琉球大学学術リポジトリ

クマノミ類との相互作用によって創出される宿主イソギンチャク共生系

メタデータ	言語: English 出版者: 琉球大学 公開日: 2021-04-15 キーワード (Ja): キーワード (En): 作成者: Hayashi, Kina, 林, 希奈 メールアドレス: 所属:
URL	http://hdl.handle.net/20.500.12000/48177

（様式第３号）

論　文　要　旨

論　文　題　目

The symbiotic system created by interactions among host sea anemones, anemonefish, and other fish

Shallow water coral reefs in tropical and subtropical seas are locations where species diversity of a given unit of area are among the highest on earth. One of the characteristics of species diversity of coral reefs are symbioses in which heterologous species are tied closely behaviorally or physiologically. One of the most well-known symbioses of coral reefs are the relationships between host anemones and anemonefish. Anemonefish (Amphiprioninae, Pomacentridae) depend on host anemones for the majority of their life cycle; anemonefish float for 8-12 days after hatching as pelagic larvae, and then colonize host anemones where they stay throughout their lives. Since the host anemones used by anemonefish vary from species to species, it is expected that anemonefish community structure will be determined by the species composition of the host anemones. Moreover, anemonefish are not the only species that use host anemones as a shelter, although other species have not been investigated in much detail. To understand the mechanisms of high biodiversity of coral reefs, we aimed to elucidate the coexistence mechanisms of anemonefish and other species of fish that utilize host anemones. We investigated the community structure of anemonefish and host anemones in the Ryukyu Archipelago (12 sites in the Okinawa Islands; 17 sites in the Sakishima Islands), and clarified that six species of anemonefish mainly coexisted by niche differentiation, in which anemonefish use different species and areas of host anemones, or sometimes via cohabitation, in which two species of anemonefish use the same host, with the lottery hypothesis only occurring in cases with low densities of anemones. Next, we investigated the frequency of host utilization by other species of fish and the factors affecting them. In the Ryukyu Archipelago, 15 species of fish (10 species of damselfish, 1 species of cardinal fish, 4 species of wrasse) use host anemones as shelter, and one species of fish (*Labroides dimidiatus*) comes to clean anemonefish. Among these fish, the most frequent species (=64% of total number observed) was the immature phase of *Dascyllus trimaculatus*, while the other 14 species were rare and are considered as temporary users of anemones. The existence of *D. trimaculatus* was affected by species of anemonefish. Therefore, we experimentally analyzed whether the frequency of aggressive anemonefish behavior differs depending on the species of anemonefish. As a result, we demonstrated that aggression varies greatly among anemonefish species, and the tendency was consistent with the results of presence or absence of *D. trimaculatus*. In this thesis, we have shown that the community structure of host anemones determines the species composition of anemonefish, and that the aggression of the anemonefish may determine coexistence with other species of fish.

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