



A revision of the genus *Rhynchostegiella* (Brachytheciaceae) in the Iberian Peninsula and Balearic Islands

JUAN GUERRA, DIANA RÍOS & MARÍA TERESA GALLEGO

Departamento de Biología Vegetal, Facultad de Biología, Universidad de Murcia, Campus de Espinardo, 30100–Murcia, Spain; e-mail: jguerra@um.es

Abstract

The moss genus *Rhynchostegiella* (Brachytheciaceae) is taxonomically revised for the Iberian Peninsula and Balearic Islands based on morphological data. After a thorough revision of both herbarium material and our own recent collections from the area, we recognize five Iberian species of the genus. A key, descriptions, illustrations and distribution data are provided for the species. The record for *Rhynchostegiella bourgaeana* in Europe, in Cadiz, Spain, is confirmed.

Key words: Bryophytes, distribution, pleurocarpous mosses, Portugal, *Rhynchostegiella bourgaeana*, Spain, taxonomy

Introduction

In recent years, the family Brachytheciaceae, one of the most diverse families of pleurocarpous mosses, including about 350 species, 40 genera and 520 species (Huttunen *et al.* 2007, Crosby *et al.* 1999), has been the subject of numerous research projects (Stech & Frahm 1999, Ignatov & Huttunen 2002, Huttunen & Ignatov 2004, Vanderpoorten *et al.* 2005, Vanderpoorten & Goffinet 2006, Huttunen *et al.* 2007), which have changed important taxonomic concepts and proposed a new systematic system. The genus *Rhynchostegiella* (Schimper 1852: 201) Limpricht (1896: 207), in particular, has undergone important changes in both respects and alterations in the traditional generic concept of several species have been proposed. This implies the need for a thorough revision to complete the taxonomic data and to elucidate the chorological distribution of the different taxa, supplying morphological characters that facilitate identification of the species. In this respect, the work of Aigoïn *et al.* (2009), who made a taxonomic and phylogenetic study based on DNA sequences of *Rhynchostegiella* and close species, is an important contribution, redefining the genus. As a result, *R. durieui* (Montagne 1839: 319) Allorge & Persson (1952: 57) is placed in the new genus *Pseudorhynchostegiella* Ignatov & Vanderpoorten in Aigoïn *et al.* (2009: 219) and some taxa of *R. tenella*-*R. litorea* group, which were treated under numerous combinations, synonyms and different taxonomic ranges, are now clearly differentiated. The same study confirmed, on the other hand, taxonomic proposal made by other authors (Hedenäs 1992, Dirkse & Bouman 1995) based exclusively on morphological characters.

The genus *Rhynchostegiella* is represented in Europe by nine species (Hill *et al.* 2006), of which the following were known in the Iberian Peninsula (Casas *et al.* 2006): *R. durieui* [= *Pseudorhynchostegiella duriaei* (Mont.) Ignatov & Vanderpoorten in Aigoïn *et al.* (2009: 219)], *R. tenella* (Dickson 1801: 16) Limpricht (1890: 209), *R. litorea* (De Not.) Limpr. (1896: 214), *R. curviseta* (Brid.) Limpr. (1896: 211) and *R. teneriffae* (Mont.) Dirkse & Bouman (1995: 112). To these should be added *R. bourgaeana* (Mitt.) Broth. (1909: 1162) (Guerra *et al.* 2003), identified from a series of samples collected in the Algeciras mountains (Cádiz, Spain) near the Strait of Gibraltar. In the Canary islands are up to 6 *Rhynchostegiella* species and number of species worldwide is unknown (Ignatov & Huttunen 2002). The aim of the present work is to present a revision of the genus *Rhynchostegiella* (*sensu stricto*) in the Iberian Peninsula and Balearic Islands, taking into account the new evidence provided by contributions on phylogeny and taxonomy and new and reliable chorological data.

R. bourgaeana. The name has apparently also been synonymized with *Rhynchostegiella curviseta* (Brid.) Limpr. (see Tropicos) but this can not stand as correct.

Selected specimens studied:—SPAIN. Cádiz: Castellar de la Frontera, Sierra de Montecoche, La Almoraima, Guerra (MUB 14253). Cádiz: Jerez, Sierra del Algibe, garganta del Medio, Guerra (MUB 10195). Cádiz: Tarifa, Sierra de la Luna, garganta de Gandelar, Guerra & Jiménez (MUB 9959).

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References

- Aigoín, D.A., Huttunen, S., Ignatov, M.S., Dirkse, G.M. & Vanderpoorten, A. (2009) *Rhynchostegiella* (Brachytheciaceae): molecular re-circumscription of a convenient taxonomic repository. *Journal of Bryology* 31: 213–221.
<http://dx.doi.org/10.1179/037366809x12469790518529>
- Allorge, V. & Allorge, P. (1945) La végétation et les groupements muscinaux des montagnes d’Algésiras. *Mémoires du Muséum National d’Histoire Naturelle n.s.* 21(3): 84–116.
- Allorge, P. & Persson, H. (1952) Mousses recoltées par P. et V. Allorge aus Iles Açores en 1937. *Revue Bryologique Lichénologique* 21: 50–95.
- Bescherelle, M. (1882) *Catalogue des mousses observées en Algérie*. Adolphe Jourdan Libraire-éditeur, Alger, 41 pp.
- Bridel, S.E. von (1812) *Muscologia Recentiorum Supplementum*. A. Akertum, Gotha.
- Brotherus, V.F. (1909) Bryales, in part. In: Engler, G.A. & Prantl, K. (Eds.) *Die Natürlichen Pflanzenfamilien*. Engelmann, Leipzig.
- Casas, C., Brugués, M., Cros, R. & Sérgio, C. (2006) *Handbook of mosses of the Iberian Peninsula and the Balearic Islands*. Institut D’Estudis Catalans, Barcelona, 349 pp.
- Crosby, M.R., Magill, R.E., Allen, B. & He, S. (1999) *A checklist of the Mosses*. Missouri Botanical Garden Press, St. Louis.
- De Notaris, G. (1838) *Syllabus muscorum in Italia et in insulis circumstantibus hucusque cognitorum*. Comfari, Torino.
- Dickson, J. (1801) *Fasciculus Plantarum Cryptogamicarum Britanniae*, fasc. 4.
- Dirkse, G.M. & Bouman, A.C. (1995) A revision of *Rhynchostegiella* (Musci, Brachytheciaceae) in the Canary Islands. *Lindbergia* 20: 109–121.
- Dirkse, G.M., Patiño, J. & González-Mancebo, J. (2012) *Rhynchostegiella bourgaeana* (Mitt.) Broth. (Bryophyta, Brachytheciaceae). In: Garilleti, R. & Albertos, B. (Eds.) *Atlas y Libro Rojo de los Briófitos Amenazados de España*. Ministerio de Agricultura, Alimentación y Medio Ambiente, Madrid, pp. 154–155.
- Duell, R. (1986) Revision of *Rhynchostegiella* and closely related taxa in Macaronesia with reference to their occurrence in Europe. *Bryologische Beiträge* 6: 91–105.
- Guerra, J., Cano, M.J., Pérez-Latorre, A.V., Ros, R.M. & Cabezudo, B. (2003) Flora brio-pteridofítica de los bosques lauroides de *Rhododendron ponticum* L. del Parque Natural de los Alcornocales (Cádiz-Málaga, España). *Acta Botanica Malacitana* 28: 19–36.
- Hedenäs, L. (1992) Notes on Madeiran *Pseudotaxiphyllum*, *Brachythecium* and *Rhynchostegiella* species (Bryopsida). *Nova Hedwigia* 54: 447–457.
- Hill, M.O., Bell, N., Bruggeman-Nannenga, M.A., Brugués, M., Cano, M.J., Enroth, J., Flatberg, K.I., Frahm, J.-P., Gallego, M.T., Garilleti, R., Guerra, J., Hedenäs, L., Holyoak, D.T., Ignatov, M.S., Lara, F., Mazimpaka, V., Muñoz, J. & Söderström, L. (2006) An annotated checklist of the Mosses of Europe and Macaronesia. *Journal of Bryology* 28: 198–267.
<http://dx.doi.org/10.1179/174328206X119998>
- Huttunen, S. & Ignatov, M.S. (2004) Phylogeny of the Brachytheciaceae (Bryophyta) based on morphology and sequence level data. *Cladistics* 20: 151–183.
<http://dx.doi.org/10.1111/j.1096-0031.2004.00022.x>
- Huttunen, S., Gardiner, A.A. & Ignatov, M.S. (2007) Advances in knowledge of Brachytheciaceae (Bryophyta). In: Newton, E.N. & Tangney, R.S. (Eds.) *Pleurocarpous mosses: systematics and evolution*. CRC press, Boca Raton, pp. 117–142.
<http://dx.doi.org/10.1201/9781420005592.ch6>
- Ignatov, M.S. & Huttunen, S. (2002) Brachytheciaceae (Bryophyta): a family of sibling genera. *Arctoa* 11: 245–296.

<http://dx.doi.org/10.15298/arctoa.11.20>

- Limpricht, K.G. (1896) Die Laubmoose Deutschlands, Oesterreichs und der Schweiz. In: Rabenhorst, L. (Ed.) *Kryptogamen-Flora von Deutschlands, Oesterreichs und der Schweiz*. Band 4, abt. 3. E.
- Mitten, W. (1870) Musci. In: Godman, F.D. (Ed.) *Natural History of the Azores, or Western Island*. J. van Voorst, London, pp. 288–328.
- Mönkemeyer, W. (1927) *Die Laubmoose Europas*. Akademische Verlagsgesellschaft, Leipzig.
- Montagne, J.P.F.C. (1839) *Hypnum teneriffae* sp. nov. In: Webb, P.B. & Berthelot, S. (Eds.) *Histoire naturelle des Iles Canaries* 3(2, 4). Paris.
- Richards, P.W. & Wallace, E.C. (1950) An Annotated List of British Mosses. *Transactions of the British Bryological Society* 1(4): i–xxxii.
<http://dx.doi.org/10.1179/006813850804878725>
- Rivas-Martínez, S. (1980) Les étages bioclimatiques de la végétation de la Péninsule Iberique. *Anales del Jardín Botánico de Madrid* 37: 251–268.
- Schimper, W.P. (1852) *Rhynchostegium*. In: Schimper, W.P. (Ed.) *Bryologia europaea seu genera muscorum europaeorum monographicae illustrata* 5. Librariae E. Schweizerbart. Stuttgartiae, 246 pp.
<http://dx.doi.org/10.5962/bhl.title.50508>
- Stech, M. & Frahm, J.–P. (1999) Systematics of species *Eurhynchium*, *Rhynchostegiella* and *Rhynchostegium* (Brachytheciaceae, Bryopsida) based on molecular data. *Bryobrothera* 5: 203–211.
- Vanderpoorten, A., Ignatov, M., Huttunen, S. & Goffinet, B. (2005) A molecular and morphological circumscription of *Brachytheciastrum* (Brachytheciaceae, Bryopsida). *Taxon* 54: 369–376.
<http://dx.doi.org/10.2307/25065365>
- Vanderpoorten, A. & Goffinet, B. (2006) Mapping uncertainty and phylogenetic uncertainty in ancestral character state reconstruction: an example in the moss genus *Brachytheciastrum*. *Systematic Biology* 55: 957–971.
<http://dx.doi.org/10.1080/10635150601088995>
- Warnstorf, C. (1906) *Kryptogamenflora der Mark Brandenburg, Laubmoose* 4. Gebrüder Borntraeger, Leipzig.
- Zodda, G. (1909) Le briofite del messinese. *Annali di Botanica* 7: 449–487.