

Vita

Candidate's name: Abigail Victoria Burns Concannon

Universities
Attended: University of New Hampshire (2019)
Bachelors of Science

University of New Brunswick (2025)
Masters of Science
Biology

Conference Presentations:

Concannon, A. V.*, Garber, A. F., Malenfant, R.M., Robertson, W. D. Benfey, T. J. June 2025. Growth and survival of mixed-sex diploid and all-female diploid and triploid rainbow trout (*Oncorhynchus mykiss*) in variable-temperature seawater. Aquaculture Association of Canada (Fredericton, New Brunswick)

Concannon, A. V.*, Garber, A. F., Malenfant, R.M., Robertson, W. D. Benfey, T. J. June 2025 Osmorespiratory compromise in triploid rainbow trout (*Oncorhynchus mykiss*). Aquaculture Association of Canada (Fredericton, New Brunswick)

Concannon, A. V.*, Garber, A. F., Malenfant, R.M., Robertson, W. D. Benfey, T. J. May 2025 Osmorespiratory compromise in triploid rainbow trout (*Oncorhynchus mykiss*). Canadian Society of Zoological Science (Waterloo, ON)

Concannon, A. V.*, Garber, A. F., Malenfant, R.M., Robertson, W. D. Benfey, T. J. April 2025 Osmorespiratory compromise in triploid rainbow trout (*Oncorhynchus mykiss*). Conference of the Biological Sciences (Fredericton, New Brunswick)

Concannon, A. V.*, Garber, A. F., Malenfant, R.M., Robertson, W. D. Benfey, T. J. March 2025. Osmorespiratory compromise in triploid rainbow trout (*Oncorhynchus mykiss*). World Aquaculture Society (New Orleans, Louisiana)

Growth, survival, and physiological responses of diploid and triploid rainbow trout (*Oncorhynchus mykiss*) in variable-temperature seawater

UNIVERSITY OF NEW BRUNSWICK
THESIS DEFENCE AND EXAMINATION

in Partial Fulfillment
of the Requirement for the Degree of
Master of Science

by

Abigail V. B. Concannon

in the Department of Biology

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

**Tuesday, October 21st, 2025
12:00 p.m.**

Bailey Hall, Room B22 & via MS TEAMS

Examining Committee

Dr. Tillmann Benfey
Dr. Amber Garber
Dr. Charles Sacobie
Dr. James Kieffer
Dr. Shawn MacLellan

co-Supervisor
co-Supervisor
Internal Examiner
External Examiner
Chair of Oral Examination

Abstract

Rainbow trout (*Oncorhynchus mykiss*) are among the most economically and culturally important aquaculture species in Canada and worldwide. Accelerating climate change—marked by rising sea temperatures and fluctuating salinity—threatens farm sustainability. This thesis examines the responses of diploid and triploid trout to thermal and salinity stress, with a focus on interlamellar cell mass (ILCM), osmoregulatory capacity, and electrolyte balance. Growth and mortality heritability were quantified through controlled trials and linear mixed-effects models to evaluate genetic contributions to performance traits. Results reveal significant treatment effects on gill morphology and ion regulation. ILCM peaked under warm seawater conditions, while plasma osmolality and ion concentrations increased in all fish following transfer from freshwater to seawater and during exposure to elevated temperature, with similar trends across ploidy groups (all $p <$

0.001). Moderate heritability estimates for growth and survival suggest meaningful potential for selective breeding to enhance resilience. Together, these findings clarify the interplay between ploidy, environment, and physiology, supporting improved breeding strategies and rearing practices that promote fish health and productivity in the face of changing climate conditions.