RESOLVING PHENOTYPIC PLASTICITY AND SPECIES DESIGNATION IN THE MORPHOLOGICALLY CHALLENGING CAULERPA RACEMOSA–PELTATA COMPLEX (CAULERPACEAE, CHLOROPHYTA) 1

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Although recent molecular studies have indicated the presence of a number of distinct species within the Caulerpa racemosa–peltata complex, due to the difficulties presented by high levels of phenotypic plasticity and the large number of synonyms, infraspecific taxa, and names of uncertain affinity, taxonomic proposals are yet to be made. In this study, we aimed to resolve the taxonomy of the complex and provide an example of how historical nomenclature can best be integrated into molecular based taxonomies. We accomplished this by first determining the number of genetic species within our globally sampled data set through a combination of phylogenetic and species-delimitation approaches of partial elongation factor TU and RUBISCO large subunit gene sequences. Guided by these results, comparative morphological examinations were then undertaken to gauge the extent of phenotypic plasticity within each species, as well as any morphological overlap between them. Our results revealed the presence of 11 distinct species within the complex, five of which showed high levels of phenotypic plasticity and partial overlap with other species. On the basis of observations of a large number of specimens, including type specimens, descriptions, and geographic inferences, we were able to confidently designate names for the lineages. Caulerpa peltata, C. imbricata and C. racemosa vars. laetevirens, occidentalis and turbinata were found to represent environmentally induced forms of a single species, for which the earlier-described C. chemnitzia, previously regarded as a synonym of C. racemosa var. turbinata, is reinstated. C. cylindracea, C. lamourouxii, C. macrodisca, C. nummularia and C. oligophylla are also reinstated and two new species, C. macra stat. nov. and C. megadisca sp. nov., are proposed.

Key index words: Caulerpa; chemnitzia; GMYC; nomenclature; peltata; phenotypic plasticity; racemosa; rbCL; species delimitation; taxonomy; tufA

List of Abbreviations: BI, Bayesian inference; BP, Bootstrap percentages; C., Caulerpa; GMYC, General mixed Yule coalescence; GTR, generalized time-reversible (model); ML, Maximum likelihood; PP, posterior probability; rbCL, RUBISCO large subunit; tufA, elongation factor TU

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