Thuchapol Karaket 2012: Strain Evaluation and Parentage Identification of Giant Freshwater Prawn *Macrobrachium rosenbergii* de Man by Microsatellite Profiling. Doctor of Philosophy (Aquaculture), Major Field: Aquaculture, Department of Aquaculture. Thesis Advisor: Associate Professor Supawadee Poompuang, Ph.D. 165 pages.

This thesis was aimed to demonstrate the usefulness of microsatellite markers for strain evaluation, parentage inference and male reproductive assessment of freshwater prawn *Macrobrachium rosenbergii*. In the first experiment, growth performance among three strains of freshwater prawn- including a commercial strain of foreign origin, a local hatchery strain and a hatchery strain of wild origin - was evaluated under separate and communal rearing conditions for 120 days. Significant differences in growth were observed among strains in both separate and communal rearing, with the commercial strain outperforming the hatchery populations. The exclusion-simulation approach was performed on different sets of one to seven microsatellite loci to determine the power of the assignment test. High accuracy of the assignment test was obtained by using seven loci, with 90% correct assignment of individuals (P<0.05). The power of the assignment test was highly dependent on the degree of population differentiation (F_{ST}). Results of this study demonstrated that an assignment score of 100% was obtained when $F_{ST} > 0.1$.

The potential use of microsatellite loci for parentage identification was assessed in a commercial strain of the freshwater prawn. Nine loci were informative, with average expected heterozygosity of 0.81 and PIC score of 0.77. The accuracy in assignment was determined in 21 full-sib and two maternal half-sib families using two contrasting methods, a pair-wise likelihood comparison approach in the CERVUS program and a full-pedigree likelihood method in the COLONY program. Use of four highly informative loci was sufficient for COLONY to resolve the genetic structure of this population, while seven loci would be required to obtain 94-99% correct assignment with CERVUS. Moreover, COLONY showed a list of full- and half-sibships, but CERVUS did not display this information. Results suggest that this set of microsatellites, used in conjunction with COLONY would be an effective tool for parentage and sibship identification in selective breeding programs of the giant freshwater prawn.

Among three male morphotypes, blue claw males were the most successful at mating under various combinations of male to female sex ratio, followed by orange claw males and small males. Morphometric traits, including condition factor, body weight, and relative claw length that were highly correlated with male type had significant effects on reproductive success of male prawn.

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