Bioactive honey production: Genetic variability of nectar traits in Tasmanian *Leptospermum scoparium*

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Speaker Bio

Chris Wellington is an Ecologist that has worked as an Environmental Professional for 15 years, with research experience in the fields of terrestrial, marine, and aquatic ecology. Currently, Chris is undertaking a PhD through UTAS (with CRCHBP funding support) focusing on investigating the heritability of traits affecting productivity in Tasmanian *Leptospermums* and the isolation of genotypes with high DHA, for potential commercial use in stationary medical-grade honey farms.

Presentation

There is growing interest in the establishment of *Leptospermum* plantations in Australia to produce honey with high bioactivity. The value of *Leptospermum* honey increases relative to the non-peroxide bioactivity provided by methylglyoxal concentration in the honey, which has been shown to correlate with dihydroxyacetone (DHA) concentration in the nectar from which the honey is derived. The commercial viability of these plantations will be at least partially dependent on our capacity to screen for and select superior genotypes, which includes understanding the genetic variability of nectar DHA and sugars, flowering, and vegetative vigour.

To facilitate the screening of a large number of provenances and families, we have developed a new reliable method to simultaneously detect and quantify DHA, glucose, fructose, and sucrose levels in *Leptospermum* nectar using normal phase liquid chromatography-tandem mass spectrometry. Minimal sample preparation is required and a short analysis time of six minutes per sample was achieved, providing the *Leptospermum* industry with a simple, cost effective and fast sample analysis.

This new analysis technique was recently used to analyse 760 nectar samples collected from a plantation of *Leptospermum scoparium* located near Hobart, Tasmania. The plantation was established with open-pollinated seed collected from 190 families from 38 native provenances throughout Tasmania, with a single plant from each family grown in each of 5 randomised blocks in the trial. Results indicated significant provenance variation and family within provenance variation but no significant block effects for both the DHA concentration in the nectar extracts and the ratio of mg DHA/kg total sugars (the industry standard measurement). For nectar glucose, fructose, and total sugars there was significant provenance and block variation, however family variation was non-significant. Within provenance heritability estimates for the ratio mg DHA/kg total sugars were greater than 0.5, but estimates are dependent on the percent outcrossing assumed. These results indicate that there is genetic variation for DHA concentration in *Leptospermum scoparium* nectar and it is possible to improve it through selection.

Ongoing research includes determining consistency of these genetic differences in consecutive flowering years and in different environmental conditions (field sites), as well as the screening of cloned genotypes from other Tasmanian *Leptospermum* species.