Mistletoe: the misunderstood woodland superhero!

Mistletoe is a remarkable plant that essentially “supercharges” the woodlands and forests where it occurs. It provides a perennial food source for many bird, mammal and insect species through its foliage, flowers, and fruits. Another important biodiversity benefit of having healthy mistletoe populations on agricultural lands and within our woodlands and forests, is that it encourages a diversity of invertebrates that inhabit the humus-like leaf-litter beneath the mistletoe clumps, providing food for a declining guild of birds, ground-foraging insectivores. Through its unique structure it also provides a great nesting site for birds with over 200 Australian bird species having been recorded nesting in mistletoe clumps. One of the most endangered of these is the Regent Honeyeater. During the breeding season Regents will both feed on mistletoe blossom and build nests in the clumps. In recent years where Eucalypt blossoming has been poor, mistletoe has played a key role in the few successful nesting attempts by Regent Honeyeaters.

However, mistletoe does not fare very well in drought conditions and it is killed when burnt in bushfires. In the past few years we have seen dramatic declines and dying-off of mistletoes in many Regent Honeyeater breeding areas. Natural processes for mistletoe to return to these habitats (through birds such as the Mistletoebird and Painted Honeyeater and other generalist dispersers) would take a long time to occur. Hence BirdLife Australia have been developing some novel partnerships between First Nations groups, Local Land Services regions, and arborists to restore mistletoe ravaged by wildfire and drought in key Regent Honeyeater breeding and foraging habitat.

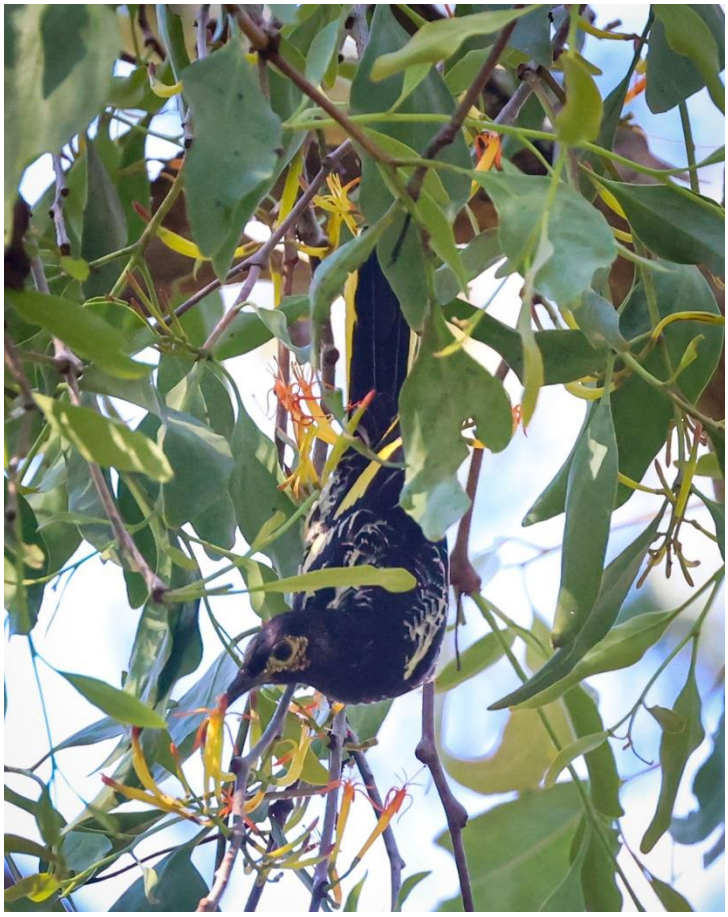

Photo 1. A Regent Honeyeater feeds in flowering Long-flowered Mistletoe on Wonnarua Country (Lower Hunter Valley, NSW) (Photo: Mick Roderick, courtesy of Mindaribba LALC)

Partnership with North West Local Land Services

Most recently BirdLife Australia partnered with North West Local Land Services to plant Needle-leaf Mistletoe (*Amyema cambagei*) into River Oaks (*Casuarina cunninghamiana*) at a selected site along Dry Oaky Creek, near Barraba, using contracted arborists. The Regent Honeyeater historically occupied the Barraba-Bundarra area as one of its stronghold regions, however, the species is now rarely recorded there (with the most recent and sadly unsuccessful nesting attempt in the area recorded by Stephen Debus in 2021). Needle-leaf Mistletoe is a known and highly favoured nectar resource of the Regent Honeyeater and is particularly important in times of drought when other nectar resources may be limited. In February 2023, the project team planted 187 seeds into a 7 ha patch of casuarinas along Dry Oaky Creek. This is one of the first known Needle-leaf Mistletoe trial plantings undertaken and the data obtained will help address knowledge gaps in species-specific propagation techniques and inform future plantings. Any individual mistletoes that successfully germinate and go on to produce fruit and blossom will help facilitate the dispersal of the species along the creek, improving local foraging opportunities for nationally threatened species such as the Regent and Painted Honeyeater, and other declining woodland birds. The seeds will be inspected at about 12 months post planting to determine germination success and assess plant growth.

Photo 2. BirdLife staff Sara Petrovic, arborist Josh Allen, and North West LLS representatives Craig Pullman and Wally Hammond at Dry Oaky Creek, Barraba on the day of mistletoe inoculation (photo courtesy of NW LLS).

Photo 3: Needle-leaf Mistletoe fruit collected from Ironbark Creek, Ironbark

Photo 4. Host casuarina subject to mistletoe inoculation at Dry Oaky Creek (DOC3 = tree ID, NW = north-west orientation). Each orange spot indicates the approximate location of five planted fruits. The 'mapping' of planting locations will assist arborists in future monitoring events (photo courtesy of NW LLS).

Partnership with Central Tablelands Local Land Services

In a similar partnership with Central Tablelands LLS, BirdLife Australia and contracted arborists have recently planted a small quantity of Needle-leaf Mistletoe on a private property along the Capertee River – an area once considered "the nursery ground for the Regent Honeyeater" – drought has seen a massive die-off of Needle-leaf Mistletoe in the Capertee Valley. Again, BirdLife Australia are being proactive, partnering to restore the mistletoe population ourselves by literally doing habitat restoration in the canopy, not in the ground. This planting work compliments the long-running and vital Capertee Valley Regent Honeyeater Recovery Project which has involved volunteers planting over **146,000 trees and shrubs** on **285 hectares** of land on **53 properties**.

Partnership with Mindaribba Local Aboriginal Land Council

These trial plantings have been informed by a longer running partnership project between BirdLife Australia and Mindaribba Local Aboriginal Land Council (LALC) which aims to restore mistletoe on traditional lands ravaged by wildfires in NSW's Lower Hunter Valley. The Long-flowered Mistletoe (*Dendrophthoe vitellina*) on Mindaribba lands that have provided Regent Honeyeater nesting habitat were burnt in the 2016 and 2017 fire seasons, effectively destroying the mistletoe resource. On these lands we sought to expedite the recolonisation process by planting the mistletoe seeds ourselves, with the first plantings taking place in summer 2019/2020. *Our current planting work is being assisted by the NSW Government through its Environmental Trust.*

This novel work which commenced in late 2019 is a world-first in habitat restoration of this type and scale; our project team now having planted over 4,500 mistletoe seeds into Spotted Gum host trees in the Tomalpin Woodlands (near Kurri Kurri) on Wonnarua Country. Previous monitoring of the summer 2021 planting achieved a survival rate of 13%, which is consistent with or slightly higher than other experiments. Initial monitoring provided key learnings relating to seed placement on branches, orientation within the canopy, size of the branch, and consideration of bark shed timing. We incorporated these learnings into our summer 2022 planting (funded by a Landcare Led Bushfire Recovery Grant) which was recently monitored in late June 2023. *Excitingly, the survival rate for this planting was 20% at 16-17 months post planting*. We have now **successfully established ~200 new mistletoe plants** into this precious piece of habitat for the Regent Honeyeater. Another important highpoint of the project was witnessing evidence of one of the original mistletoes our project team planted in December 2019 producing its first crop of fruit in December 2022, proving that mistletoe restoration can provide a mature resource for woodland birds within three years of planting.

So how do you plant mistletoe?

The process for planting mistletoe isn't actually that difficult. We watch the mistletoe clumps as they flower, then start to produce fruit. Once the fruit is ripe it is ready for picking and we collect fruit from easily-accessed clumps. We try not to store the mistletoe for long; in fact, planting is best done on the same day as we pick them (if need be, they can be stored for a few days to a couple of weeks in the fridge but the seeds need to be picked with their stems attached to avoid seeds becoming overripe and mouldy). We could plant the seeds low down as we walk around the forest, but that wouldn't help our Regent Honeyeaters as they prefer mistletoe clumps that are high in the trees. So to get the seeds up into the canopy we employ professional

arborists to hoist the seeds up high to places where the birds will use them. The seed is simply pushed out of the fruit-casing and then wiped onto branches, preferentially smaller lateral branches and on the underside so that moisture from dew gathers and to keep it away from the prying eyes of mammals that love to munch on mistletoe leaves, like Brushtail Possums. Then we wait and see how many mistletoe seeds sprout and grow!

Photo 5. Ripe and ripening Long-flowered Mistletoe fruit (photo courtesy of Mindaribba LALC)

Photo 6. A germinated Long-flowered Mistletoe high in the canopy of its Spotted Gum host (photo courtesy of Mindaribba LALC)

We are extremely grateful to Mindaribba LALC for welcoming us onto their traditional lands on Wonnarua Country to work together on this exciting project and we pay our respects to their Elders, past, present, and emerging. BirdLife Australia recognise and are grateful for the immense contribution of Indigenous people to the knowledge and conservation of Australia's birds.

It is still early days in this exciting work, and we are trialling different methods of fruit-collection and seed-planting to better inform how we do this most effectively into the future.

We would also like to thank Central Tablelands LLS and North West LLS for partnering with us on trial Needle-leaf Mistletoe plantings and look forward to working with them into the future. *This important work has received funding from the Australian Government's National Landcare Program.*

Kristy Peters, Mick Roderick, and Sara Petrovic – Woodland Birds Team, BirdLife Australia

Further Resources

Mistletoe Breaking the myths (nsw.gov.au)

The road to saving Australia's regent honeyeaters - Australian Geographic

Myths about Mistletoe - Website - Local Land Services (nsw.gov.au)

Woodland Birds School Program Feature - Mistletoe: Marvellous yet often misunderstood! - Hunter Region Landcare Network (hunterlandcare.org.au)

Mistletoes of Southern Australia, David Watson, 9781486310937 (csiro.au)

The Mistletoes of Subtropical Queensland, New South Wales and Victoria - Nokomis

(62) Mistletoebirds Spreading the Seeds of Love - YouTube