

Vita

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Universities
Attended: University of Western Ontario (2014)
BSc Biochemistry

University of New Brunswick (2022)
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MSc Science
Biology

Publications / Conference Presentations:

Germaine, T. November 2024. Restoration in the Nashwaak Watershed [Conference Presentation]. Nashwaak Watershed Association Inc. Annual General Meeting (Fredericton, NB).

Germaine, T., Smith, R., and C. Sacobie. April 2023. Genetic variation in adventitious rooting, seed germination, and berry phenolic content of black elderberry (*Sambucus canadensis*) in New Brunswick [Conference Presentation]. Conference of the Biological Sciences UNB (Fredericton, NB).

Genetic variation in adventitious rooting, seed Germination, and berry phenolics content of black elderberry (*Sambucus canadensis*) in New Brunswick

UNIVERSITY OF NEW BRUNSWICK

THESIS DEFENCE AND EXAMINATION

in Partial Fulfillment

of the Requirement for the Degree of
Master of Science

by

Tanya R. Germaine

in the Department of Biology

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

**Monday, January 6th, 2025
1:30 p.m.**

Bailey Hall, Room B27

Examining Committee

Dr. Charles Sacobie & Ron Smith	co-Supervisors
Dr. Mark Sherrard	Internal Examiner
Dr. Jasen Golding	External Examiner
Dr. Shawn MacLellan	Chair of Oral Examination

Abstract

Black elderberry (*Sambucus canadensis*), a North American shrub renowned for its ecological and medicinal value, remains less studied than its European counterpart, *Sambucus nigra*. This thesis examines genetic variation in seed germination, adventitious rooting, and berry phenolic content (chlorogenic acid and rutin) in wild *S. canadensis* populations across New Brunswick, Canada. Sampling was stratified across ten populations from diverse biogeographic zones. Germination experiments assessed seed vigour and environmental interactions, while phenolic content was quantified using HPLC-MS/MS. Root development was evaluated via displacement volume in controlled propagation trials. Results revealed substantial variation in phenolic concentrations (chlorogenic acid: 487–1825 ng; rutin: 884–2404 ng), with these compounds strongly correlated with each other ($\beta = 0.735$, $p < 0.001$). Germination success varied significantly across sites (59%–78%), with faster germination observed in coastal populations.

Vigour classes highlighted differences in germinants and growth dynamics among populations, reflecting adaptability to local environmental pressures. Root development showed limited site variability but was uncorrelated with plant size metrics. These findings underline significant genetic and phenotypic diversity within *S. canadensis* populations, emphasizing its potential for ecological restoration, sustainable agriculture, and the natural health industry. This study supports population selection for improved adaptability and enhanced bioactive compound production.