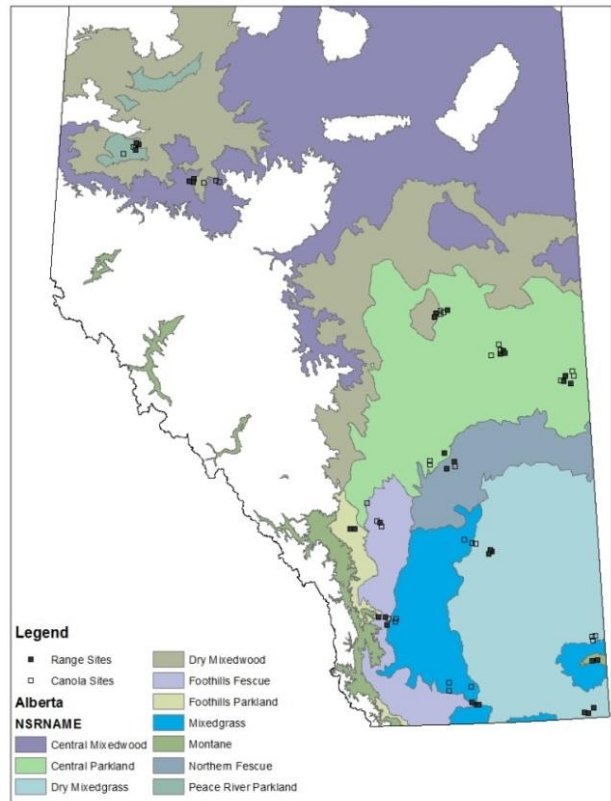




## Native Bees in Alberta’s Agricultural Landscape

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Over the past two years a team of researchers from the University of Alberta have been surveying bee communities in grasslands and canola fields throughout southern and central Alberta. Recent studies have demonstrated that not only are commercial honey bees declining, but there have also been drops in native bee numbers, likely due to threats such as changes in land-use, pathogens, pesticides and climate change. Alberta is home to nearly 300 species of bee but there have been no systematic survey of their distribution and abundance, despite their importance for flowering plants in both native ecosystems and croplands. Many of these bees are less successful in nesting within disturbed soils, including soils tilled for crops, and are dependent on other habitats, such as grasslands. However, grasslands that support cattle may affect the plant communities and soils through grazing and trampling, which may have repercussions for bees. The researchers surveyed 35 grassland sites and 33 canola sites over two years for bees and measured characteristics of the vegetation, including use by cattle.



Sites sampled in 2014 and 2015 for pollinators were located throughout Alberta’s southern natural regions. The study design had 12 clusters of locations, each cluster included both grassland and canola to enable comparison of land uses.

The study found over 230 species of bee. Bee communities varied across the province, with more individuals and more species found in drier parts of the province. Within rangeland sites, areas assessed as healthier, according to the Alberta Rangeland Health Assessment, tended to have both more bees and more diverse bee communities. The declines in bee abundance and diversity in less healthier grassland is attributed to changes in the flowering plant community on which the bees depend. The communities of bees using canola fields and rangelands differed from each other. While there tended to be more bees in canola fields, likely due to the large supply of pollen and nectar for bees, these areas bloom for only a

short period of time. In contrast, the diversity of flowers in grasslands helps to ensure a more continuous food source for bees throughout the season, and indeed we found more bees in areas with more diverse plant cover. We also briefly examined bee communities in relation to surrounding land-use cover and found that areas surrounded by more grassland in a 2 km radius had both more bees and more diverse bee communities. Finally, we found a modest positive relationship between bee diversity and forage quality, which we attribute to the maintenance of more diverse forb communities, which tend to be higher in protein than grasses.

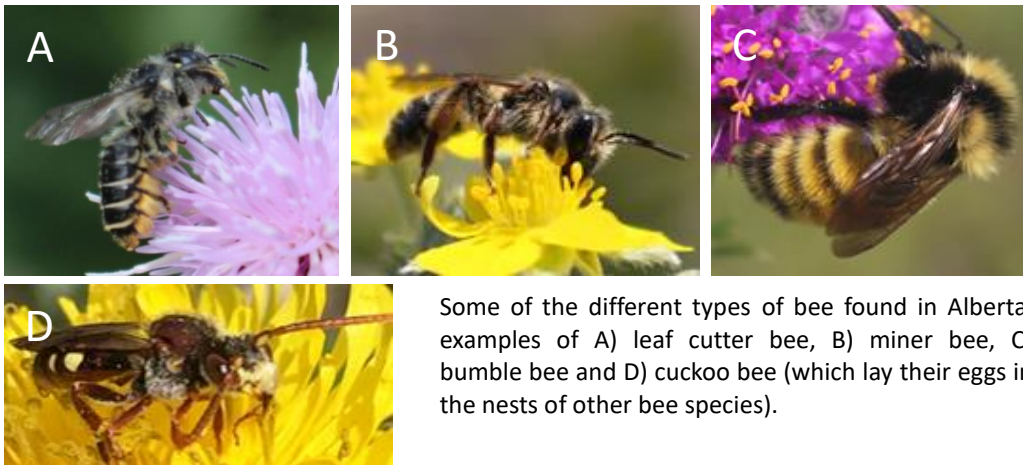
The results of this study demonstrate the importance of grassland for bees, but also show that management of grasslands for a healthier condition can increase bee abundance and diversity. These practices may extend beyond the grassland as bees can forage up to 3 km from their nest, in turn potentially increasing the yield of crops like canola. Monitoring changes in the distribution and abundance of bees may be critical for understanding the future of the vital pollination services provided by these insects. For more information on this project, please contact Dr. Cameron Carlyle ([cameron.carlyle@ualberta.ca](mailto:cameron.carlyle@ualberta.ca)).



A graduate student targeting large bodied bees for capture and identification in a canola field.



An undergraduate student field assistant targeting large bodied bees for capture and identification in native grassland.



Some of the different types of bee found in Alberta, examples of A) leaf cutter bee, B) miner bee, C) bumble bee and D) cuckoo bee (which lay their eggs in the nests of other bee species).