



2017 RESEARCH FINDINGS

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Photo: Jesse Steele

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Quenda; nature's gardeners

Like many of Australia's digging mammals, the southern-brown bandicoot (known locally in the south-west of WA as the quenda) is considered an ecosystem engineer — their digging activities alter their physical surroundings, changing resource availability for other plants and animals. The 'ecosystem services' provided by quenda are likely to be crucial to maintaining a healthy ecosystem.

Quenda dig distinctive conical shaped holes in the soil during their search for underground food, including invertebrates, hypogeous fungi, and plant tubers. A single quenda can dig around 45 holes per day, resulting in the upheaval of almost 11kg of soil per day; nearly four tonnes of soil per year¹. Their digging (termed biopedturbation) is important for maintaining a healthy ecosystem, improving soil quality via increased water infiltration, and increased capture and breakdown of organic matter² (see Figure 1). These actions translate into improved germination, growth, and survival of seedlings of many plant species³.

How do digging mammals help maintain urban bushland?

If water can't soak into the soil when it rains, this spells big problems for many plants. In our own gardens, we can add something like WettaSoil to help the water infiltrate the soil to get to plant roots where it is needed. We can't go around applying

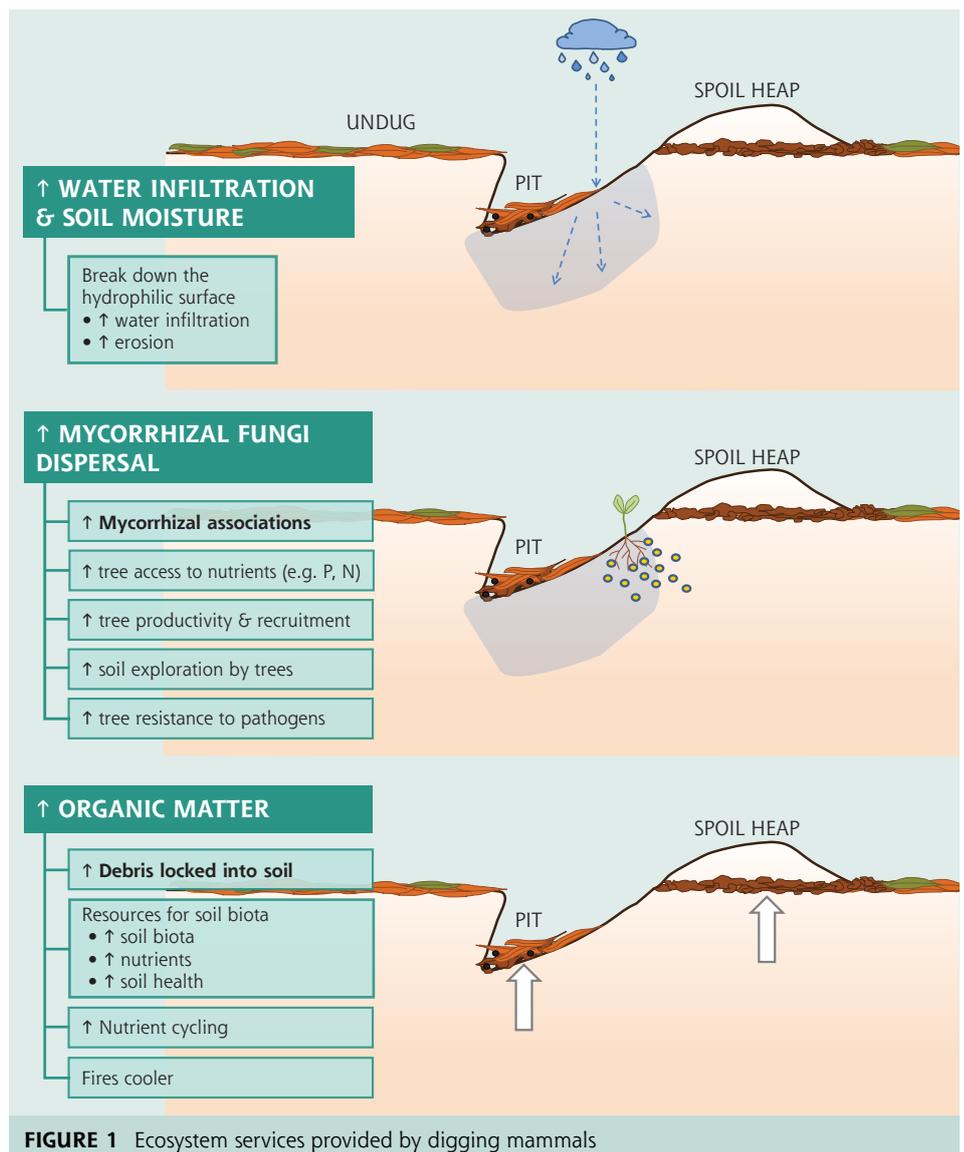


FIGURE 1 Ecosystem services provided by digging mammals

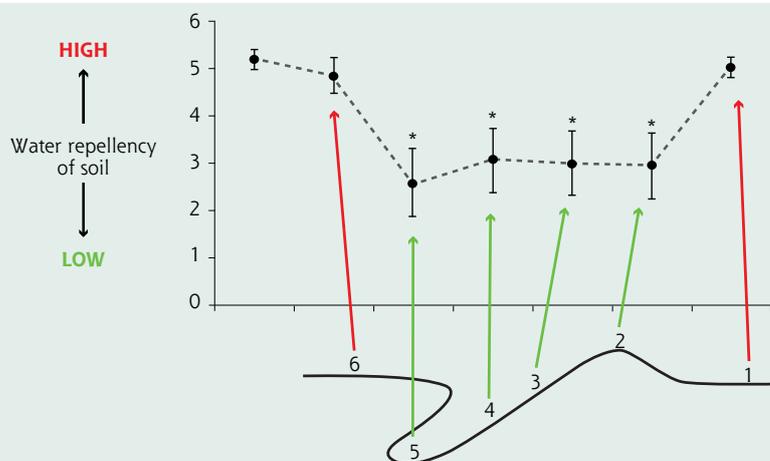


FIGURE 2 Side profile of a typical quenda dig, showing location of microsites (1–6) at which soil water repellency was measured. Soil water repellency was lower in the disturbed soil of the spoil heap (2), and the microsites within each dig (3, 4, 5) compared to the undisturbed soil in front of (6) and behind (1) the quenda digs.

* Indicates the dug soil has lower water repellency than undug soil³.

WettaSoil to all the remnant bushland around us, but luckily if quenda are there, we don't have to. Their diggings help to breakdown soil hydrophobicity and allow water to infiltrate the disturbed soil³ (see Figure 2).

In our own gardens, we apply fertiliser to give plants a boost of nutrients to help them grow. In nature, quenda provide this gardening service by increasing the nutrients available to plants in a couple of different ways:

- Quenda eat the underground fruiting bodies of mycorrhizal fungi, and pass viable fungi spores in their scats. These fungi are crucial to the health of trees such as tuart and jarrah, because they form symbiotic associations with the tree roots, increasing access to nutrients and water. By dispersing fungi spores in their scats, quenda help to ensure that new seedlings are exposed to these important symbionts.

- Quenda digs also encourage the capture and break down of organic matter, returning nutrients to the soil where they can be used by plants. Organic matter in the form of leaf litter tends to accumulate more in areas containing quenda digs compared to flat, un-dug ground. In addition to the capture of this organic matter, the quenda digs also provide an environment conducive to break down of leaf litter; plots containing quenda digs contain less coarse litter and more fine litter, indicating that decomposition occurs more quickly in the areas that have been dug-up by quenda.
- Increased breakdown of leaf litter helps to return nutrients to the soil, but also has the added benefit of reducing the fuel load available to burn during a bushfire. This is demonstrated by comparing leaf litter load inside and outside predator-proof fenced

enclosures into which digging mammals had been reintroduced⁴. There is less leaf litter inside these enclosures, which mathematical modelling predicts would result in much lower flame heights and a slower rate of fire spread compared with outside the fence.

For now, quenda persist in some urban areas, and are regular visitors to many backyards and gardens.

Urban bushland will suffer if quenda, our little gardeners, start to disappear. With the continued pressure of urbanisation and development, it will be important to learn how to coexist with critters like the quenda, to ensure we do not lose the valuable ecosystem services they provide. ■



More information

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References

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4. Hayward, MW, G Ward-Fear, F L'Hotellier, K Herman, AP Kabat, JP Gibbons. 2016. Could biodiversity loss have increased Australia's bushfire threat? *An. Cons.* **19**(6):490–497.



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