A systematic study of crustose coralline algae (Corallinales, Rhodophyta) in the Ryukyu Islands: Preliminary analyses of the genetic diversity and phylogenetic relationships of eight species

PG-5 A systematic study of crustose coralline algae (Corallinales, Rhodophyta) in the Ryukyu Islands: Preliminary analyses of the genetic diversity and phylogenetic relationships of eight species

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Crustose coralline algae, a cosmopolitan group of calcifying algae, are distributed from the Arctic to the tropics. They are ecologically important reef-building organisms or settlement or morphogenetic inducers for marine invertebrates including abalones, corals, and sea urchins.

In the Ryukyu Islands, approximately 20 crustose coralline algal species have been reported in eight genera from three families. More than half of which are also reported in the Indo–Pacific region. However, because of recent changes in species and genus circumscriptions, the taxonomic status of some species is unclear. Furthermore, no molecular-phylogenetic study has focused on coralline algae from Japan. Therefore, we report the first attempt to use molecular tools, DNA sequences of small subunit ribosomal RNA gene of the eight commonly distributed species in the Ryukyu Islands. Phylogenetic study among these eight and other coralline algal species, *Lithophyllum kotschyanum*, *Hydrolithon onkodes*, *H. reinboldii*, *Mastophora pacifica*, *M. rosea*, *Neogoniolithon brassica-florida*, *Pneophyllum conicum*, *Mesophyllum erubescens*, was carried out. Sequences obtained from the six examined species of crustose coralline algae with the exception of two *Mastophora* species were assessed for differences with the already published sequences from other regions.

Our phylogenetic analyses revealed that although *Mastophora*, the type genus of the subfamily Mastophoroideae, formed a monophyletic clade with *Metamastophora*, a genus of this subfamily, the *Mastophora–Metamastophora* clade and other genera of this subfamily were polyphyletic. Moreover, five *Hydrolithon* species including *H. reinboldii*, the type species of this genus, did not group together. Therefore, the definitions of the subfamily Mastophoroideae and the genus *Hydrolithon* need to be taxonomically revised. Additionally, monophyly of *H. onkodes* and *N. brassica-florida* from the Ryukyu Islands and other regions was not supported. The intraspecific sequence differences of six examined species except for two *Mastophora* species were comparable to sequence differences between congeneric species of coralline algae. Thus the results suggest that the six examined species could potentially harbor several cryptic or even distinct species.