

Title:

Competitive Dominance of Juvenile Spring Chinook Salmon Among Hatchery, Supplementation, and Wild Populations

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Abstract:

We tested the null hypotheses that competitive dominance among juvenile Chinook salmon, *Oncorhynchus tshawytscha*, would not be affected by domestication selection after varying influences of state-of-the-art hatchery culture. Three lines of fish were compared. The first line (Supplementation) were offspring of natural origin upper Yakima spring Chinook salmon. These fish are part of an intentional program of supplementation and may have been offspring of wild upper Yakima parents or first generation supplementation hatchery fish. The second line (Naches) is an unsupplemented wild line of spring Chinook that inhabits the Naches Basin. The third line (Hatchery) were offspring of upper Yakima Basin hatchery parents. Fish that are descendants of hatchery parents were spawned artificially in the hatchery, reared to smolt, and released. Dyadic challenges of size-matched juvenile fish that were offspring of parents of these three lines were conducted after a six-day acclimation in 113.4-liter aquaria. Dominance was assessed in 266 Supplementation vs. Naches replicates, 287 Supplementation vs. Hatchery replicates, and 258 Naches vs. Hatchery replicates during 2005. Supplementation fish were significantly more dominant than Naches and Hatchery fish. Overall dominance was not significantly different between Naches and Hatchery fish. The frequencies of different types of interactions used by Supplementation, Naches, or Hatchery fish during pairwise comparisons were not significantly different. Supplementation fish were more aggressive than Naches and Hatchery fish, and this difference was likely caused by higher aggressiveness of subordinate Supplementation fish. Naches fish were more aggressive than Hatchery fish. Significant differences in aggressiveness were not detected between dominant vs. dominant fish or subordinate vs. subordinate fish in any of the pairings. However, dominant fish were more aggressive than subordinate fish based on mean interaction rate. Supplementation fish lost significantly less weight than Naches fish, but no other pairwise comparison of length or weight growth was significantly different. However, dominant fish, regardless of origin, grew more or lost less weight

than subordinate fish in both lengths and weight. All origins of fish grew longer but lost weight in 2005. These initial results will be compared to future years results to determine if changes occur with increasing levels of hatchery influence.