

Photoperiod, temperature, and fish size effects on prevalence of early puberty in post-smolts

RESEARCH QUESTION:

We sought to determine whether a fish size threshold exists for the association between increasing water temperature and early sexual maturation in post-smolts. We also sought to determine whether providing an artificial winter photo signal influenced this association. Under LD24:0 photoperiod we raised smolts that either received or did not receive a 6-week winter signal (i.e., LD 12:12 photoperiod, followed by return to LD24:0) at 12°C, with replicated tanks (winter signal and no winter signal fish combined) receiving an increase in temperature from 12°C to 14°C at either 100 g, 250 g, or 350 g mean weight. At 500 g mean weight, we assessed male maturation via gonadosomatic index and compared rates of maturation in each treatment group to the control group (i.e., fish that remained at 12°C throughout).

DURATION: 2020-2021

FISH SIZE TESTED: 10 g to 500 g

SALINITY TESTED: Fresh water

TEMPERATURE: Increase from 12 to 14°C

HIGHLIGHTS:

- No size/temperature threshold effect observed on early maturation.
- Significantly higher male maturation when temperature increased at 100 g and 250 g.
- Possible lower risk size range for temperature increase.
- Artificial winter photoperiod could have a preventive effect; possible energy diversion for smoltification limits energy reserves for maturation.

ADDITIONAL INFO:

- To avoid maturation, it is recommended to avoid temperature increase to 14 °C in RAS, especially for the post-smolt sizes 100 and 250 g.
- Risk for maturation is less for 150 g fish during temperature increase to 14 °C
- Providing an artificial winter photo signal to induce smoltification (as opposed to other means) could have a preventative effect on early male maturation during the post-smolt phase.



The factsheet is ready for implementation, but with the note that the testing has not been done for all industrial relevant conditions.

