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## Research brings new hope for saltland pasture legume

*Melilotus siculus* is shaping up as the new plant that will make salt-affected land a more productive part of the farm – a productive legume that produces high quality feed and fixates nitrogen to enhance compliment grasses.

While many plants can tolerant saline soils, finding a salt-tolerant legume has become a quest for graziers and researchers alike who want to find the missing piece in the pasture mix to bring new saltland productivity.

After years of extensive searching and evaluating, researchers from the Future Farm Industries CRC have identified *Melilotus siculus* (*M. siculus*) as the best annual legume species suited to growing in moderately high saline and waterlogged environments.

Amanda Bonython (SARDI) one of the researchers in the Future Farm Industries CRC's *Understorey* project evaluating *M. siculus* said field and glasshouse studies have shown the plant is the most promising legume for improving the productivity of Australia's salt-affected agricultural land.

"The genus *Melilotus* has been linked to problems with compounds that can cause tainting and occasional livestock health issues. An important difference between *M. siculus* and other *Melilotus* species is that it contains lower levels of coumarins, a chemical compound that can cause these problems," Amanda explained.

"*Melilotus siculus* has demonstrated high combined tolerance to both salinity and waterlogging compared to current commercial legumes – making it a significant discovery. However, the field performance of regenerating stands of *M. siculus* has been hampered by poor nodulation when inoculated with commercial strains of bacteria (rhizobia) that fix nitrogen.

The problem is linked to the ability of the bacteria to survive the summer months, when the plants are dead and soil salinity is at its greatest. When the bacteria does not survive, the soil can't nodulate the regenerating plants."

The research focus has now shifted to finding persistent and effective rhizobia. This has involved collecting nodules from other similar legumes growing in saline soils and evaluating their persistence over the summer months and their nodulation success with regenerating *M. siculus* stands. These experiments have produced some very promising results," Amanda said.

This research has taken Amanda on a recent rhizobia and seed collection mission to Spain with fellow researcher Dr Phillip Nichols (DAFWA). The journey was jointly funded by the AW Howard Trust Inc and the Future Farm Industries CRC.

"During the two week collection mission, nodules and soil from native *M. siculus* plants growing in saline environments were collected. We also collected seed from *M. siculus* plants and from another thirty legume species," Amanda explained.

A selection of the most promising rhizobia strains will now be comprehensively tested this year to confirm their persistence and ability to successfully nodulated regenerating *M. siculus* stands.

Running in parallel to the rhizobia research will be a detailed evaluation of the *M. siculus* plant germplasm, which includes selecting plants for their productivity under saline conditions and suitability to target Australian soils.

“It is looking promising but a lot of hard work is still needed to ensure the best combination of both rhizobia and plant germplasm are identified for commercial release,” Amanda said.

Future Farm Industries CRC is confident that a salt-tolerant *M. siculus* cultivar can be grown in farmers' paddocks in four to five years.

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