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Consumer growth linked to diet and RNA:P stoichiometry: Response of *Bosmina* to variation in riverine food resources

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ABSTRACT: Feeding experiments were performed with riverine *Bosmina* to investigate how their somatic growth rate responded to variation in food resources arising from changing hydrodynamic conditions. Experimental manipulations of food quality and quantity were achieved by diluting riverine suspended particulate matter (seston) to obtain a range of food concentrations and by amending natural seston with laboratory-grown *Scenedesmus acutus*. *Bosmina* experienced food limitation during periods of elevated discharge when the P content of seston was low (C : P > 600). Growth rates covaried with body RNA and P contents ($R^2 = 0.96$ and 0.86 , respectively; content expressed as percent of dry mass), which is consistent with the hypothesis that high growth rates require increased allocation to P-rich ribosomal RNA and that high seston C : P induces P limitation in riverine *Bosmina*. P limitation arises in riverine consumers of riverine seston when hydrologic conditions favor terrestrial inputs, sediment resuspension, and low algal productivity, thereby resulting in seston fractions dominated by P-poor materials. During low discharge, riverine seston was P-rich relative to *Bosmina* requirements and growth rates were decoupled from body P content. *Bosmina* RNA content was strongly and linearly related to growth over a broad range of resource conditions, suggesting that it may be a useful surrogate to assess dietary sufficiency of food resources in natural settings.

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