

Genetic diversity and outlier loci detecting of shell color variation in the Pacific oyster (



Color polymorphism is relatively common in marine mollusks. Shell color affects the visual perception of products which, consequently, influences consumer preference and product value. To increase the value of the Pacific oyster (*Crassostrea gigas*) for the half-shell market, four shell color strains (golden, white, purple, and black) of *C. gigas* have been developed through successive selective breeding. To investigate genetic variation and identify breeding signatures of *C. gigas*, the four shell color strains and three wild populations were assessed through using 133 single nucleotide polymorphism (SNP) markers. The genetic diversity analysis demonstrated that the shell color strain exhibited significant reduction in observed number of alleles in comparison with the wild population. However, there is no significant differences of observed heterozygosity and expected heterozygosity were identified among the seven populations. Based on three outlier tests, a total of 16 loci were identified under selection, and four common outlier loci (CgSNP82, CgSNP273, CgSNP646, and CgSNP1131) were detected based on all the methods. FST values showed

significant genetic differentiation between shell color strains, as well as between shell color strains and wild populations. The information on the genetic variation and differentiation in shell color strains and wild populations of *C. gigas* is useful for setting up suitable guidelines for founding and maintaining of cultured stocks. The detected loci might benefit the breeding programs after being tested.

Auteurs du document : Junlin Song, Qi Li, Xiaoxiao Zhong, Lingfeng Kong, Hong Yu

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