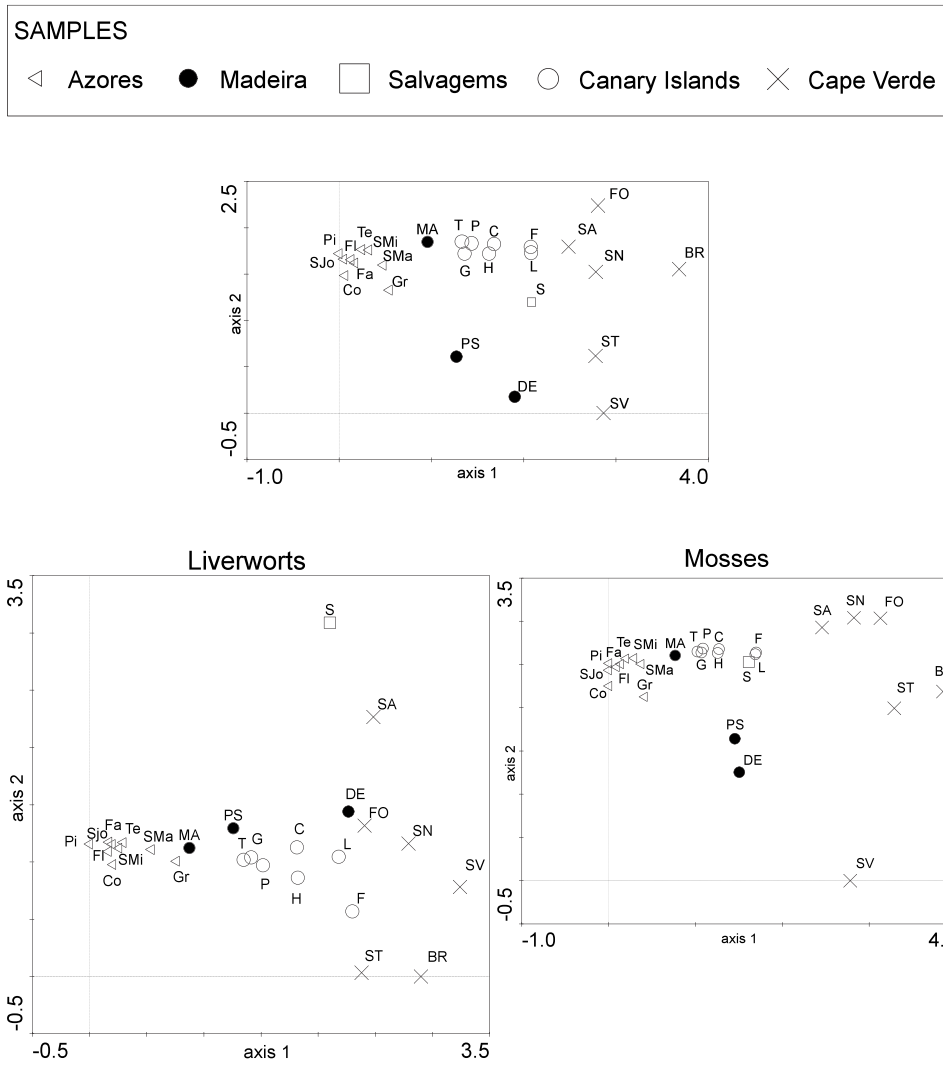

Fig. 3. Detrended Correspondence Analysis for all Macaronesian Islands and all species (upper graph), mosses only (left graph) and liverworts (right graph). Data for the species was presence/absence. Eigenvalues for the analysis with all species were axis 1: 0.435, axis 2: 0.153 and lengths of gradient for the first two axes: 6.204 and 5.329. Eigenvalues for the mosses analysis were axis 1: 0.434, axis 2: 0.208 and lengths of gradient for the first two axes 6.963 and 5.293. Eigenvalues for the liverworts analysis were axis 0.346, axis 2: 0.110 and lengths of gradient for the first two axes 4.641 and 3.127. Islands with fewer than 10 species, according to the consulted references, were eliminated from the analysis. Azores: SMi (Sao Miguel), SMa (Santa María), Gr (Graciosa), Te (Terceira), Fl (Flores), Co (Corvo), Sj (Sao Jorge) and Pi (Pico); Canary Islands: H (El Hierro), P (La Palma), G (La Gomera), T (Tenerife), C (Gran Canaria), F (Fuerteventura) and L (Lanzarote); Madeira: MA (Madeira), PS (Porto Santo), DE (Deserta); S (Salvagems); Cape Verde: SA (Sao Antao), SN (Sao Nicolau), SV (Sao Vicente), FO (Fogo), ST (Santiago), BR (Brava).

form a group together with Madeira. The distance between Cape Verde and the Canaries was shortest for liverworts, while for mosses a shortest distance was found with Madeira.

Bryophyte richness in the Macaronesian islands was most strongly correlated with vascular plant richness, altitude and precipitation ($p \leq 0.01$), and also, at the significance level of $p \leq 0.05$, with island area and latitude.

DISCUSSION

The Canary Islands have a remarkably rich bryophyte flora, taking into consideration their latitude, at the southern limit of the Mediterranean region. The bryophyte richness in this archipelago (499 species) is comparable to that of the northern archipelagos of the Azores and Madeira, with 438 and 542 species, respectively (Gabriel *et al*., 2005; Sérgio *et al*., 2008)). The high bryophyte richness in the Canaries is largely related to their high diversity in land forms as regards altitude, age, and the presence of well-developed laurel forests.

The analysis of species distribution in the Canary Islands showed that only 26% of the species have a general distribution in this archipelago. For most of the non-restricted species (i.e., those occurring on more than two islands), the different distribution patterns may be related mainly to altitude and precipitation. Thus, 13% of the species occur on all islands with the exception of Lanzarote and Fuerteventura. The absence in these two islands of a well developed thermo-Mediterranean bioclimatic belt explains their low species richness (see Tab. 2). Differences in the bryophyte flora of these islands are explained more by the absence of the species restricted to the higher bioclimatic belts, than by the presence of exclusive species. In the Canaries, island age does not seem to have such a high correlation with species richness as shown by Frahm (2005) for the Azores. However, this factor seems to have a high influence on the low species number on El Hierro, the youngest island in the Canaries. Among the 41 species distributed in the western islands, 18 are absent from Hierro. The recent age of this island (only 0.8 myr) can be correlated with the absence of some important habitats for species richness, such as wet habitats. Many species restricted to this type of habitat are present on all the western islands and absent from Hierro (e.g. *Homalia* sp. pl., *Oxyrrhynchium hians, Platyhypnidium riparioides, Rhynchostegiella* sp. pl., etc.).

Another aspect that undoubtedly influences species distribution is the state of conservation of the habitats. The great reduction of the laurel forest in Gran Canaria and its poor state of conservation could be the main reason for the absence of the 42 species that show an otherwise western distribution in the archipelago. Differences in the conservation state of this forest type might also explain the similar species richness of Gran Canaria and La Gomera, the latter with a smaller area and lower altitude.

A distribution pattern restricted to the higher islands (Tenerife, La Palma and Gran Canaria) includes only 16 species. This low species number is related to the scarce representation of the supra-Mediterranean bioclimatic belt in Gran Canaria. However, this belt includes many species restricted to La Palma and Tenerife (e.g. *Amphidium lapponicum*, *Grimmia anodon, Ptychostomum pallens,* etc.), or restricted to one of the two islands e.g. *Coscinodon cribosus* on Tenerife and *Neckera menziesii* on La Palma.

All the analyses clearly indicate that there are two different groups of islands in the Canaries as regards their bryophyte flora. Lanzarote and Fuerteventura show higher similarity with some Cape Verde islands in the analysis of liverworts (see Fig. 3). According to our results, there are differences in the composition of the Macaronesian bryophyte flora between mosses and liverworts, as was also pointed out by Vandenpoorten *et al.* (2007). In the case of liverworts, some islands of the Canaries and Madeira archipelagos (the poorest in species: Lanzarote, Fuerteventura and Deserta), show greater affinities with the Cape Verde archipelago. Lobin (1982), Grolle & Long (2000) and Vanderpoorten *et al.* (2007) point out that the flora of Cape Verde is more closely related to the flora of sub-Saharan Africa than to those of other Macaronesian archipelagos. However, the driest islands showed higher similarities due to the presence of drought tolerant liverwort species such as *Lunularia cruciata*, *Mannia androgyna, Plagiochasma rupestre*, *Targionia hypophylla*, *Riccia* sp. pl., etc.

Furthermore the DCA analysis for all the Macaronesian archipelagos demonstrates that the Canaries show greater affinity with the flora of Madeira and Porto Santo than with the Azores. These results agree with those obtained by Nicolás *et al.* (1989) for phanerogams. Our analysis distinguishes three groups of islands differentiated by their biogeographical affinities. The first group is formed by the Azores, where there is a higher species number with a northern geographical distribution e.g. *Herbertus borealis* Crundw., as corresponds with their latitude. The Azores islands that lie closest to the Canaries and Madeira have the lowest mean rainfall (Graciosa, Santa Maria and São Miguel). Madeira has greater affinity with the Azores for liverworts than for mosses. The second group comprises the Canaries, Madeira islands and some of the Cape Verde islands (depending on the group: mosses or liverworts, as mentioned previously). Islands in this group are situated in the graph according to their bryophyte richness, which explains why the absences seem to have a high impact in this analysis. Floristically, Porto Santo is closer to the Canary Islands than Madeira in liverworts, but the reverse situation was found in the mosses. Lastly a third group, with a predominance of the tropical component, is formed by the Cape Verde islands. This island group is more clearly differentiated in the mosses. The influence of aridity results in an increased similarity between the drier Macaronesian islands. However, species-rich islands show major differences related to a greater abundance of species but more restricted to each biogeographical region (especially in the case of mosses).

The differences in floristic composition between these three groups mainly depends on latitude, precipitation and distance from the mainland, although these factors do not completely explain bryophyte species composition within each island group. Altitude, an important factor in floristic composition for phanerogams (Nicolás *et al.*, 1989), was mainly correlated with bryophyte richness, especially in the case of mosses. The influence of the distance from the mainland for phanerogams was mainly correlated with the influence that long-distance dispersion of continental species may have (Nicolás *et al.*, 1989). However, in the case of bryophytes, this could be interpreted as being determined by the increase in precipitation as the distance from the continental coast is increased.

The species list for the Canary Islands shows a high proportion (38%) of restricted species (present on only 1 or 2 islands), which may be related to habitat rarity due to both natural and human causes. Fourty-five of these species might be considered data-deficient, since there are no records of them during the past 30 years. Some of them might even be presumed extinct, such as *Sphagnum compactum, Cinclidotus fontinaloides* or *Fontinalis antipyretica*. Other very

restricted species are locally abundant, as it occurs for instance with *Bartramia pomiformis*, *Myurium hochstetteri* or *Telaranea europaea*. However, most of the restricted species grow in very rare habitats, especially in the supra-Mediterranean belt and restricted areas of the laurel forest. There is a clear need to analyse the habitats and frequency of these rare species and to compile a list of endangered bryophytes in the Canary Islands.

SPECIES LIST

ANTHOCEROTOPHYTA

ANTHOCEROTALES

Anthocerotaceae Dumort.

Anthoceros agrestis Paton - H, P, G, T, C.

Anthoceros caucasicus Steph. - P, G, T, C, L.

Anthoceros punctatus L. - H, P, T, C.

Phaeoceros carolinianus (Michx.) Prosk. - P, T, C.

Phaeoceros laevis (L.) Prosk. - P, G, T.

Notothiladaceae (Milde) Müll. Frib. *ex* Prosk.

Phymatoceros bulbiculosus (Brot.) Stotler, W. T. Doyle *et* Crand.-Stotl. (= *Phaeoceros bulbiculosus* (Brot.) Prosk.) - H, P, G, T, C.

MARCHANTIOPHYTA

MARCHANTIALES

Targioniaceae Durmort.

Targionia hypophylla L. - H, P, G, T, C, F, L.

Targionia lorbeeriana Müll. Frib. - **H** [Allorge & Jovet-Ast (1956); Eggers (1982)], **P** [Arnell (1961); Eggers (1982)], **G** [Schwab *et al.* (1986)], **T** [Arnell (1961); Augier & Noailles (1968); Eggers (1982)], **C** [Arnell (1961); Koppe & Düll (1986)], **F** [Malme (1988)], **L** [During (1981)].

This species was not recognized by Dirkse *et al.* (1993) as distinct from *T. hypophylla*. Zamora *et al.* (1990) and Boisselier-Dubayle & Bischler (1999) pointed out the morphological continuity of characters between the two species. According to Grolle & Long (2000), the *T. hypophylla* and *T. lorbeeriana* complex is far from being clearly understood, although these authors still recognise both species.

Aytoniaceae Cavers

Asterella africana (Mont.) A. Evans - H, P, G, T, C, F.

Mannia androgyna (L.) A. Evans - H, P, G, T, C, F, L.

Plagiochasma rupestre (J. R. Forst. *et* G. Forst.) Steph. - H, P, G, T, C, F, L.

Reboulia hemisphaerica (L.) Raddi - H, P, G, T, C, F.

Conocephalaceae Müll. Frib. *ex* Grolle

Conocephalum conicum (L.) Dumort. - T, C.

Lunulariaceae H. Klinggr.

Lunularia cruciata (L.) Lindb. - H, P, G, T, C, L.

Cleveaceae Cavers

Athalamia spathysii (Lindenb.) S. Hatt. - H, P, T, C, F.

Marchantiaceae (Bisch.) Lindl.

Dumortiera hirsuta (Sw.) Nees - H, P, G, T, C.

Marchantia paleacea Bertol. - P, G.

Marchantia polymorpha L. - P, G, T, C.

subsp. ***montivagans*** Bischl. *ex* Boisselier - G [Long *et al*. (1981) as *M. alpestris* (Nees) Burgeff; Dirkse *et al.* (1993) as *M. alpestris*], P [Schiffner (1902) as *M. polymorpha* var. *alpestris* (Nees) Nees; Arnell (1961) as *M. polymorpha* var. *alpestris*, Long *et al*. (1981) as *M*. *alpestris*; Dirkse *et al.* (1993) as *M. alpestris*), C (Dirkse *et al.* (1993) as *M. alpestris*].

subsp. ***ruderalis*** Bischl. - P [Pitard & Corbière (1907); Eggers (1982)], G [Eggers (1982), T [Pitard & Corbière (1907); Eggers (1982)], C [Bryhn (1908); Arnell (1961); Eggers (1982)].

subsp. ***polymorpha*** - G [Pitard & Corbière (1907) as *M. polymorpha* var. *aquatica* Nees].

All three subspecies recognized by Bischler & Boisselier (1991), *montivagans*, *polymorpha* and *ruderalis*, have been reported in the Canary Islands, but even after 1991 many reports do not mention any subspecies. Consequently the precise distribution of the three subspecies is not known in the Canary Islands.

Exormothecaceae Müll. Frib. *ex* Grolle

Exormotheca pustulosa Mitt. - H, P, G, T, C, L.

Corsiniaceae Engler

Corsinia coriandrina (Spreng.) Lindb. - H, P, G, T, C.

Oxymitraceae Müll. Frib. *ex* Grolle

Oxymitra incrassata (Brot.) Sérgio *et* Sim-Sim - H, P, G, T, C, F.

Ricciaceae Rchb.

Riccia atromarginata Levier - H, P, T, C, F.

Riccia bicarinata Lindb. - C.

Riccia bifurca Hoffm. - P, G, T.

Riccia cavernosa Hoffm. - G, T, C, L.

Riccia ciliata Hoffm. - H, P, G, T, C, F.

Riccia ciliifera Link *ex* Lindenb. - T, C.

Riccia crinita Taylor (= *R. canescens* Steph., *R. trichocarpa* M. Howe) - **T** [Koppe & Düll (1982)], **C** [Dort & Nieuwkoop (2003)].

Dirkse *et al*. (1993) followed Damsholt (1989), who synonymized *R. canescens* with *R. ciliata* Hoffm., but Jovet-Ast (1994) kept *R. ciliata* as a distinct species of *R. canescens* and considered the latter a synonym of *R. trichocarpa*, whose valid name is at present *R. crinita*.

Riccia crozalsii Levier - H, G, T, C, L.

Riccia crystallina L. emend. Raddi - T, C, F, L.

Riccia glauca L. - P, **G** [González-Mancebo *et al.* (2003, 2008)], T, C.

Riccia gougetiana Durieu *et* Mont. - H, P, G, T, C, F.

Riccia lamellosa Raddi - H, P, G, T, C, F, L.

Riccia ligula Steph. - P.

Riccia macrocarpa Levier - P, G, T, C.

Riccia nigrella DC. - H, P, G, T, C, F, L.

Riccia papillosa Moris - H, P, G, T, C.

Riccia sorocarpa Bisch. - H, P, G, T, C, F, L.

Riccia subbifurca Warnst. *ex* Croz. - G, T, C.

****Riccia teneriffae* S. W. Arnell - T.

This seems to be a doubtful species, since there have been no records since its original description (Arnell, 1962), nor was it considered by Jovet-Ast (1986) in her study of the Mediterranean species of the genus *Riccia*.

Riccia trabutiana Steph. - H, P, G, T, C, F

Riellaceae Engler

Riella affinis M. Howe *et* Underw. - T, C.

Riella cossoniana Trab. - C.

Riella notarisii (Mont.) Mont. - **C** [Dort & Nieuwkoop (2003)].

Sphaerocarpaceae (Dumort.) Heeg

Sphaerocarpos michelii Bellardi - T, **C** [Dort & Nieuwkoop (2003)], F, L.

Sphaerocarpos texanus Austin - H, T, C, F.

Metzgeriaceae H. Klinggr.

Aneura pinguis (L.) Dumort. - P, G, T, C.

Fossombronia angulosa (Dicks.) Raddi - H, P, G, T, C, F.

Fossombronia caespitiformis De Not. ex Rabenh. subsp. ***caespitiformis*** - P, G, T, C, F, L.

subsp. ***multispira*** (Schiffn.) J. R. Bray *et* D. C. Cargill (= *F. husnotii* Corb.) - P, G, T, C.

Fossombronia echinata Macvicar - T, C.

Fossombronia pusilla (L.) Nees - H, P, G, T, C, F.

Metzgeria conjugata Lindb. - T.

Metzgeria furcata (L.) Dumort. - H, P, G, T, C, L.

Metzgeria leptoneura Spruce - T.

Metzgeria temperata Kuwah. -**T** [Werner (2008)].

Riccardia chamedryfolia (With.) Grolle - P, G, T, C.

Riccardia multifida (L.) Gray - P, T.

JUNGERMANNIALES

Lophoziaceae Cavers

Gymnocolea inflata (Huds.) Dumort. - Canary Islands.

Jungermannia atrovirens Dumort. - P, G, T.

Jungermannia callithrix Lindenb. *et* Gottsche - **G** [Werner (2008)].

Jungermannia gracillima Sm. - P, T.

Jungermannia hyalina Lyell - P, G, T, C.

Jungermannia leiantha Grolle - T.

Jungermannia pumila With. - P, G ,T.

Leiocolea heterocolpos (Thed. *ex* Hartm.) H. Buch (= *Lophozia heterocolpos* (Thed. *ex* Hartm.) Howe) - P.

Leiocolea turbinata (Raddi) H. Buch (= *Lophozia turbinata* (Raddi) Steph.) - T.

Lophozia bicrenata (Schmidel *ex* Hoffm.) Dumort. - H, P, G, T.

Lophozia excisa (Dicks.) Dumort. - H, G, T.

Nardia geoscyphus (De Not.) Lindb. - T.

Nardia scalaris Gray - H, P, G, T.

Tritomaria exsecta (Schmidel *ex* Schrad.) Loeske - **G** [González-Mancebo *et al.* (2003, 2008)], T.

Gymnomitriaceae H. Klinggr.

Marsupella emarginata (Ehrh.) Dumort. - H, P, G, T, C.

Marsupella funckii (F. Weber *et* D. Mohr) Dumort. - C.

Marsupella profunda Lindb. - P.

Arnelliaceae Nakai

Southbya nigrella (De Not.) Henriq. - P, G, F.

Southbya tophacea (Spruce) Spruce - **P** [González-Mancebo *et al.* (1996)], T.

Gongylanthus ericetorum (Raddi) Nees - H, P, G, T, C, L.

Plagiochilaceae (Jörg.) Müll. Frib.

Plagiochila bifaria (Sw.) Lindenb. (= *P. killarniensis* Pearson) - H, P, G, T, F.

Plagiochila exigua (Taylor) Taylor - P, G T.

*****Plagiochila maderensis*** Gottsche *ex* Steph. - **G** [González-Mancebo *et al*. (2008)].

This species was reinstated as a Madeiran endemic by Rycroft *et al*. (2004) and later reported in the Canary Islands by Sim-Sim *et al.* (2005) from herbarium specimens identified previously as *P. spinulosa.* These authors did not publish any details of the locality or island from which the specimens originated. Recently, it has been recorded in La Gomera (González-Mancebo *et al.*, 2008). According to the comments of Sim-Sim *et al.* (2005), a revision of the specimens previously identified as *P. spinulosa* will probably increase the known occurrences of this species in the Canaries.

Plagiochila porelloides (Torrey *ex* Nees) Lindenb. - P.

Plagiochila punctata (Taylor) Taylor - G, T.

Plagiochila spinulosa (Dicks.) Dumort. - P, G, T.

As mentioned previously under *P. maderensis*, the presence of this species in the Canaries is uncertain, since a revision of the specimens previously identified as *P. spinulosa* is necessary.

Plagiochila stricta Lindenb. - **T** [Blockeel (2002); Rycroft *et al.* (2002)].

Plagiochila virginica A. Evans - H, P, G, T.

According to Heinrichs *et al.* (2002), *P. virginica* rather than *P. dubia* (= *Plagiochila patula* (Sw.) Lindenb.) occurs in Macaronesia. Consequently, reports of *P. dubia* Lindenb. *et* Gottsche included in Dirkse *et al.* (1993) must refer to *P. virginica.*

Geocalycaceae H. Klinggr.

*****Heteroscyphus denticulatus*** (Mitt.) Schiffn. - P, G, T, C.

Lophocolea bidentata (L.) Dumort. - P, G, T, C.

Lophocolea fragrans (Moris *et* De Not.) Gottsche *et al*. - H, P, G, T, C.

Lophocolea heterophylla (Schrad.) Dumort. - P, G, T, C.

Saccogyna viticulosa (L.) Dumort. - H, P, G, T, C.

Scapaniaceae Mig.

Diplophyllum albicans (L.) Dumort. - H, G, T.

Scapania compacta (A. Roth) Dumort. - H, P, G, T, C.

Scapania curta (Mart.) Dumort. - G, T.

Scapania gracilis Lindb. - P, G, T.

Scapania nemorea (L.) Grolle - G, T.

Scapania undulata (L.) Dumort. - P, G, T, C.

Adelanthaceae (Jörg.) Grolle

Cephalozia bicuspidata (L.) Dumort. - P, G, T.

Cephaloziella baumgartneri Schiffn. - P, G, T, C, F.

Cephaloziella calyculata (Durieu *et* Mont.) Müll. Frib. - H, P, **G** [González Mancebo *et al.* (2008)], T, C.

Cephaloziella dentata (Raddi) Steph. - **T** [Brullo *et al.* (2004)].

Cephaloziella divaricata (Sm.) Schiffn. - **H** [Zippel, 1998)], P, G, T, C.

Cephaloziella hampeana (Nees) Schiffn. - T.

Cephaloziella rubella (Nees) Warnst. - **P** [Zippel (1998)], G, T, **C** [Dort & Nieuwkoop (2003)] , F.

Cephaloziella stellulifera (Taylor *ex* Spruce) Schiffn. - H, P, G, T, F, L.

Cephaloziella turneri (Hook.) Müll. Frib. - H, P, G, T, C.

Lepidoziaceae Limpr.

Lepidozia cupressina (Sw.) Lindenb. - P, G, T.

*****Telaranea azorica*** (H. Buch *et* Perss.) Pócs ex Schumacker *et* Váňa (= *Lepidozia azorica* H. Buch *et* Perss.) - T.

Telaranea europaea J. J. Engel *et* G. L. S. Merrill - **G** [Patiño *et al.* (2006)], T.

According to Engel & Merrill (2004), European and Macaronesian specimens identified as *T. nematodes* (Gottsche *ex* Austin) M. Howe correspond to *Telaranea europea.*

Calypogeiaceae (Müll. Frib.) Arnell

Calypogeia arguta Nees *et* Mont. - P, G, T.

Calypogeia fissa (L.) Raddi - H, P, G, T.

Calypogeia sphagnicola (Arnell *et* J. Perss.) Warnst. *et* Loeske - T.

Calypogeia suecica (Arnell *et* J. Perss.) Müll. Frib. - T.

Radulaceae (Dumort.) Müll. Frib.

Radula aquilegia (Hook. f . *et* Tayl.) Gottsche *et al*. - T.

*****Radula carringtonii*** J. B. Jack - T.

Radula holtii Spruce - **G** [Boecker *et al.* (1993)], T.

*****Radula jonesii*** Bouman *et al.* - T.

Radula lindenbergiana Gottsche *ex* C. Hartm. - H, P, G, T, C, F, L.

*****Radula wichurae*** Steph. - T.

Porellaceae Cavers

Porella arboris-vitae (With.) Grolle - P, G, T, C.

This species was excluded from the Canary Islands by Söderström *et al.* (2002). Fontinha (2005) and Bischler *et al.* (2006) agree with them and consider it to be restricted to southern continental areas and therefore exclude it from Macaronesia. In our opinion, further studies are needed to confirm the exclusion of the species from the Canary Islands, because of the climatic differences between the Canary Islands and Madeira and because the species is present in North Africa.

****Porella canariensis*** (F. Weber) Underw. - H, P, G, T, C, F, L.

Porella obtusata (Tayl.) Trevis. - P, G, T, C.

Porella platyphylla (L.) Pfeiff. - T.

This is a similar case to *Porella arboris-vitae*, also excluded from the Canary Islands by Söderström *et al.* (2002) and from Madeira by Fontinha (2005). Bischler *et al.* (2006) considered this species to have a northern distribution (European, Asiatic and North American). A revision of the Canarian specimens should be conducted to clarify its status in the Canarian archipelago.

Frullaniaceae Lorch

****Frullania azorica*** Sim-Sim *et al.* - H, P, **G** (Zippel, 1998), T, C, F.

Sim-Sim *et al.* (1995) proposed that the Macaronesian specimens identified as *Frullania cesatiana* De Not. and *F. muscicola* Steph. (= *F. cesatiana* var. *muscicola* (Steph.) Bisang *et al.* nom. nud.) correspond to *Frullania azorica*. Also the reports from the Canary Islands of *F. obscurifolia* Mitt. belong to *Frullania azorica* (Grolle & Long, 2000) and likewise those of *F. riparia* Hampe *ex* Lehm. (Casas *et al*., 1989***).***

Frullania dilatata (L.) Dumort. - H, P, G, T, C, F, L.

Frullania ericoides (Nees) Mont. - H, P, G, T, C.

Frullania fragilifolia (Taylor) Gottsche *et al*. - **P** [Pitard & Corbière (1907); Engler (1910)], G, **T** [Engler (1910)].

Dirkse *et al*. (1993) did not report this species from La Palma and Tenerife; however Losada-Lima *et al.* (2004) corrected the omission.

Frullania microphylla (Gottsche) Pearson - P, G, T, F, L.

*****Frullania polysticta*** Lindenb. - H, P, G, T, C, F, L.

Frullania tamarisci (L.) Dumort. - H, P, G, T, C, F, L.

Frullania teneriffae (F. Weber) Nees - H, P, G, T, C, F.

Jubulaceae H. Klinggr.

Jubula hutchinsiae (Hook.) Dumort. subsp. ***hutchinsiae*** - P, G, T.

According to Sim-Sim *et al.* (2002), two varieties have been recognized *for Jubula hutschinsiae* subsp. *hutchinsiae* in Macaronesia (var. *hutchinsiae* and var. *integrifolia* Lindb.), the latter frequent in the Canary Islands, but nomeclatural and taxonomic problems still exist with these names as stated by Ros *et al.* (2007) and Söderström *et al.* (2007).

Lejeuneaceae Casares-Gil

Acanthocoleus aberrans (Lindenb. *et* Gottsche) Kruijt - P, G, T.

Drepanolejeunea hamatifolia (Hook.) Schiffn. - H, G, T.

Harpalejeunea molleri (Steph.) Grolle - H, P, G, T.

*****Lejeunea canariensis*** (Steph.) Steph. - H, P, T, C.

Grolle & Long (2000) indicated that the Macaronesian specimens identified as *Lejeunea laetevirens* Nees *et* Mont. belong to the endemic species *L. canariensis*.

Lejeunea cavifolia (Ehrh) Lindb. - **T** [Augier & Noailles (1968)].

Dirkse *et al.* (1993) following Arnell (1961) indicated that this species was absent from the Canary Islands. However, the species had been reported by Augier & Noailles (1968), a record that probably has been later overlooked. In our opinion further studies are needed to definitively establish its absence in the Canary Islands.

Lejeunea eckloniana Lindenb. - H, P, G, T, C.

Lejeunea flava (Sw.) Nees - P, T.

Lejeunea lamacerina (Steph.) Schiffn. - P, G, T, C.

Lejeunea mandonii (Steph.) Müll. Frib. - P, T, C.

Marchesinia mackaii (Hook.) Gray - P, G, T, C, F.

Microlejeunea ulicina (Taylor) A. Evans (= *Lejeunea ulicina* (Taylor) Gottsche *et al.*) - H, P, G, T, C.

Cololejeuneaceae Herzog *ex* Grolle

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

Aphanolejeunea sintenisii Steph. (= *A. teotonii* V. Allorge *et* Ast) - P, T.

Cololejeunea minutissima (Sm.) Schiffn. - H, P, G, T, C, F, L.

*****Cololejeunea schaeferi*** Grolle - H, P, G, T.

As Dirkse *et al.* (1993) mentioned, Grolle (1985) showed that all records of *Cololejeunea calcarea* (Lib.) Schiffn. from the Canary Islands belonged to *C. schaeferi*. These authors excluded *C. calcarea* from their checklist, despite indicating that it had been reported from Fuerteventura by Malme (1988). We agree with Dirkse *et al.* (1993) that the material of Malme (1988) should be revised before including *C. calcarea* in the species list.

Colura calyptrifolia (Hook.) Dumort. - G, T.

BRYOPHYTA

SPHAGNOPSIDA

SPHAGNALES

Sphagnaceae Dumort.

Sphagnum compactum Lam. *et* DC. - T.

ANDREAEOPSIDA

ANDREAEALES

Andreaceeae Dumort.

Andreaea heinemannii Hampe *et* Müll. Hal. subsp. ***crassifolia*** (Luisier) Sérgio - P, T, C.

POLYTRICHOPSIDA

POLYTRICHALES

Polytrichaceae Schwägr.

Atrichum angustatum (Brid.) Bruch *et* Schimp. - T.

Atrichum undulatum (Hedw.) P. Beauv. - P, T.

Pogonatum aloides (Hedw.) P. Beauv. - H, P, G, T, C.

Pogonatum nanum (Hedw.) P. Beauv. - P, **G** [González-Mancebo *et al.* (2003, 2008)], T, C.

Pogonatum urnigerum (Hedw.) P. Beauv. - C.

Polytrichastrum formosum (Hedw.) G. L. Sm. - G, T.

Polytrichum commune Hedw. - T, C.

Polytrichum juniperinum Hedw. - H, P, G, T, C, L

Polytrichum piliferum Hedw. - H, P, G, T, C

BRYOPSIDA

ENCALYPTALES

Encalyptaceae Schimp.

Encalypta streptocarpa Hedw. - P, **T** [González-Mancebo *et al.* (1996)].

Encalypta vulgaris Hedw. - H, P, T, C, F.

FUNARIALES

Funariaceae Schwägr.

Entosthodon attenuatus (Dicks.) Bryhn - H, P, G, T, C, F [Sunding (1969)], L.

Entosthodon convexus (Spruce) Brugués (= *Funaria convexa* Spruce) - **H** [Störmer (1959) as *F. dentata* var. *convexa* (Spruce) Bott.], **P** [Störmer (1959) as *F. dentata* var. *convexa*; Düll (1980); Casas *et al*. (1996)], **G** [Schwab *et al*. (1986); González-Mancebo *et al*. (2007)], **T** [Crundwell & Nyholm (1974); Schwab & Haustein (1984)], **C** [Sunding (1966) as *F. dentata* var. *convexa*; Sunding (1967) as *F. dentata* var. *convexa*; Crundwell & Nyholm (1974); Schwab & Haustein (1984); Koppe &

Düll (1986); Blockeel (2002)], **F** [Malme (1988); Casas *et al*. (1996)], **L** [Malme (1977) as *F. calcarea* var. *convexa* (Spruce) Husn.].

This species was considered by Dirkse *et al.* (1993) as a synonym of *Funaria muhlenbergii* Turner. However, it was accepted as a distinct species by Hill *et al*. (2006).

Entosthodon durieui Mont. (= *E. pallescens* Jur.) - T.

Entosthodon fascicularis (Hedw.) Müll. Hal. - C, F.

*****Entosthodon krausei*** Besch. - **H** [González-Mancebo & Losada-Lima (1990) as *Funaria fritzei* Geh.; González-Mancebo *et al.* (1996)], **P** [González-Mancebo & Losada-Lima (1990) as *Funaria fritzei*; González-Mancebo *et al.* (1996)], G, T.

In accordance with Hill *et al.* (2006) this taxon needs further elucidation, and, following these authors and Losada-Lima *et al*. (2001b, 2004), we consider *Funaria fritzei* Geh. as a synonym of *Entosthodon krausei.*

Entosthodon muhlenbergii (Turner) Fife (= *Funaria muhlenbergii* Turner) - H [González-Mancebo & Losada-Lima (1990)], **P** [González-Mancebo & Hernández-García (1996)], **G** [González-Mancebo *et al*. (2008)], **T** [Montagne (1840); Pitard & Negri (1907) as *Funaria fontanesi* Schwägr; Bryhn (1908) as *F. dentata* Crome; Geheeb & Herzog (1910) as *Funaria dentata* and *Funaria mediterranea* Lindb.; Ade & Koppe (1942) as *Funaria dentata*; Schwab & Haustein (1984)], **C** [Schiffner (1902); Pitard & Negri (1907) as *Funaria fontanesi*; Bryhn (1908) as *F. dentata* and *F. mediterranea*; Geheeb & Herzog (1910) as *F. dentata* and *F. mediterranea*; Dort & Nieuwkoop (2003)].

Entosthodon obtusus (Hedw.) Lindb. - H, G, T.

Entosthodon pulchellus (H. Philib.) Brugués (= *Funaria pulchella* H. Philib.) - **H** [Casas *et al*. (1996)], **P** [Long *et al.* (1981); González-Mancebo & Hernández-García (1996)], **G** [Schwab *et al*. (1986)], **T** [Crundwell & Nyholm (1974); Schwab & Haustein (1984); González-Mancebo *et al*. (1991)], **C** [Casas *et al*. (1996)], **L** [During (1981); Malme (1988); González-Mancebo *et al*. (1996)].

This species was considered by Dirkse *et al.* (1993) as a synonym of *Funaria muhlenbergii* Turner. However, it was accepted as a distinct species by Hill *et al*. (2006).

Entosthodon schimperi Brugués - **P** [Brugués *et al.* (2001)], **C** [Brugués *et al.* (2001)].

Funaria hygrometrica Hedw. - H, P, G, T, C, F, L.

Funariella curviseta (Schwägr.) Sérgio - T, C, F, L.

Goniomitrium seroi Casas - H, P, G, T, C.

Physcomitrium pyriforme (Hedw.) Bruch *et* Schimp. - T, C.

Pyramidula tetragona (Brid.) Brid.- C.

Gigaspermaceae Lindb.

Gigaspermum mouretii Corb. - H, P, G, T, C, F, L.

Oedipodiella australis (Wager *et* Dixon) Dixon - P, **C** [(Dort & Nieuwkoop (2003)], F.

GRIMMIALES

Grimmiaceae Arn.

Coscinodon cribrosus (Hedw.) Spruce - T.

Grimmia anodon Bruch *et* Schimp. - **P** [González-Mancebo *et al.* (2004)], T.

Grimmia crinita Brid. - T.

******Grimmia curviseta*** Bouman - P, T.

Grimmia decipiens (Schultz) Lindb. - H, P, G, T, C.

Grimmia donniana Sm. - T.

This species was included in the list for Tenerife by Eggers (1982), based on reports by Renauld & Cardot (1902) and Dixon (1911). The first authors based their report on *Grimmia fragilis* Schimp. This taxon is now considered a synonym of *G. montana* Bruch *et* Schimp., but it was treated in Wijk *et al*. (1962) as a synonym of *G. donniana*, because these authors followed Habeeb (1950) for the taxonomy of the group. Dixon (1911) based his record on a sterile collection, as did González-Mancebo *et al*. (1991). According to Jesús Muñoz (pers. comm.), the occurrence of the autoicous and always richly fruiting *G. donniana* in the Canary Islands is very doubtful. A further revision of the herbarium specimens is needed to confirm the occurrence of this species in the Canary Islands.

Grimmia funalis (Schwägr.) Bruch *et* Schimp. - H, T.

Grimmia laevigata (Brid.) Brid. - H, P, G, T, C, F, L.

Grimmia lisae De Not (= *G. azorica* Renauld *et* Cardot, *G. canariensis* Schimp. *ex* Paris nom. nud., *G. trichophylla* f. *propagulifera* H. Winter nom. illeg.) - **P** [González-Mancebo *et al.* (2004)], **G** [González-Mancebo *et al.* (2007, 2008); Werner (2008)]; **T** [Paris (1895) as *G. canariensis*; Bryhn (1908); Winter (1914) as *G. trichophylla* f. *propagulifera*; Dixon (1908) as *G. azorica;* Armitage (1926) as *G. azorica*; Ade & Koppe (1942); Greven (1995); Blockeel (2002)].

Grimmia longirostris Hook. - **T** [Muñoz (1998a)].

Grimmia montana Bruch *et* Schimp. - P, T, C.

Grimmia nutans Bruch - **C** [Dirkse & Greven (1993) as *G. meteorae* C. Towns.)].

Grimmia orbicularis Bruch *ex* Wilson - P.

Grimmia ovalis (Hedw.) Lindb. - P, T, C.

Grimmia pulvinata (Hedw.) Sm. - H, P, G, T, C, F, L.

Grimmia ramondii (Lam. *et* DC.) Margad. (= *Dryptodon patens* (Hedw.) Brid.) - T.

Grimmia tergestina Tomm. *ex* Bruch *et* Schimp. - T.

Grimmia torquata Drumm. - P, T.

Grimmia trichophylla Grev. (= *G. meridionalis* (Müll. Hal.) E. Maier - H, P, G, T, C, F, L.

Grimmia ungeri Jur (= *G. canadensis* H. Winter *nom. illeg. non* Kindb.) -**T** [Winter (1914) as *G. canadensis*; Muñoz (1998b)].

Racomitrium aciculare (Hedw.) Brid. - H, P, G, T.

Racomitrium aquaticum (Schrad.) Brid. -T.

Racomitrium ellipticum (Turner) Bruch *et* Schimp. - T.

Racomitrium heterostichum (Hedw.) Brid. - H, P, G, T.

Racomitrium lanuginosum (Hedw.) Brid. - H, P, G, T.

Schistidium apocarpum (Hedw.) Bruch *et* Schimp. - H, P, G, T.

Schistidium flaccidum (De Not.) Ochyra - H, P, T, C.

Schistidium frigidum H. H. Blom - **T** [Smith (2004)].

Ptychomitriaceae Schimp.

Campylostelium pitardii (Corb.) E. Maier (= *Grimmia pitardii* Corb.) - P.

Campylostelium strictum Solms - G, T.

Ptychomitrium nigrescens (Kunze) Wijk *et* Margad. - H, P, G, T, C, F.

Ptychomitrium polyphyllum (Sw.) Bruch *et* Schimp. - **H** [Zippel (1998)], P, T.

ARCHIDIALES

Archidiaceae Schimp.

Archidium alternifolium (Hedw.) Mitt. - H, P, G, C.

DICRANALES

Fissidentaceae Schimp.

Fissidens adianthoides Hedw. - T.

Fissidens asplenioides Hedw. - T.

Fissidens bryoides Hedw. - H, P, G, T, C, F, L.

Dirkse *et al.* (1993) considered *F. viridulus* (Sw.) Wahlenb. as a synonym of *F. bryoides*. However, it was segregated as a different species by Hill *et al.* (2006). We have included the islands listed by Dirkse *et al*. (1993) for this species; but a thorough revision is needed to establish the identity of the specimens reported from the Canary Islands.

*****Fissidens coacervatus*** Brugg.-Nann. - G, T, C.

Fissidens crassipes Wilson *ex* Bruch *et* Schimp. subsp. ***warnstorfii*** (M. Fleisch.) Brugg- Nann. - P, G, T, C.

Fissidens crispus Mont. - **P** [Eggers (1982) as *F. minutulus* Sull.], **T** [Bruggeman-Nannenga (1978) as *F. minutulus;* Eggers (1982) as *F. minutulus*], **C** [Eggers (1982) as *F. minutulus*]**, L** [Eggers (1982) as *F. minutulus*].

This species was not considered by Dirkse *et al.* (1993). However, it was accepted as a distinct species by Hill *et al.* (2006). We have included the island records listed by Eggers (1982), but a thorough revision is needed to establish its distribution in the Canary Islands.

Fissidens curvatus Hornsch. (= *F. algarvicus* Solms) - H, P, G, T, C, F, L.

Fissidens dubius P. Beauv. - P, G, T.

Fissidens exilis Hedw. - G.

Fissidens ovatifolius R. Ruthe - P, G, T, C.

Fissidens polyphyllus Wilson *ex* Bruch *et* Schimp. -T.

Fissidens rivularis (Spruce) Schimp. - P, T.

Fissidens serratus Müll. Hall. (= *F. papillosus* Sande Lac.) - G.

Fissidens serrulatus Brid. - P, G, T, C.

Fissidens luisieri P. de la Varde was described from the Azores by Potier de la Varde (1955) and reported from the Canary Islands (P, G, T) by Sérgio *et al.* (1997). The morphological delimitation of the species remains controversial, and current studies using molecular thechniques indicate that these two names correspond to a single species (Werner *et al*. unpublished data).

Fissidens sublimbatus Grout - **H** [Ros *et al.* (2001)], **P** [González-Mancebo *et al.* (2004)], **T** [Ros *et al.* (2001)], **C** [Ros *et al.* (2001)], **F** [Ros *et al.* (2001)], **L** [Ros *et al.* (2001)].

Fissidens taxifolius Hedw. - H, P, G, T, C, F.

subsp. ***pallidicaulis*** (Mitt.) Mönk. (= *F. pallidicaulis* Mitt.) - H [Störmer (1959)], P [Schiffner (1902); Geheeb & Herzog (1910); Störmer (1959)]; Lohmeyer & Trautmann (1970)], G [Pitard & Negri (1907); Störmer (1959)], T [Mitten (1870); Schiffner (1901, 1902); Renauld & Cardot (1902) as *F. pallidicaulis*; Pitard & Negri (1907); Borgesen (1924) as *F. pallidicaulis*; Störmer (1959)], C [Koppe & Düll (1986)], L [Malme (1988)].

Both taxa recognized by Hill *et al.* (2006) (*F. taxifolius* subsp. *taxifolius* (Müll. Hal.) Pursell *et* Brugg.-Nann. and *F. taxifolius* subsp. *pallidicaulis*) have been reported from the Canary Islands. However, due to the variations in the species concept (since *F. pallidicaulis* has been considered as a synonym of *F. taxifolius* and other authors have distinguished varieties or subspecies), it is not currently possible to know to which of the subspecies distinguished by Hill *et al.* (2006) the previous records refer. For this reason, only reports indicating subsp. *pallidicaulis* are included here.

Fissidens viridulus (Sw. *ex* anon.) Wahlenb. - **H** [Pitard & Negri (1907) as *F. incurvus* Starke *ex* Röhl. ; González-Mancebo *et al.* (1996) as *F. limbatus* var. *bambergeri* (Schimp. *ex* Milde) Düll], **P** [Pitard & Negri (1907) as *F. incurvus*; Störmer (1959) as *F. bambergeri* Milde; González-Mancebo *et al.* (1989a)], **G** [Schwab *et al.* (1986)], **T** [Mitten (1870); Bryhn (1908) as *F. incurvus*; Winter (1914) as *F. incurvus*; Mägdefrau (1943); Schwab & Haustein (1984); Wijlens (1987); Losada-Lima & Beltrán-Tejera (1987); González-Mancebo *et al.* (1989b, 1991) as *F. incurvus* and *F. viridulus*; Hernández-García *et al.* (1991); Casas (1995)], **C** [Störmer (1959) as *F. bambergeri*; Sunding (1967, 1972); Dort & Nieuwkoop (2003)], **F** [Sunding, (1971); Malme (1988) as *F. viridulus* var. *bambergeri* (Schimp. *ex* Milde) Waldh.], **L** [Störmer (1959) as *F. bambergeri*; Malme (1977) as *F. bambergeri*; Malme (1988) as *F. viridulus* var. *bambergeri*; González-Mancebo *et al.* (1996) as *F. limbatus* var. *bambergeri*].

This species was considered a synonym of *Fissidens bryoides* by Dirkse *et al.* (1993), for which reason a thorough revision is needed to establish the distribution of the two species in the Canary Islands. Both varieties accepted by Hill *et al.* (2006) for *F. viridulus* (var. *incurvus* (Starke *ex* Röhl.) Waldh. and var. *viridulus*) have been reported from the Canary Islands.

Ditrichaceae Limpr

Ceratodon conicus (Hampe) Lindb. - **P** [Smith (2004)], **T** [Bryhn (1908); Winter (1914) as *C. purpureus* var. *graefii* Limpr.; Störmer (1959); Smith (2004)].

Ceratodon purpureus (Hedw.) Brid. - H, P, G, T, C.

subsp. ***purpureus*** - H [Schiffner (1902) as *C. purpureus* var. *brevifolius* Milde], T [(Augier & Noailles (1968)], C [Schiffner (1902) as *C. purpureus* var. *canariensis* Schiffn.].

subsp. ***stenocarpus*** (Bruch. *et* Schimp. *ex* Müll. Hal.) Dixon - T [Augier & Noailles (1968) as *C. stenocarpus* var. *corsicus* Bruch *et* Schimp.].

Cheilothela chloropus (Brid.) Broth. - H, P, G, T, C, L.

Ditrichum pusillum (Hedw.) Hampe - T.

Ditrichum subulatum Hampe - P, G, T, C.

Pleuridium acuminatum Lindb. - H, P, G, T, C.

Pleuridium subulatum (Hedw.) Rabenh. - P, **T** [Geheeb & Herzog (1910)].

Rhamphidium purpuratum Mitt. - **G** [Patiño *et al.* (2006)], T.

Trichodon cylindricus (Hedw.) Schimp. (= *Ditrichum cylindricum* (Hedw.) Grout) - T.

Rhabdoweisiaceae Limpr.

Amphidium lapponicum (Hedw.) Schimp. - P, T.

Amphidium mougeotii (Schimp.) Schimp. - **P** [González-Mancebo *et al.* (2004)], T.

Amphidium tortuosum (Hornsch.) Cufod. (= *A. curvipes* (Müll. Hal.) Broth.) - H, P, G, T, C.

Dicranoweisia cirrata (Hedw.) Lindb. - H, P, G, T, C.

Cynodontium bruntonii (Sm.) Bruch *et* Schimp. (= *Oreoweisia bruntonii* (Sm.) Milde) - G, P, T.

Rhabdoweisia fugax (Hedw.) Bruch *et* Schimp. - H, P, G, T, **C** [Dort & Nieuwkoop (2003)].

Dicranaceae Schimp.

Dicranella heteromalla (Hedw.) Schimp. - H, P, G, T, C.

Dicranella howei Renauld *et* Cardot - **P** [Eggers (1982); Losada-Lima *et al.* (1993)], **G** [Schwab *et al.* (1986); Werner (2008)], **T** [Eggers (1982); Losada-Lima & Beltrán-Tejera (1987); Losada-Lima *et al.* (1990); González-Mancebo *et al.* (1991)], **C** [Long *et al.* (1981)], **L** [During (1981); Malme (1988)].

Dirkse *et al.* (1993) considered this species as a synonym of *Dicranella varia* (Hedw.) Schimp., but other works segregate the two species, as do Hill *et al.* (2006). A thorough revision is needed to establish the distribution of the two species in the Canary Islands.

Dicranella staphylina H. Whitehouse - **T** [Smith (2004)].

Dicranella varia (Hedw.) Schimp. (= *Anisothecium varium* (Hedw.) Mitt.) - **P** [Pitard & Negri (1907) as *Dicranella rubra* Lindb.; Düll (1980): Eggers (1982)], **G** [González-Mancebo *et al.* (2008)], **T** [González-Mancebo *et al.* (1991)], **C** [Eggers (1982); Koppe & Düll (1986)].

Dicranum canariense Hampe *ex* Müll. Hal. (*D. scottianum* subsp. *canariense* (Hampe) Corb.) - H, P, G, T, C.

Dicranum flagellare Hedw. - Canary Islands.

Dicranum scoparium Hedw. - P, G, T.

Leucobryaceae Schimp.

Campylopus flexuosus (Hedw.) Brid. - H, P, G, T.

Campylopus fragilis (Brid.) Bruch *et* Schimp. - H, P, G, T, C, F.

Campylopus introflexus (Hedw.) Brid. - **T** [Brullo *et al.* (2004)].

Campylopus pilifer Brid. - H, P, G, T, C.

Leucobryum albidum (P. Beauv.) Lindb. - **P** [Düll (1980)], **T** [Schiffner (1901, 1902) as *Leucobryum madeirense* Schiffn.; Pitard & Negri (1907) as *L. glaucum* var. *albidum* (Brid. *ex* P. Beauv.) Cardot; Bryhn (1908) as *L. madeirense*; Geheeb & Herzog (1910) as *L. glaucum* var. *albidum* and *L. madeirense*; Winter (1914);

Mägdefrau (1943) as *L. glaucum* var. *albidum*; Störmer (1959) as *L. glaucum* var. *albidum*].

Leucobryum glaucum (Hedw.) Ångstr. - **T** [Montagne (1840) as *Dicranum glaucum* Hedw.; Dixon (1911); Pitard & Negri (1907); Bryhn (1908); Ammann *et al.* (2003); Zippel (1998)], **C** [Geheeb & Herzog (1910)].

Dirkse *et al*. (1993) considered *L. juniperoideum* (Brid.) Müll. Hal. as a synonym of *L. glaucum*. However, it is considered as a distinct species by Hill *et al*. (2006). A thorough revision is needed to establish the identity of the specimens reported for the Canary Islands and the distribution of the two species in this archipelago.

Leucobryum juniperoideum (Brid.) Müll. Hal. - **P** [Long (1978); Düll (1980); Schwab & Haustein (1984)], **G** [Schwab *et al.* (1986); González-Mancebo *et al*. (2003, 2008)], **T** [Montagne (1840); Casas (1986); Casas *et al.* (1996)].

Microcampylopus laevigatus (Thér.) Giese *et* J.-P. Frahm - P.

POTTIALES

Pottiaceae Schimp.

Acaulon fontiquerianum Casas *et* Sérgio - C.

Acaulon mediterraneum Limpr - **G** [González-Mancebo *et al*. (2007)].

Acaulon muticum (Hedw.) Müll. Hal. -G, T, C.

Acaulon triquetrum (Spruce) Müll. Hal. - T, **C** [Dort & Nieuwkoop (2003)], F, **L** [Stern (1995)].

Aloina aloides (Koch *ex* Schultz) Kindb. - H, P, G, T, C, F, L.

Aloina ambigua (Bruch *et* Schimp.) Limpr. (= *A. aloides* var. *ambigua* (Bruch *et* Schimp.) E. J. Craig) - **P** [Long *et al*. (1981); González-Mancebo *et al*. (1996, 2004); Gallego *et al*. (1999)], **G** [Störmer (1959); Schwab *et al*. (1986); González-Mancebo *et al*. (2003, 2008)], **T** [Geheeb & Herzog (1910); Winter (1914); Störmer (1959); Schwab & Haustein (1984); Losada-Lima *et al*. (2001a); Werner (2008)], **C** [Bryhn (1908); Sunding (1966, 1967, 1971); Koppe & Düll (1986)], **F** [Sunding (1971, 1972)], **L** [Sunding (1971); Malme (1977); Kunkel (1978); González-Mancebo *et al*. (1996)].

This species was considered by Dirkse *et al*. (1993) as a synonym of *A. aloides*.

Aloina brevirostris (Hook. *et* Grev.) Kindb. - **P** [González-Mancebo *et al.* (2004)], **T** [Gallego & Cano (1998)], **L** [Gallego & Cano (1998); Gallego *et al.* (1999)].

******Aloina humilis*** M. T. Gallego, M. J. Cano *et* Ros - **H** [Gallego *et al.* (1998, 1999)], **T** [Gallego *et al.* (1998, 1999)], **F** [Gallego *et al.* (1998, 1999)].

Aloina rigida (Hedw.) Limpr. - **P** [González-Mancebo *et al.* (2004)], G, T, **C** [Koppe & Düll (1986)], F, L.

Anoectangium aestivum (Hedw.) Mitt. - H, P, G, T, C, F.

Barbula convoluta Hedw. - H, P, T, C, F, L.

Barbula unguiculata Hedw. - H, P, G, T, C, F, L.

Bryoerythrophyllum inaequalifolium (Taylor) R. H. Zander - H, P, G, T, C.

Bryoerythrophyllum recurvirostrum (Hedw.) P. C. Chen - Canary Islands.

Cinclidotus fontinaloides (Hedw.) P. Beauv. - C.

Crossidium aberrans Holz. *et* E. B. Bartram - C.

Crossidium crassinerve (De Not.) Jur. - H, P, G, T, C, F, L.

Crossidium davidai Catches. - **T** [Dirkse & Bouman (1995a); Blockeel (2002)], **C** [Dirkse & Bouman (1995a); Dort & Nieuwkoop (2003)], **F** [Dirkse & Bouman (1995a)], **L** [Dirkse & Bouman (1995a); Stern (1995)].

Crossidium geheebii (Broth.) Broth. - H, P, G, T, C, F, L.

Crossidium squamiferum (Viv.) Jur. - H, P, G, T, C, F, L.

Dialytrichia mucronata (Brid.) Broth. - P, G, T, F.

Didymodon acutus (Brid.) K. Saito - T, C, L.

Didymodon australasiae (Hook. *et* Grev.) R. H. Zander - H, P, G, T, C, F, L.

Didymodon fallax (Hedw.) R. H. Zander - P.

Didymodon insulanus (De Not.) M. O. Hill - **P** [González-Mancebo *et al.* (2004)], **G** [González-Mancebo *et al.* (2008)].

Dirkse *et al.* (1993) considered this species as a synonym of *Didymodon vinealis* (Brid.) R. H. Zander. It remains uncertain to which of the two species many of the Canarian specimens refer.

Didymodon luridus Hornsch. - P, G, T, C, F, L.

Didymodon nicholsonii Culm. - **P** [González-Mancebo *et al.* (2004)].

Didymodon rigidulus Hedw. - H, P, G, T, C, F, L.

Didymodon sicculus M. J. Cano, Ros, García-Zamora *et* J. Guerra - **P** [González-Mancebo *et al.* (2004)], **G** (Patiño *et al.* (2006)], **T** [Jiménez *et al.* (2004)], **C** [Jiménez *et al.*(2004)].

Didymodon tophaceus (Brid.) Lisa - H, P, G, T, C, F, L.

Didymodon umbrosus (Müll. Hal.) R. H. Zander (*D. australasiae* var. *umbrosus* (Müll. Hal.) R. H. Zander - **P** [Long *et al.* (1981)], **T** [González-Mancebo *et al.* (1991)], **C** [Long *et al.* (1981)].

Didymodon vinealis (Brid.) R. H. Zander - H, P, G, T, C, F, L.

Dirkse *et al.* (1993) considered *D. insulanus* as a synonym of *D. vinealis*.

Eucladium verticillatum (With.) Bruch *et* Schimp. - H, P, G, T, C, F.

Gymnostomum aeruginosum Sm. - **T** [Rodríguez Cabrera & Ron Álvarez (1980); González-Mancebo *et al.* (1991)], **C** [Sunding (1967)].

Dirkse *et al.* (1993) followed Zander (1977), who considered *G. aeruginosum* to be a synonym of *G. calcareum* Nees *et* Hornsch. This is a view which is not widely accepted at present since they are commonly recognized as two distinct species.

Gymnostomum calcareum Nees *et* Hornsch. - P, G, T, C, F, L.

Gymnostomum viridulum Brid. - H, P, G, T, C, F, L.

Gyroweisia reflexa (Brid.) Schimp. - P, G, T, C.

Leptophascum leptophyllum (Müll. Hal.) J. Guerra *et* M. J. Cano (= *Chenia rhizophylla* (Sakurai) R. H. Zander) - H, P, **G** [González-Mancebo *et al.* (2003, 2008); Werner (2008)], T, C, F.

Microbryum davallianum (Sm.) R. H. Zander (= *Pottia davalliana* (Sm.) C. E. O. Jensen) - **T** [Koppe & Düll (1982)], **C** [Koppe & Düll (1986)], **L** [During (1981)].

Dirkse *et al.* (1993) considered *M. davallianum* as a synonym of *M. starckeanum*, although most of the Canarian literature has recognized both taxa.

Microbryum starckeanum (Hedw.) R. H. Zander (= *Pottia starckeana* (Hedw.) Müll. Hal.) - **H** [Dirkse *et al.* (1993)], **P** [Dirkse *et al.* (1993)], **G** [Schwab *et al.* (1986)], **T** [Mitten (1870); Geheeb & Herzog (1910); Winter (1914); Crundwell *et al.* (1978)], **C** [Montagne (1840); Bryhn (1908); Long *et al.* (1981); Koppe & Düll (1986); Dort & Nieuwkoop (2003)], **F** [Malme (1988)], **L** [Malme (1977, 1988); González-Mancebo *et al.* (1996)].

Pseudocrossidium hornschuchianum (Schultz) R. H. Zander (= *Barbula hornschuchiana* Schultz) - H, P, G, T, C, F, **L** [González-Mancebo *et al.* (1996)].

Pseudocrossidium revolutum (Brid.) R. H. Zander (= *Barbula revoluta* Brid.) - **P** [González-Mancebo *et al.* (2004)], T, C, F, L.

Pterygoneurum subsessile (Brid.) Jur. - L.

Scopelophila ligulata (Spruce) Spruce - G.

Syntrichia fragilis (Taylor) Ochyra (= *Tortula fragilis* Taylor) - P, G, T, C, F.

Syntrichia laevipila Brid. (= *S. pagorum* (Milde) J. J. Amann, *Tortula laevipila* (Brid.) Schwägr.) - H, P, G, T, C, F, L.

Syntrichia minor (Bizot) M. T. Gallego, J. Guerra, M. J. Cano, Ros *et* Sánchez-Moya - **P** [Cano *et al.* (2002)].

Syntrichia montana Nees (= *S. intermedia* Brid., *Tortula intermedia* (Brid.) Berk., *hom. illeg.*) - P, T, C.

Syntrichia papillosa (Wilson) Jur. (= *Tortula papillosa* Wilson) - C.

Syntrichia princeps (De Not.) Mitt. (= *Tortula princeps* De Not.) - P, T, C.

Syntrichia ruralis (Hedw.) F. Weber *et* D. Mohr (= *Tortula ruralis* (Hedw.) P. Gaertn., B. Mey. *et* Scherb.) - H, P, **G** [González-Mancebo *et al.* (2003, 2008)], T, C.

Syntrichia virescens (De Not.) Ochyra (= *Tortula virescens* (De Not.) De Not.) - P, T, C.

Timmiella anomala (Bruch *et* Schimp.) Limpr. - T, C.

Timmiella barbuloides (Brid.) Mönk. - H, P, G, T, C, F, L.

Timmiella flexiseta (Bruch) Limpr. - T, C.

Tortella flavovirens (Bruch) Broth. - H, P, **G** [González-Mancebo *et al.* (2003, 2008)], T, C, F, L.

Tortella fragilis (Hook. *et* Wilson.) Limpr. - T.

Tortella inflexa (Bruch) Broth. - **P** [González-Mancebo *et al.* (2004)], **G** [González-Mancebo *et al.* (2003, 2008)], L.

*****Tortella limbata*** (Schiffn.) Geh. *et* Herzog - **G** [Cezón & Muñoz (2006)], C.

Tortella nitida (Lindb.) Broth. (= *Tortella cirrifolia* (Mitt.) Broth.) - H, P, G, T, C, F, L.

Tortella cirrifolia (Mitt) Broth was excluded by Dirkse *et al.* (1993) but was later accepted by Losada-Lima *et al.* (2001a, 2004). However, it was synonymized with *T. nitida* by Sjögren (2001).

Tortella squarrosa (Brid.) Limpr - (= *Pleurochaete squarrosa* (Brid.) Lindb.) - H, P, G, T, C, F, L.

Although this species was placed by Hill *et al.* (2006) in the genus *Pleurochaete*, we follow Werner *et al.* (2005) and Grundmann *et al.* (2006), who, on the basis of molecular data, do not consider that this genus merits segregation from the genus *Tortella.*

Tortella tortuosa (Hedw.) Limpr. - H, P, **G** [González-Mancebo *et al.* (2003, 2008)], T, F, L.

Tortula acaulon (With.) R. H. Zander (= *Phascum cuspidatum* Hedw.) - T, C, F, L.

We have followed Zander (1993) for the taxonomic treatment of this taxon, a view which is supported by molecular data published by Werner *et al.* (2002, 2004).

******Tortula ampliretis*** Crundw. *et* D. G. Long - H, P, G, T, C, L.

Tortula atrovirens (Sm.) Lindb. - H, P, G, T, C, F, L.

Tortula bolanderi (Lesq. *et* James) M. Howe - H, **P** [González-Mancebo *et al.* (2004) as *Syntrichia bolanderi* (Lesq. *et* James) R. H. Zander)], G, T, C.

Tortula bogosica (Müll. Hal.) R. H. Zander (= *Desmatodon bogosicus* Müll. Hal.) - T, C.

Tortula brevissima Schiffn. - **G** [González-Mancebo *et al.* (2003, 2008)], **T** [Blockeel (2002)].

Tortula canescens Mont. - P, G, T, C, F.

Tortula cuneifolia (Dicks.) Turner - P, G, T, C, L.

Tortula israelis Bizot *et* F. Bilewsky – **C** [Dort & Nieuwkoop (2003)].

Tortula lindbergii Kindb. *ex* Broth (= *Pottia lanceolata* (Hedw.) Müll. Hal., *Tortula lanceola* R. H. Zander) - T, C, F, L.

The nomenclature followed for this name is that of Ros *et al.* (2008), who, after studying the type of *Tortula lindbergii*, concluded that it is conspecific with *Tortula lanceola* R. H. Zander, and therefore the latter name should be replaced by *Tortula lindbergii*, which was published a hundred years earlier.

Tortula marginata (Bruch *et* Schimp.) Spruce - H, P, G, T, C.

Tortula muralis Hedw. - H, P, G, T, C, F, L.

Tortula pallida (Lindb.) R. H. Zander (= *Pottia pallida* Lindb.) - C.

Tortula protobryoides R. H. Zander (= *Pottia bryoides* (Dicks.) Mitt., *Protobryum bryoides* (Dicks.) J. Guerra *et* M. J. Cano) - C.

This species was accepted by Dirkse *et al.* (1993), but later excluded by Losada-Lima *et al.* (2001a, 2004). However, we have found no references to justify its exclusion from the Canary Islands. We have followed Zander (1993) for the taxonomic treatment of this taxon, a view which is supported by molecular data published by Werner *et al.* (2002, 2004).

Tortula revolvens (Schimp.) G. Roth - P, L.

Tortula solmsii (Schimp.) Limpr. - H, P, G, T, C, F, L.

Tortula subulata Hedw. - P, **G** [González-Mancebo *et al.* (2003, 2008)], T, C, F, **L** [Malme (1988)].

Tortula truncata (Hedw.) Mitt. (= *Pottia truncata* (Hedw.) Bruch *et* Schimp.) - P, G, T, C.

Tortula vahliana (Schultz) Mont. - P, **G** [González-Mancebo *et al.* (2003, 2008)], T, C.

Tortula viridifolia (Mitt.) Blockeel *et* A. J. E. Smith (= *Pottia crinita* Bruch *et* Schimp.) - T, **C** [Dort & Nieuwkoop (2003)].

Trichostomum brachydontium Bruch - H, P, G, T, C, F, L.

Trichostomum crispulum Bruch - P, G, T, C, F, L.

Weissia condensa (Voit) Lindb. - C, F, L.

Weissia controversa Hedw. - H, P, G, T, C, F, L.

Weissia longifolia Mitt. - H, P, G, T, C, L.

SPLACHNALES

Meesiaceae Schimp.

Leptobryum pyriforme (Hedw.) Wilson - T.

ORTHOTRICHALES

Orthotrichaceae Arn.

Orthotrichum acuminatum H. Philib. - **P** [Lara *et al.* (1999a); González-Mancebo *et al.* (2004)], **G** [González-Mancebo *et al.* (2007)].

Orthotrichum affine Schrad. *ex* Brid. - P, **G** [González-Mancebo *et al.* (2007)], T, C, F.

Orthotrichum alpestre Bruch *et* Schimp**.** - **G** [González-Mancebo *et al.* (2007)].

Orthotrichum anomalum Hedw. - Canary Islands [Smith (2004)].

Orthotrichum cupulatum Hoffm. *ex* Brid. - P, T.

Orthotrichum diaphanum Schrad. *ex* Brid. - H, P, G, T, C, F, L.

******Orthotrichum handiense*** F. Lara, Garilleti *et* Mazimpaka - **F** [Lara *et al.* (1999b)].

Orthotrichum lyellii Hook. *et* Taylor - H, P, G, T, C.

Orthotrichum patens Bruch *ex* Brid. - C.

Orthotrichum pumilum Sw. *ex* anon. - P, G, T, C.

Orthotrichum rupestre Schleich. *ex* Schwägr. - H, P, **G** [González-Mancebo *et al.* (2003, 2008)], T, C.

Orthotrichum striatum Hedw. - C.

Orthotrichum tenellum Bruch *ex* Brid. - P, G, T, C.

Ulota calvescens Wilson - H, P, G, T.

Ulota crispa (Hedw.) Brid. - H, P, T, C.

Zygodon conoideus (Dicks.) Hook. *et* Taylor - T, C.

Zygodon rupestris Schimp. *ex* Lorentz - H, P, G, T, C, F, L.

Zygodon viridissimus (Dicks.) Brid. - **H** [Zippel (1998)], **P** [Zippel (1998)], G, T, C.

HEDWIGIALES

Hedwigiaceae Schimp.

Hedwigia ciliata (Hedw.) P. Beauv. - H, P, G, T, C.

Hedwigia stellata Hedenäs - **P** [Casas (1996); González-Mancebo *et al.* (2004)], **G** [González-Mancebo *et al.* (2008)], **T** [Casas *et al.* (1996)], **C** [Dort & Nieuwkoop (2003)].

BRYALES

Bartramiacae Schwägr.

Anacolia webbii (Mont.) Schimp. - H, P, G, T, C.

Bartramia pomiformis Hedw. - P, T.

Bartramia stricta Brid. - H, P, G, T, C, F, L.

Philonotis caespitosa Jur.- **T**.

González-Mancebo *et al*. (1987) reported *P. caespitosa* var. *aristata* Loeske and var. *caespitosa* for the Canary Islands. However, neither of the taxa was included in Dirkse *et al*. (1993), apparently without argumentation. In Losada-Lima *et al.* (2004), these specimens were considered as *Philonotis fontana*, again without argumentation. No reference has been found to support the exclusion of this species from the Canary Islands.

Philonotis calcarea (Bruch *et* Schimp.) Schimp. - G, T.

Philonotis fontana (Hedw.) Brid. - G, T, C.

Philonotis rigida Brid. - H, P, G, T, C.

Philonotis tomentella Mol.- **T**

As with *Philonotis caespitosa*, this species was recorded in the Canary Islands by González-Mancebo *et al.* (1987), but was not included in Dirkse *et al.* (1993), nor in Losada-Lima *et al.* (2004).

Bryaceae Schwägr.

Anomobryum julaceum (Schrad. *ex* P. Gaertn., E. Meyer *et* Scherb.) Schimp. - H, P, G, T, C.

Brachymenium notarisii (Mitt.) A. J. Shaw - H, P, G, T, C.

Bryum apiculatum Schwägr. (= *B. nitens* Hook.) - T.

Bryum argenteum Hedw. - H, P, G, T, C, F, L.

Bryum canariense Brid. - H, P, G, T, C, F, L.

Bryum cellulare Hook. - P, T.

Bryum dichotomum Hedw. (= *B. bicolor* Dicks., *B. dunense* Smith *et* Whiteh.) - H, P, G, T, C, F, L.

Bryum funckii Schwägr. - **P** [González-Mancebo *et al.* (2004)], T, C.

Bryum gemmiferum R. Wilczeck *et* Demaret - L.

Bryum gemmilucens R. Wilczeck *et* Demaret - G, **C** [Dort & Nieuwkoop (2003)], L.

Bryum gemmiparum De Not. - H, P, G, T, C.

Bryum radiculosum Brid. - P, G, T, C, F, L.

Bryum ruderale Crundw. *et* Nyholm - P, T, C, L.

Bryum sauteri Bruch *et* Schimp. - T.

Bryum tenuisetum Limpr. - T.

Bryum torquescens Bruch *et* Schimp. (= *B. icodense* Wint.) - P, G, T, C, L.

Bryum valparaisense Thér. (= *B. pyriferum* Crundw. *et* Whiteh.) - P, T, C.

Bryum violaceum Crundw. *et* Nyholm - **T** [Smith (2004)].

Imbribryum alpinum (Huds. *ex* With.) N. Pedersen (= *B. alpinum* With.) - H, P, G, T, C.

Based on phylogenetic studies, Pedersen & Hedenäs (2005) proposed the segregation of some species of the genus *Bryum* Hedw. into discrete genera, such as *Plagiobryum* Lindb. and *Imbribryum* N. Pedersen & Hedenäs.

Ptychostomum bornholmense (Wink. *et* R. Ruthe) D. T. Holyoak *et* N. Pedersen (= *Bryum bornholmense* Wink. *et* R. Ruthe) - **C** [Crundwell & Whitehouse (2001)].

According to Spence (2005), most of the species included in *Plagiobryum* Lindb. by Pedersen & Hedenäs (2005) should be moved to *Ptychostomum* Hornsch. because that is an older name. Holyoak & Pedersen (2007) also moved *Bryum bornholmense*, *B. caespiticium* and *B. rubens* to *Ptychostomum*, based on phylogenetic analyses.

Ptychostomum capillare (Hedw.) D. T. Holyoak *et* N. Pedersen (= *Bryum capillare* Hedw., *B. platyloma* Schwägr., *Plagiobryum capillare* (Hedw.) N. Pedersen) - H, P, G, T, C, F, L.

Ptychostomum donianum (Grev.) D. T. Holyoak *et* N. Pedersen (= *Bryum donianum* Grev., *Plagiobryum donianum* (Grev.) N. Pedersen) - H, P, G, T, C.

Ptychostomum imbricatulum (Müll. Hal.) D. T. Holyoak *et* N. Pedersen (= *Bryum caespiticium* Hedw.) - H, P, T, C, **L** [González-Mancebo *et al* (1996)].

When *Bryum caespiticium* is transferred to *Ptychostomum*, the epithet *caespiticium* is unavailable because the combination *Ptychostomum caespiticium* Brid. has already been used for a different species. Holyoak & Pedersen (2007) proposed the combination *Ptychostomum imbricatulum*, and this is followed here.

Ptychostomum pallens (Sw.) J. R. Spence (= *Bryum pallens* Sw., *Plagiobryum pallens* (Sw.) N. Pedersen) - **P** [González-Mancebo *et al.* (2004) as *B. pallens*], T.

Ptychostomum pallescens (Schleich. *ex* Schwägr.) J. R. Spence (= *Bryum pallescens* Schleich. *ex* Schwägr, *Plagiobryum pallescens* (Schleich. *ex* Schwägr.) N. Pedersen) - T.

Ptychostomum pseudotriquetrum (Hedw.) J. R. Spence *et* H. P. Ramsay *ex* D. T. Holyoak *et* N. Pedersen (= *Bryum pseudotriquetrum* (Hedw.) Gaertn, *Plagiobryum pseudotriquetrum* (Hedw.) N. Pedersen) - T.

Ptychostomum rubens **(Mitt.)** D. T. Holyoak *et* N. Pedersen (= *Bryum rubens* Mitt.) - P, T, C.

Mielichhoferiaceae Schimp.

Epipterygium tozeri (Grev.) Lindb. - H, P, G, T, C, F.

Pohlia annotina (Hedw.) Lindb. - P.

Pohlia cruda (Hedw.) Lindb. - P.

Pohlia elongata Hedw. - T.

Pohlia melanodon (Brid.) A. J. Shaw - P, G, T, C.

Pohlia wahlenbergii (F. Weber *et* D. Mohr) A. L. Andrews - P, G.

Plagiomniaceae T.J.Kop.

Plagiomnium affine (Blandow *ex* Funck) T. J. Kop. - P, T.

Plagiomnium rostratum (Schrad.) T. J. Kop. - T.

Plagiomnium undulatum (Hedw.) T. J. Kop. - P, G, T, C.

Aulacomniaceae Schimp.

Aulacomnium androgynum (Hedw.) Schwägr. - P, T, C.

Orthodontiaceae (Broth.) Goffinet

Orthodontium pellucens (Hook.) Bruch *et* Schimp. - P.

HOOKERIALES

Leucomiaceae Broth.

****Tetrastichium fontanum*** (Mitt.) Cardot - H, P, T, C.

****Tetrastichium virens*** (Cardot) S. P. Churchill - T.

Pilotrichaceae Kindb.

Cyclodictyon laetevirens (Hook. *et* Taylor) Mitt. - T.

HYPNALES

Fontinaleceae Schimp.

Fontinalis antipyretica Hedw subsp. ***antipyretica*** (= *F. antipyretica* var. *azorica* Cardot) - P.

Amblystegiaceae G. Roth

Amblystegium serpens (Hedw.) Schimp. - P.

Hygroamblystegium tenax (Hedw.) Jenn. (= *Amblystegium tenax* (Hedw.) C. E. O. Jensen) - T.

Hygroamblystegium varium (Hedw.) Lindb. (= *Amblystegium varium* (Hedw.) Lindb. - P, **G** [Schwab *et al.* (1986)], T.

Cratoneuron filicinum (Hedw.) Spruce - P.

Leptodyctium riparium (Hedw.) Warnst. (= *Amblystegium riparium* (Hedw.) Schimp.) - P, G, T, C.

Sanionia uncinata (Hedw.) Loeske (= *Drepanocladus uncinatus* (Hedw.) Warnst.) - T.

Calliergonaceae (Kanda) Vanderpoorten, Hedenäs, C. J. Cox *et* A. J. Shaw

Warnstorfia fluitans (Hedw.) Loeske (= *Drepanocladus fluitans* (Hedw.) Warnst.) - T [Montagne (1840)].

Leskeaceae Schimp.

Lescuraea mutabilis (Brid.) Lindb. *ex* I. Hagen - C.

Leskea polycarpa Hedw. - Canary Islands.

Thuidiaceae Schimp.

*****Pelekium atlanticum*** (Hedenäs) Hedenäs (= *Thuidium atlanticum* Hedenäs) - H, P, G, T.

Brachytheciaceae G. Roth

Brachytheciastrum velutinum (Hedw.) Ignatov *et* Huttunen (= *Brachythecium velutinum* (Hedw.) Schimp.) - H, P, **G** [González-Mancebo *et al.* (2003, 2008)], T.

Brachythecium rivulare Schimp. - P.

Brachythecium rutabulum (Hedw.) Schimp. - H, P, G, T, C.

Brachythecium salebrosum (Hoffmm. *ex* F. Weber *et* D. Mohr) Schimp. - C.

Cirriphyllum crassinervium (Taylor) Loeske *et* M. Fleisch. (= *Eurhynchium crassinervium* (Taylor) Schimp.) - H, P, G, T, C.

Homalothecium aureum (Spruce) H. Rob. - C.

Homalothecium lutescens (Hedw.) H. Rob. - Canary Islands.

Homalothecium sericeum (Hedw.) Schimp. - H, P, G, T, C, F, L.

Kindbergia praelonga (Hedw.) Ochyra (= *Eurhynchium praelongum* (Hedw.) Schimp.) - H, P, G, T, C.

Oxyrhynchium hians (Hedw.) Loeske (= *Eurhynchium hians* (Hedw.) Sande Lac.) - P, G, T, C.

Oxyrhynchium pumilum (Wilson) Loeske (= *Eurhynchium pumilum* (Wilson) Schimp.) - H, P, G, T, C.

Oxyrhynchium schleicheri (R. Hedw.) Röll. (= *Eurhynchium schleicheri* (Hedw.) Jur.) - P, C.

Oxyrhynchium speciosum (Brid.) Warnst. (= *Eurhynchium speciosum* (Brid.) Jur.) - P, G, T.

Plasteurhynchium meridionale (Schimp.) M. Fleisch. (= *Eurhynchium meridionale* (Schimp.) De Not.) - H, P, G, T, C, F, L.

Plasteurhynchium striatulum (Spruce) M. Fleisch. (= *Isothecium striatulum* (Spruce) Kindb.) - T

Platyhypnidium riparioides (Hedw.) Dixon (= *P. torrenticola* (Ochyra, C. Schmidt *et* Bültmann) Ochyra *et* Bednarek-Ochyra, *Rhynchostegium riparioides* (Hedw.) Cardot) - P, G, T, C.

Platyhypnidium torrenticola was described as *Gradsteinia torrenticola* Ochyra, C. Schmidt *et* Bültmann from the Canary Islands by Ochyra *et al.* (1998) and subsequently transferred to the genus *Platyhypnidium.* It was included by Losada-Lima *et al.* (2001a, 2004). Nevertheless Werner *et al.* (2007) synonymized this species with *Platyhypnidium riparioides* based on molecular phylogenetic studies.

Pseudoscleropodium purum (Hedw.) M. Fleischer - H, P, G, T, **C** [Dort & Nieuwkoop (2003)].

******Rhynchostegiella bourgaeana*** (Mitt.) Broth. - **H** [Dirkse & Bouman (1995b)], **T** [Dirkse & Bouman (1995b; Werner (2008)], **C** [Dirkse & Bouman (1995b)].

This species was considered by Dirkse *et al.* (1993) as a synonym of *Rhynchostegiella tenella* (Dicks.) Limpr., based on Düll (1986). Subsequently, Dirkse & Bouman (1995b) resurrected the species described by Müller (1862) from Gran Canaria as *Hypnum bourgaeanum* Mitt., and considered it to be endemic to the Canary Islands.

Rhynchostegiella litorea (De Not.) Limpr. - **H** [Dirkse & Bouman (1995b), **P** [Dirkse & Bouman (1995b); González-Mancebo *et al.* (2004)], **G** [Dirkse & Bouman (1995b); González-Mancebo *et al.* (2003, 2008); Werner (2008)], **T** [Dirkse & Bouman (1995b)], **C** [Koppe & Düll (1986) as *R. tenella* var. *litorea* (De Not.) Mönk.; Dirkse & Bouman (1995b); Dort & Nieuwkoop (2003)], **L** [(Malme (1988)].

This species was not included in Dirkse *et al.* (1993) but, after revision of the genus *Rhynchostegiella* in the Canary Islands by Dirkse & Bouman (1995b), it was

recognized from the archipelago and later included by Losada-Lima *et al.* (2001a, 2004). *Rhynchostegiella curviseta* (Brid.) Limpr. and *Rhynchostegiella durieui* P. Allorge *et* Persson were excluded from the Canary Islands by Dirkse & Bouman (1995b) after revision of the specimens, which were re-identified as *R. litorea.*

*****Rhynchostegiella macilenta*** (Renauld *et* Cardot) Cardot - P, G, T, **C** [Dirkse & Bouman (1995b)].

Rhynchostegiella teneriffae (Mont.) Dirkse *et* Bouman (= *R. jacquinii* (Garov.) Limpr.) - P, G, T, C.

Rhynchostegiella jacquinii was synonymized with *R. teneriffae* by Dirkse & Bouman (1995b).

******Rhynchostegiella trichophylla*** Dirkse *et* Bouman - **H** [Dirkse & Bouman (1995b)], **P** [Dirkse & Bouman (1995b)], **G** [Dirkse & Bouman (1995b); González-Mancebo *et al.* (2003, 2008)], **T** [Dirkse & Bouman (1995b); Blockeel (2002)], **C** [Dirkse & Bouman (1995b); Dort & Nieuwkoop (2003)], **L** [Dirkse & Bouman (1995b)].

This species was described from the Canary Islands by Dirkse & Bouman (1995b).

Rhynchostegium confertum (Dicks.) Schimp. - H, P, G, T, C.

Rhynchostegium megapolitanum (Blandow *ex* F. Weber *et* D. Mohr) Schimp. - P, T, C.

Rhynchostegium murale (Hedw.) Schimp. – **T** [Geheb & Herzog (1910) as *Rhynchostegium murale* var. *complanatum* Schimp].

This species was eliminated from the Canary Islands by Dirkse *et al.* (1993), who indicated that the material recorded from La Palma by Düll (1980) corresponded to *Rhynchostegium confertum.* However, it was also reported from Tenerife by Geheeb & Herzog (1910). In our opinion further studies are needed to definitely establish its presence in the Canary Islands.

Sciuro-hypnum plumosum (Hedw.) Ignatov *et* Huttunen (= *Brachythecium plumosum* (Hedw.) Schimp.) - H, P, **G** [Patiño *et al.* (2006)], T.

Sciuro-hypnum populeum (Hedw.) Ignatov *et* Huttunen (= *Brachythecium populeum* (Hedw.) Ignatov *et* Huttunen - **T** [González-Mancebo *et al.* (1991].

This species was not included in Dirkse *et al.* (1993), although it was later added in Losada *et al.* (2001a, 2004). The presence of this species in the Canaries is uncertain and the specimens collected by González-Mancebo *et al.* (1991) should be revised.

Scleropodium cespitans (Wilson *ex* Müll. Hal.) L. F. Koch - T.

Scleropodium touretii (Brid.) L. F. Koch - H, P, G, T, C, F, L.

Scorpiurium circinatum (Brid.) M. Fleisch. *et* Loeske - H, P, G, T, C, F, L.

Scorpiurium deflexifolium (Solms) M. Fleisch. *et* Loeske - T, C.

Fabroniaceae Schimp.

Fabronia pusilla Raddi - H, P, G, T, C.

Hypnaceae Schimp.

*****Andoa berthelotiana*** (Mont.) Ochyra - P, T, F.

Calliergonella cuspidata (Hedw.) Loeske - P.

Hypnum andoi A. J. E. Smith. (= *H. cupressiforme* var. *mammillatum* Brid.) - **P** [Störmer (1959) as *H. cupressiforme* var. *mammillatum*; Düll (1980) as

H. cupressiforme var. *mammillatum*], **G** [Störmer (1959) as *H. cupressiforme* var. *mammillatum*; Kunkel (1977) as *H. cupressiforme* var. *mammillatum*], **T** [Bryhn (1908) as *H. cupressiforme* var. *mammillatum*].

This species was considered by Dirkse *et al.* (1993) and Losada-Lima *et al.* (2001a, 2004) as a synonym of *Hypnum cupressiforme,* but Hill *et al.* (2006) considered them distinct species.

Hypnum cupressiforme Hedw. - H, P, G, T, C, F, L.

Most of the varieties recognized by Hill *et al.* (2006), i.e. var. *cupressifome* (= var. *uncinulatum* Schimp., var. *uncinatulum* Schimp. nom. inval. orthographic variant), var. *filiforme* Brid., var. *lacunosum* Brid. (= var. *imbricatum* Boulay), var. *resupinatum* (Taylor) Schimp. and var. *subjulaceum* Molendo, have been reported from the Canary Islands, but many of the reports do not mention infraspecific taxa. Some additional varieties have been also reported: var. *ovatum* Renauld *et* Cardot and var. *tectorum* (Brid.) J.-P. Frahm.

Hypnum jutlandicum Holmen *et* E. Warncke (= *H. cupressiforme* var. *ericetorum* Schimp.) - P, T.

Hypnum uncinulatum Jur. - H, P, G, T, C.

Pseudotaxiphyllum elegans (Brid.) Z. Iwats. - P, **G** [Boecker *et al.* (1993) as *Isopterygium elegans* (Brid.) Lindb.)], **T** [Boecker *et al.* (1993) as *I. elegans*].

Pylaisia polyantha (Hedw.) Schimp. - **G** [Zippel (1998)], T.

Pterigynandraceae Schimp.

Habrodon perpusillus (De Not.) Lindb. - C.

Heterocladium heteropterum (Brid.) Schimp. - **T** [Wijlens (1987)].

The presence of this species in the Canary Islands is uncertain, since for a long time it has been considered as a synonym of *H. wulfsbergii* I. Hagen. According to González-Mancebo *et al.* (2008), the records of González-Mancebo *et al.* (2003) from La Gomera represent *H. wulfsbergii.* Furthermore, Hedenäs (1992) stated that all material of this genus identified by him from Northern Macaronesia belongs to *H. wulfsbergii,* and it is doubtful whether *H. heteropterum* occurs in Madeira. The material identified by this author from the Canary Islands also belongs to *H. wulfsbergii.*

Heterocladium wulfsbergii I. Hagen - **G** [Dirkse *et al.* (1993); Crundwell & Smith (2000); González-Mancebo *et al.* (2008)], **T** [Winter (1914) as *Pseudoleskeella teneriffae* H. Winter; Crundwell & Smith (2000)].

Heterocladium wulfsbergii was considered by Dirkse *et al.* (1993) as a synonym of *H. heteropterum*.

Pterigynandrum filiforme Hedw. - **P** [González-Mancebo *et al.* (2004)], C.

Hylocomiaceae (Broth.) M. Fleisch.

Ctenidium molluscum (Hedw.) Mitt. - P.

Hylocomium splendens (Hedw.) Schimp. - G.

Plagiotheciaceae (Broth.) M. Fleisch.

Plagiothecium nemorale (Mitt.) A. Gaeger (= *P. sylvaticum* (Brid.) Schimp.) - **T** [Bryhn (1908) as *P. sylvaticum*].

Plagiothecium succulentum (Wilson) Lindb. - **P, T**.

This species was considered by Dirkse *et al* (1993) as a synonym of *P. nemorale* (Mitt.) A. Jaeger, but Hill *et al.* (2006) segregated these two species. For this reason some

of the reports of *P. succulentum* should be revised to clarify their identity under this taxonomic concept.

Sematophyllaceae Broth.

Sematophyllum substrumulosum (Hampe) E. Britton - H, P, G, T, C.

Cryphaeaceae Schimp.

Cryphaea heteromalla (Hedw.) D. Mohr - H, P, **G** [González-Mancebo *et al.* (2003, 2008)], T, C.

Leucodontaceae Schimp.

Antitrichia californica Sull. - P, T, C.

Antitrichia curtipendula (Hedw.) Brid. - H, P, G, T, C.

*****Leucodon canariensis*** (Brid.) Schwägr. - H, P, G, T, C, F, L.

Leucodon sciuroides (Hedw.) Schwägr. - H, P, G, T, C, F, L.

*****Leucodon treleasei*** (Cardot) Paris - **P** [Pitard & Negri (1907) as *Astrodontium treleasei* Cardot)], **T** [Pitard & Negri (1907) as *A. treleasei*; Bryhn (1908) as *A. treleasei*)], **C** [Pitard & Negri (1907) as *A. treleasei*)].

This species was not included in Dirkse *et al.* (1993), probably following Corley *et al.* (1981), who treated it as a synonym of *L. canariensis*. After the revision of Hedenäs (1992), it is generally accepted as a distinct species, a view which is supported by molecular data (Stech *et al*., unpublished).

Pterogonium gracile (Hedw.) Sm. - H, P, G, T, C, F, L.

Neckeraceae Schimp.

Homalia lusitanica Schimp. - P, G, T, C.

Homalia webbiana (Mont.) Schimp. - P, G, T, C, F.

Neckera cephalonica Jur *et* Unger – H, P, G, T, C.

Neckera complanata (Hedw.) Huebener - P, G, T, C, F.

Neckera crispa Hedw. - P, **G** [Ammann *et al.* (2003)], **T** [Ammann *et al*. (2003); Viera & Reinoso (1994)].

Dirkse *et al.* (1993) excluded this species from Tenerife because the record mentioned in Wijlens (1987) represents *Neckera intermedia,* as probably also does that of De Sloover (1977). However, there are further records for this species from Tenerife that have been included here.

* ***Neckera intermedia*** Brid. - H, P, G, T, C, F.

Neckera menziesii Drumm. (= *Metaneckera menziesii* (Drumm.) Steere) - P.

Neckera pennata Hedw. - G, **T** [Bunbury (1856)].

Dirkse *et al.* (1993) did not include the reference above mentioned for Tenerife; however Losada *et al.* (2004) did it.

Neckera pumila Hedw. - H, P, G, T, C.

Thamnobryum alopecurum (Hedw.) Gangulee var. ***alopecurum*** - H, P, G, T, C.

Thamnobryum maderense (Kindb.) Hedenäs was treated by Hedenäs (1992) at species level, and reported from Tenerife, but it was reduced to a variety of *T. alopecurum* by Stech *et al.* (2001) on the basis of molecular data. This treatment has been followed here, despite the fact that Frahm & Sabovljevic (2006) retain specific status for the taxon, but based on a reduced number of samples.

Echinodiaceae Broth.

*****Echinodium spinosum*** (Mitt.) Jur. - P.

Leptodontaceae Schimp.

*****Cryptoleptodon longisetus*** (Mont.) Enroth (= *Leptodon longisetus* Mont.) - H, P, G, T, C.

Leptodon smithii (Hedw.) F. Weber *et* D. Mohr - H, P, G, T, C, F, L.

Lembophyllaceae Broth.

****Isothecium algarvicum*** W. E. Nicholson *et* Dixon - H, P, G, T, **C** [Dort & Nieuwkoop (2003)].

Isothecium alopecuroides (Lam. *ex* Dubois) Isov. - P.

Isothecium myosuroides Brid. - H, P, G, T, C, F.

subsp. ***brevinerve*** Lindb. (= *I. myosuroides* subsp. *tenuinerve* Kindb.) - P [Düll (1980) as *I. myosuroides* subsp. *tenuinerve*)], T [Ade & Koppe (1942) as *I. myosuroides* var. *tenuinerve* (Kindb.) Braithw.].

subsp. ***myosuroides*** (= *Eurhynchium bornmuelleri* Schiffn. nom. inval., *I. bornmuelleri* Schiffn., *I. myosuroides* var. *bornmuelleri* (Schiffn.) Corb. - G [Geheeb & Herzog (1910) as *I. myosuroides var. bornmuelleri*; Störmer (1959) as *I. myosuroides* var. *bornmuelleri*)], P [Düll (1980) as *I. myosuroides* var. *bornmuelleri*)], T [Schiffner (1901, 1902) as *I. bornmuelleri*; Schiffner (1902) as *I. bornmuelleri*; Renauld *et* Cardot (1902) as *E. bornmuelleri*; Bryhn (1908) as *I. bornmuelleri*; Geheeb & Herzog (1910) as *I. myosuroides* var. *bornmuelleri*; Ade & Koppe (1942) as *I. myosuroides* var. *bornmülleri*; Mägdefrau (1943) as *I. myosuroides* var. *bornmuelleri*; Störmer (1959) as *I. myosuroides* var. *bornmuelleri*)].

The reports of this species from the Canary Islands do not always indicate the subspecies distinguished by Hill *et al.* (2006), and so it is not possible in all cases to know to which of them the reports refer.

Myuriaceae M.Fleisch.

Myurium hochstetteri (Schimp.) Kindb. - T.

Anomodontaceae Kindb.

Anomodon viticulosus (Hedw.) Hook. *et* Taylor - P.

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Note added in proof

The next species should be added p. 341:

Tortula inermis (Brid.) Mont. - **P** [Long *et al.* (1981)], **T** [Crundwell *et al.* (1978), González-Mancebo *et al.* (1991)], **C** [Schiffner (1902), Störmer (1959)], **F** [Malme (1988)], **L** [Malme (1988)].

This species was considered by Dirkse *et al.* (1993) as a synonym of *Tortula subulata* Hedw., however, it is accepted as an independent species by Hill *et al.* (2006). The report of Fuerteventura (Malme, 1988) was considered by Dirkse *et al.* (1993) as *Tortula subulata*.