

# Diversity and abundance of native bees in Alberta's prairies

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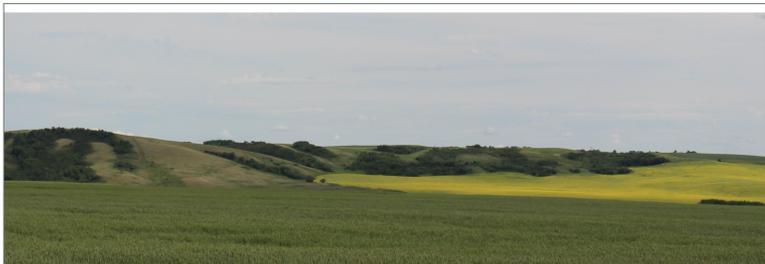
## Introduction

Pollination is an essential ecosystem service that supports the production of crops across the globe, contributing to the global economy and our quality of life<sup>1</sup>. In addition to supporting crops, pollination is a critical ecological process and is essential to the fitness of many native flowering plants<sup>2</sup>. Despite the important economic and ecological roles that bees play, little is known about the composition, distribution, or habitat requirements of native bee communities in many parts of the world, including the prairies<sup>3</sup>.



**Figure 1.** Images of bees in undisturbed areas (left) vs. in a cropped field (right).

Undisturbed areas like rangelands provide nesting habitat and a steady supply of food for bees, while mass-flowering crops like canola often benefit from pollination through yield improvements<sup>4</sup> (Fig 1).



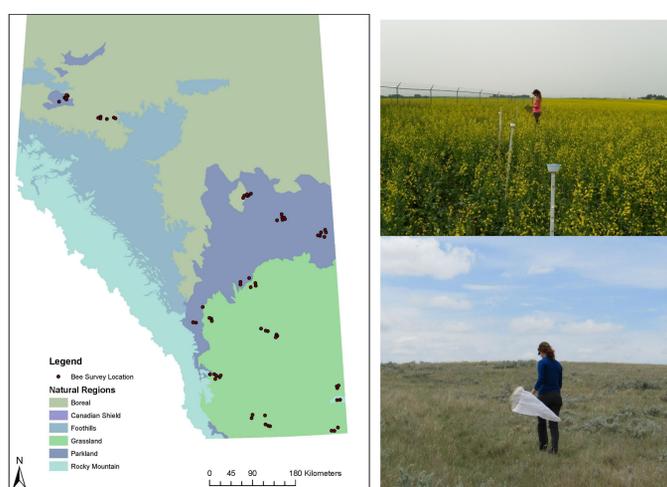
**Figure 2.** Landscape view of crop production adjacent to an area of rangeland from Alberta's agricultural zone

Both canola fields and rangelands are widely dispersed and intermixed across the agriculturally productive zone of Alberta, which dominates certain regions of the province (Fig 2).

## Objectives

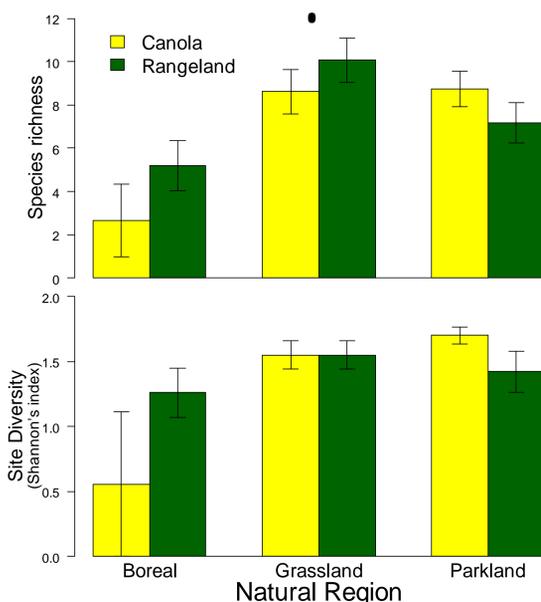
- Measure the diversity and abundance of native bees in Alberta's agro-ecosystem.
- Identify management and landscape factors that correlate with bee populations and communities.

## Methods



**Figure 3.** Locations of bee survey locations across Alberta (left), and bee collection methods (right).

Rangeland (n=35) and canola (n=33) sites were sampled for bees twice per year in both 2014 and 2015 using pan traps and netting (Fig 3).

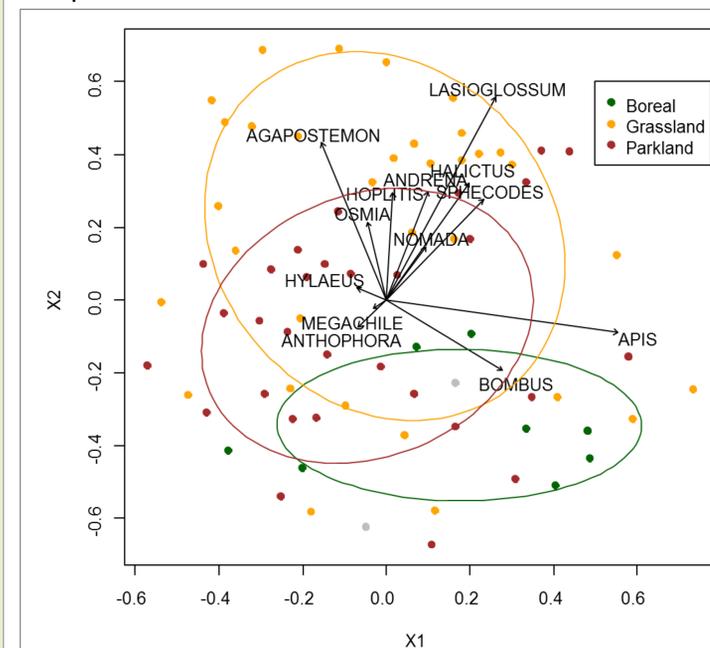


**Figure 4.** Species richness (top) and diversity (bottom) of bee communities caught in bee bowls placed in rangeland and canola sites across different natural regions.

In 2014, we collected 7242 bee specimens constituting 5 families, 30 genera, and over 100 species. The most common bees were *Lasioglossum* spp., but there were many rare genera.

## Results and Discussion

Species richness and diversity followed similar patterns, which varied across ecoregions, but were not different between rangeland and canola sites (Fig. 4). While many species are widespread and occur across multiple regions, there were patterns in bee community composition.



**Figure 5.** NMDS ordination for the 13 most abundant genera broken down by natural region, where Yellow=Grassland, Red=Parkland, and Green=Boreal.

*Agapostemon* and *Lasioglossum* species were associated with sites in the southern Grasslands, whereas larger-bodied bees tended to be more abundant in northern Boreal sites (Fig 5).



Many bee species were found in both canola and rangeland sites, and some genera show preference for different land-use types. These results are the first description of broad spatial patterns in Alberta's bee communities and will contribute to the development of baseline information and future efforts to monitor changes in bee communities over time.

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## References

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