

REPRODUCTION AND FEEDING
IN THE TROPICAL, CARNIVOROUS
COPEPOD *Euchaeta rimana* Bradford

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ABSTRACT

The response of egg production to variation in ingestion rate was determined for the tropical, carnivorous, marine copepod *Euchaeta rimana* in the laboratory at 25° C using a small copepod *Acrocalanus inermis* as prey. Maximum egg production was relatively low (9 eggs female⁻¹ day⁻¹; 20 % of body carbon day⁻¹) compared to rates extrapolated from temperate marine copepod species, but was similar to that of another tropical marine copepod species. This latitudinal disparity in the maximum for weight specific egg production rates suggests a different strategy of physiological adaptation to temperature for the temperate versus tropical species, perhaps reflecting differences in food availability.

Among the factors which determine the weight specific reproductive rate (clutch size, inter-clutch duration, egg size and female body weight), only egg size did not vary with variation in ingestion. Clutch size and egg production rates were both negative exponential functions of ingestion, implying that clutch size may reflect egg production rates under conditions prevailing in the field. Clutch size of field collected females (range: 11 to 22 eggs female⁻¹) were significantly higher than those observed during measurements in the laboratory (range: 4 to 17 eggs female⁻¹). At the clutch sizes observed in field collections, the corresponding inter-clutch duration as determined experimentally was relatively constant at 2 to 3 days. These high reproductive rate estimates suggest that *E. rimana* females may not be as food limited in nature as previously suggested by other investigators. Finding mates may be a more significant problem for these females than finding food

in nature, since 25 % of the females examined in the laboratory appeared unfertilized and produced no viable eggs.

No significant threshold for ingestion was found before egg production would commence. However, from unexpected variations in female body weight, total production was calculated as egg production plus somatic weight change. Literature data for metabolic rates and assimilation efficiency agree well with the minimum ingestion required before positive total production would occur. Gross efficiency (production/ingestion) for egg production declined with increasing ingestion, but gross efficiency for total production increased with increasing ingestion. If *E. rimana* females are feeding at the upper end of their functional response for ingestion in nature (as suggested by clutch size data), a relatively high gross efficiency for total production ($\approx 30\%$) would be predicted. This conjecture may partially explain the high numerical abundance reported for this species in oligotrophic, tropical habitats.