

become stable 24 to 36 hours after molting. Thus, hemolymph values 36 to 240 hours after sampling were not significantly different from each other. Based on these results, only 36 hours (or more) postmolt animals were sampled after transfer from control (32 ppt) to five test salinities (8, 16, 24, 32 and 40 ppt). Hemolymph samples were then taken 1, 2, 3, 5, 7 and 10 days after transfer. Results showed that in general, osmolality, total protein and chloride concentrations in the hemolymph did not vary with time within the same salinity.

Both sizes exhibited hyperosmotic and hyperionic regulation in lower salinities and hypoosmotic and hypoionic regulation in higher salinities. The isosmotic values obtained were approximately 676 to 720 mOsm (24 to 28.8 ppt) for the 10 g, and 724 to 792 mOsm (26 to 28.5 ppt) for the 30 g size group. For chloride, the isoionic values ranged from 324 to 339 mM in 10 g prawns. Slopes of the regression lines of hemolymph osmolality versus salinity in 10 g prawns were not significantly different from slopes of similar regression lines in 30 g prawns. These results suggest that the ability to regulate osmotic and total protein concentration in the hemolymph is similar in the two size groups.

Induced Ovarian Maturation and Rematuration by Eyestalk Ablation of *Penaeus monodon* Collected from Indian Ocean (Phuket Province) and Songkhla Lake

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Because of the difficulty involved in maintaining a supply of sexually mature female shrimp for larval production in hatcheries, experiments on induced ovarian maturation in tiger shrimp, *Penaeus monodon* by eyestalk ablation were carried out from March to August, 1983. These shrimps were collected from two areas of Thailand: Phuket on the Indian Ocean and Songkhla Lake with entry to the Gulf of Thailand. Every female had one eyestalk pinched before being stocked together with males in various female-male ratios in 50-ton cement tanks with continuous water flow. The shrimp were fed 10% of their body weight daily with a diet of 90% green mussel (*Mytilus edulis*) and 10% cow liver.

Results show that of those female shrimps collected in the Phuket area which is a natural spawning ground, 51% became gravid. However, of those collected in Songkhla Lake which is not a spawning area, only 19.51% became gravid. There was also a large difference in the number of days between eyestalk ablation and first spawning: 4-5 days for the Phuket samples and 20-30 days for those from Songkhla Lake. The survival rate of the larvae until P₂₀

averaged 8.5% (total 732, 259) for the Phuket samples and 4.0% (total 300,000) for the Songkhla Lake samples. Results show mass mortality during the nauplius and mysis stages of shrimp from both locations which may indicate a greater susceptibility to bacterial and fungal infections in larvae produced from artificially matured females.

Further studies should be undertaken to determine the proper nutritional diet for maximum production of gravid females, and to discover methods to increase sperm production in males from areas other than natural spawning grounds.

Variation in Tissue Lipid Content and Fatty Acid Composition During Ovarian Maturation of Unablated and Ablated *Penaeus monodon* Broodstock

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The tissue lipid content and fatty acid composition in the hepatopancreas, tail muscle and gonad of unablated and ablated *Penaeus monodon* were determined. Females at various stages of maturity were collected from offshore spawning grounds in Tigbauan and Guimbal, Iloilo, Philippines. Ablated females were reared in captivity.

The hepatopancreas showed the highest lipid content at 15.72 to 25.20% in unablated females and 22.47 to 34.90% in ablated females. Fresh lipid levels averaged 2.60% with no marked variation throughout the maturation period. Ovarian lipid increased from 5.80% (unablated) and 7.50% (ablated) in Immature Ovaries to more than two-fold in Early Maturing Ovaries coupled with a drop in hepatopancreatic lipid suggesting lipid mobilization to the ovaries. In ablated females, ovarian lipid progressively increased to a maximum of 21.90% in Fully Mature Ovaries with a corresponding rise in hepatopancreatic lipid. Both the ovarian and hepatopancreatic lipids declined in spent females. Fatty acid profiles of the tissues consistently showed the presence of polyunsaturated fatty acids (PUFA) 20:4 ω 6, 20:5 ω 3 and 22:6 ω 3. These fatty acids were reflected in the spawned egg. The lipid level in the hepatopancreas appeared to be inversely related to the total PUFA concentration in the ovaries. Lipid accumulation in ablated females was significantly higher than in unablated females.

The findings suggest storage and subsequent utilization of lipids for maturation and spawning processes. The type of polyunsaturates present in the maturing ovaries is indicative of their metabolic and physiological importance in the reproductive process.