



# Genetic diversity of different populations and improved growth in the F1 hybrids in the swimming crab (*Portunus trituberculatus*)

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**ABSTRACT.** The swimming crab, *Portunus trituberculatus*, is widely distributed throughout the coastal waters of Asian-Pacific nations and is an important economic species in this region. The aquaculture of swimming crabs has been plagued by problems associated with low growth rates, poor flesh quality, and weak disease resistance. To overcome these problems, selective breeding programs have been suggested as a means of genetically improving these traits in stock populations. In this study, we evaluated the genetic differentiation of 3 different geographical populations (Zhoushan: S; Laizhou Bay: L; and Haizhou Bay: H) using 8 polymorphic microsatellite loci. Nine strains of first filial generation were obtained, with 3 geographically populations as parental stock. We assessed the growth and survival rates of the F1 generation to identify new strains or breeds showing improvements in these economically important traits. Our results indicated that pairwise  $F_{ST}$  among populations was significantly higher than 0 ( $P = 0.0000$ ) for every population pair, ranging from 0.0810 to 0.1083

for 3 different geographical populations. We observed significant heterosis for the growth and viability (survival) traits, although some strains (crossbred combinations) showed evidence of hybrid weakness in some growth measurements. One particular strain (“SL”) outperformed other combinations, displaying the greatest extent of heterosis over the growth and viability (survival) traits. These results indicate that hybridization may be used to increase the performance of *P. trituberculatus* in aquaculture.

**Key words:** *Portunus trituberculatus*; Geographic population; Heterosis; Genetic differentiation; Crossbreeding