

琉球大学学術リポジトリ

琉球列島における外来淡水魚類の分布パターンと生活史特性：島嶼における効果的な外来種の管理に向けて

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論 文 要 旨

論 文 題 目

Distribution patterns and life-history traits of non-native freshwater fish in Ryukyu Archipelago: towards effective management of freshwater fish invasions in island's aquatic ecosystems

In the thesis, I explored distribution patterns, changes in biodiversity, life-history traits and its variability, and factors affecting establishment and dispersal success of non-native freshwater fish in Ryukyu Archipelago.

In chapter 1, I studied distribution patterns of non-native freshwater fish in islands of the Ryukyu Archipelago and examined changes in biodiversity by biological invasions. Distribution patterns of non-native freshwater fish can be explained by introduction reason and species richness of non-native freshwater fish correlated with population density rather than environmental variables. Analyses of beta diversity showed introductions of various ornamental aquarium fish in Okinawa-jima Island likely decrease total beta diversity of the most invaded island. Species contribution to beta diversities of native species were larger than that of non-native freshwater fish.

In chapter 2, I explored current status and distribution of non-native freshwater fish on Okinawa-jima Island, which is the most invaded island in Ryukyu Archipelago. I revealed currently at least 22 non-native freshwater fish are reproducing on Okinawa-jima Island. Distribution patterns and rates of range expansion of each species were clarified.

In chapter 3, I examined introduction history and establishment rates of non-native freshwater fish in Okinawa-jima Island. From the results obtained in this chapter, I predicted dumping of ornamental pet fish will continue in the future and recommended strict rules and measures to prevent future invasions via this most important pathway.

In chapter 4, I studied life history traits of non-native freshwater fish established on islands in Ryukyu Archipelago. First, I studied non-native fish in Haebaru Reservoir, on Okinawa-jima Island and targeted *Coptodon zillii*, *Amatitlania nigrofasciata*, *Parambassis ranga*, and clarified life history parameters such as growth, age composition, maturity and spawning season. Second, I explored life history variability of globally invasive freshwater fish, *Oreochromis niloticus* and *Micropterus salmoides*. I sampled *O. niloticus* in Yonaguni-jima Island, and compared life history with populations across the global distribution to clarify geographical variability of life history traits. *Oreochromis niloticus* showed greater life span compared to populations in other regions, and longer life span likely due to that *O. niloticus* are not exploited in Ryukyu Archipelago. Furthermore, I studied resource polymorphism (life history

variability in a single population) of *M. salmoides* and reported sympatric occurrence of “dwarf” and “normal” forms of *M. salmoides* and causes and consequences of this novel resource polymorphism are discussed

Finally, in chapter 5, I explored factors affecting establishment and dispersal success of non-native freshwater fish.