Species boundaries within *Sargassum* (Fucales, Phaeophyceae) of Western Australia

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A genus dominating the brown algal flora of most tropical areas, *Sargassum* C.Agardh, has long been a challenge for taxonomists in terms of species delimitation and sub-generic assignment. In Australia, where more than a quarter of all species have been recorded, *Sargassum* species provide habitat, structure and food for a wide range of animals and plants. Thalli are usually large and brown, and physically differentiated into stem, leaves, vesicles and reproductive branches. Despite this suite of features available for identification, the task of taxonomic assignment is complicated by within-species variation due to morphological plasticity, seasonality and developmental forms. In this study, *Sargassum* species sampled from Esperance, W.A. to the Kimberley, W.A. over 3 years were sequenced for the nuclear ITS-2, mitochondrial *cox*3 and chloroplast *rbc*L-S spacer regions. The three current Australian subgenera are supported by this study, *Phyllotrichia* J.Agardh, *Arthophycus* J.Agardh and *Sargassum* J.Agardh and a fourth is proposed. Fifteen genetic species were found, including two new species, from 51originally listed from WA shores. Many of the original records are now recognised as synonymies or misidentifications.In the subgenus *Phyllotrichia,* all previous species remain current except *Sargassum peronii* C.Agardh which is now synonymised with *S. decurrens* (R.Brown ex Turner) C.Agardh. In subgenus *Arthrophycus,* only two distinct genetic species are obvious from all Australian collections, necessitating a clearer revision of the subgenus. A North West species, most closely conforming to the description of *Carpophyllum nothum* Grunow, which has long been synonymized with *Cystoseira trinodis* (Forsskål) C.Agardh, will now be moved to *Sargassum.* It shares morphological similarity to both subgenus *Arthrophycus* and *Sargassum* and is a clear intermediate between the two subgenera, an observation supported by molecular data. In Subgenus *Sargassum* at least 10 species appear distinct with many new synonymies proposed or validated from recent work on the group. This study further shows the usefulness of molecular techniques in taxonomic delineation of morphologically plastic species, and provides greater insight into the true species richness of *Sargassum*, an ecologically and economically important genus of macroalgae.




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