

The Effects of Btk Applications on the Diets of Eastern Wood-warblers



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Bacillus thuringiensis var. *kurstaki* (Btk) is an effective biocide commonly used in spruce budworm (SBW) management. However, Btk may indirectly impact predators of SBW such as warblers by reducing prey availability. Low SBW density may therefore, lead to diet shifts in warbler species that are “SBW-linked”.

Experimental Design

To determine how wood-warblers (especially SBW-linked) respond to reductions of SBW larvae populations I will monitor their dietary habits throughout the breeding season. I will be using a Before-After-Control-Impact (BACI) design to compare the diets of individuals in treated areas (Btk) and untreated areas pre and post spray. ***I hypothesize that SBW-linked warblers will switch to alternate prey sources when SBW densities are lowered by Btk applications.*** If this is true then I predict:

- 1) DNA barcodes will be more diverse in diet samples of individuals from treated sites.
- 2) Nitrogen and carbon isotope ratios will differ among treated and untreated sites.
- 3) If such prey switching is evident it will indicate that SBW-linked warblers are capable of a functional response to changes in SBW density.

Methods

The study area is located in northern New Brunswick throughout Restigouche and Gloucester county (Figure 1). Treated sites were aerially sprayed once with a concentration of 1.5L/ha of Btk.

Untreated sites were located >150m from treated sites to minimize the effect of spray drift.

To monitor warbler diet fecal samples were collected using a sampling apparatus outlined in Ruhl et al. 2016 (Figure 2). This method allows for a more complete sample to be collected which is important when dealing with bird species that produce small samples to begin with. The fecal samples will be analyzed using both stable isotope analysis and DNA metabarcoding to

determine changes in diet and whether species are capable of a functional response. To date, approximately 55 fecal samples in total were collected during the 2020 breeding season (40 in treated, and 15 in untreated sites). The expected completion of this analysis will be October 2021 once samples have been collected for both the 2020 & 2021 breeding seasons.



Figure 2. Sampling apparatus used for fecal collection based on Ruhl et al. 2016 .

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Ruhl et al. 2016.



Figure 1. General locations of study sites in northern NB, 2020.