

SUMMER RESEARCH 2024/25

PROJECT ABSTRACT



THE UNIVERSITY OF
WAIKATO
Te Whare Wānanga o Waikato

PROJECT # 55

SUPERVISOR/S:	Associate Professor Mike Clearwater
PROJECT TITLE:	Elucidating key mānuka genes determining honey value
FIELD:	Plant Biology
DIVISION/SCHOOL:	HECS - Te Aka Mātuatua School of Science
PROJECT LOCATION:	Hamilton

PROJECT ABSTRACT:

The astonishingly high value of mānuka honey derives from the unique properties delivered by methylglyoxal (MGO), which is produced in honey by conversion of dihydroxyacetone (DHA) found in mānuka nectar. DHA is found in high amounts only in nectars of some species in the mānuka genus, *Leptospermum*. Why mānuka has high amounts of DHA in its nectar, but other plants do not, is the obvious question. In partnership with Māori honey producers and Plant and Food Research, we have recently shown that the unusual DHA content of mānuka nectar is influenced by light falling on the flower while it is open, and photosynthesis occurring within the 'nectary' cells that make the nectar sugars. We have also shown that nectar DHA is correlated with the activity of a phosphatase gene within the nectary. In this project, the summer student will contribute to experiments that investigate the link between these two findings. How does variation in light affect the expression of the phosphatase gene, and alter nectar chemistry? Project work will include running experiments, sampling of flowers and nectar, and processing of samples for gene expression analysis and chemical composition.

STUDENT SKILLS:

- Basic knowledge of plant biology and physiology, and an interest in learning more
- Attention to detail, careful record keeping, sample collection and handling
- Effective time management, including availability to work on experiments that may take several days to complete
- Understanding of genetics, including experience in basic techniques for molecular biology, would be beneficial

PROJECT TASKS:

1. Care of mānuka plants
2. Running experiments
3. Sampling of nectar and flower tissue
4. Sample preparation and analysis
5. Data collation and interpretation

EXPECTED OUTCOMES:

- Student's Research Poster (as per clause 6 of the [Scholarship regulations](#))
- Measurements of mānuka nectar flow and composition in response to light treatments
- Completion of experiments testing the effect of light on floral nectary gene expression and nectar chemistry

