

Food spectrum and trophic position of an Arctic cephalopod, *Rossia palpebrosa* (Sepiolida), inferred by stomach contents and stable isotope ($\delta^{13}\text{C}$ and $\delta^{15}\text{N}$) analyses

Golikov A., Ceia F., Sabirov R., Belyaev A., Blicher M., Arboe N., Zakharov D., Xavier J.
Kazan Federal University, 420008, Kremlevskaya 18, Kazan, Russia

Abstract

© Inter-Research 2019. *Rossia palpebrosa* (Sepiolida) is the most abundant nekto-benthic cephalopod in the Arctic; however, its feeding and trophic ecology are largely unknown. This work aims to assess the role of this species in Arctic ecosystems based on the contents of its stomach and analyses of $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ stable isotopes in its beak. The main taxa identified in the food spectrum were Crustacea (frequency of occurrence: 52.1%), followed by Polychaeta (14.6%) and fishes (6.3%). Sipuncula and Echinoidea were occasionally found and were recorded here as *R. palpebrosa* prey for the first time, as well as Polychaeta and Euphausiacea. A significant geographic increase in $\delta^{13}\text{C}$ values (mean \pm SE, $.19.3 \pm 0.2\text{‰}$) from the Barents Sea to West Greenland was found, but no significant ontogenetic increase, suggesting no migrations occurred among different water masses. Values of $\delta^{15}\text{N}$ ($8.7 \pm 0.2\text{‰}$) and trophic level (TL; 3.6 ± 0.1) revealed significant ontogenetic increases and an absence of geographic patterns, suggesting the trophic role of this species is similar throughout the studied part of the Arctic. Stable isotope values, TL and food spectrum for *R. palpebrosa* are close to Arctic nekto-benthic predatory fishes and shrimps, especially *Pandalus borealis*. However, sepiolids prey on organisms exceeding their own size and do not scavenge. A gradual ontogenetic decrease in isotopic niche width, while increasing diversity in the food spectrum of larger specimens, was observed in *R. palpebrosa*. However, $\delta^{13}\text{C}$ values, i.e. variation in primary productivity supporting food sources, were more responsible for these ontogenetic differences in niche size than $\delta^{15}\text{N}$ values.

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Keywords

Arctic marine food webs, Bobtail squid, Competition, Ecological niche, Feeding, Northern shrimp, *Pandalus borealis*, Trophic ecology

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