Recruitment of grouper broodstock on the basis of single locus DNA markers

ABSTRACT

Scientific breeding programs are founded on the screening and recruitment of genetically diverse broodstock, with the ultimate aim of developing heterogeneous breeding populations that host a collection of desirable traits. Single locus DNA markers can be applied to facilitate the process of selection as they are species specific, reliable, reproducible and easy to use. This study set forth to develop a library of single locus DNA markers for two commercially cultured species of groupers, Epinephelus fuscoguttatus and Epinephelus corallicola. DNA was isolated from one representative specimen of each species and utilized to construct shotgun genomic libraries. DNA sequences derived from the library were selected for the development of 42 and 41 single locus DNA markers for Epinephelus fuscoguttatus and Epinephelus corallicola respectively. The markers were then tested against randomly selected specimens obtained from the wild. Genotyping results revealed that the species specific primers demonstrated the ability to distinguish between individuals from the same species into distinct operational taxonomic units (OTUs) on the basis of their differential DNA profiles, thus establishing a basis for selection based on genetic heterogeneity. The findings of this study present a strong case for the application of single locus DNA markers as molecular tools for the selection of broodstock on the basis of genotyping.