

## Inconspicuous flora of the rocky shores: Crustose brown algae (Ralfsiales, Phaeophyceae) from the (sub) tropical Indo-Pacific

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The crustose brown algae are generally epilithic in marine habitats, although some species have been reported as symbiotic lichens, or found in euryhaline and even freshwater environments. They have received little attention due to their simple appearance (brownish-black spots on rocks) and lack of apparent economic value despite some being the dominant flora of certain habitats. Taxonomic confusion, arising from their morphological simplicity, discrimination largely based on reproductive structures, and the overlap in morpho-anatomical features among species, necessitates the use of molecular techniques for identification. The crustose brown algae are polyphyletic and occur in widely divergent clades among the brown algae with the majority placed in Ralfsiales, while the rest are closely associated with other phaeophyceae orders such as Sphacelariales and Ishigeales. The Ralfsiales comprises the Ralfsiaceae, Neoralfsiaceae, and Mesosporaceae. Common crustose brown algal taxa of the tropical Indo-Pacific include species of *Mesospora*, *Diplura* and *Neoralfsia* whereas the distribution of *Ralfsia*, *Analipus*, *Endoplura* and *Heteroralfsia* appears to be limited to colder water regions. Molecular analyses suggested that *Mesospora*, currently synonymised with *Hapalospongidion*, should be retained as a separate genus but more authentic specimens of the latter are necessary for a taxonomic revision. The *rbcL* marker performed better in the elucidation of phylogeny at higher classification levels, whereas *cox1-5'* is more suited as a barcoding marker for species level identification of the crustose brown algae.

**Keywords:** *cox1-5'*, *Diplura*, *Hapalospongidion*, *Mesospora*, *Neoralfsia*, *rbcL*