



Life history bottlenecks in *Diaptomus clavipes* induced by phosphorus-limited algae

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ABSTRACT: Considerable information has accumulated on food quality effects on certain cladocerans; meanwhile, other zooplankton have received comparatively little nutritional study. In particular, little is still known about nutrition of copepods with more complex ontogenetic changes. Recent studies have identified strong ontogenetic differences in phosphorus content of copepods, which have been found to be highest for late naupliar stages. Laboratory experiments were set up to examine the life cycle of a calanoid copepod relative to mineral P limitation on a pure algae diet. We hypothesized that P imbalance would cause nauplii particularly to be affected by algal nutrient status. Developmental rates, growth rates, and fecundity of *Diaptomus clavipes* under excess (1.0 mg C L⁻¹) P-deficient and P-sufficient *Scenedesmus obliquus* were determined. We found strong differences between diets in survival to maturity: nauplii developed into copepodites and adults that successfully reproduced when fed the P-sufficient algae but invariably died after molting into copepodite CII when reared on the P-deficient algae. Differences in developmental rates were small for most life stages of nauplii for both food types but were substantial both for copepodite CI and particularly for CII that lived without molting up to 22 d on P-deficient food before dying. Surprisingly, copepodites that fed on P-deficient algae had similar or higher specific somatic growth rates than animals on P-sufficient algae. Although these experiments demonstrate a strong ontogenetic component to copepod nutrition, and a heretofore undocumented dependence of copepod success on algal P content, the life history bottleneck occurs at a later stage than we hypothesized.

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