Temperature effects on Arctic charr phenotypic plasticity

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Evolvability is the potential of a population to produce adaptive phenotypic variation.

(Hansen et al., 2011)
The Effect of Temperature on Bone Ossification

• Sampled two equivalent developmental stages
  Alcian blue (cartilage) & Alizarin red (bone)
• Quantify variation in bone ossification (ImageJ)
The Effect of Temperature on Bone Ossification

- Measuring; Area of Stain and Intensity of Stain

More bone ossified in fish raised at colder temperature

F_{1,134} = 55.6, p < 0.001

F_{1,168} = 46.1, p < 0.001

Bone more heavily ossified in fish raised at warmer temperature

F_{1,69} = 28.7, p < 0.001
Later-life Phenotypic Plasticity

- Diet manipulation experiment
- Induces different biomechanical stresses leading to bone remodelling
- Investigating the effect of temperature on this plastic response (2x2 study design)
- Conducted geometric morphometric analysis
Later-life Phenotypic Plasticity

Distance between means: 0.0045  \( P = 0.116 \)

Distance between means: 0.0061  \( P < 0.001 \)
Take-home points

Conservation biology should consider environmental influence on development.

Especially given the potential of climate change to influence the developmental process.

Putative results suggest bone ossification may be more heavily ossified at an earlier stage under lower temperatures.

Results suggest temperature does have an impact on plastic response to diet manipulation.