



Dr Geoff Woodall inoculating swamp sheoak seedlings with Frankia (inset: Frankia nodules on sheoak roots)

Photo: Bob Hingston

## Avongro trials nitrogen-fixing bacteria in saline land agroforestry

Avongro Inc is trialing a way to make it easier for landholders to succeed at establishing commercially promising native timber crops on saline land.

*Frankia* is a nitrogen-fixing bacteria that lives in symbiosis with some plants letting them grow in soils that are saline, low in nutrients, have extreme pH or even heavy metal pollution. Avongro wants to find out if, when planted in saline Wheatbelt farmland, swamp sheoak (*Casuarina obesa*) seedlings pre-treated with *Frankia* will grow better than untreated seedlings.

Avongro's agroforestry consultant Bob Hingston said "Swamp sheoak grows naturally around the margins of saline creeks, salt lakes and rivers throughout the WA Wheatbelt and Goldfields in rainfall zones from 275mm. It is an excellent agroforestry species due to its nitrogen fixing ability, it has palatable foliage (useful in drought), it is a useful shade and shelter species and its light crown assists

pasture growth under the canopy of plantations. As an endemic species to WA, swamp sheoak fits perfectly with current natural resource management funding opportunities that promote revegetation of native species.”

Swamp sheoak seedlings, half of them treated with *Frankia*, were planted last winter at 1.87ha trial sites on valley floor farmland at Aldersyde and Goomalling.

The Aldersyde trial site, supported by funding from the Western Australian Government's State Natural Resource Management Program, is at Ian and Margaret Hall's farm and is close to several other agroforestry demonstration sites, making it a good stop on Landcare and forestry field days.

The Goomalling trial site is on Michael and Karen McGill's farm. Swamp sheoak is one of the native Western Australian timbers Michael's brother Brad McGill uses in his fine furniture business, Floating Edge Design. The Goomalling trial site is being developed in partnership with Wheatbelt NRM, through funding from the Australian Government's National Landcare Programme.

“Swamp sheoak may be suitable for carbon sequestration opportunities and has great potential as a long term commercial tree crop option provided that correct provenances are grown,’ said Mr Hingston. “Previous Greening Australia, Wheatbelt NRM and Avongro trials I've worked on were looking for best bet swamp sheoak provenances for commercial agroforestry, chosen for growth rate and tree form,” said Mr Hingston, “so in this latest trial we're also comparing the top five provenances we've identified so far, both with and without *Frankia*.”

Soil salinity, soil profile, and soil nutrient data was collected from each site at the time of planting. Eight months after planting, it's much too soon to know whether *Frankia* has made a difference to tree growth. Despite overall poor tree survival on the lower half of the Aldersyde trial site, survival counts shows *Frankia* inoculated seedlings doing slightly better. At Goomalling there isn't much difference between the survival of treated and untreated seedlings. Details are in the reports **Establishment of *Casuarina obesa* provenances with *Frankia* on Saline Avon Farmland** available at [www.avongro.com.au](http://www.avongro.com.au). Mr Hingston recommends both sites are tested again in 2022 for tree growth and form, *Frankia* nodulation, and soil condition, particularly nitrogen levels.

“Avongro is all about sustainable production and economic development in the Wheatbelt,” said Avongro Chairman Alan Briggs. “If inoculating seedlings with bacteria increases revegetation success on saline farmland, it can open up more opportunities for landholders to reap the benefits of Landcare or agroforestry within their broader farming systems.”

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