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Impact of tuart canopy decline on brushtail possums

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Since the early 1990s, there has been a noticeable decline of the health of tuart (*Eucalyptus gomphocephala*) in Yalgorup National Park in Western Australia. The exact reason for the decline is unknown although there have been multiple theories put forward such as land clearing for agricultural and urban development, decreased rainfall and pathogens such as native cankers and *Phytophthora* spp. Although some of the tuart trees are recovering from the decline, the change to vegetation structure in the tuart forest has been extreme.

Tuart forests are home to a large number of fauna, including brushtail possums, and the change in their health may affect resource availability for these tree-living native mammals. The death of such huge expanses of trees may further affect the availability of shelter and food resources for fauna.

On the Swan Coastal Plain, brushtail possums (*Trichosurus vulpecula*) often shelter in tuart tree hollows and feed upon tuart leaves. We therefore examined whether tuart tree health and vegetation characteristics affected the presence and abundance of brushtail possums in Yalgorup National Park.

Methods & Results

Sites were selected based on the canopy condition and canopy growth trend witnessed over the past 15 years, using Landsat multispectral imagery data. Six sites were located in areas with healthy tuart trees, and six sites were located in areas where the health of tuart trees has declined over this time. At each site, 15 traps were located in three parallel transects, with traps placed 30m apart. Traps were baited with universal bait and opened for six nights in May 2011. All possums captured were uniquely identified using microchips.

We measured tuart tree health (21 trees per site) and a number of habitat characteristics immediately around each trap site.



Healthy tuart site with very little canopy loss or epicormic regrowth.



Unhealthy tuart site showing high amounts of canopy loss, with most foliage being epicormic regrowth.

Declining tuart sites had a higher tuart tree density but smaller tuart trees, as well as a greater amount of crown loss and epicormic regrowth than healthy sites (see Figure 1).

Contrary to our expectations, possums were generally captured in higher numbers in declining tuart sites, with captures positively correlated with higher amounts of canopy crown loss, epicormic regrowth and density of tuart trees (see Figure 2). The one declining site where possums were not captured had low amounts of epicormic regrowth and low tuart tree density.

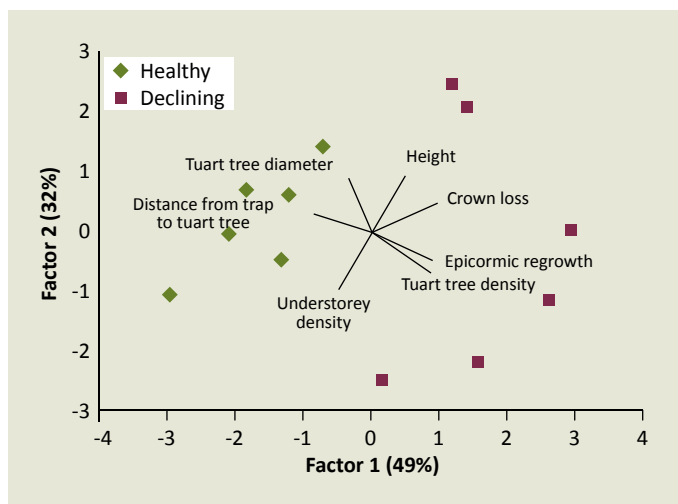


Figure 1 Principal Component Analysis (PCA) on the tuart health characteristics (lines and text) and vegetation variables at 12 sites (each dot representing a site) located in Yalgorup National Park. Eigenvectors (lines) for tuart health characteristics and vegetation variables are overlaid, and indicate how each habitat variables is associated with the sites.

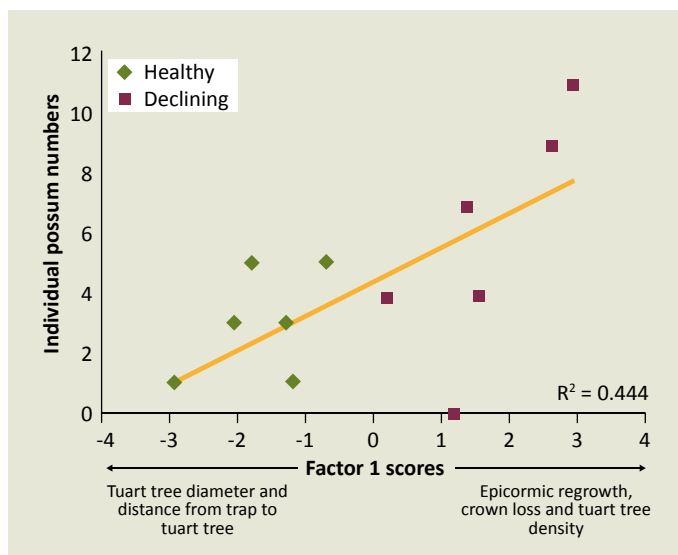


Figure 2 Association between the abundance of possums captured and the habitat characteristics of each site (PCA Factor 1 scores).



The brushtail possum is a tree-living (arboreal) marsupial. This native species primarily feeds on tree foliage.

Conclusions & Recommendations

Although possums were found in higher numbers at sites with a high amount of canopy crown loss, these sites had higher density of tuart trees and contained high amounts of epicormic regrowth in the tuart canopies. The higher density of tuart trees may provide more resources for possums, especially at sites where epicormic regrowth is high.

The epicormic resprouts of recovering tuart trees may be preferentially selected by brushtail possums. Eucalypt foliage varies widely in its chemical composition. A previous study has shown that the amount of plant secondary metabolites in eucalypts influences the distribution and abundance of possums (Scrivener *et al.* 2004).

Tree-living native mammals, such as the brushtail possum, are influenced by tree health and vegetation characteristics. Understanding relationships between habitat health and fauna presence will be vital for understanding how management can be directed towards biodiversity conservation.

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Reference

1. Scrivener, N.J., Johnson, C.N., Wallis, I.R., Takasaki, M., Foley, W.J. and Krockenberger, A.K. (2004) Which trees do wild common brushtail possums (*Trichosurus vulpecula*) prefer? Problems and solutions in scaling laboratory findings to diet selection in the field. *Evolutionary Ecology Research* 6: 77-87.



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