

Title:

Physiology and Precocialism of Hatchery Spring Chinook Salmon

Authors:

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Summary of Presentation:

Over the past five years we have conducted research to characterize the physiology and development of wild and hatchery-reared spring chinook salmon in the Yakima River Basin. These studies have revealed that approximately 35-50% of the hatchery-reared males from this program undergo precocious maturation at 1+ years of age. While this is a natural life-history strategy the hatchery environment may be potentiating this developmental pathway beyond natural levels resulting in loss of anadromous adults, skewing of sex ratios, and negative genetic and ecological impacts on wild populations. Our current project has three central objectives: 1) Continue monitoring the maturation rate of the Cle Elum hatchery population. 2) Obtain an estimate of the rate of precocious male maturation in the wild Yakima spring chinook population and 3) Conduct a growth rate modulation study at the Cle Elum Facility to control the precocious male maturation rate. Results to date indicate that the Cle Elum hatchery fish continue to show male maturation rates in excess of 40%. Examination of 600 wild fish collected in mid-winter at Roza dam indicates male maturation rates of approximately 11%. The growth rate modulation experiment has successfully produced fish with four growth trajectories based on summer/autumn growth patterns with the following size and "preliminary maturity rates" as of Feb-Mar, 2003: High/High (20 g, 44%), High/Low (14 g, 37%), Low/High (12 g, 22%), Low/Low (11g, 29%) for comparison to Cle Elum Production fish (19 g, 40%) and wild fish captured near Cle Elum (8.3 g, 4%). These data suggests that male precocity can be modulated through growth manipulation and that the current production fish are being grown near a maximum rate for their water temperature (> 2X wild fish). Future experiments may be required to establish a rearing regime that produces fish large enough for tagging, but with slow enough growth to further reduce precocity levels to that of their wild cohorts. Conducted in cooperation with the YN, Oncorh Consulting, WDFW, and the USFWS. (BPA contract #'s 1992-022 and 2002032).