

Steelhead Temperature

Ongoing Research

Progress Report

Steelhead Temperature

- David Noakes – OSU, OHRC – ontogeny
- Michael Blouin – OSU - genetics
- Kathleen Cole – U Hawaii - histology
- Bruce Morrison – Ontario Ministry of Natural Resources – statistics, experimental design
- Carl Schreck – USGS, OSU – physiology

Steelhead Temperature

- Hypothesis:
 - Temperature during embryonic development affects physiological, anatomical and behavioral characteristics
- Predictions:
 - A) sexual differentiation – Environmental Sex Determination
 - B) skeletal development (vertebral number; ossification; fin ray numbers)
 - C) muscle development and function (skeletal, heart; swimming; behavior)
 - D) size at hatching

Steelhead Temperature

- Experimental Design
 - Wild (6) and Hatchery (6) parents, single pair crosses
 - Replicate groups reared at each of three (3) temperatures (cold, ambient, warm) (+/- 10 F°)
 - 72 groups @ 100 embryos = 7200 fish; preserved at end of embryonic development (95% EtOh for genetic sample; 10% buffered formalin for body); all fish individually identified

Steelhead Temperature

- Screen “cold” and “warm” fish by histological examination of gonads – estimate sex ratios
- IF sex ratios other than 50:50, THEN examine corresponding genetic sex of sampled individuals
- Compare phenotypic and genetic sex for known individuals = “sex change”
- Detailed analysis by H : W; male : female, family; temperature

Steelhead Temperature

- Genetic samples preserved
- Warm- and ambient-incubated samples preserved; 1/2 of cold-incubated samples preserved (remainder being reared to larger size)
- Histological analysis started on cold samples
- Additional fish from ODFW Hatcheries (various ages)– reared at cold or warm temperatures – to be examined by histology and genetics