

Nissara Kitcharoen 2011: A Study on Heritability and Genetic Improvement of Giant Freshwater Prawn (*Macrobrachium rosenbergii* de Man, 1879). Doctor of Philosophy (Aquaculture), Major Field: Aquaculture, Department of Aquaculture. Thesis Advisor: Professor Uthairat Na-Nakorn, Ph.D. 79 pages.

In this study heritability was estimated for growth related traits of Giant Freshwater Prawn (*Macrobrachium rosenbergii* de Man, 1879) before and after morphological sexual differentiation. Estimation was made on data from 16 full-sib and 8 half-sib families. The variance estimation was performed using a univariate mixed linear animal model. Variance components were analyzed following an animal model using a Restricted Maximum Likelihood procedure (REML) employing average information (AI) algorithm. Heritability estimates (h^2) varied considerably with ages. Based on mixed sex data, h^2 for carapace length (CL; 0.35 ± 0.15) and body weight (BW; 0.26 ± 0.13) at 2 months old were higher than those estimated at 5 months old. However, when data were sorted by sex, h^2 estimated from data of females were higher than those of males for CL (0.26 ± 0.16 vs. 0.10 ± 0.06), BW (0.28 ± 0.17 vs. 0.12 ± 0.08), body length (BL; 0.40 ± 0.17 vs. 0.11 ± 0.07), total length (TL; 0.47 ± 0.18 vs. 0.11 ± 0.07), and claw length (CIL; 0.29 ± 0.16 vs. 0.03 ± 0.04). The same trend was observed for traits at 6 months old in both bulk and individual rearing. In the second experiment, an empirical evidence was provided that selection made from early maturing female Giant Freshwater Prawns yielded offspring that grew faster than those of females selected from the later maturing batches. Sixteen full sibling families were produced and separately reared. When they reached maturation, gravid females were removed and separately divided into four batches according to time to maturity. The within family selection, with a 10% selection proportion on body length, was then performed within each batch. The females were simultaneously mated with males from different families within a batch. Growth comparison of offspring between batches showed that the offspring of the females selected from the first batch were larger in carapace length (CL) and body weight (BW) than those from later batches. In the third experiment, a genetic trend analysis was performed on the data from a total of 2,236 GFP in 3 generations of which the within family selection was performed targeting female body length at 7 months of age. Mean breeding values of body length increased 0.37 in females but was not changed for males. These results imply that of, selection to improve growth traits performed on female Giant Freshwater Prawn will result in positive genetic response in females.

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