

Vita

Candidate's name: Sarah Anne McGeachy

Universities
Attended: Mount Allison University (2018)
Bachelors of Science
Honours

University of New Brunswick (2019)
Bachelors of Education

University of New Brunswick (2022)
Masters of Science
Biology

Conference Presentations:

McGeachy SA, Benfey TJ. August 2022. Investigating hypoxia tolerance of triploid brook charr (*Salvelinus fontinalis*). Aquaculture Canada and WAS North America Conference (St. John's, Newfoundland and Labrador).

McGeachy SA, Benfey TJ. May 2022. Investigating hypoxia tolerance of triploid brook charr (*Salvelinus fontinalis*). 28th Annual University of New Brunswick Graduate Research Conference (Virtual).

McGeachy SA, Benfey TJ. May 2022. Investigating hypoxia tolerance of triploid brook charr (*Salvelinus fontinalis*). 61st Annual Canadian Society of Zoologists Conference (Virtual).

McGeachy SA, Benfey TJ. May 2021. Improving hypoxia tolerance of triploid brook charr (*Salvelinus fontinalis*). 60th Annual Canadian Society of Zoologists Conference (Virtual).

McGeachy SA, Benfey TJ. November 2020. The effect of chronic hypoxia and temperature on hypoxia tolerance in brook charr (*Salvelinus fontinalis*). Aquaculture Association of Canada Virtual Student Conference 2020 (Virtual).

Hypoxia Tolerance of Triploid Brook Charr, *Salvelinus fontinalis*

UNIVERSITY OF NEW BRUNSWICK

THESIS DEFENCE AND EXAMINATION

in Partial Fulfillment

of the Requirement for the Degree of
Master of Science

by

Sarah A. McGeachy

in the Department of Biology

U.N.B., Fredericton, N.B.

Friday, September 2nd, 2022

10:00 a.m.

via MS TEAMS

Examining Committee

Dr. Tillmann Benfey

Dr. Charles Sacobie

Dr. Kurt Samways

Dr. Adrian Reyes-Prieto

Supervisor

Internal Examiner

External Examiner

Chair of Oral Examination

Abstract

Triploid salmonids are used in aquaculture and stocking programs for recreational fishing because they are reproductively sterile and therefore cannot breed in the wild. However, they appear to be more sensitive than diploids to environmental stressors. The objective of this study was to develop a better understanding of the hypoxia tolerance of triploids. I compared the acute hypoxia tolerance of sibling diploid and triploid brook charr that were acclimated to either moderate hypoxia (70% of air saturation) or normoxia (100% air saturation). Fish then underwent acute hypoxia trials, by slowly injecting nitrogen gas to displace oxygen and using loss of equilibrium (LOE) as the endpoint. Hypoxia-acclimated fish had a lower oxygen tension (PO_2) at LOE compared to fish acclimated to normoxia, regardless of ploidy. Ploidy did not affect time to LOE, but triploids had a higher PO_2 at LOE (i.e., were less hypoxia tolerant) compared to diploids. Potential predictors of hypoxia tolerance (hematocrit, blood glucose,

blood lactate, relative ventricular mass, hepatosomatic index, condition factor, compact myocardium thickness, and interlamellar cell mass) did not provide conclusive results. This study has shown the capacity for hypoxia acclimation to improve triploid performance and certainly warrants further investigation.