Cost-effective Manuka plantation establishment

Researchers at the CRC for Honey Bee Products have developed a tool to find the most suitable Western Australian soil conditions for the growth of *Leptospermum nitens* for medicinal Manuka honey production.

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Leptospermum nitens is a Western Australian native plant that shows promise at producing nectar containing dihydroxyacetone (DHA), a compound necessary for creating high-value medicinal honey.

Medicinal Manuka honey may not be the only benefit to cultivating *L. nitens*. The plant may also help reverse agricultural land degradation by decreasing wind and water erosion and dryland salinity. It also has the potential to sequester carbon. The potential income from medicinal honey production may offset the costs of reforestation in these regions.

novel tools

environmental stewardship

bioactive honey

Before the potential benefits of growing *L. nitens* can be achieved, the Western Australian honey bee industry must quickly and cheapy find land suitable for its growth.

By developing a robust, rapid and non-invasive electromagnetic induction (EMI) spatial soil mapping system, CRC research helps to identify soil conditions most suitable for *Leptospermum* growth in WA.

Leptospermum nitens after 2-3 years growth on deep sandy soils at Mooribin, WA (Image: H. Shaukat)

EMI can measure salt content, soil moisture, soil texture, stratigraphic layers or depth to bedrock. These soil properties can be matched with data on plant survival and growth, gathered using drones/unmanned aerial vehicles.

Using EMI to investigate how soil texture affected the growth and survival of *L. nitens*, CRC researchers found there was a significantly larger shrub survival and growth rate in sandy loam and loamy textured soils (medium and heavier texture classes) compared with deep sandy areas. Further increases in the clay content did not improve shrub survival or size.

Table 1. *Leptospermum nitens* performance in different soil textures after 2-3 years of growth at Mooribin and Kukerin, Western Australia.

Parameter	Deep sandy soil (light texture)	Sandy top & loamy subsoil (medium texture)	Loamy top & loamy subsoil (medium texture)	Loamy top & clayey subsoil (heavy texture)
Shrub survival (% ha^{-1})	75	88	89	83
Shrub growth (diameter cm)	26	25	38	33

L. nitens plantations can thrive in marginal agricultural lands with low fertility, providing an alternative to cropping.

The CRC tested *L. nitens* survival rate at Mooribin in WA. It had a high survival rate of 75% per hectare, despite the site having uniformly deep sandy soil with low agronomic value.

L. nitens also achieved similar survival rates in areas with higher clay content. These areas often have a high cost of production for growing crops.

The EMI spatial soil mapping system developed by the CRC provides a useful tool for planning new commercial plantations of *L. nitens*. It improves the capacity of growers to identify areas where plantations are most likely to succeed.

CRC PhD candidate Hira Shaukat using EMI to measure and map soil properties (Image: H. Shaukat)

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