Bol. Soc. Esp. Briol. 30/31: 43-51 (2007)

BRYOPHYTES COLLECTED BY THE SPANISH BRYOLOGICAL SOCIETY DURING A FIELD TRIP AT LA GOMERA (CANARY ISLANDS)

Juana María González-Mancebo[1], Belén Albertos[2], Anna Barrón[3], Katia Cezón[4], Rosa María Cros[3], Isabel Draper[5], Belén Estébanez[5], Ricardo Garilleti[2], Tomas Hallingbäck[6], Rafael Hernández-Maqueda[4], Francisco Lara[5], Ana Losada-Lima[1], Rubén G. Mateo[4], Vicente Mazimpaka[5], Jesús Muñoz[4], Rafael Medina[5], Nagore G. Medina[5], Jairo Patiño[1], Felisa Puche[2], Susana Rams[7], Rosa María Ros[7] & Elena Ruiz[3]

1. Departamento de Biología Vegetal (Botánica), Universidad de La Laguna, c/ Astrofísico Francisco Sánchez s/n, E-38071-La Laguna, Tenerife, Spain. E-mails: jglezm@ull.es, alosada@ull.es, jpatino@ull.es
2. Departamento de Botánica. Universitat de Valencia. c/ Dr. Moliner 50, E-46100 Burjassot, Valencia, Spain. E-mail: belen.albertos@uv.es; ricardo.garilleti@uv.es, puche@uv.es
3. Departament de Biologia Animal, de Biologia Vegetal i d'Ecologia, Unitat de Botànica, Universitat Autònoma de Barcelona, E-08193 Bellaterra, Barcelona, Spain. E-mail: anabelen.barron@campus.uab.es, rosamaria.cros@uab.es, elena.ruiz@uab.es
4. Real Jardín Botánico (CSIC), Plaza de Murillo 2, E-28014-Madrid, Spain. E-mail: kcezon@rjb.csic.es, rhernandez@rjb.csic.es, rgmateo@rjb.csic.es, jmunoz@rjb.csic.es
5. Universidad Autónoma de Madrid, Facultad de Ciencias, Departamento de Biología, c/ Darwin 2, E-28049 Madrid, Spain. E-mail: isabel.draper@uam.es, belen.estebanez@uam.es, francisco.lara@uam.es, nagore.medina@uam.es, rafael.medina@uam.es, vicente.mazimpaka@uam.es
6. Swedish Species Information Centre, SLU, ArtDatabanken, PO Box 7007, Uppsala, SE-75007, Sweden. Email: tomas.hallingback@artdata.slu.se
7. Departamento de Biología Vegetal (Botánica), Universidad de Murcia, Campus de Espinardo, E-30100 Murcia, Spain; E-mail: rams@um.es, rmros@um.es

Resumen: Se presenta la lista de especies de briófitos recolectados en La Gomera (Islas Canarias) en tres áreas montañosas: los domos volcánicos de Agando, Carmona y Zarcita, en el Parque Nacional de Garajonay, La Fortaleza de Chipude y Enchereda. Las recolecciones incluyen 93 musgos, 48 hepáticas y 2 antocerotas. Se aportan tres nuevas citas para las Islas Canarias (*Acaulon mediterraneum*, *Orthotrichum alpestre* y *Racomitrium microcarpon*) y tres para La Gomera (*O. acuminatum,* O. *affine* y *Tortella limbata*). Finalmente, se citan además nuevas localidades para algunos briófitos interesantes en este archipiélago, como *Archidium alternifolium, Campylostelium strictum, Fissidens dubius* y *F. exilis*.

Abstract. Bryophytes collected at La Gomera (Canary Islands) in three mountain areas, Agando, Carmona and the Zarcita volcanic domes in the Garajonay National Park, Fortaleza de Chipude and Enchereda, are documented. include 93 mosses, 48 liverworts and 2 hornworts. Three new records are contributed to the Canary Islands (*Acaulon mediterraneum*, *Orthotrichum alpestre* and *Racomitrium microcarpon*), and 3 specifically to the island of La Gomera (*O. acuminatum, O. affine* and *Tortella limbata*). Finally, new localities were discovered for some interesting bryophytes in the Canaries such as *Archidium alternifolium, Campylostelium strictum, Fissidens dubius* and *F. exilis.*

INTRODUCTION

The island of La Gomera is located in the Atlantic Ocean between latitudes 28°01′ and 28°13′ N and longitudes 17°06′ and 17°21′ W. It is a small island (368 km^2) with a maximum altitude of 1.484 m. The study area ranges in elevation from 600 to 1.230 m and occupies three different mountain areas, from the north-east (Enchereda), through the central area (volcanic domes in Garajonay National Park) to the Fortaleza de Chipude, located in the south-west. The vegetation is mainly formed by rupicolous communities, a mosaic of laurel forest, ericaceous forest and woodlands and *Euphorbia-Cistus* shrubs in lower areas (Table 1). Annual precipitation averages from 600 to 900 mm (Marzol *et al*., 1990; Fernández *et al*., 1998). However, mist precipitation is very important, especially in spring and summer due to the prevailing NE winds that affect the north and eastern slopes of the island from 700-1.200 m a.s.l. Additional mist precipitation in the cloud forest varies from 0–50 mm in the driest areas to more than 400 mm in areas directly affected by the prevailing NE winds that cause cloud banks (Fernández *et al.*, 1998). The mean annual temperature is approximately 13-17°C.

The 20th meeting of the Spanish Bryological Society was held at La Gomera Island on 4-6th February 2005. During the meeting, more than 20 bryologists focused their attention on compiling a list of bryophyte species in the three mountain areas mentioned. This report summarizes the findings of that effort with a list of species which comprises approximately 50% of the known bryophyte flora from La Gomera.

On the first day of the field work we explored the main volcanic domes of the Garajonay National Park, a very interesting area for bryophytes because of their phonolite-traquite composition and the high influence of the prevailing NE winds. The laurel forest of Tajaqué was also visited and some specimens were collected, especially in the uppermost area. Excursions on the second day focused on the base and top area of the Fortaleza de Chipude (traditionally called Argodey). This is an area worthy of note to compare with the previous one since it is situated on the windward slope, which is only slightly affected by the cloud bank. Consequently, it presents plant characteristics of the drier areas of the island (Table 1). We also collected in the laurel forest of El Cedro. Finally on the third day, we visited the Natural Park of Majona, starting from the track in a disturbed area with ericaceous shrub-land and walking to the top, where laurel forest and ericaceous woodlands are in good condition and present a high biomass of bryophytes.

The bryophyte flora of La Gomera has been previously documented in a series of papers (Ammann *et al*., 1992; Arnell, 1961; Boecker *et al*., 1993; Bouman & Dirkse, 1992; Bruggeman-Nannenga, 1985; Cezón & Muñoz, 2006; Dirkse & Bouman, 1995; Dirkse *et al*., 1991, 1993; Eggers, 1982; Geheeb & Herzog, 1910; Gola, 1911; González-Mancebo *et al*., 2004a, b; Kunkel, 1977; Long *et al*., 1981; Losada *et al*., 1990; Patiño *et al*., 2006; Pitard & Corbière, 1907; Schwab *et al*., 1986; Størmer, 1959; Zippel, 1998). Nonetheless, the areas prospected at this meeting had been poorly studied, which the novelties and rarities commented below evidence. Localities in the following list are indicated with a number (Table 1). The nomenclature follows Hill *et al*. (2006) except for the genera *Imbribryum* N.

Pedersen and *Plagiobryum* Lindb., for mosses, and Ros *et al*. (2007) for liverworts and hornworts.

No	Locality	Vegetation	Altitude (m)
	VOLCANIC DOMES (GARAJONAY NATIONAL PARK)		
1	Roque de Agando	Rupicolous	1.000-1.150
2	Roque de Carmona	Rupicolous	1.050-1.129
3	Roque de la Zarcita,lower area	Ericaceous forest	1.150-1.180
4	Roque de la Zarcita, upper area	Rupicolous	1.180-1.233
	TAJAQUÉ (GARAJONAY NATIONAL PARK)		
5	Path to Tajaqué	Laurel forest	1.150-1.200
6	Tajaqué viewpoint	Ericaceous forest	1.200-1.230
	MONUMENTO NATURAL DE LA FORTALEZA DE CHIPUDE OR ARGODEY		
7	Chipude (lower slope)	*Euphorbia-Cistus* shrub	1.040-1.125
8	Chipude (up slope and plateau)	*Euphorbia-Cistus* shrub	1.125-1.243
	EL CEDRO (GARAJONAY NATIONAL PARK)		
9	El Cedro forest	Laurel forest	850-900
	MAJONA NATURAL PARK		
10	Path to Enchereda (lower area)	Ericaceous shrub	600-700
11	Path to Enchereda (forest area)	Ericaceous forest	700-900
12	Upper area of Enchereda	Ericaceous woodlands and laurel forest	900-1.065

Table 1. List of localities prospected during the twentieth meeting of the Spanish Bryological Society.

SPECIES LIST

New records to Canary Islands are marked with two asterisks (**) and new records to La Gomera island with a single asterisk (*).

ANTHOCEROTOPHYTA

***Anthoceros agrestis* Paton** – 10
***Phymatoceros bulbiculosus* (Brot.) Stotler, W. T. Doyle & Crand.-Stotl.** – 2, 10

MARCHANTIOPHYTA

***Asterella africana* (Mont.) A. Evans** – 9
***Cephaloziella divaricata* (Sm.) Schiffn.** – 4
***Cephaloziella turneri* (Hook.) Müll. Frib.** – 3
***Cololejeunea schaeferi* Grolle** – 12
***Corsinia coriandrina* (Spreng.) Lindb.** – 1, 2, 5, 10
***Drepanolejeunea hamatifolia* (Hook.) Schiffn.** – 12
***Dumortiera hirsuta* (Sw.) Nees** – 9
Fossombronia caespitiformis* De Not. ex Rabenh. subsp. *caespitiformis – 2, 5, 7, 10

Fossombronia caespitiformis* subsp. *multispira* (Schiffn.) J. R. Bray and D. C. Cargill in Stotler *et al. (= *Fossombronia husnotii* Corb.) – 2
***Fossombronia pusilla* (L.) Nees** – 1, 2, 7, 10
***Frullania dilatata* (L.) Dumort.** – 1, 4, 8, 11
***Frullania polysticta* Lindenb –** 11
***Frullania tamarisci* (L.) Dumort.** – 1, 2, 3, 4, 5, 7, 8, 10, 11, 12
***Frullania teneriffae* (F. Weber) Nees** – 1, 2, 3, 4, 5, 6, 12
***Gongylanthus ericetorum* (Raddi) Nees** – 2, 3, 5, 8
***Harpalejeunea molleri* (Steph.) Grolle** – 3, 4, 5, 6, 12
***Heteroscyphus denticulatus* (Mitt.) Schiffn.** – 12
***Lejeunea eckloniana* Lindenb.** – 3, 9, 10, 11, 12
***Lejeunea lamacerina* (Steph.) Schiffn.** – 11
***Lepidozia cupressina* (Sw.) Lindenb.** – 4
***Lophocolea heterophylla* (Schrad.) Dumort.** – 12
***Lunularia cruciata* (L.) Lindb. –** 10
***Mannia androgyna* (L.) A. Evans** – 2, 10, 11
***Metzgeria furcata* (L.) Dumort.** – 2
***Microlejeunea ulicina* (Taylor) A. Evans** – 12
***Oxymitra incrassata* (Brot.) Sérgio & Sim-Sim** – 8
***Plagiochila bifaria* (Sw.) Lindenb.** – 12
***Plagiochila exigua* (Taylor) Taylor** – 3, 6, 12
***Plagiochila maderensis* Gottsche ex Steph.** – 11, 12
***Plagiochila punctata* (Taylor) Taylor** – 12
***Plagiochila virginica* A. Evans** – 3
***Porella canariensis* (F. Weber) Underw.** – 2, 3, 5, 6, 9, 10, 11, 12
***Porella obtusata* (Tayl.) Trevis.** – 1, 2, 3, 5
***Radula lindenbergiana* Gottsche ex C. Hartm.** – 3, 6, 11, 12
***Reboulia hemisphaerica* (L.) Raddi** – 5, 6, 11
***Riccia ciliata* Hoffm.**– 2
***Riccia glauca* L.** – 10
***Riccia gougetiana* Durieu & Mont.** – 2, 8, 10
***Riccia lamellosa* Raddi** – 7
***Riccia nigrella* DC.** – 7, 10
***Riccia papillosa* Moris** – 5
***Riccia sorocarpa* Bisch.** – 7
***Saccogyna viticulosa* (L.) Dumort.** – 5, 6, 9, 11, 12
***Scapania compacta* (A. Roth) Dumort.** – 2, 3, 6, 12
***Scapania curta* (Mart.) Dumort.** – 1, 3, 12
***Scapania gracilis* Lindb.** – 3, 6, 12
***Scapania nemorea* (L.) Grolle** – 3, 12
***Scapania undulata* (L.) Dumort.** – 12
***Targionia hypophylla* L.** – 2, 6, 7, 10

BRYOPHYTA

** ***Acaulon mediterraneum* Limpr.** – 8
***Aloina rigida* (Hedw.) Limpr.** – 4
***Anacolia webbii* (Mont.) Schimp.** – 2, 5, 7, 8
***Antitrichia curtipendula* (Hedw.) Brid.** – 5, 6
***Anoectangium aestivum* (Hedw.) Mitt.** – 5
***Archidium alternifolium* (Hedw.) Mitt.** – 2
***Bartramia stricta* Brid.** – 2, 4, 5, 7, 11
***Brachythecium rutabulum* (Hedw.) Schimp.** – 7
***Bryum argenteum* Hedw.** – 7, 8, 10
***Campylopus fragilis* (Brid.) Bruch & Schimp.** – 1, 2, 3, 5
***Campylopus pilifer* Brid.** – 1, 2, 3, 4, 5
***Campylostelium strictum* Solms** – 7
***Cheilothela chloropus* (Brid.) Broth.** – 8
***Crossidium crassinerve* (De Not.) Jur.** – 7
***Cryphaea heteromalla* (Hedw.) D. Mohr** – 1
***Cryptoleptodon longisetus* (Mont.) Enroth** – 1, 4, 5, 9, 11, 12
***Cynodontium bruntonii* (Sm.) Bruch & Schimp.** – 4

Dicranella heteromalla **(Hedw.) Schimp.** – 3
Dicranoweisia cirrata **(Hedw.) Lindb.** – 1, 3, 4
Dicranum canariense **Hampe ex Müll. Hal.** – 3, 4, 5, 6, 11, 12
Dicranum scoparium **Hedw.** – 4
Didymodon australasiae **(Hook. & Grev.) R. H. Zander** – 7, 8
Didymodon insulanus **(De Not.) M. O. Hill** – 5, 8
Didymodon vinealis **(Brid.) R. H. Zander** – 2, 7, 8, 10, 11
Entosthodon attenuatus **(Dicks.) Bryhn** – 2, 5
Entosthodon convexus **(Spruce) Brugués** – 10
Entosthodon muhlenbergii **(Turner) Fife** – 11
Entosthodon obtusus **(Hedw.) Lindb.** – 2, 4
Fissidens bryoides **Hedw.** – 3, 6, 11
Fissidens curvatus **Hornsch.** – 1, 7, 8, 10, 11
Fissidens dubius **P. Beauv.** – 2
Fissidens exilis **Hedw.** – 2
Fissidens serrulatus **Brid.** – 9
Fissidens taxifolius **Hedw.** – 3, 4, 5, 9, 10
Funaria hygrometrica **Hedw.** – 10
Grimmia decipiens **(Schultz) Lindb.** – 1, 2, 7, 8
Grimmia laevigata **(Brid.) Brid.** – 1, 2, 3, 4, 5, 7, 8, 11
Grimmia lisae **De Not.** – 1, 2, 4, 6, 7, 8, 11
Grimmia pulvinata **(Hedw.) Sm.** – 1, 2, 7, 8
Grimmia trichophylla **Grev.** – 1, 3, 5, 6, 7, 8, 11
Hedwigia ciliata **(Hedw.) P. Beauv.** – 4, 7
Hedwigia stellata **Hedenäs** – 2, 3, 5
Homalothecium sericeum **(Hedw.) Schimp.** – 3, 11, 12
Hypnum cupressiforme **Hedw.** – 1, 3, 4, 8, 12
Hypnum uncinulatum **Jur.** – 1, 2, 3, 4, 5, 6, 8, 11, 12
Imbribryum alpinum **(Huds. ex With.) N. Pedersen** – 1, 4, 11
Isothecium algarvicum **W. E. Nicholson & Dixon** – 11
Isothecium myosuroides **Brid.** – 2, 3, 4, 5, 6, 8, 9, 11, 12
Leptodon smithii **(Hedw.) F. Weber & D. Mohr** – 1
Leucodon canariensis **(Brid.) Schwägr.** – 3, 4, 5, 6, 9, 12
Microbryum starckeanum **(Hedw.) R. H. Zander** – 7, 8, 10
Neckera cephalonica **Jur. & Unger** – 1, 3, 4, 5, 6
Neckera complanata **(Hedw.) Huebener** – 11, 12
Neckera intermedia **Brid.** – 3, 4, 5, 6, 9, 11, 12
* *Orthotrichum acuminatum* **H. Philib.** – 8
* *Orthotrichum affine* **Schrad. ex Brid.** – 3
** *Orthotrichum alpestre* **Bruch & Schimp.** – 8
Orthotrichum lyellii **Hook. & Taylor** – 1, 3, 4, 5, 8
Plagiobryum capillare **(Hedw.) N. Pedersen** – 1, 7, 8
Plagiomnium undulatum **(Hedw.) T. J. Kop.** – 9
Plasteurhynchium meridionale **(Schimp.) M. Fleisch.** – 4, 11
Pleuridium acuminatum **Lindb.** – 4, 5, 8
Pogonatum aloides **(Hedw.) P. Beauv.** – 1
Polytrichastrum formosum **(Hedw.) G. L. Sm.** – 12
Polytrichum juniperinum **Hedw.** – 1, 2, 3, 7
Pseudocrossidium hornschuchianum **(Schultz) R. H. Zander** – 8
Pseudoscleropodium purum **(Hedw.) M. Fleisch.** – 3
Pterogonium gracile **(Hedw.) Sm.** – 2, 3, 5, 7, 10, 11, 12
Ptychomitrium nigrescens **(Kunze) Wijk & Margad.** – 1, 7, 8, 10, 11
Racomitrium lanuginosum **(Hedw.) Brid.** – 4

** ***Racomitrium microcarpon*** **(Hedw.) Brid.** – 2, 4
Rhabdoweisia fugax **(Hedw.) Bruch & Schimp.** – 3
Rhynchostegium confertum **(Dicks.) Schimp.** – 3, 11
Scleropodium touretii **(Brid.) L. F. Koch** – 1, 3, 5, 7, 8, 9, 11
Scorpiurium circinatum **(Bruch) M. Fleisch. & Loeske** – 12
Sciuro-hypnum plumosum **(Hedw.) Ignatov & Huttunen** – 2
Syntrichia laevipila **Brid.** – 8
* ***Tortella limbata*** **(Schiffn.) Geh. & Herzog** – 1 (published by Cezón & Muñoz, 2006)
Tortella nitida **(Lindb.) Broth.** – 10, 11
Tortula ampliretis **Crundw. & D. G. Long** – 8
Tortula atrovirens **(Sm.) Lindb.** – 7, 8, 10
Tortula brevissima **Schiffn.** – 7, 8
Tortula canescens **Mont.** – 4, 7
Tortula cuneifolia **(Dicks.) Turner** – 7
Tortula muralis **Hedw.** – 1, 2, 4, 5, 7, 11
Tortula solmsii **(Schimp.) Limpr.** – 8
Tortula vahliana **(Schultz) Mont.** – 10
Thamnobryum alopecurum **(Hedw.) Gangulee** – 4, 9, 11
Trichostomum brachydontium **Bruch** – 1, 2, 7, 10, 11, 12
Trichostomum crispulum **Bruch** – 10
Ulota calvescens **Wilson** – 1, 3, 4, 12
Weissia controversa **Hedw.** – 2, 3, 4, 7, 10
Zygodon viridissimus **(Dicks.) Brid.** –
1

COMMENTS ON THE SPECIES LIST

Ninety-three species of mosses distributed in fifty-seven genera were recorded in the studied areas of La Gomera. Forty-nine liverwort taxa representing twenty-seven genera were also found, and two hornworts complete the list. These collections represent over 30% of the bryophyte flora known from the Canary Islands and 50% of that from La Gomera. Three moss species (*Acaulon mediterraneum, Orthotrichum alpestre* and *Racomitrium microcarpon*) are herein documented for the first time in the Canary Islands. In addition, three species (*Orthotrichum acuminatum, O. affine* and *Tortella limbata)* are new records to La Gomera.

Acaulon mediterraneum is a species that has been recently reinstated as separated taxon from *A. muticum* (Guerra & Cros, 2006; Holyoak, 2003). However, are unaware of any previous record of *A. muticum* var. *mediterraneum* from the Canary Islands. For this reason, this record from soils of Fortaleza de Chipude represents a new species to this archipelago. *Orthotrichum alpestre*, a relatively common species in northern and central Europe, but quite rare in the Mediterranean, was found growing as an epiphyte on the branches and trunk of a dead *Euphorbia lambii* Svent. shrub, also in Fortaleza de Chipude. *Racomitrium microcarpon* is a boreal-montane species which is mainly distributed in northern latitudes on dry siliceous rocks (Dierβen, 2001). It was found in 2 of the 3 volcanic domes studied in the Garajonay National Park.

With regard to the new records for La Gomera, *Tortella limbata* is a globally rare species, known from less than five populations in the Canary Islands. It was previously reported from Gran Canaria in a single locality (Schiffner, 1902). *Orthotrichum affine* was previously known from La Palma, Tenerife, Gran Canaria and Fuerteventura (Dirkse *et al*., 1993) and was found as an epiphyte on the branches and trunks of dead *Cistus chinamadensis* A.

Bañares & P. Romero subsp. *gomerae* A. Bañares & P. Romero shrub. *Orthotrichum acuminatum* was previously cited only in La Palma (Lara *et al*, 1999; González-Mancebo *et al*., 2004c). In La Gomera, it was found as an epiphyte on *Erica arborea* L., *Juniperus turbinata* Guss and *Euphorbia lambii Svent.*

Finally, 4 of the mosses listed herein are rare taxa in the Canaries, but each have a wider distribution range: *Archidium alternifolium, Campylostelium strictum, Fissidens dubius* and *F. exilis. Archidium alternifolium* has been cited from 4 islands (Dirkse *et al.,* 1993), but is a rare species in the archipelago, and the collection of the excursion from the Carmona volcanic dome represents the second locality in this Island. *Campylostelium strictum* is an oceanic species reported in the Canaries only from La Gomera and Tenerife (Shwab *et al*., 1986; Dirkse & Boumann, 1990). In La Gomera, it was only reported from the Garajonay National Park, and Chipude is a new locality of this taxa. *Fissidens* dubius is a boreo-temperate species, which was only known from 8 localities distributed in 3 of the islands of the Canary Islands (Størmer, 1959; Long *et al.*, 1981; Dirkse *et al.,* 1993; González-Mancebo *et al.,* 2004b). It had been recorded only at Agando in Gomera (González-Mancebo *et al.,* 2007). *Fissidens exilis* is a temperate species in the Canaries which had been reported from only 3 localities in 2 of the Islands (Størmer, 1959; van Dort *et al.,* 2003, González-Mancebo *et al.,* 2007). The report of the Carmona volcanic dome for both *Fissidens* species represents a new locality of the island.

ACKNOWLEDGMENTS

We are grateful to the Cabildo Insular de La Gomera and Garajonay National Park for their help with meeting organization. We are especially grateful to Ángel Fernandez López and Julio Leal Pérez, who help us during field work.

LITERATURE CITED

AMMANN, K., L. SÁNCHEZ-PINTO & G. LANG (1992). *Teneriffa und La Gomera 1981-1990*. Vegetationsafnahmen und Artenliste. 1-56 pp

ARNELL, S. (1961). List of the hepaticae of the Canary Islands. *Svensk Bot Tidskr.* 55: 379-393.

BOECKER, M., E. FISCHER & W. LOBIN (1993). Epiphylle Moose von den Kanarischen Inseln (La Gomera und Teneriffa). *Nova Hedwigia* 57(1-2): 219-230.

BOUMAN, A. C. & G. M. DIRKSE (1992). The genus *Radula* in Macaronesia. *Lindbergia* 16: 119-127.

BRUGGEMAN-NANNENGA, M.A. (1985). The section *Pachylomidium* (genus Fissidens). IV. Further species from Europe, the Mediterranean and the Atlantic African islands. *Proc. Kon. Nederl. Akad. Wetensch*., ser. C 88(2): 183-207.

CEZÓN, K. & J. MUÑOZ (2006). The rediscovery of *Tortella limbata* (Bryopsida, Pottiaceae). *Bryologist* 109(3): 401-407.

DIRKSE, G. M. & A. C. BOUMAN (1990). Additions to the bryophyte flora of the Canary Islands. *Lindbergia* 15: 145-150.

DIRKSE, G. M. & A. C. BOUMAN (1995). A revision of *Rhynchostegiella* (Musci, Brachytheciaceae) in the Canary Islands. *Lindbergia* 20: 109-121

DIRKSE, G. M., A. C. BOUMAN & A. LOSADA-LIMA (1993). Bryophytes of the Canary Islands, an annotated checklist. *Cryptogamie, Bryol. Lichénol*. 14(1): 1-47.

DIRKSE, G.M., M.A. BRUGGEMAN-NANNENGA & A.C. BOUMAN (1991). *Fissidens papillosus* Lac. new to the Canary Islands. *Cryptogamie, Bryol. Lichénol*. 12(4): 451-454.

DIERβEN, K. (2001). Distribution, ecological amplitude and phytosociological characterization of European bryophytes. *Bryophyt. Biblioth.* 56: 1-289.

DORT, K.W. van & J.A.W. NIEUWKOOP (2003). De bryologische excursie naar Gran Canaria in 1996. *Buxbaumiella* 64: 11-27.

EGGERS, J. (1982). Artenliste der Moose Makaronesiens. *Cryptogamie, Bryol. Lichénol*. 3: 283-335.

FERNÁNDEZ, A., C. FAGUNDO & A. HERRERA (1998). *El Parque Nacional de Garajonay. La Gomera*. Ministerio de Medio Ambiente. Organismo Autónomo de Parques Nacionales, Madrid.

GEHEEB, A. & T. HERZOG (1910). *Bryologia Atlantica*. Stuttgart. 66 pp.

GOLA, G. (1911). Contributio alla conoscenza delle epatiche delle Isole Canarie. *Atti Reale Accad. Sci. Torino* 46: 1004-1008.

GONZÁLEZ-MANCEBO, J. M., A. LOSADA-LIMA & J. PATIÑO-LLORENTE (2004a). Forest floor bryophytes of laurel forest in Gomera (Canary Islands): Life strategies and influence of the tree species. *Lindbergia* 29: 5-16.

GONZÁLEZ-MANCEBO, J. M., A. LOSADA-LIMA & J. PATIÑO-LLORENTE (2004b). Sobre la variación de la biodiversidad de briófitos en el Parque nacional de Garajonay (La Gomera, Islas Canarias). Análisis preliminar. *Vieraea* 31: 421-44

GONZÁLEZ-MANCEBO J. M., A. LOSADA-LIMA & J. PATIÑO-LLORENTE (2004c). Briófitos. *In*: BELTRÁN TEJERA E., (ed.), *Hongos, líquenes y briófitos del Parque Nacional de la Caldera de Taburiente.* Naturaleza y Parques Nacionales. Madrid, Serie Técnica, Organismo Autónomo de Parques Nacionales. pp. 352-458.

GONZÁLEZ-MANCEBO, J. M., A. LOSADA-LIMA, J. PATIÑO-LLORENTE & J. LEAL-PÉREZ (2007). Briófitos, *In*: BELTRÁN TEJERA, E., (ed.), *Hongos, líquenes y briófitos del Parque Nacional de Garajonay*. Naturaleza y Parques Nacionales. Madrid, Serie Técnica, Organismo Autónomo de Parques Nacionales (in press).

GUERRA J. & R. M. CROS (ed. coord.) (2006). *Flora Briofítica Ibérica. Vol. III. Pottiales: Pottiaceae, Encalyptales: Encalyptaceae*. Universidad de Murcia y Sociedad Española de Briología. Murcia.

HILL, M.O., N. BELL, M. A. BRUGGEMAN-NANNENGA, M. BRUGUÉS, M. J. CANO, J. ENROTH, K. I. FLATBERG, J. - P. FRAHM, M. T. GALLEGO, R. GARILLETI, J. GUERRA, L. HEDENÄS, D. T. HOLYOAK, J. HYVÖNEN, M. S. IGNATOV, F. LARA, V. MAZIMPAKA, J. MUÑOZ & L. SÖDERSTRÖM (2006). An annotated checklist of the mosses of Europe and Macaronesia. *J. Bryol.* 28: 198-267.

HOLYOAK, D. T. (2003). *Acaulon muticum* var. *mediterraneum* in Britain. *Bull. Brit. Bryol. Soc*. 80: 59-63.

KUNKEL, G. (1977). *Inventario florístico de la Laurisilva de La Gomera, Islas Canaria*s. Naturalia Hispanica 7. Instituto Nacional para la conservación de la naturaleza. Ministerio de Agricultura. Madrid. 7: 5-11; 98-103.

LARA, F., V. MAZIMPAKA & R. GARILLETI (1999). *Orthotrichum acuminatum* H. Philib. new to the Canary Islands. *J. Bryol.* 21: 75.

LONG, D. G., A. C. CRUNDWELL & C. C. TOWNSEND (1981). New records of bryophytes from the Canary Islands. *J. Bryol.* 11: 521-536.

LOSADA-LIMA, A., J. M. GONZÁLEZ-MANCEBO & E. BELTRÁN-TEJERA (1990). Los briófitos del Parque Nacional de Garajonay. *In*: PÉREZ de PAZ, P.L. (ed*.): Parque Nacional de Garajonay. Patrimonio Mundial.* ICONA. p. 98-105.

MARZOL, M. V., J. L. SÁNCHEZ-MEGÍA & L. SANTANA PÉREZ (1990). El clima de Garajonay en el contexto insular. *In*: PÉREZ de PAZ, P. L. (ed.), Parque Nacional de Garajonay. Patrimonio Mundial. ICONA. Santa Cruz de Tenerife, pp. 57–65.

PATIÑO, J., J. M. GONZÁLEZ-MANCEBO, A. LOSADA-LIMA & J. LEAL (2006). Some new records of bryophytes from Gomera Island (Canary Islands, Spain). *Bol. Soc. Esp. Briol.* 29: 13-16.

PITARD, J. & L. CORBIÈRE (1907). Hepaticae. In: Pitard, J. & L. Proust, Les Iles Canaries. Flore de l´Archipel. *Mém. Soc. Bot. France* 7: 445-463.

ROS, R. M., V. MAZIMPAKA, U. ABOU-SALAMA, M. ALEFFI, T. L. BLOCKEEL, M. BRUGUÉS, M. J. CANO, R. M. CROS, M. G. DIA, G. M. DIRKSE, W. EL SAADAWI, A. ERDAĞ, A. GANEVA, J. M. GONZÁLEZ-MANCEBO, I. HERRNSTADT, K. KHALIL, H. KÜRSCHNER, E. LANFRANCO, A. LOSADA-LIMA, M. S. REFAI, S. RODRÍGUEZ-NUÑEZ, M. SABOVLJEVIĆ, C. SÉRGIO, H.

SHABBARA, M. SIM-SIM & L. SÖDERSTRÖM (2007). Hepatics and Anthocerotes of the Mediterranean, an annotated checklist. *Cryptogamie, Bryol.* 28: 1-xx.

SCHIFFNER, V. (1902). Neue Materialien zur Kenntnis der Bryophyten der atlantischen Inseln. *Hedwigia* 41: 269-294.

SCHWAB, G., A. SCHÄFER-VERWIMP, R. LÜBENAU-NESTLE & I. VERWIMP (1986). Beitrag zur Kenntnis der Moosflora des Kanareninsel La Gomera. *Bryol. Beitr*. 6: 1-31.

STØRMER, P. (1959). A contribution to the bryology of the Canary Islands. *Skr. Norske Vidensk. Akad. Oslo. Mat. Naturvidensk. Kl*. 5: 1-90.

ZIPPEL, E. (1998). Die epiphytische Moosvegetation der Kanarischen Inseln. Soziologie, Struktur und Ökologie. *Bryophyt. Biblioth*. 52: 1-149.