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Community-powered science to keep Aussie icons standing

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Rolling fields dotted with sheep and majestic old gum trees form a quintessential part of the Australian landscape. These paddock trees perform a critical, under-appreciated role in improving farm viability and conserving biodiversity. Through the power of social media, a volunteer army of citizen scientists has been helping in the research effort to preserve these icons.



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Dr Linda Broadhurst leads a unique, community-powered science project that is helping to restore one particular species of paddock tree: the yellow box eucalypt (*Eucalyptus melliodora*).

‘Several generations of farmers have grown up with these paddock trees. In two to three generations, the trees will be gone – unless we do something about it,’ explains [Dr Broadhurst](#), a CSIRO conservation biologist.

‘We’ve got an ageing cohort of eucalypts in our agricultural landscape that we need to think about replacing as quickly as possible.’

The mighty yellow box once stood proudly alongside Blakely’s red gum and white box in [box gum grassy woodlands](#) that covered close to 20 times the area they cling to today. The remnant stands provide an essential habitat for endangered bird species – such as the critically endangered regent honeyeater, brown tree creeper and the superb parrot – and pollen for bees producing Australia’s popular yellow box honey.

Remnant stands of yellow box are now recognised as critically endangered and protected under both Commonwealth (EPBC Act) and state legislation.

Maximising genetic diversity

[Paddock trees](#) are a visible reminder of the vegetation Australia has lost to intensive agricultural land management over hundreds of years.

However, tree restoration is not straightforward. Scientists say it is vital for such projects to source genetically diverse seed from suitable trees that are not too closely related. Poor-quality eucalyptus seed produced through inbreeding can be less fit than wild seeds, or may not have the resilience to respond to changes in their environment.

Dr Broadhurst has gathered about 80 volunteer researchers from across the community to help her [assess the genetic health](#) of the critically endangered yellow box by collecting seed samples for genetic analysis.

‘People love yellow box,’ she says. ‘We put out a call on CSIRO social media channels and through the Greening Australia Capital Region and the response was very positive. From there, it flowed to various community groups and beekeeping organisations in Victoria, New South Wales and Queensland.’

Many of the volunteers are farmers who recognise the value of the old gums scattered around their family’s property.

Value for farmers

‘All paddock trees provide shade and shelter for stock,’ says Dr Broadhurst: ‘not just yellow box, but eucalypts in general.’

Paddock trees could play a very important role during periods of high stress for stock, such as the longer, hotter summers experienced in south-eastern Australia in recent years.

Stewart Scott is a dryland, mixed-enterprise farmer from near Deniliquin, New South Wales, whose yellow box trees were surveyed in the project.

‘I’ve cleared a lot of country, but we’ve still kept belts of timber,’ says Mr Scott. He agrees that ‘stock do a lot better with timber’.

Scattered trees with enormous, deep roots can also draw down water to help keep salinity at bay. Further, their root systems – and associated insects and microbes – recycle nutrients, helping regulate soil acidity and maintain soil friability.

Despite these benefits to stock and soil, paddock trees may literally stand in the way of progress. With a shift in farming practice toward larger farms and automated farming equipment, the trees can upset the straight paths that tractor and harvester engineers might prefer and tree roots can damage farming machinery.

‘The big challenge for us at the moment is how we can help farmers grow these trees in a production landscape, and still keep their production high,’ explains Dr Broadhurst.

Regent honeyeaters

Recent studies show that paddock trees may be important ‘stepping stones’ for bird species moving in response to changing climate patterns. Like frogs hopping between lily pads, birds can fly between paddock trees, small revegetation patches and treed roadside verges to reach safe havens as they move away from increasingly hostile habitats.



Credit: Chris Tzaros

‘Yellow box is crucial to the long-term survival of regent honeyeaters,’ says Dean Ingwersen, who is regent honeyeater recovery coordinator with [Birdlife Australia](#).

Mr Ingwersen and his team are working to restore and preserve precious bird habitat across Tasmania, Victoria and New South Wales. They recognise the importance of new knowledge in managing the natural environment, especially of studies such as Dr Broadhurst’s.

‘If a species like yellow box is indeed suffering from inbreeding, we need to understand what this does to things like recruitment and rehabilitation, as well as what happens to aspects of their ecology, like timing of flowering and nectar flow,’ Mr Ingwersen says.

Yellow box honey

Beekeepers also know that the few remaining yellow box trees that still dot the south-eastern Australian agricultural landscape – from which their bees derive this well-known and loved honey variety – are not faring well.

Beekeeper Leo Kuter is one of the volunteers who put up his hand to help the yellow box research project by collecting samples from near his hives on Mr Scott’s property, just north of the Murray River in southern New South Wales.

Armed with a GPS, pruning shears and an esky, the two friends collected leaves, gumnuts and a herbarium sample – together with information about the site and the health of the yellow box population growing nearby – as per the instructions included in the project collection kit.

‘The yellow box trees I collected from are all 200–300 years old,’ says Mr Kuter. ‘They are the last of the big trees not chopped down in the 1900s to clear the way for weirs on the Murray.’



Credit: Helen Kinsela

Native forests are definitely the most important resource for beekeepers, explains Ararat beekeeper, Judy Leggett, another volunteer participating in the CSIRO/Greening Australia project.

‘Australia's eucalypts in particular are good sources of honey and help give the honey its distinctive taste and density,’ explains Ms Leggett, who is also secretary of the Central Victorian Apiarists Association.

‘As a beekeeping tree, yellow box is very good for honey production,’ she says. ‘It’s interesting to see if the trees have all come from a similar genetic background, or whether the ones down here in Victoria as opposed to New South Wales are very different.’

As a conservationist, Dr Broadhurst would like to see more vegetation in agricultural areas, and for more farmers to appreciate the benefits of paddock trees.

‘It’s not too late. We’ve got a really good opportunity to do something about it. We’ve got to make sure we help farmers keep their landscapes productive, but also keep native vegetation. It’s not an either/or situation – its win-win for biodiversity and production.’

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