

Vita

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Universities
Attended: University of New Brunswick (2016)
Bachelors of Science

University of New Brunswick (2020)
Masters of Science
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Publications:

Milbury, K.J., Cwynar, L.C., Edwards, S., 2019. Distinguishing eastern North American forest moth pests by wing-scale ultrastructure: potential applications in paleoecology. FACETS 4, 493–506. doi:10.1139/facets-2018-0051

A late-Holocene reconstruction of forest moth outbreaks in central 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

Kristen Jane Milbury

in the Department of Biology

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

Monday, May 25th, 2020

2:00 p.m.

Via TEAMS

Examining Committee

Dr. Les Cwynar

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Supervisor

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Abstract

Fossil lepidopteran scales found in lake sediments are a new proxy for reconstructing population outbreaks of important forest moth pests such as spruce budworm (*Choristoneura fumiferana* Clemens), hemlock looper (*Lambdina fiscellaria* Guenée), and forest tent caterpillar (*Malacosoma disstria* Hübner). We introduce a new method to distinguish these pests and two others, eastern blackheaded budworm (*Acleris variana* Fernie) and jack pine budworm (*Choristoneura pinus* Freeman), by traits on their wing-scale ultrastructure as seen using scanning electron microscopy. We made qualitative and quantitative comparisons of morphological traits at the ultrastructural level and found that hemlock looper and eastern blackheaded budworm scales could be categorically separated from each other and from the three other species. The remaining three species were not as easily distinguished, especially when trying to identify unknown fossil scales. Using this new proxy, we produced a high-resolution record of fossil lepidopteran scales

using a 173-cm sediment core collected from Killarney Lake, in central New Brunswick, Canada. Our results show that fossil scales were abundant and well preserved over a 1620-year period. A total of 29 scale peaks were detected for an average periodicity of 55.8 years.