



***Sporolithon yoneshigueae* sp. nov. (Sporolithales, Corallinophycidae, Rhodophyta), a new rhodolith-forming coralline alga from the southwest Atlantic**

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Abstract

The aim of this study was to describe the new rhodolith-forming coralline alga species, *Sporolithon yoneshigueae* sp. nov., based on both morpho-anatomical and molecular data. Specimens were collected in rhodolith beds between 28 and 66 m depths in northeastern and southeastern Brazil. The new species can be distinguished from all other species of the genus *Sporolithon* by its wide tetrasporangial compartment pore diameter (35–43 µm) and the correspondingly large number (19–24) of rosette cells surrounding the tetrasporangial compartment pore. Phylogenies inferred from *psbA* and SSU markers support it as a new species within *Sporolithon* with interspecific genetic divergence varying from 8.86–10.94 %, and 3.67–4.63%, respectively. Observations from recent gathering and from herbarium collections show that specimens previously designated as *Sporolithon mediterraneum* in Brazil correspond to *Sporolithon yoneshigueae*.

Key words: genetic marker, molecular phylogeny, Sporolithaceae, taxonomy

Introduction

The Sporolithaceae (Sporolithales, Corallinophycidae, Rhodophyta) encompasses those crustose coralline algae (CCA) with cruciately divided tetrasporangia occurring individually in calcified compartments rather than conceptacles (Verheij 1993, Le Gall *et al.* 2010). Currently comprising the extant genera *Sporolithon* Heydrich and *Heydrichia* R.A.Townsend, Y.M.Chamberlain & Keats, the family was previously included in the Corallinales (Verheij 1993) but was recently elevated to ordinal rank as the Sporolithales by Le Gall *et al.* (2010), because of its unique tetrasporangial development and its closer alliance in molecular phylogenies to the Rhodogorgonales rather than the Corallinales.

In *Heydrichia* tetrasporangia are borne on multiple stalk cells that result from the production of successive sporangia, and tetrasporangial compartments are surrounded by an involucre of narrow elongate cells that differ from the ordinary vegetative cells (Townsend *et al.* 1994, Maneveldt & van der Merwe 2012). *Sporolithon* differs from *Heydrichia* in possessing tetrasporangia that are borne on a single stalk cell that does not produce successive sporangia, and the absence of an involucre of narrow elongate cells surrounding the individual tetrasporangial compartments.

Coralline algae have traditionally been described and subsequently identified on the basis of typological species concepts using only morphological/anatomical criteria. However, in the last decade, taxonomy based on DNA analysis has become a complementary tool for delimiting taxa (e.g. Peña *et al.* 2011, Bahia *et al.* 2014), determining cryptic speciation (e.g. Broom *et al.* 2008, Bittner *et al.* 2011, Sissini *et al.* 2014), and enabling the identification of unfertile material.

The usefulness of molecular markers for phylogenetic inferences and species delimitations depend on the existence of a database containing DNA sequences from other related taxa. The GenBank genetic sequence database hosts some *Sporolithon* species' DNA sequences of different genetic markers (e.g., *psbA*, *rbcl*, COI, SSU, LSU). However, due to cryptic speciation and high phenotypic plasticity observed in CCA (e.g., Riosmena-Rodriguez *et al.* 1999, Bittner *et al.*