



Growth rates of Antarctic krill, *Euphausia superba*: Comparison of the instantaneous growth rate method with nitrogen and phosphorus stoichiometry

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ABSTRACT: Zooplankton growth rates are hard to measure directly, and proxy measurements are desirable to encompass the variety of species and scales of interest. The growth rate hypothesis of stoichiometric theory states that a negative relationship exists between nitrogen : phosphorus (N : P) stoichiometry and growth rate, driven by cellular ribosomal ribonucleic acid (rRNA) content. Despite the wealth of literature on the growth rate hypothesis, there exist no practical demonstrations of its use in the marine literature. We thus investigated whether this hypothesis could be the basis of a technique to estimate growth rates of *Euphausia superba* by comparing, for the same individual krill, elemental stoichiometry and growth rates derived from the instantaneous growth rate (IGR) method. These growth rates were the first IGR measurements from South Georgia; from within a restricted area over the course of just 1 month, these rates were highly variable, from negative to near maximum rates recorded for the species. Although there were significant differences in N: P ratio and phosphorus content between individuals and schools, there was no relationship between N: P ratio and growth rate when data were grouped by school. Thus, our data do not support the predictions of the growth rate hypothesis at an intraspecific scale. However, when all data were pooled, the mean values of growth rate and N: P ratio did fit the interspecific relationship established previously for freshwater zooplankton. We suggest that krill maintain the biochemical machinery for high growth potential and maintain high growth in summer to take advantage of short-term fluctuations in food.

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