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THE IMPACT OF FIRE ON THE ENDEMIC HONEY POSSUM

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AFTER completing my Honours degree at Victoria I decided that it was time for a change of scenery, a new adventure! So when I was given the opportunity to study the honey possum *Tarsipes rostratus* in the Fitzgerald River National Park on the south coast of Western Australia, it was just too good an offer to pass up. To be honest, I hadn't heard of the honey possum before but the more I found out about this unique and remarkable small mammal the more excited I got about the work that was ahead of me. Anyway, to cut a long story short, I commenced my PhD at Murdoch University under the supervision of Associate Professor Ron Wooller.

Photo: S. Hopper

My first fieldtrip to the Fitzgerald was in March 2000; the vast relatively undisturbed heathlands were like nothing I had ever seen before. It was amazing, at first glance you don't really see anything but the closer you look the more flowers and colour you can see, quite often hidden in amongst the dense foliage of the plants. It was the same with the fauna; you don't tend to see many animals (apart from the kangaroos at dusk of course!), yet you know that there are honey possums and other small mammals all around. I couldn't wait to see my first honey possum and the next morning I did just that. I felt a real sense of honour to be able to work on honey possums, as they are an elusive species that not many people get to catch a glimpse of, let alone work with!

The honey possum is a tiny (7 – 12 g) flower-feeding marsupial found only in the southwestern corner of Western Australia. It has a real sweet tooth feeding solely upon nectar and pollen, the only non-flying mammal in the world to do so! My PhD research actually focussed on the impact of fire on the honey possum. Clearly, given their specialised diet and their need for cover from predators and unfavourable weather, fire has impacts on the availability of these important resources.

So what did I find out? Well, after analysing the three years of data I collected, along with the additional long-term data that was available to me (some 15 years worth!), I was able to determine that capture rates of honey possums were significantly related to the number of years since the vegetation was last burnt. Capture rates declined markedly after fire and remained low for the next four to five years. Their numbers then increased slowly, but steadily, over the next 20 to 25 years. Maximal abundance was recorded about 30 years after fire. Although there appeared to be a slight decline in capture rates thereafter, honey possums were still being captured in vegetation unburnt for more than 50 years.

As one might expect, the pattern of increase in honey possum capture rates following fire paralleled the pattern of availability of cover in the vertical and, to a lesser extent, horizontal plane. Presumably the denser the vegetation cover, the greater protection from aerial and terrestrial predators, and from unfavourable weather.

The foodplants in the Fitzgerald most frequently visited by the honey possum were Banksia nutans in summer and B. baueri in winter. Both plants have

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flowers that are rich in nectar and pollen, vital to the honey possum's survival. These foodplants are slow growing and take many years to start flowering following fire, so it was no surprise that the trend in capture rates was similar to the maturation of these foodplants. Most of their favoured foodplants were from the Banksia and Dryandra genera. Other foodplants which they visited frequently, and which start flowering more quickly after fire, are some of the Eucalyptus and Calothamnus species; flower products from these foodplants were also eaten by honey possums in long unburnt areas.

Whilst honey possums appear to have a preference to remain sedentary within areas that meet their food and shelter requirements, they probably have the capacity to engage in longer distance movements when necessary (e.g. when faced with a lack of food). As such, bush corridors connecting areas of vegetation known to accommodate honey possums are likely to be a valuable resource. However, given the honey possums' need to eat nectar and pollen daily (they have a high metabolic rate), bush corridors would need to contain a number of different local foodplants that are rich in nectar and/or pollen. Some of the best foodplants would probably be the banksias and dryandras that grow in nearby areas of native vegetation. The shelter requirements of the honey possum could be met in bush corridors by the planting of rather dense multi-strata vegetation. Such habitat would provide cover from aerial and terrestrial predators and from unfavourable weather. The size of a bush corridor that would be used by honey possums is really dependent upon the quality of the food and shelter resources it provides.

In summary, the life of the honey possum consists of a continual search for food, cover and mates!

Management implications:

- In terms of honey possum conservation, this long-term study indicates that, if possible, management burns in these heathlands should be separated by intervals of at least 20 years between successive fires. If burns are required more frequently to meet other management priorities, it is highly preferable that these fires are small and patchy. Such practices may help ensure the long-term survival of this unique, highly specialised marsupial, found only in Western Australia.
- Honey possums need their preferred foodplants to survive. They feed on plants that are rich in nectar and/or pollen and this study indicates that they generally feed on flowers that are close to the ground (e.g. *Calothamnus gracilis*, *Dryandra falcata*, *Banksia baueri* and *B. nutans*) but will also feed on some flowers that are several metres off the ground (e.g. *Eucalyptus buprestium*).
- Following a fire, nearby patches of unburnt vegetation can be important refuges, feeding grounds and shelter for the few honey possums that visit recently burnt areas. These unburnt refuges also appear to be the source of honey possum colonists in the years following a fire.

Like many Australian mammals, the range of the honey possum has contracted markedly over the last 200 years and the coastal heathlands of the southwest are its last stronghold. With careful management and conservation these important heathlands might just protect these delightful and truly unique marsupials far into the future.

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