

# BOCAGIANA

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## FIRST REFERENCE TO THE BRYOFLORA OF PORTO SANTO'S ISLETS

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With 1 map and 1 table

**ABSTRACT.** This study is the first reference to the bryoflora of the islets of Porto Santo.

The bryophytes surveyed are mosses, belonging to two families, Bryaceae and Pottiaceae, comprehending six genus and eight species.

For the first time the moss *Didymodon nicholsonii* Culm. is cited to Porto Santo and beside to Madeiran archipelago, being also the first reference to Macaronesia.

**RESUMO.** Este estudo é a primeira referência sobre a brioflora dos ilhéus do Porto Santo.

Os briófitos inventariados são musgos pertencentes a duas famílias, Bryaceae e Pottiaceae, compreendendo seis géneros e oito espécies.

Pela primeira vez cita-se o musgo *Didymodon nicholsonii* Culm. para o Porto Santo e para o arquipélago da Madeira, sendo também a primeira referência para a Macaronésia.

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## INTRODUCTION :

Porto Santo is located in the Atlantic Ocean, c. 60 Km from the NE part of Madeira Island. It consists of one small main island (Porto Santo island), surrounded by six islets (Ilhéu das Cenouras, Ilhéu de Fora, Ilhéu da Fonte de Areia, Ilhéu da Cal e Ilhéu de Cima) representing a total area of about 70 Km<sup>2</sup>.

Porto Santo was originated from submarine volcanic activity. Intercalation of sedimentary reef material occur in the upper levels (between 18 and 13,5 MY), presenting the subaerial lava flows and the intrusions of basalt and trachytes a subsequently occurrence (CARVALHO & BRANDÃO 1991). Its clima is semiarid exacerbated by frequent and strong winds, the mean annual precipitation is approximately 380 mm, with about 90% concentrated on the cooler season, October to April. The vegetation is adapted to xeromorphic conditions being principally herbaceous with scattered shrubs and some small trees mainly situated on cliffs.

The bryoflora from the coastal dry zones of Madeira is less abundant either in number or species diversity, comparing to the bryoflora from the indigenous Laurel forest (Laurissilva) (SÉRGIO & FONTINHA 1994). Several species of mosses and hepatics typical from coastal dry exposed localities are adapted to the severe natural conditions, presenting short life cycles during the favourable season or are ephemeral occurring sporadically (FONTINHA 1995).

This work results from an expedition made to Porto Santo's islets from the May 28 until June 1, 1997. During this expedition the observation of bryophytes was diminute, being necessary to undertake more surveys mainly during and after the rainfall season for a better knowledge about the bryoflora of these interesting sites.

## MATERIAL AND METHODS

The area of study comprises the six islets of Porto Santo, namely, Ilhéu das Cenouras (4,8 ha), Ilhéu de Fora (5,0 ha), Ilhéu da Fonte de Areia (3,1 ha), Ilhéu do Ferro (25,8 ha), Ilhéu da Cal (139,0 ha) and Ilhéu de Cima (32,0 ha), figure 1. The samplings were taken according to their accessibility, during an expedition from May 28 until June 1, 1997.

Voucher specimens are housed in MADJ<sup>3</sup> and LISU<sup>4</sup>.

The nomenclature follows mostly EGGERS (1982) and sometimes DÜLL (1984, 1985).

## RESULTS

The bryophytes surveyed are mosses, belonging to two families, Bryaceae and Pottiaceae, comprehending six genus and eight species, namely, Bryaceae (*Bryum argenteum* Hedw., *Bryum dunense* A.J.E. Sm. & Whiteh.) and Pottiaceae [*Aloina aloides* (Schultz)

<sup>3</sup> Herbário do Jardim Botânico da Madeira

<sup>4</sup> Herbário do Museu, Laboratório e Jardim Botânico de Lisboa

Kindb., *Didymodon luridus* Hornsch. ex Spreng., *Didymodon nicholsonii* Culm., *Pseudocrossidium revolutum* (Brid.) Zander, *Tortella flavovirens* (Bruch) Broth., *Trichostomum crispulum* Bruch].

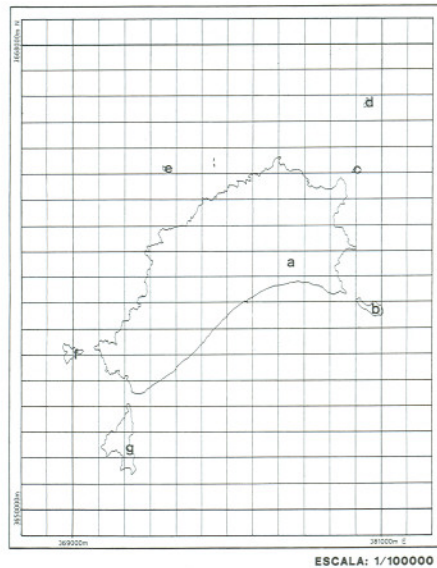


Fig. 1 - Porto Santo including the main island, Porto Santo (a) and the 6 islets Ilhéu de Cima (b), Ilhéu das Cenouras (c), Ilhéu de Fora (d), Ilhéu da Fonte da Areia (e), Ilhéu do Ferro (f), Ilhéu da Cal (g).

#### Surveyed specimens on Porto Santo

*Aloina aloides* (Koch. Ex Schultz) Kindb., Ilhéu da Cal, 31/05/1997, *Fontinha* 8174 (MADJ); *Bryum argenteum* Hedw., ibidem, idem, *Fontinha* 8182 (MADJ); *Bryum argenteum* Hedw., Ilhéu de Cima, 01/06/1997, *Fontinha* 8179 (MADJ) and (LISU); *Bryum dunense* A.J.E. Sm. & Whiteh., Ilhéu da Cal, 31/05/1997, *Fontinha* 8176 (MADJ); *Bryum dunense* A.J.E. Sm. & Whiteh., ibidem, idem, *Fontinha* 8171 (MADJ) and (LISU); *Bryum dunense* A.J.E. Sm. & Whiteh., Ilhéu de Cima, 01/06/1997, *Fontinha* 8178 (MADJ) and (LISU); *Didymodon luridus* Hornsch. ex Spreng., Ilhéu da Cal, 31/05/1997, *Fontinha* 8172 (MADJ); *Didymodon nicholsonii* Culm., ibidem, idem, *Fontinha* 8175 (MADJ) and (LISU); *Pseudocrossidium revolutum* (Brid.) Zander, ibidem, idem, *Fontinha* 8183, (MADJ, LISU); *Tortella flavovirens* (Bruch) Broth., Ilhéu das Cenouras, 29/05/1997, *Fontinha* 8181 (MADJ) and (LISU); *Tortella flavovirens* (Bruch) Broth., Ilhéu de Cima, 01/06/1997, *Fontinha* 8180 (MADJ) and (LISU); *Tortella flavovirens* (Bruch) Broth., Ilhéu da Cal, 31/05/1997, *Fontinha* 8177 (MADJ) and (LISU); *Trichostomum crispulum* Bruch, ibidem, idem, *Fontinha* 8173 (MADJ).

TABLE 1 - Surveyed bryophytes, organised alphabetically by family and genus.

Family	Taxon	Ilhéu da Cal	Ilhéu de Cima	Ilhéu das Cenouras
Bryaceae	<i>Bryum argenteum</i> Hedw.		X	
Bryaceae	<i>Bryum dunense</i> A. J. E. Sm. & Whiteh.	X	X	
Pottiaceae	<i>Aloina aloides</i> (Schultz) Kindb.	X		
Pottiaceae	<i>Didymodon luridus</i> Hornsch. ex Spreng.	X		
Pottiaceae	<i>Didymodon nicholsonii</i> Culm.	X		
Pottiaceae	<i>Pseudocrossidium revolutum</i> (Brid.) Zander	X		
Pottiaceae	<i>Tortella flavovirens</i> (Bruch) Broth.	X	X	X
Pottiaceae	<i>Trichostomum crispulum</i> Bruch	X		

## DISCUSSION

This study is the first reference to the bryoflora of the islets of Porto Santo.

For the first time *Didymodon nicholsonii* Culm. is cited to Porto Santo and beside to Madeiran archipelago. Until now this species was not refereed to Macaronesia (Azores, Madeira, Canary and Cape Vert islands).

According to DÜLL (1984) *D. nicholsonii* is a variety of *D. luridus* Hornsh., nevertheless ARTS (1987) and GREVEN (1990) considered *D. nicholsonii* an independent species. The material collected at Ilhéu da Cal and identified as *D. nicholsonii*, is in accordance to the description of this species (i.e. basal cells, bistratose margins, presence of gemmae, etc).

On this expedition only mosses were surveyed, neither liverworts nor hornworts were observed. Only in three islets it was possible to detect mosses, namely at Ilhéu das Cenouras, Ilhéu de Cima and Ilhéu da Cal, the last one with a higher diversity and soil cover of these plants.

The low number of bryophytes identified and the absence of liverworts and hornworts is plausibly due to the months when the survey occurred. During the dry season the visibility of bryophytes in coastal dry exposed localities is quite null. However after the rainfall the abundance and coverage of these plants can be surprising. Therefore new surveys need to be undertaken in different periods mainly between winter and spring, for a more complete knowledge about the bryoflora of the islets of Porto Santo.

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