Single nucleotide polymorphisms (SNPs) provide high-throughput, high-resolution DNA data for BASIS studies

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Abstract

Migratory studies require markers for which a large number of individuals can be processed in a relatively short time. Genetic markers, especially allozymes, have provided substantial insight into key questions asked by BASIS investigators. However, issues of sample collection and preservation as well as a desire for increased resolution have driven efforts to develop DNA markers to describe discrete aggregations of salmon stocks. Given the multi-jurisdictional range of these species, it is desirable that genetic markers and the corresponding data be transportable across laboratories. Allozymes meet these criteria while most DNA markers do not. To solve this dilemma, we are developing single nucleotide polymorphism genotyping assays (SNPs) based upon the 5'-nuclease reaction. We have approximately 20 SNP assays each in Chinook, chum, and sockeye salmon. Using these assays, a single technician with one thermal cycler can generate 3840 genotypes in a 7.5 hr day. These assays are easy to standardize across laboratories, and the resulting genotype data are readily combined with those collected using any other sequence detection platform.

1. Genotyping Without Gels

SNP genotyping involves simply amplifying target DNA in the presence of allele-specific dyes. The genotype of each fish is determined by the color of the resulting reaction.