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Incursion and reproductive strategy of a planktonic copepod *Acartia japonica* in Sagami Bay, Japan

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Abstract

The incursion and successful establishment of non-native zooplankton species can significantly alter plankton community composition. The accumulation of biological and physiological knowledge in these species are essential for understanding the mechanisms of their dispersal and successful establishment in their non-original habitats. Recently, we found the occurrence of a planktonic copepod *Acartia (Odontacartia) japonica*, Mori, 1940 as a newcomer at Manazuru Port in Sagami Bay, Japan, where has been well studied and monitored for over two decades. The present study investigated the annual and seasonal variation in abundance of the species in water column at Manazuru Port in Sagami Bay, based on the monthly monitoring six years from 2011 to 2016, to clarify the appearance pattern of the newly occurring copepod. We also examined the *in-situ* egg production of the species, to understand its reproductive traits in the field.

Acartia japonica has appeared in water column at Manazuru Port only from summer to autumn every year after 2013. The species has disappeared from late autumn for 200-300 days, and has appeared again in the next summer. The water temperature measured during its occurrence period suggests that the copepod is a warm stenothermal species. The species produced subitaneous and diapause eggs during its occurrence period in the field. Subitaneous eggs were mainly produced from August to September (summer), which hatched immediately and may increase the individual number of the species. Diapausing eggs were produced from September to November (autumn), which showed an ability to survive over 300 days under ambient-water temperature in the laboratory. Therefore, diapause eggs may play a role to connect the temporally divided populations of the species in each year. Continuous occurrence in every warm season and diapause egg production suggests successful establishment of the species population at Manazuru Port in Sagami Bay.

Keywords

non-native species, seasonal appearance, egg production, resting egg