

Mount Gambier site key in selective breeding program for pine tree plantations

28 August 2020



Tree Breeding Australia general manager Tony McRae inspecting a radiata pine tree flower. *(ABC Rural: Bridget Herrmann)*

Key points:

- Plantation trees are constantly being bred for more useful genetics
- The seed fertilisation process takes two years
- The genetic mixes created in Mount Gambier are sent all over Australia

An elite selection of trees in South Australia have been hard at work during baby-making season to create better genetics for plantation timber.

The radiata pine trees have been chosen for Australia's only softwood breeding research and gene conservation site located in Mount Gambier and run by national forestry cooperative Tree Breeding Australia. General manager Tony McRae said the aim of the site was selective breeding for plantation



trees. "They're not just any babies, they're coming from the very best parents that have very good characteristics," he said. "Some of the babies will have even better genes than their parents, so that will enable us to identify those and increase the productivity in future generations of plantations."

However, these seeds will not make it to commercial plantations; instead, they will be planted in trials across the nation to track their genetic success. Researchers study the trees over their life for attributes such as wood quality and growth rate, and the information will further develop genetics available for plantation companies.

Tree Breeding Australia's breeding research and gene conservation site at Kilsby Road, Mount Gambier. *(ABC Rural: Bridget Herrmann)*

"We plant up to 9,500 seeds [in each trial] which are genetically unique, coming from some 300 different families," Dr McRae said.

"We will combine that data with trials which have been planted in previous years or decades ... we're generating new data on a daily basis."



He said that from there, the best genetics are brought back to the breeding site.

"Out of the hundreds of thousands that we have in the trials, we might bring in 30 to 50 new parents, so we know the good parents based on performance out in the trials."

Tree Breeding Australia's pine technician David McKersie and general manager Tony McRae inspect the completed cross-pollination. *(ABC Rural: Bridget Herrmann)*

When the pollen meets the trees

It takes roughly two years to get viable seeds, from first

pollination until pinecones are harvested, and pollination can only happen in a narrow six-week window. During this time, pine technicians such as David McKersie find opened flowers on the trees and place paper bags over them — protecting them from wild pollen. When scales on the flower begin to open, specific pollen is injected into the bag via resealable holes.



A bag covers several pine flowers, holding in the selected pollen. Each bag combines a specifically chosen genetic mix. (ABC Rural: Bridget Herrmann)

"It's usually about six days [after bagging] until we do the first pollination, and then we do three pollinations in four-day intervals," Mr McKersie said.

The bag is removed around six weeks later after the flower has closed and a pinecone is left to form.

"Then we wait two years, we take the cones from the trees, dry them, extract the seed ... and then it goes into next year's trials," he said.

Each cone averages 40 seeds but that does not guarantee a high yield.

"Around 40-45 per cent of initial flowers bagged actually survive through to extraction," Mr McKersie said.

"Even if they do, it's actually the viable seed you get out at the end [that matters], because you may have a cone full of seed or the seed may be rubbish.



"Whether that's due to the pollen, frost or any other condition is speculation."

These are fertilised seeds harvested from a pinecone. (ABC Rural: Bridget Herrmann)

Branching out

Dr McRae said growing conditions improve the chances of success.

"The very important thing is to choose a site where the environment is conducive to flowering and seed production;

Mount Gambier is reasonably mild," he said.

While the genetics start in the Limestone Coast, the data is accessible for member forestry companies across the nation.

These year-old pine cones will stay on the tree for another year before being harvested. (ABC Rural: Bridget Herrmann)

"We consolidate that data into an index which will represent the value of any particular genotype or tree for their particular situation when they grow them in a commercial setting," Dr McRae said.

"By growing better and using better genetics, you can produce more wood from the same unit area for the same resources that you input.

Source: <https://www.abc.net.au/news/rural/2020-08-28/baby-making-season-for-forestry-tree-breeding/12600754>

