

THE EFFECTS OF CONTROLLED ENVIRONMENT AND  
DIETS ON BROODSTOCK MATURATION, SPAWNING,  
SPERMATOPHORE QUALITY AND JUVENILE  
PRODUCTION OF *Penaeus merguensis* (de Man)

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MASTER OF SCIENCE  
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production of *penaeus merguensis* (de Man) / Akinfolajimi

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By

**AKINFOLAJIMI OLUBUNMI**

Thesis submitted in Fulfillment of the Requirements  
for the degree of Masters of Science in the  
Faculty of Applied Science and Technology  
Universiti Putra Malaysia

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I wish to express my profound gratitude to my Chairman of Supervisory Committee, Encik Aizam Zainal Abidin for his scholarly involvement, and counseling, financial and moral support throughout the duration of this work and also in the edition of the manuscript. He and his family have been a source of blessing and encouragement all the way. The helpful suggestions, constructive comments, help in data analysis and editorial guidance of other members of my Supervisory Committee, Dr Hj. Mohd. Kamul B. Abdul Kader and Dr Siti Aishah Abdullah are gratefully acknowledged.

**By**

**AKINFOLAJIMI OLUBUNMI**

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**SOME ASPECTS OF THE MATURATION AND ARTIFICIAL PROPAGATION OF *Penaeus merguensis* (de Man)**

By

**AKINFOLAJIMI OLUBUNMI**

**December 1998**

**Chairman: Encik Aizam Zainal Abidin**

**Faculty: Faculty of Applied Science and Technology**

Some aspects of the maturation and artificial propagation of *Penaeus merguensis* were studied. The percentage of naturally matured shrimps that were transported to the hatchery and spawned was 83.33% while the percentage of hatchery matured shrimps that spawned were 66.66%, 50.00%, 50.00% and 33.33% for broodstocks fed with squids (*Loligo* sp.), polychaete (*Diopatra* sp.), *Artemia* biomass and pellets diets, respectively.

The lipid and fatty acid composition of some locally available maturation diets were also determined and compared. Analytical results indicate that the total

lipid content (wet weight) of the diets was highest in *Loligo* sp (4.30%) followed by that of *Diopatra* sp. and enriched adult *Artemia* at 1.82 % and 1.15 % respectively. The lipid content of pellets was 6.0% (dry weight). Total fatty acid composition of the diets was highest for *Loligo* sp. (7519.74 µg/g) wet tissue, followed by the total fatty acid contents of *Diopatra* sp., enriched *Artemia* sp. and pellets at 5554.05 µg/g, 1075.38 µg/g and 636.62 µg/g wet tissue respectively.

Maturation diets have been reported to have certain polyunsaturated fatty acids, which can help trigger maturation. The total polyunsaturated fatty acid contents for *Loligo* sp., *Diopatra* sp., enriched adult *Artemia* and pellets were 5899.33 µg/g, 1726.81 µg/g, 326.14 µg/g and 12.57 µg/g constituting 78.46%, 31.09%, 30.33% and 1.98% of the total fatty acid composition respectively.

A study was carried out to evaluate the effects of different rearing conditions on the growth and survival of juvenile *Penaeus merguensis* in circular and rectangular tanks. Postlarvae *P. merguensis* with initial weight of 5.0 mg were reared under varied rearing conditions by utilising trash-fish and commercial pellets, trash-fish and commercial *Spirulina*, and trash-fish and *Skeletonema* as treatment A, B, and C respectively. The specific growth rates of the different treatments were 14.53, 10.89 and 12.16 while; the survival rates were 96.92%, 44.39% and 89.55% respectively. There was no significant difference ( $p < 0.05$ ) in the specific growth rate and survival rate for juveniles fed trash-fish and commercial pellets and the juveniles fed trash-fish and *Skeletonema*. The specific

growth rate and survival rate of juveniles fed trash-fish and *Spirulina* were found to be significantly lower than in the other two treatments.

In another experiment, postlarvae *P. merguensis* with an initial weight of about 3.5 mg/ postlarva (PL) were reared under two different densities, 1200 and 2400 respectively. All the tanks were fed with trash-fish and commercial pellets. The specific growth rates were 15.34 and 11.82 while the survival rates were 84.50% and 90.57% respectively. However, there was no significant difference ( $p < 0.05$ ) between the values obtained

A comparison of the performance of circular and rectangular tanks in terms of growth and survival of juveniles stocked at a density of 1200 per liter shows that juveniles reared in circular tanks had lower specific growth rate than those reared in rectangular tanks. There was a higher survival rate than for juveniles reared in rectangular tanks. However, these differences are not statistically significant ( $p < 0.05$ ). A more uniform growth was observed for juveniles reared in raceways (C. V = 32.84%) than juveniles reared in circular tanks (C.V = 34.31%).