

## Dietary Lipid Requirements for Optimal Egg Quality of Redclaw Crayfish, *Cherax quadricarinatus*

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### Abstract

The effect of three crude dietary lipid levels (4, 8, and 12%) on egg quality of the female redclaw crayfish, *Cherax quadricarinatus*, was evaluated. Three replicate groups of 40 crayfish (mean initial weight  $\pm$  SD,  $23.0 \pm 3.0$  g) per diet treatment were stocked in 15,000-L tanks, at 28 C. After 75 d of culture, there were significant differences ( $P < 0.001$ ) in egg area ( $3.52$ – $3.90$  mm<sup>2</sup>), volume ( $34.0$ – $39.3$  mm<sup>3</sup>), weight ( $4.81$ – $5.36$  mg), and diameter ( $2.15$ – $2.27$  mm) in response to dietary lipids in the diet. Using the quadratic equation, the maximum responses of these parameters corresponded to lipid levels from 8.60–8.84%. There were no significant differences ( $P > 0.05$ ) in survival (82.1–86.9%), final weight (41.0–43.7 g), number of spawning females (18.12–27.38%), and fecundity (9.07–10.31 eggs/g female). Additionally, there were no significant differences ( $P > 0.05$ ) in egg mean protein ( $2306.87 \pm 440.08$   $\mu$ g/egg), lipid ( $441.95 \pm 83.23$   $\mu$ g/egg) and carbohydrate ( $74.81 \pm 10.12$   $\mu$ g/egg) contents, and energy ( $13.49 \pm 2.25$  kcal/egg). The optimum overall response was obtained for dietary lipid content of 8.7%, which we recommend to optimize egg quality of this freshwater crayfish.

Cultivation of freshwater Australian redclaw crayfish, *Cherax quadricarinatus*, is increasing in several countries; however, little attention has been placed on developing adequate diets for maturation of broodstock. At present, broodstock diets have been based on formulations of other aquatic species (Austin 1992; Barki and Karplus 2000). A cost-effective and nutritionally balanced diet is of growing interest to producers (García-Ulloa et al. 2003).

Egg quality, gonad maturation, and fecundity in crustaceans are greatly affected by broodstock nutrition (Rodríguez-González 2001; Wouters et al. 2001). The role of dietary lipids for broodstock has been studied for several crustacean species (D'Abramo et al. 1980; Xu et al. 1994; Racotta et al. 2004). Lipids are a source of dietary energy and fatty acids that are essential for maintenance and functional integrity of biomembranes (Ackman and Kean-Howie 1995). Lipids act as a main source of metabolic organic energy for egg development and participate in embryonic tissue formation (García-Guerrero et al. 2003).

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