

Title:

Effects of Domestication on Competitive Dominance

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Summary of Presentation:

Despite our best efforts, raising fish in hatcheries can cause unintended behavioral changes in salmonids due to domestication selection. We tested the null hypothesis that dominance would not be affected by domestication selection after one generation of hatchery culture. Fish that were used in the experiments were offspring of naturally produced spring chinook salmon (wild) and offspring of spring chinook salmon that spent one generation under hatchery culture (hatchery). Both fish had grandparents that were naturally produced in the upper Yakima River. Fish were mated and reared as part of a common garden experiment. We tested two types of competitive dominance, contest and scramble. Dyadic challenges of size-matched juvenile fish were conducted for one-week trials in 80, 30-gallon aquaria. In the contest trials, we created one highly profitable location in the aquaria. This location provided cover, food, and water velocity. Dominance was assigned to the fish that ate the most pellets within the water column, was in the preferred habitat the most, and initiated and dominated the most behavioral contests. In the scramble trials, the cover was removed from the tanks and food was introduced in unpredictable locations upon the water surface. Dominance was assigned to the fish that ate the most pellets. There were no significant differences in dominance of hatchery and wild fish in either the contest trials (n=229, Wilcoxon matched pair test, $P>0.05$) or the scramble trials (n=97, Wilcoxon matched pair test, $P>0.05$). In addition there were no differences in the frequency of different types of agonistic interactions that were used by hatchery and wild fish, except that wild fish used chasing behaviors more than hatchery fish in contest trials ($P<0.05$). However, wild fish were generally more aggressive than hatchery fish in both contest and scramble trials (initiated more agonistic interactions). We also found that dominant fish grew more than subordinate fish in both contest and scramble trials. Our results suggest that offspring of first generation hatchery fish that spawn in the Yakima River will have similar dominance rates as wild fish if the timing and size of emergence, and growth rates are similar. These data should be considered preliminary until published in a peer-reviewed journal.