

## Variations in egg production rates of *Calanus sinicus* (Copepoda: Calanoida) estimated by gonad morphology

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Ocean mixing brings nutrients to surface layer, which in turn enhance phytoplankton production. Phytoplankton can increase in number and biomass in a short time by cell division, hence increase of cell abundance or chlorophyll concentration can be seen nearby the area of nutrient supply. In contrast, multicellular zooplankton, e.g. copepods, takes time to increase in number, as improvement of food condition brings increase in egg production first. It takes several days to weeks for the development of the eggs to the adults and thus biomass increase in multicellular zooplankton would occur away from the area of nutrient supply, which makes it difficult to be distinguished. Here, we developed a method to estimate egg production rate (EPR) of *Calanus sinicus*, one of the dominant copepods around Japan, based on the observation of gonad morphology. Niehoff and Runge (2003) first established the method for *C. finmarchicus* and EPR can be estimated without culture experiment. The method was applied to the time series sample collected around the Tosa Bay and we found the long-term fluctuation of the EPR of *C. sinicus*, which was different to its abundance fluctuation.

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