ECTOMYCORRHIZAL FUNGI ON TREE ROOTS © SUSAN NUSKE / JCU / WWF-AUS

WWF UPDATE 2018

NORTHERN BETTONG PROJECT

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NORTHERN BETTONG EATING A TRUFFLE © STEPHANIE TODD / JCU / WWF-AUS

A keystone species

There are so many reasons why we are working to save the northern bettong: this endemic marsupial is a Far North Queenslander and found nowhere else; they are culturally important to local Traditional Owners, featuring in dreaming stories; and they are adorable and unique truffle lovers with a prehensile tail which they use to carry around nesting material. But now we have another reason to protect them. Research is showing that they are a keystone species, meaning they are an essential part of maintaining the health of the overall ecosystem. Unfortunately, research is also showing us there's not many left.

Northern bettongs perform a unique and potentially irreplaceable role as a disperser of truffles and other ectomycorrhizal fungi. *Ectomycorrhizal fungi*: fungi that grow on the roots of trees, a relationship that benefits both the fungus and the tree. *Truffles*: below-ground fruiting bodies of many ectomycorrhizal fungal species. In wet open forests, particularly where the soil is poor, a huge diversity of ectomycorrhizal fungi grows on the roots of common woodland trees, including *Eucalyptus*, *Allocasuarina*, and *Melaleuca*. The fungi enable the trees to gain access to more nutrients, increase the tree's drought resistance and help prevent attacks from herbivores. This makes these fungal communities essential to tree health and nutrient cycling.

Because they grow completely underground, truffles rely on mycophagous (fungus-eating) mammals for dispersal. These animals can sniff out the truffles, dig them up and eat them, then spread the spores through the forest in their scats. Truffles are the main component of the northern bettong's diet (up to 70%), so bettongs have long been thought to be an important fungi disperser. However, we're a bit blown away by just how important the bettong's role turns out to be!

Scat Analysis: by the Numbers

> 291 scat samples analysed for fungi spores

> 77 species of truffle consumed by northern bettongs only

Researchers collected scats from northern bettongs and nine other mammal species in the area. They compared the number and types of fungi spores found in the scats to determine what the animals were eating Northern bettongs overwhelmingly consumed a larger diversity and number of unique species of fungi compared to all other mammals combined. For example, northern bettongs ate 135 different species of truffle, while all other mammals combined only ate 73. In addition, 77 species of truffle were only consumed by northern bettongs and no other mammals.

This implies that losing northern bettongs from the ecosystem may have dramatic consequences for fungal diversity, potentially affecting tree health and nutrient cycles in these habitats. By carrying out a unique fungal dispersal role, bettongs are essential to the life cycle of many truffle species, as well as maintaining tree-fungal relationships and ecosystem function.

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Looking forward

The endangered northern bettong has already disappeared from several areas within its range. These ecosystems could be in danger of declining truffle diversity, compromising the fungal communities essential for tree health. It's thought that at least some species of fungi can survive for decades, likely meaning we are yet to see the ultimate impacts in areas where bettongs have recently disappeared.

We are working with other conservation organisations, researchers and government agencies to consider what steps need to be taken to conserve this keystone species and to ensure protection of their entire ecosystem. Maintaining and expanding the two remaining northern bettong populations is a priority, but we're also starting to plan for a captive breeding population of northern bettong, with hopes of translocation into suitable habitat in the future. These populations would not only help to ensure the survival of the northern bettong, but also of the diverse fungal communities that rely on them for dispersal, and potentially even the whole ecosystem.

You can find the published research here.

Signing off until next time - Caitlin

COURTESY OF CAITLIN WEATHERSTONE

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If you would like to volunteer with us, please send me an email at weatherstone.caitlin@gmail.com

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+100

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WWF has 6,628 staff worldwide

+5.4M

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1961

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