別紙４

学 位 論 文 の 要 旨

論文題目　Ecological studies on symbiotic relationships between large-sized jellyfish and other animals in Asian waters
(アジア海域における大型クラゲ類と他動物との共生に関する生態学的研究)

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Many species of fish juveniles and invertebrates are associated with jellyfishes. However, their interactions are complicated, depending on combinations of taxa and developmental stages of the host and symbionts. I have investigated the ecology of symbionts on large-sized jellyfishes occurring in Asian waters.

In the Seto Inland Sea of Japan, metacercariae of three species of trematodes were found in the mesoglea of the jellyfish. Moreover, these jellyfishes, *Aurelia aurita* s.l., *Chrysaora Pacifica* and *Cyanea nozakii* frequently harbored fish juveniles of *Psenopsis anomala*, *Thamnaconus modestus*, and *Trachurus japonicus*. The mean intensity of metacercariae in *A. aurita* s.l. clearly showed seasonality. That of metacercariae in *C. nozakii* was highest among all jellyfish hosts and appeared to be enhanced by its medusivory to become the second intermediate, and/or paratenic host. Trophic interactions between the jellyfish and associated fish were verified, using both gut content and stable isotope analyses. The detection of both the trematodes and nematocysts in the guts of *P. anomala* and *T. modestus* juveniles, in addition to results on the stable isotope analysis, suggests that transmission of the parasites occurs via prey-predator relationships.

Trachurus japonicas and *P. anomala* were associated various jellyfishes occurring in East Asian waters. In Southeast Asia, *Alepes djedaba*, *Latreutes anoplonyx*, *Charybdis feriata* and *Ophiocnemis marmorata* were widely associated with many kinds of jellyfishes. Juveniles of *T. japonicus* and *Alepes djedaba* seemed to adopt jellyfish as prey collectors on the basis of observations of the digestive tube contents analyses of the associated fish. *Psenospis anomala* juveniles mainly used the host as a food source. For symbiotic invertebrates such as *C. feriata* and *O. marmorata*, jellyfish can play roles for settlement. *Latreutes anoplonyx* seemed to utilize the jellyfish for breeding. These three symbionts directly fed upon the host jellyfish. *Charybdis feriata* devoured not only the host jellyfish but also other symbionts on them.

Two rhizostome jellyfishes, *Rhopilema hispidum* and *Lobonemoides robustus* were commercially harvested for food in Thailand. These harbored a variety of juvenile fish and invertebrates that were accidentally caught with these hosts, and then discarded as by-catch. The impact of the jellyfish fishery on recruitment and survival of these associated animals were estimated on the basis of my original data and FAO fisheries statistics. It is likely that the negative impact was more severe on the symbiotic ophiuroid *O. marmorata*, which firmly attaches to the hosts, than on juvenile fish that can easily escape from gears such as coarse-meshed scoop nets and hooks. Loss of the ophiuroids as by-catch was estimated 126–165 million individuals annually, suggesting a possibility that the jellyfish fisheries greatly hinder recruitment of the symbionts. For symbiotic fish juveniles, the fisheries could reduce their refuses and prey collectors. For sustainable jellyfish fisheries, the life cycle and interactions of hosts and symbionts should be more intensively studied.