

Vita

Candidate's name: Marika Isolde Kirsten Brown

Universities
Attended: University of New Brunswick (2019)
Bachelors of Science in Environmental
and Natural Resource Management

University of New Brunswick (2022)
Masters of Science
Biology

Publications / Conference Presentations:

Edge, C. B., Brown, M. I., Hertz, S., Thompson, D., Ritter, L., & Ramadoss, M. (2021). The persistence of glyphosate in vegetation one year after application. *Forests*, 12(5), 601–601. <https://doi.org/10.3390/f12050601>

Xiao, J., Yakimowski, S., Brown, M., Hertz, S., Parachnowitsch, A. & Edge, C. (unpub.) Changes to the vegetation community 20 years after herbicide use in the Acadian Forest.

Atlantic Forestry Centre Winter Speaker Series, 2021. "Response of pollinators to glyphosate application in managed forests of New Brunswick"

34th Annual Meeting of the Scandinavian Association for Pollinator Ecology, 2020. "Effect of Glyphosate-based herbicide use on flowering plant and pollinator communities in managed forests"

SERG International Workshop, 2020. "Response of pollinator communities to herbicide application"

Bumblebee response to Glyphosate application in managed forests of New Brunswick, Canada

UNIVERSITY OF NEW BRUNSWICK

THESIS DEFENCE AND EXAMINATION

in Partial Fulfillment

of the Requirement for the Degree of
Master of Science

by

Marika I. K. Brown

in the Department of Biology

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

Monday, June 13th, 2022

10:00 a.m.

Via MS TEAMS

Examining Committee

Dr. Amy Parachnowitsch

Dr. Chris Edge

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Abstract

Pesticides are used to target undesired pests, but their use can also affect non-target organisms. Non-target effects can be both direct (such as a toxic response) or mediated effects, where the response from the focal community is observed because of changes within another community. Herbicide use in managed forests occur in late summer/ early fall when some pollinators are still flying and foraging. This puts them at risk of direct exposure to spray either during the application or after through contact with residues in pollen and nectar resources. Pollinators also rely on the plant community and alterations to the plant community structure from herbicide applications could influence pollinator responses. To test for this, I assessed bumblebee community patterns in forest blocks sprayed with a glyphosate-based herbicide and unsprayed (control) blocks. Overall, there were more individual bumblebees caught in sprayed blocks, but higher richness in unsprayed blocks. Bumblebee response to herbicide use was not significant

between application and the bumblebee community (direct) but was observed when mediated through changes within the floral community. Herbicide application significantly increased cover of flowering plants and this resulted in higher abundance and diversity of bumblebees. Overall, the use of minor canopy disturbances (such as herbicide application) following the creation of early successional stands (from clearcutting) benefit plant species that bumblebees use, and this can result in increases in abundance and diversity.