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Distribution of siphonophores in the Northwest Pacific Ocean and links to environmental conditions

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Despite their abundance in marine ecosystems, studies on siphonophores are limited. In this study, 26 species of siphonophores in the Northwest Pacific Ocean were identified during multiple cruises of the R/V ISABU from 2018–2020, and various factors that may affect the occurrence of siphonophores, including water temperature, salinity, zooplankton biomass, and trophic niche were investigated. Statistical analysis revealed that the distribution of siphonophores and their biomass could be divided into two water mass groups, affected by the Kuroshio and Oyashio Currents. The species with high contributions to distinguishing the water mass groups (including *Chelophyces contorta*, *Dimophyes arctica*, *Bassia bassensis*, and *Eudoxoides spiralis*—mainly belonging to the Diphyidae) showed species-specific correlations with water temperature and salinity. This suggests that diphyids can be used as indicator species for currents and hydrological factors that influence water mass. The biomass of siphonophores exhibited a trend opposite to that of non-gelatinous zooplankton and showed no association with other gelatinous zooplankton. These results can be interpreted from an ecological niche perspective. Through nitrogen and carbon stable isotope analyses, the dietary sources of siphonophores could potentially overlap with those of chaetognaths or non-gelatinous zooplankton. Because the trophic position of siphonophores (2.4–3.2) also falls in the range of those of chaetognaths (2.8–3.4) and non-gelatinous zooplankton including copepods, euphausiids, and amphipods (2.4–3.5), diet competition with carnivorous mesozooplankton could be predicted. Considering that the diversity and biomass of most siphonophores are strongly positively correlated with water temperature and salinity, expansion of the Kuroshio Current is expected to lead to an increase in siphonophores in the Northwest Pacific in the future. The findings of this study are anticipated to provide novel insights into climate change prediction and response and enhance our understanding of siphonophore communities.

KEYWORDS

biodiversity, gelatinous zooplankton, indicator species, Kuroshio Extension, siphonophore, stable isotope, trophic position

Siphonophores Of The Pacific With A Review Of The World Distribution

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