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## Sugar gum – the sweet taste of success in vineyard stakes

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Sugar gum could become a viable alternative for posts used in vineyards, farms and horticulture, according to a new study funded by the Joint Venture Agroforestry Program (JVAP1).

Researchers from the Commonwealth Scientific and Industrial Research Organisation (CSIRO) investigated the scope for genetic improvement in three low rainfall eucalypts potentially suitable for vine trellis posts.

Tree breeder David Bush and wood biodeterioration specialist Kevin McCarthy looked at various traits in sugar gum (*E. cladocalyx*), swamp yate (*E. occidentalis*) and several spotted gums (*Corymbia* spp.), including natural durability, proportion of heartwood, amount of heartwood extractive and basic density.

In particular, they looked for evidence of variability in these traits across the individual species.

“Wide variation in product durability would normally equate to unreliability and represent a significant marketing problem,” said Bush.

“But since much of the variation is genetic, it will provide an opportunity to select and propagate from the very best and make substantial improvement through our breeding programs.”

Research revealed sugar gum as the standout performer on natural durability.

“Assessing traits relating to natural durability of trees from young-aged trials (eight to 12 years) showed that sugar gum may be well-suited to production of naturally durable posts and is at the same time amenable to genetic improvement,” said Bush.

“Heartwood development (heartwood diameter as a proportion of Diameter Breast Height Over Bark) was quite strong in both sugar gum and the spotted gums at eight to ten years after planting.

“As the durable component of the wood, this is a fundamentally important trait and the significant genetic variation indicates that genetic improvement should be possible by species / provenance selection in the spotted gums and both provenance and family-within-provenance selection in sugar gum. This trait would also be desirable for sawlog production.”

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Their findings could prove especially valuable for the Australian wine industry, which generally relies on wooden posts to support vine trellises; an estimated 5.5m/year are needed for new plantings and replacements at a cost of \$33m.

These are mostly creosote or CCA-treated pine posts, which have drawbacks in certain situations, such as:

- They have relatively low strength compared with durable hardwood posts and up to 15% may be broken during mechanical harvesting. While the cost of a post might be only a few dollars, the cost of removal and replacement in an established vineyard can be several times more.
- Broken treated posts are difficult and expensive to dispose of – in most states burning is prohibited and disposal in landfill is regulated.
- Treated posts can be a marketing liability for some food crops, particularly 'organic' crops, where standards worldwide are tightening on the use of timber treated with CCA or creosote.

Steel posts are another alternative, but have their own disadvantages. They can damage mechanical harvesters, corrode in some soils, are generally unsuitable for load-bearing situations and could become significantly more expensive as energy costs rise.

Posts made from recycled plastic usually have low load bearing capacity and have been found to bend in prolonged high temperatures.

As part of the JVAP research, accelerated decay studies were carried out that showed genetic variation in both sugar gum and spotted gums for resistance to both brown and white rotting fungi. However, while the sugar gum had good overall resistance to fungal deterioration (particularly the south Flinders Ranges provenances), the spotted gum heartwood was severely attacked.

At last – added value from thinnings?

CSIRO also found significant genetic variation in basic density for both species, which is strongly related to strength. Even at a young age these have a high density (> 600 kg.m<sup>-3</sup>) suggesting a post strength that is likely to be much greater than *Pinus radiata*.

“This study has identified a potential product from a key low rainfall species (sugar gum) that might be produced from thinnings within as little as eight to 12 years on typical sites,” said Bush. “This is an important development, because while sugar gum is likely to produce high-quality sawlogs, a disincentive to investment is the long lead-time to final harvest.

“A commercial product earlier in the rotation would greatly improve the economics, particularly as pulpwood and/or other composites from thinnings are unlikely given the high density of the wood, and high extractives content.”

There are a number of challenges for sugar gum vineyard post production that need to be addressed before it can be considered for full scale commercial production. These include:

- Whether or not sapwood removal is necessary
- Strength determination
- Heartwood taper
- Pole performance with respect to driving and handling.

The report Genetic improvement for naturally durable hardwood posts is available from the Rural Industries Research and Development Corporation at [www.rirdc.gov.au](http://www.rirdc.gov.au).

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