RECENT RECORDS OF CINCLIDOTUS (MUSCI, POTTIACEAE) IN PORTUGAL: C. AQUATICUS (HEDW.) BRUCH & SCHIMP. AND C. RIPARIUS (HOST EX BRID.) ARN.

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Resumen: Se presenta información novedosa sobre la distribución Cinclidotus aquaticus (Hedw.) Bruch & Schimp. and Cinclidotus riparius (Host ex Brid.) Arn. en Portugal, así como a cartografía y dados ecológicos.

Abstract: New information on the aquatic bryophytes, Cinclidotus aquaticus (Hedw.) Bruch & Schimp. and Cinclidotus riparius (Host ex Brid.) Arn. is presented for Portugal, as well as their cartography and some ecological data.

INTRODUCTION

Cinclidotus aquaticus (Hedw.) Bruch & Schimp. and C. riparius (Brid.) Arn. are two rather uncommon species of Cinclidotus only accounted after 1970 for Portuguese territories and in not more than two localities each, in the Maciço Calcário Central (Sérgio, 1972; Sérgio et al., 1988; Sérgio & Carvalho, 2003).

After a careful revision of Cinclidotus specimens —using the taxonomic criteria of leaf marginal cells as diagnostic character to separate C. riparius from C. fontinaloides (Hedw.) P. Beauv. (Blockeel, 1998)— both species were confirmed in national territory. This revision also served the purpose of confirming the identification of Portuguese Cinclidotus specimens for the cooperation required with the recent publication of this genus in Flora Briofítica Ibérica (Ederra, 2006).

Resulting from these revisions and after some extensive field work in national river surveys, several new populations of Cinclidotus riparius were discovered in areas scattered from northeast to southeast Portugal. Simultaneously, C. aquaticus populations were found in a smaller number of localities in close proximity to the previously known ones in Maciço Calcário Central (Sérgio et al., 1988), and its distribution remains confined to a small area of the national territory.
The present work resumes the distribution and ecologic information known for these two *Cinclidotus* species in mainland Portugal. The studied specimens will be discriminated, and the asterisk corresponds to a new province for the species’ distribution.

**CINCLIDOTUS AQUATICUS (HEDW.) BRUCH & SCHIMP.**

*Cinclidotus aquaticus* was considered to be an endangered species in Portugal and, up to this point, it can only be found in the centre region of the country, in streams and small rivers running over a calcareous substrate. This species was first recorded for Portugal about 20 years ago (Sérgio *et al.*, 1988) and since then it has only been found in few localities of nearby calcareous mountains, proving to have a very restricted distribution in the national territory (Fig. 1). According to Dierßen (2001), *C. aquaticus* is a mediterranean-temperate species, sub-oceanic to sub-continental and, in fact, the region where this species was found corresponds to the sub-littoral section of the country with narrow climatic amplitudes and total precipitation between 800 and 1400mm, exactly in the transition zone between Eurosiberian and Mediterranean biogeographic regions.

This species has been found in dripping calcareous habitats or above the minimum water level of currents, sometimes in rock or cement walls that reinforce the stream margins next to cultivated fields, growing in patches mixed with *Cinclidotus riparius* and *C. fontinaloides*. It has been observed with sporophytes, in spring, in a rocky wall seasonally inundated by pure calcareous spring water, in rheophilous conditions.

With the recent data for distribution of the species populations a new province (Estremadura) must be added to the general distribution of this moss in Portugal.

**Studied material**


CINCLIDOTUS RIPARIUS (HOST EX BRID.) ARN.

The known distribution of this species in Portugal was limited to two localities in the centre of the country, however, with the recent data, the recognized distribution of Cinclidotus riparius was significantly expanded. New localities are now known for the north and for the continental parts of the territory, proving to be a much more widely distributed species, not restricted to calcareous regions. This plant also develops in sub-neutral waters running over other types of bedrocks, particularly schist.

These populations have been found not only in rocks and roots of riparian vegetation in the river margins, but also in fountains always next to the water table. Cinclidotus riparius seems more tolerant to pollution than C. aquaticus and well developed populations of this species, although sterile, were found in a wide variety of chemical water conditions, in fact, according to Dierfen (2001), it tolerates moderately polluted conditions.

In calcareous regions this species was found in stable rocky-river margins along with Fontinalis hypnoides C. J. Hartm. var. duriae (Schimp.) Husn. and Scorpiurium circinatum (Brid.) Fleisch. & Loeske. However, the more immediate associate of the rheophyte Cinclidotus riparius seems to be C. fontinaloides, often growing intermixed, as also stated by other authors in other countries (Blockeel, 1998).

The separation of both taxa is often confusing, and Cinclidotus riparius may be overlooked when both species share the same micro-habitat, but the difference on growth patterns and frequent fertility of C. fontinaloides help to distinguish the taxa in the field. On the other hand, C. fontinaloides is consistently more abundant and shows a more vigorous development occupying a greater substrate surface especially on easily inundated zone.

Figure 2. Distribution of Cinclidotus riparius in Portugal. Black squares: new localities.
With this study we can include five new provinces to the total distribution area of this species in Portugal (Fig. 2).

**Studied material**


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**REFERENCES**