Ingestion rate and gut clearance in the planktonic copepod Centropages hamatus in relation to food concentration and temperature

Ingestion rate, gut clearance rate and gut content were measured in the laboratory in adult females of the planktonic copepod C. hamatus fed the centric diatom Ditylum brightwellii. Ingestion rate increased with algal concentration approaching a maximum rate \( \leq 85\% \text{ body } C \cdot \text{day}^{-1} \) at 15\(^\circ\)C. Within the temperature interval studied (1\(^\circ\)-15\(^\circ\)C), maximum ingestion rate increased with temperature with a Q10 of 3.9. Gut clearance was estimated by following the exponential decrease in the gut content of plant pigments (measured fluorimetrically) with time after feeding, and showed approximately the same temperature dependence (Q10 = 3.3) as ingestion rate. The relationship between gut content and algal concentration was described by an equation similar to that relating ingestion rate to algal concentration. Gut content multiplied with gut clearance rate, which can be considered an estimate of ingestion rate, yielded values similar to ingestion rates actually measured. This implies that in situ algal ingestion rates may be estimated from measurements of the content of plant pigments in the guts of freshly caught copepods.

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