



Nutrient limitation on a planktonic rotifer: Life history consequences and starvation resistance

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ABSTRACT: Nutrient content of plants is low relative to that of herbivores. Dietary nutrients can limit the growth and reproduction of herbivores. We studied life history consequences and starvation resistance for a common planktonic rotifer, *Keratella cochlearis*, feeding on algae grown on nutrient-limited media. A strain of *Cryptomonas* was grown on three types of growth medium with nitrogen (N) and phosphorus (P) adjusted to produce N-limiting, P-limiting, and nutrient-sufficient conditions. The analysis of nutrient content of *Cryptomonas* cells grown on nutrient-limited conditions showed that those algae exhibited higher P content than algae growing on a nutrient-sufficient medium. However, *Cryptomonas* reached lower densities in nutrient-limited media. The life history responses of *Keratella* to food quality were examined with low and high food availability. Our study showed that the interaction of food quantity and quality had a significant effect on rotifer growth rates. We observed, at low food levels, that *Keratella* growth rates were highest when the algae were grown under P limitation. The lowest rotifer growth rates were obtained when the rotifer fed on *Cryptomonas* grown in nutrient-sufficient conditions. Our study also showed that starvation resistance was higher for those rotifers fed on N-limited *Cryptomonas*. In natural situations, rotifers could even grow better under nutrient-limited conditions if this group of algae is dominant in the phytoplankton community. Moreover, differences in starvation resistance could be critical in determining competitive outcome and community structure in nutrient-variable environments.

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