



RESEARCH FINDINGS 2011

Is tree health a determinant of reptile species richness and abundance in wandoo woodlands?

Pogona minor (bearded dragon) in *Dryandra* woodland.

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Large portions of the world's forests and woodlands are currently affected by declining tree health, however the effects of these tree declines on fauna communities is largely unknown.

Since 2002, the small patches of *Eucalyptus wandoo* woodlands remaining in the Western Australian wheatbelt have demonstrated a decline in health (see Figure 1). Declines in tree health potentially alter habitat for reptiles either directly, through the loss of foraging resources and shelter provided by the canopy itself, or indirectly, through the changes in leaf litter, coarse woody debris and environmental characteristics (e.g. temperature, solar infiltration). Our study examined whether the decline in wandoo health and associated changes to habitat characteristics influenced the local reptile community.



Figure 1 Examples of declining (a) and healthy (b) *Eucalyptus wandoo* trees. Symptoms of decline include flagging (or chlorosis of leaves), death of large proportions of the tree canopy which results in more dead branches evident (a). A healthy *E. wandoo* tree (b) has few or no dead branches with at least 75% of its canopy intact.

Method & Results

Reptile communities were surveyed using pitfall and funnel trapping at 12 'healthy' and 12 'declining' sites within Dryandra State Forest and Wandoo National Park. Reptile abundance or species richness were not significantly different between 'healthy' and 'declining' wandoo woodland sites (see Figure 2).

However, when fire history is included in the analyses, the abundance of reptiles (see Figure 3) and species richness in declining sites was positively correlated with time since fire. In contrast, reptile species richness and abundance in healthy sites displayed no relationship with fire history.

Leaf litter was correlated to reptile abundance in wandoo woodlands (see Figure 4). Reptile abundance was highest for sites with more leaf litter available.

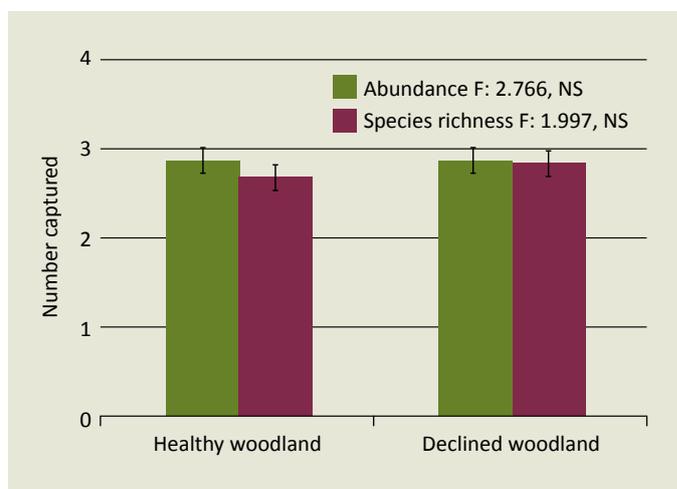


Figure 2 There was no difference in reptile abundance (a) or species richness (b) in 'healthy' or 'declining' *Eucalyptus wandoo* woodlands. Values are the average ($\pm 1SD$) for 12 healthy and 12 declining sites.



Two reptile species with two different stories to tell. *Ctenotus schomburgkii* (a) were more common in healthy *Eucalyptus wandoo* sites. By contrast, *Morethia obscura* (b) were more common in declining *Eucalyptus wandoo* sites and sites with higher wandoo tree densities. We know very little about the ecology of either of these small lizard species to be able to understand their habitat preferences.

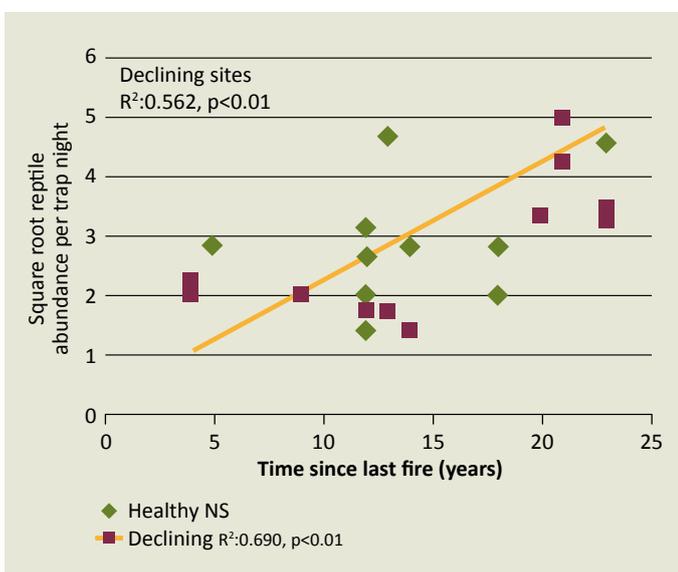


Figure 3 Reptile abundance in declining *Eucalyptus wandoo* woodlands (but not healthy sites) is affected by time since fire. Data are values for each of the 12 healthy and 12 declining sites.

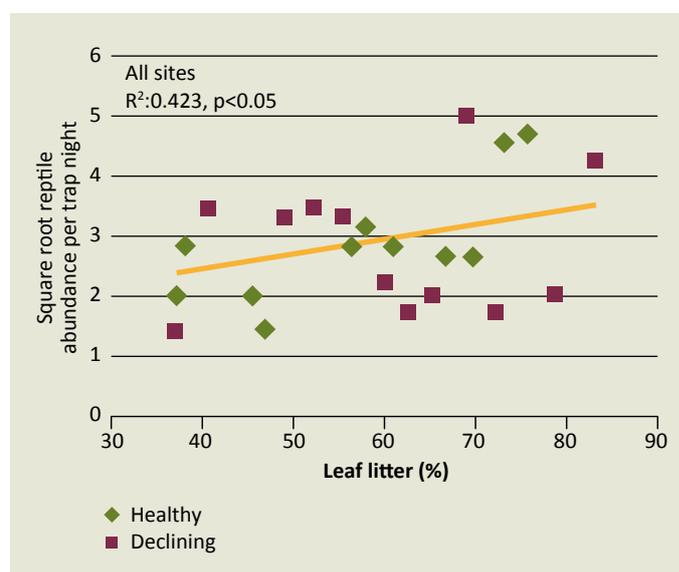


Figure 4 Reptile abundance is correlated with leaf litter cover over 24 *Eucalyptus wandoo* woodland sites. Line is fitted to all data.

Conclusions & Recommendations

Wandoo tree health, alone, does not influence reptile abundance and species richness. However the reptile community is apparently responding to a complex interplay between tree health and fire history: there is a relationship between time since last fire and the abundance and species richness of reptiles evident for declining wandoo sites (but not for healthy sites). Leaf litter is likely to be the driving mechanism behind the reptile-fire relationship, with reptile abundance and species richness positively correlated with leaf litter cover. These results suggest that where wandoo tree health is poor, reptiles respond positively to longer inter-fire times. Fire management should therefore take tree health into account in designing burning regimes.

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