

Vita

Candidate's name: Lauren Elizabeth Fraser Stead

Universities
Attended: University of New Brunswick (2015)
Bachelors of Science
Environmental & Natural Resources

University of New Brunswick (2019)
Masters of Science
Biology

Presentations:

L. Stead (March 2017) Understanding the processes underlying the southern climate envelope boundary for Spruce Budworm, *Choristoneura fumiferanae*. University of New Brunswick Proposal.

L. Stead (July 2018) Eat well or avoid being eaten?: Life-history trade-offs in host choice of a specialist folivore. Canadian Society for Ecology and Evolution Annual General Meeting.

L. Stead (April 2019) Eat well or avoid being eaten?: Life-history trade-offs in host choice of a specialist folivore. Population and Evolutionary Ecology Research Group Meeting.

Life History Trade-Offs in Host Choice for a Specialist Folivore, *Choristoneura Fumiferanae*

UNIVERSITY OF NEW BRUNSWICK
THESIS DEFENCE AND EXAMINATION
in Partial Fulfillment
of the Requirement for the Degree of
Master of Science

by

Lauren E. F. Stead

in the Department of Biology

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

**Wednesday, July 17th, 2019
2:00 p.m.**

Bailey Hall, Room 27

Examining Committee

Dr. Stephen Heard & Rob Johns

Dr. Alexa Alexander-Trusiak

Dr. Kara Costanza

Dr. Cheryl Patten

Co-Supervisors

Internal Examiner

External Examiner

Chair of Oral Examination

Abstract

Spruce budworm is an important outbreaking pest in Atlantic Canada. It defoliates several coniferous tree species, including balsam fir and black spruce. Budworm is a flush feeder, meaning it feeds on the newest foliage, as soon as the buds burst, and times its emergence from diapause accordingly. This emergence often lines up with that of balsam fir, but is asynchronous to its secondary host, black spruce, which bursts much later. This asynchrony with black spruce led me to question why budworm would even choose black spruce as a host, if balsam fir were available. To better understand the consequences of host plant selection by spruce budworm prior to overwintering, as well as in the spring for feeding, I completed experiments to determine how host tree species influences the budworm performance during both the overwintering and feeding periods. I established weekly cohorts to put budworm on these host trees, simulating a broad window of emergence from diapause, beginning a few weeks before expected budburst of balsam fir to a few weeks

after budburst of black spruce. After pupation, I removed the budworm and the branches they were on. I assessed bud stage of these host trees for each cohort and various performance measures of surviving budworm. Budworm on balsam fir had higher survival. I also investigated budworm overwintering mortality on these same trees. In northern New Brunswick, I felled and collected various sections of the host trees including branches and trunks from the upper and middle crown. I collected emerging budworm from these tree sections and reared them through so I could assess parasitism. Unless budworm emerge from diapause perfectly synchronous to balsam fir's budburst, black spruce is just as good of a host for budworm to feed and overwinter on. Budworm overwintering on balsam fir had higher parasitism, likely due to its evolution with that host. There are ultimately trade-offs between overwintering mortality and having a superior quality food host.