Utilisation of *Phytophthora cinnamomi* affected habitats by honey possums (*Tarsipes rostratus*) in the Cape Riche area, Western Australia.

This thesis is presented for the degree of Bachelor of Science Conservation and Wildlife Biology Honours Murdoch University, 2008.

Submitted by
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Declaration

I declare that this thesis is my own account of my research and contains as its main content work which has not been previously submitted for a degree at any tertiary educational institution.

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ABSTRACT

This study investigated how the presence of the plant pathogen *Phytophthora cinnamomi* in vegetation assemblages impacts on habitat utilisation by the honey possum (*Tarsipes rostratus*). The study took place in coastal heathlands at Cape Riche, Western Australia, between January 2007 and November 2007. Honey possums were radio tracked through an area affected with *P. cinnamomi* as well as healthy areas to determine the extent to which habitat utilisation is impacted on. This will then allow for a more robust prediction of how further spread of *P. cinnamomi* is likely to impact on honey possums in the future. The presence of *P. cinnamomi* was confirmed by plating samples of dying plants. The areas of *P. cinnamomi* at the study site are extensive but patchy with ‘islands’ of healthy vegetation assemblages still remaining. A comparison of microclimate at the study site showed that unaffected areas had a larger range of temperatures than affected areas which may be due to differences in wind which is restricted (having a buffering effect) due to dense vegetation in unaffected sites. In affected areas, a greater proportion of the time was recorded where temperature was below 5°C compared with unaffected areas. This could potentially impact on honey possums, which go into torpor during cool weather, and at temperatures below 5°C, have a higher metabolic rate to maintain their body temperature. This means they need to forage for more nectar and pollen during cooler weather in affected areas where foodplants are less abundant. The number of honey possums captured was correlated to season ($\chi^2=13.1, p<0.0005$) with the largest number of honey possums captured during the summer field trip when more plants were flowering.

Honey possum preferred foodplants were identified from pollen collected from captured honey possums. A total of 20 different pollen species were identified from samples, nine of which were identified as important honey possum preferred foodplants as they were found in more significant amounts. Based on pollen, *Banksia plumosa* subsp. *plumosa* was identified as the preferred foodplant at the Cape Riche study site followed by *Adenanthes cuneatus*. Both are common throughout the study area and flower all year.
*Banksia plumosa* subsp. *plumosa* is susceptible to *P. cinnamomi* and was only found in unaffected areas whereas *Adenanthos cuneatus* was found to less susceptible and was prevalent throughout *P. cinnamomi* affected areas. Honey possums fed on a diverse range of plant species (determined by pollen) during all seasons, except autumn when *B. plumosa* subsp. *plumosa* was the most prevalent pollen species collected from honey possums.

A total of 18 honey possums (body mass 5.9 – 16g) were radio tracked for up to 9 days using radio transmitters weighing 0.36g and 0.9g (Holohil Systems Ltd, Canada). Radio tracked honey possums demonstrated a particular preference for *Banksia plumosa* subsp. *plumosa* which they utilised for food, shelter and as a daytime refuge. Comparison of vegetation structure indicated that sites selected by radio tracked honey possums had significantly denser vegetation between 40-140 cm in height compared with randomly selected sites. Significant differences were identified between *Phytophthora cinnamomi* affected and unaffected locations with vegetation at affected locations being sparser and shorter than that at unaffected sites.

This study clearly showed that honey possums are influenced by the presence of *P. cinnamomi* affected vegetation at Cape Riche. The presence of *P. cinnamomi* at the study area results in large areas which are generally lacking in susceptible Proteaceous species such as *Banksia* and food resources tend to be sparse through these areas. Honey possums are capable of moving relatively large distances with estimated distances ranging from 4m to 1400m over a period of 30 minutes to 9 days. In areas affected with *P. cinnamomi* some honey possums fed on less susceptible plant species. Other honey possums moved long distances to healthy unaffected areas with higher densities of preferred foodplants. Further spread of *P. cinnamomi* is likely to have a serious impact on honey possums as healthy areas become affected and food resources become too limited to sustain honey possum populations.
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This study was approved by the Murdoch University ethics committee (W2007/06). Relevant licences to take flora and fauna were obtained from the Department of Conservation and Land Management Licence to take fauna for scientific purposes (License SF5574 & SF006014) and Department of Conservation and Land Management Flora Licence for scientific or other prescribed purposes (Licence SW011486 & CE001689)

Field work was approved by Murdoch University ref 07/30
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