

Genetic differences between early-run and late-run populations of chum salmon (*Oncorhynchus keta*) in Toyohira river

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1. Introduction

Chum salmon in Toyohira river has clear history. It had disappeared or decreased dramatically in 1950s to 1970s because of water pollution. After sewage treatment was improved, juvenile of hatchery chum salmon from Chitose river has been released to Toyohira river since 1979. Nowadays, chum salmon run to Toyohira river to spawn. It's known that it can be divided to early-run and late-run population. In Salmonids, genetic, morphologic, and behavioral changes in few generations since migration are observed. Then, purpose on my research is to show genetic differences between early-run and late-run populations of chum salmon (*Oncorhynchus keta*) in Toyohira river through comparing with Chitose river population, which is closely related with.

2. Method

236 samples from Toyohira and Chitose river in 2014 to 2015 and 36 samples from Akka river, Iwate in 2012 as outgroup were used. To know genetic information, microsatellite analysis was conducted and 13 loci for chum salmon were chose. These loci were amplified by PCR and sequenced by NGS. Then, the correct sequence of each microsatellite was extract using with script and individual genotype were identified. Hardy-Weinberg equilibrium (HWE), Null allele, Linkage disequilibrium, Heterozygosity (He), Allele richness (AR), STRUCTURE, and Pairwise F_{ST} were analyzed.

3. Result and Discussion

About 80% of samples were genotyped successfully. 7 loci could be used as a result of HWE, Null allele, and Linkage disequilibrium. Between Chitose and Toyohira population, clear difference was not observed on He, AR, and STRUCTURE analysis. As a result of Pairwise F_{ST} , there were significant differences between Chitose-run-early and Chitose-run-late, between Toyohira-run-early and Chitose-run-late, between outgroup and other populations. On the other hand, other result didn't show significant difference. It is assumed that Chitose population differentiates genetically by running term and that the origin of Toyohira-run-early is Chitose-run-late population.

4. Conclusion

Genetic differentiation by running term was observed in Chitose river, but was not in Toyohira river.