



New Research

Two Eucalypts Are Better Than One For Beetle Diversity

This research is important

- Yellow box (*Eucalyptus melliodora*) and Blakely's red gum (*Eucalyptus blakelyi*) are the dominant trees in the critically endangered box-gum grassy woodlands in south-eastern Australia.
- The leaf litter under eucalypts is extraordinarily rich in insect species, and is important for carbon storage, nutrient cycling, and foraging by native mammals, reptiles and birds.
- The litter layer environment under yellow box and Blakely's red gum differs strongly in complexity and moisture content from the interspersed grassland, and provides an important microhabitat in grassy woodlands. No research has previously compared beetle diversity under these two eucalypt species.



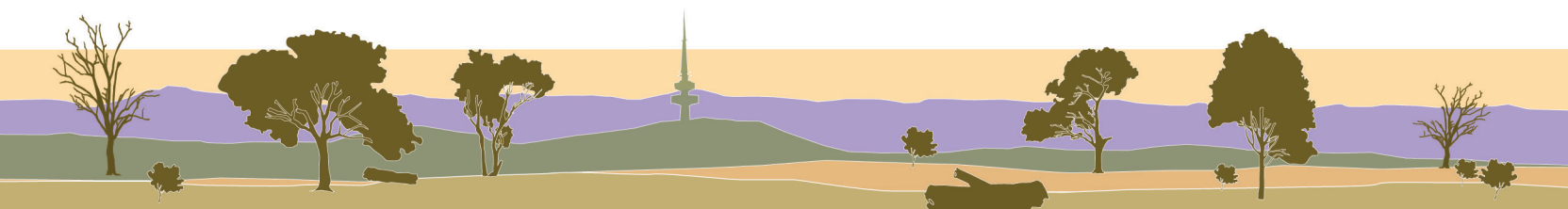
Typical specimen of Yellow Box found in Goorooyarroo Nature Reserve, showing the whole tree, trunk and leaf litter

Beetles are a major component of biodiversity in leaf litter

- Beetles are incredibly diverse in grassy woodlands and perform a variety of different ecological roles by feeding on different plants and fungi, breaking down animal and plant debris, and being eaten by other animals such as birds and reptiles.
- This research looked at differences in the number and variety of beetle species found under each eucalypt. The survey area was in Goorooyarroo Nature Reserve as part of the research experiment on woodland restoration.
- Results, recently published in *Journal of Biogeography*, showed beetle assemblages under yellow box and Blakely's red gum had distinct differences in diversity and composition.



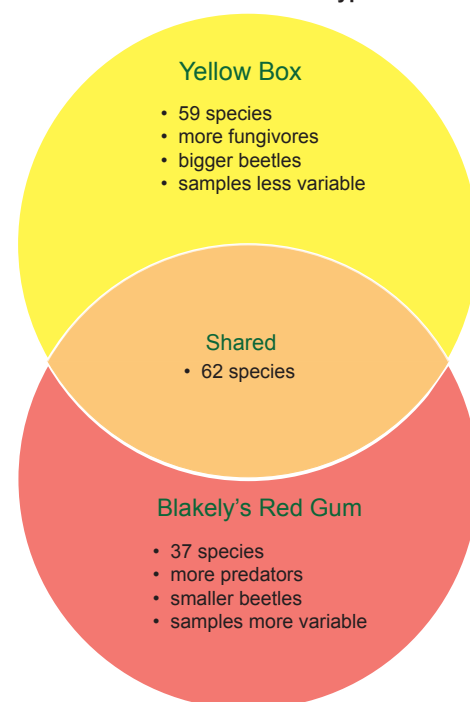
Typical specimen of Blakely's Red Gum found in Goorooyarroo Nature Reserve, showing the whole tree, trunk and leaf litter



Beetle assemblages were different under each eucalypt.

- A total of 1,034 beetles were sampled (from under 24 yellow box and 23 Blakely's red gum), which included 158 different species.
- Yellow box had a higher richness and abundance of beetles, but had higher similarity between trees, whereas Blakely's red gum had a lower richness and abundance of beetles but lower similarity between trees.
- Blakely's red gum had more beetles that were predators, whereas yellow box had more beetles that feed on fungus. Yellow box also had more large beetles, such as scarab and click beetles, indicating a greater biomass (total amount of beetles in a given area) under this eucalypt.
- This data shows how each eucalypt is associated with a very different beetle community and points to how both trees in combination can support a larger number and variety of beetle species than either tree alone.

Leaf-litter Beetles Formed Distinct Assemblages Under Each Eucalypt



Conservation Implications

The litter environment under trees is an important and distinct environment in box-gum grassy woodlands because:

- it is extraordinarily rich in insect species
- is an important for carbon store and plays a role in nutrient cycling
- provides foraging sites for mammals, reptiles and birds

The difference in beetle assemblages from the leaf litter under yellow box and Blakely's red gum can be exploited for conservation purposes by ensuring a mix of both eucalypts in restoration plantings, and not favouring only one of these tree species.

A mix of both eucalypts at small spatial scales will maintain patchiness and variation in beetle diversity, and this contributes to overall biodiversity across landscapes.

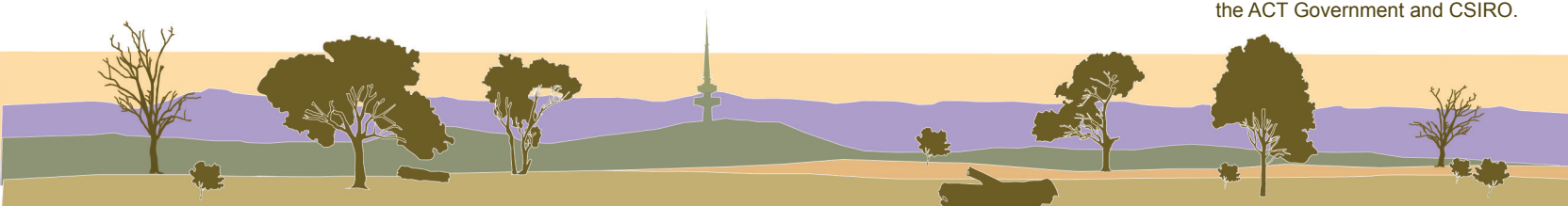
Where to from here?

This is part of a larger research project looking at the interactions between beetles and the surrounding woodland environment of this critically endangered ecosystem. Future research will continue to look at how leaf litter contributes to the biodiversity and health of box gum grassy woodlands.

Published Research

Barton, P.S., Manning, A.D., Gibb, H., Lindenmayer, D.B. and Cunningham, S.A. (2010) Fine-scale heterogeneity in beetle assemblages under co-occurring *Eucalyptus* in the same subgenus. *Journal of Biogeography* 37(10): 1927-1937

The Mulligans Flat–Goorooyarroo Woodland Experiment is a joint partnership between The Australian National University, the ACT Government and CSIRO.



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