

Phylogenetic relationships and revision of the genus *Blastomussa* (Cnidaria: Anthozoa: Scleractinia) with description of a new species

Abstract

The Indo-Pacific coral genus *Blastomussa* (Cnidaria: Anthozoa: Scleractinia) includes three species, i.e., *B. merleti*, *B. wellsi*, and *B. loyae*. Following the re-examination of relevant type material, other museum specimens, and the study of newly sampled corals, the genus is revised and the new species *B. vivida* is described. The new species differs from its congeners by being encrusting, having coralla with a cerioid corallite arrangement and much larger corallites. In vivo, the expanded polyp mantle is fleshy and characterised by bright, vivid colours. Specimens were sampled in New Caledonia, northern Papua New Guinea, Sabah (northern Malaysia), Brunei Darussalam and the east coast of Peninsular Malaysia. Additional records from Southeast Asia and the western Pacific were obtained through the study of museum collections and published illustrations of living animals in situ: Japan, Vietnam, Indonesia, Philippines, and Australia. The new species appears widespread and has so far been misidentified as *B. wellsi*, which has smaller corallites, less septa, and a phaceloid corallite arrangement. The phylogenetic relationships within the genus *Blastomussa* and with other genera were investigated by analyses of their nuclear and mitochondrial DNA. These other genera are *Parasimplastrea*, *Plerogyra*, *Physogyra*, all currently incertae sedis in the Robust clade of Scleractinia as a result of molecular coral systematics, and *Nemenezophyllia*, whose phylogenetic position is examined for the first time. Representatives of all these genera are characterised by fleshy polyps with well-developed and expandable mantles. They are all closely related and form a strongly supported clade. The results of the molecular analyses provide evidence for *Blastomussa*'s monophyly and show that the new *B. vivida* is a distinct species, which is most closely related to *B. wellsi*. Furthermore, the only known extant species of the genus *Parasimplastrea* appears to be embedded within the *Blastomussa* clade, thus prompting its taxonomic revision. Because *Blastomussa* is closely related to the monospecific *Nemenezophyllia*, the affinities of their polyp and corallite morphology are

discussed. Although polyp morphology and molecular data suggest that *Blastomussa*, *Plerogyra*, *Physogyra*, and *Nemanzophyllia* could constitute a new scleractinian family, the macro and micromorphology of their skeletons need to be examined before a family diagnosis can be formulated.