

Two new species of *Mesospora* (Ralfsiales, Phaeophyceae) from the subtropical Indo-Pacific region

SZE-WAN POONG¹, PHAIK-EEM LIM^{1*}, SIEW-MOI PHANG^{1,2}, HAJI SUNARPI³, JOHN A. WEST⁴, KATHY ANN MILLER⁵, WENDY A. NELSON⁶ AND HIROSHI KAWAI⁷

¹*Institute of Ocean and Earth Sciences, University of Malaya, 50603 Kuala Lumpur, Malaysia*

²*Institute of Biological Sciences, Faculty of Science, University of Malaya, 50603 Kuala Lumpur, Malaysia*

³*Faculty of Mathematics and Natural Sciences, Mataram University, Lombok-NTB, Indonesia*

⁴*School of Biosciences 2, University of Melbourne, Victoria 3010, Australia*

⁵*University Herbarium, 1001 Valley Life Sciences Building 2465, University of California, Berkeley, CA 94720, USA*

⁶*National Institute of Water and Atmospheric Research, Wellington, New Zealand*

⁷*Kobe University Research Center for Inland Seas, Rokkodai, Kobe 657-8501, Japan*

ABSTRACT: The marine crustose brown algal genus *Mesospora* is poorly known despite its wide occurrence in tropical and warm temperate coastal areas. Taxonomic studies on *Mesospora* are largely dependent on the presence of reproductive structures due to its simple thallus morphology and vegetative anatomy. Increased sampling and the combination of molecular and morpho-anatomical studies have revealed new species. *Mesospora indopacifica* sp. nov. and *Mesospora lombokensis* sp. nov. are described based on specimens collected from the subtropical Indo-Pacific. *Mesospora indopacifica* is distinguished by a closely packed basal portion of erect filaments, biseriate plurangia capped by two or three prominent sterile cells and unangia borne on one- or two-celled stalks lateral to the middle of the erect filaments. This new species was found on the east coast of peninsular Malaysia, eastern Australia and Lombok Island, Indonesia. *Mesospora lombokensis* is characterised by tightly adherent erect filaments, biseriate plurangia terminated by one sterile cell and unangia borne on one- to three-celled stalks lateral to the middle of the erect filaments. This species appears to be endemic to Lombok Island, Indonesia. Phylogenetic analyses using plastid *rbcL* and mitochondrial *cox1-5'* genes indicate that both *M. indopacifica* and *M. lombokensis* are genetically distinct from other species of the genus. This study also provides the first *rbcL* sequences of *Mesospora pangoensis* (holotype), *Hapalospongidion gelatinosum* (syntype), *Hapalospongidion saxigenum* and *Basispora africana*.

KEY WORDS: *Basispora*, *cox1*, *Hapalospongidion*, *Mesospora pangoensis*, *rbcL*

INTRODUCTION

Species in the crustose brown algal genus *Mesospora* are incompletely known because of the lack of diagnostic morphological characters for species delimitation, inadequate information on previously described species, confusing variation in terminology related to the position of reproductive structures (León-Alvarez & Norris 2005), a paucity of type material for DNA sequence analysis and in some cases the lack of proper documentation and selection of type specimens when descriptions were published in earlier works. *Mesospora* was established based on *Mesospora schmidtii* Weber–van Bosse (1911) from Indonesia. This crustose brown algal genus is generally characterised by the following features: epilithic, mucilaginous and pseudoparenchymatous thallus wholly adherent to the substratum; loosely adherent erect filaments arising from a basal disc of prostrate filaments; intercalary plurangia inserted near the apex of erect filaments and stalked unangia borne laterally at the base of erect filaments (Weber–van Bosse 1913).

Species of *Mesospora* are typically distributed in tropical to warm temperate coastal areas, mostly in the Pacific (e.g. Børgesen 1924; Setchell & Gardner 1937; West & Calum-

pong 1996) with one report of the type species from the Indian Ocean (Krishnamurthy & Baluswami 1986). *Mesospora macrocarpa* (Feldmann) den Hartog is the only species reported from the Mediterranean Sea (Feldmann 1931, 1937; den Hartog 1968). Six species and one variety are currently recognised, excluding three undescribed species reported by Lim *et al.* (2007). Five of the species of *Mesospora* were first described on the basis of morphological observations, while *Mesospora elongata* Poong, Lim & Phang was discovered by analysing the plastid large subunit of RuBisCo (*rbcL*) and mitochondrial cytochrome *c* oxidase subunit 1 gene (*cox1-5'*) sequences in addition to morphological observations (Poong *et al.* 2013). Only three of the six species of *Mesospora* have been genetically analysed (Poong *et al.* 2014). Species of *Mesospora* are morpho-anatomically distinguished based on a combination of vegetative characters including number of cells per erect filament and thickness of the basal layer and, more importantly, reproductive features such as the position of the unangia, the number of unangial stalk cells and the number of sterile cells terminating the plurangia (Poong *et al.* 2013).

The family of Mesosporaceae, which included *Hapalospongidion*, *Basispora* and *Mesospora*, is characterised by having free erect filaments loosely adjoined in a mucilaginous matrix, intercalary plurangia and unangia arising terminally on a stalk or on a vegetative filament (Tanaka & Chihara 1982). *Hapalospongidion* was established based on

* Corresponding author (phaikem@um.edu.my).

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