Ecology of Native Bees in North Taranaki, New Zealand

A thesis presented in partial fulfilment of the requirements for the degree of

Master of Science

in

Zoology

at Massey University, Manawatū, New Zealand.

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2018

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.

Acknowledgements

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.

A huge thank you to my supervisors, Alastair Robertson and David Pattemore. Thank you for your guidance and wisdom on all things bee related. Thank you also for your encouraging words when I was struggling to motivate myself. I am very grateful to Barry Donovan for his expertise on all of New Zealand's bees. Thank you for taking the time to help me identify my bees. You have given me some specialised knowledge that I may be able to help pass on to others, to give our little bees some more recognition in a world ruled by their celebrity cousins the honey bees and bumble bees! Finally thank you to Katherine Holt for her extremely helpful knowledge of identifying pollen grains.

I would like to acknowledge my parents, without whom this thesis would have never been completed. Thank you to my Dad, Stephen Hartley, for encouraging me to pursue my passions with the natural world at university. Thank you to my Mum, Anna Hartley, for being my biggest supporter and a dedicated research assistant.

I am very grateful for the people who took the time out of their day to help me catch bees: Tama Porter, Jamie Darbyshire, and Alarna Stratton - your help was much appreciated!

Thank you to Shelley Ogle and Jo Taylor for all your advice and support, it was so helpful to be following our university paths together!

I hugely appreciated the financial support given to me in the form of two scholarships: the Julie Alley Bursary, and the J P Skipworth Scholarship. These scholarships helped me immensely when working two jobs and studying at the same time became impossible.

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