

By contrast, for larger crabs the benefits of more frequent feeding are less consistent. In *S. serrata* reared in RAS, feeding once, twice, or three times daily did not significantly affect growth or survival, and the best numerical performance occurred in the once-daily 10 p.m. treatment (Mayzuri et al., 2025). A separate RAS apartment study also found no significant biological advantage of increasing frequency, although feeding twice daily gave the highest profit and labor efficiency, suggesting that operational optimization may favor moderate frequency even when growth responses are similar (Diatin et al., 2026).

5.3 Relationship between feeding time and feeding behavior

Feeding time is closely tied to mud crab behavior because activity rhythm, prey detection, and digestive physiology shape when feed is most effectively consumed. Juvenile *S. olivacea* respond rapidly to attractive diets, and pellet or natural feed choice appears to be mediated partly by chemosensory cues released into the water, which trigger approach and feeding behavior. Broader evidence also shows that feeding rhythm is related to circadian organization and digestive enzyme activity, so synchronizing feed delivery with active periods can improve feed utilization and reduce waste (Wang et al., 2024).

Importantly, this relationship changes with ontogeny. Zoea of *S. paramamosain* showed a strong diurnal feeding rhythm, with significantly higher feeding rates at 10:00-14:00 from ZI to ZIV, and newly hatched larvae required immediate feeding because they do not retain yolk reserves. In contrast, adult and juvenile field studies show continuous night feeding and only limited daytime feeding, often associated with high tide, indicating a shift from larval daytime peaks to predominantly nocturnal feeding later in life. Overall, the literature indicates that mud crab growth performance is influenced less by a single fixed schedule than by matching feeding time and frequency to developmental stage, behavior, and production system. Night-oriented schedules appear more suitable for juveniles and adults, whereas larvae often benefit from more frequent and partly daytime feeding windows.

6 Effects of Different Feeding Levels on Mud Crab Growth Performance

6.1 Growth rate

Feeding level strongly affects mud crab growth because ration size determines whether enough nutrients remain after maintenance needs are met for tissue accretion and molting (Mayzuri et al., 2025). In a dose-response fattening trial with raw fish, different feeding levels significantly changed absolute weight gain and specific growth rate, showing that ration is not a neutral management variable in *Scylla serrata* culture (Annisa et al., 2024). Evidence from a broader review likewise indicates that trash fish offered at 15% of body weight yields optimal growth and feed efficiency under fattening conditions. At the same time, growth response is not determined by quantity alone, because some studies found that feed formulation differences produced little improvement when protein levels were modest or water conditions fluctuated strongly.

The growth advantage of appropriate feeding also reflects stage-specific metabolic demand. Juvenile *S. serrata* in postmolt stages showed average growth rates of 2.064% initial body weight per day, far above intermolt crabs at 0.492%, while feed intake and nutrient demand for growth were also higher in postmolt animals. This helps explain why stable and appropriately timed feeding tends to improve specific growth rate by maintaining nutrient availability for metabolism and reducing energy loss to stress. Experimental work further shows that once a biologically adequate intake is reached, increasing feeding frequency alone does not necessarily improve growth, since feeding one, two, or three times daily in RAS produced no significant difference in growth parameters, even though one daily feeding gave the best numerical result in that trial (Figure 2) (Diatin et al., 2026).

6.2 Feed conversion efficiency and economic benefits

Feeding level influences production economics primarily through feed conversion ratio (FCR), because lower FCR means less feed is required to produce each unit of crab biomass (Andal et al., 2025). In mud crab polyculture, the treatment with the lower FCR also produced higher absolute growth, reinforcing the general pattern that efficient feed use translates directly into better production output. Evidence from feeding-dose trials is more nuanced, however: one 45-day fattening study found that different ration levels significantly altered growth but did not significantly affect FCR, even though observed FCR values remained relatively high at 1.7-3.8 (Annisa et al., 2024).