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Ecology of Native Bees in North Taranaki, New Zealand

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Nikki Maria Hartley

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Abstract

Studies are increasingly finding that native bees are important pollinators in many systems, in both natural and agricultural settings. With the possible loss of honey bees due to various reasons, it has become clear that relying on major pollinator for the world's pollination needs is problematic. Instead, we must look to native, wild pollinators, such as solitary bees, to avoid declines in pollination rates. However, these native bees are at risk from a number of different factors worldwide including habitat destruction and degradation for agriculture, climate change, and pesticide use. It is therefore important to have a clear idea of the state of native pollinators, to assess how they are affected by these risks.

This thesis gives a novel insight into the abundance and diversity of native bee species in the northern Taranaki area, New Zealand. I examined three main research questions concerning potential threats to native bees: how native bees are affected by varying land uses; how the abundances of native bees respond to different weather variables; and what the floral preferences of native bees in this region are.

572 bees from seven species were caught during the study. Overall, perhaps surprisingly, the abundance of native bees was positively associated with an increase in agricultural intensity and exotic vegetation. However, the results of this study show that species of native bees may respond differently to land use changes -the abundance of the three species of native bees that were collected frequently enough to measure preferences (*L. paahaumaa*, *L. sordidum*, and *L. cognatum*) all showed neutral to positive responses to an increase in agricultural intensity. Whereas, other species were caught much less frequently and may require more native habitat for persistence. This study also showed that weather has a significant impact on the likelihood of encountering native bees, specifically temperature, wind speed, and cloud cover.

This study indicated that these native bees have varying levels of generalisation, and differing preferences for native or introduced plants, when it comes to their floral preferences. The results indicated that the three common species (*L. paahaumaa*, *L. sordidum*, and *L. cognatum*) all forage on many different plant species, including both introduced and native species. This ability to forage on both native and introduced flora may explain the ability of these bees to inhabit areas of high agricultural intensity, while others cannot.

This thesis identified some of the potential threats to native bees in New Zealand and how they may impact native bee populations in North Taranaki. An understanding of these impacts is vital for future conservation management of native bees in New Zealand.

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I would like to dedicate this thesis to the 572 bees that gave their lives (unwillingly I admit) to make this study possible. Although your lives were cut short, I hope you were able to have a joyous time eating pollen and nectar and industriously building nests before I came along with my net. I hope that your sacrifice will help to lead on to the preservation of your species in the long run.

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