

Yoottana Kanchanachai 2011: Estimation of Genetic Parameters for Weight and Body Size of Pacific White Shrimp (*Litopenaeus vannamei*). Master of Science (Aquaculture), Major Field: Aquaculture, Department of Aquaculture. Thesis Advisor: Associate Professor Supawadee Poompuang, Ph.D. 98 pages.

The objective of this study was to estimate genetic parameters for weight and body size of Pacific White Shrimp (*Litopenaeus vannamei*) at tagging age and harvest size. Shrimp from 12 full-sib families were reared until age was 77 days post hatch (tagging age) in average, 200 shrimps per family were tagged for family identification, and 950 shrimps per family were data collected (weight and bodysize). Then, 140 tagged shrimps were sampled from each family and they were reared together in 3 different environments. When the average age was 124 days post hatch (harvest size), 1,664 shrimps were randomly cached and individually measured. Mean value (SD) was 18.70 (3.00) g for body weight (BW), 11.67 (1.14) cm for body length (BL), 8.72 (1.03) cm for abdominal length (AL), 2.95 (0.22) cm for carapace length (CL), 74.62 (1.85) % for percent tail length (ALBL), 25.38 (1.85) % for percent carapace length (CLBL) and 1.60 (0.15) g/cm for ratio between body weight and body length (BWBL). Sex, days post hatch, and pond had significant effects on weight and size traits ( $P < 0.05$ ). Female were larger than male for all traits, except percent tail. Variance components of the study traits were estimated by a Restricted Maximum Likelihood (REML) procedure with animal mixed linear models. At harvest age, the heritability estimate (S.E.) was 0.37 (0.14) for BW, 0.34 (0.13) for BL, 0.35 (0.13) for AL, 0.13 (0.06) for CL, 0.05 (0.03) for ALBL and CLBL, and 0.34 (0.13) for BWBL. Genetic correlation (SE) between BW and BL, AL, CL, ALBL, CLBL and BWBL were 0.98 (0.01), 0.97 (0.02), 0.94 (0.05), 0.36 (0.32), -0.36 (0.32) and 0.99 (0.01) respectively. High heritability estimates suggested that high genetic response could be obtained through genetic selection for BW and size traits (BL, AL and BWBL). Furthermore, high genetic correlations between BW and size traits (BL, AL, CL and BWBL) imply that selection for improving BW would cause simultaneous changes of the size traits. The present study demonstrates the application of REML and mixed model techniques to estimate variance components and genetic parameters for economically important traits in shrimp.

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Thesis Advisor's signature