

Mammal Pollinators in Ku-ring-gai

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Date: 18 June 2017

Presented to: The Australian Plants Society - North Shore Group Walks and Talks at 10 am, 19th June, 2017 at Caley’s Pavilion in Ku-ring-gai Wildflower Garden with following walk to nest box

Many people are unaware of the important role mammal-pollinators play in the fertilisation of our native plants. Most of the mammal pollination action is at night (nocturnal) or twilight (crepuscular) and the mammals themselves have comparatively drab colours and make little sound. In contrast to this, bird and insect pollinators, such as bees, are active mainly during the day (diurnal) and, in the case of birds, audible calls are made. To capture the nocturnal action of mammal pollinators we use special cameras that activate to record a video when a heat (Infra-red or IR) source, such as a warm-blooded mammal, is moving in the field of view. These cameras are attached to support, such as a neighbouring plant branch, to target a flowering native plant bloom and left for there for a couple of weeks. The videos of the action of mammals feeding on the nectar and pollen of the bloom are recorded as video files on an SD card which are downloaded to a computer, the mammals shown identified and movies edited from the raw footage obtained.

Some native marsupials are specifically adapted to feed on nectar and pollen and are equipped with a brush-tipped tongue which rapidly darts in and out to collect individual nectar droplets and pollen along the way which is dusted over the mammal’s fur to be transferred to another flower to fertilise it. The structure and nectar/pollen production of some native plants, such as the Brush-flowered *Banksia* spp., *Callistemon* spp., *Telopea* sp., and some *Grevillea* spp. for example, are specifically adapted to attract such feeding and fertilisation by native marsupial specialists. There specialist marsupial nectar-feeding species are the VULNERABLE Eastern Pygmy Possum *Cercartetus nanus* and two species of Feathertail Glider: the Broad-toed *Acrobates frontalis* and the Narrow-toed *Acrobates pygmaeus*. The former adapted to the tangle of branches in shrubs of the mid-storey while the latter are adapted more to the canopy of trees. Some other native marsupials are not so specialised, but a major part of their diet comes from feeding on nectar when available: the Brown Antechinus *Antechinus stuartii* and the Sugar Glider *Petaurus breviceps*. Again the former more adapted to the dense mid-storey, while the latter is more adapted to the tree canopy.

Fruit bats are native placental mammals that feed on nectar and pollen as well as fruit and are major pollinators of certain tree species such as the Turpentine *Syncarpia glomulifera* that is abundant in Ku-ring-gai on moister soils. There are 3 species that occur in Ku-ring-gai: The VULNERABLE Grey-headed Flying-fox *Pteropus poliocephalus*, the Little Red Flying-fox *Pteropus scapulatus* and the Black Flying-fox *Pteropus alecto*. The other native placental mammal that will often feed on the nectar of native Proteaceous shrubs is the Bush Rat *Rattus fuscipes*.

In addition, I have found a number of both native and introduced mammals the will feed on the nectar of mid-storey Proteaceous shrubs: native Brushtail and Ringtail Possums, introduced Black Rat *Rattus rattus*, and on low blooms native Swamp Wallaby *Wallabia bicolor* and introduced Red

Fox *Vulpes vulpes*. These are more opportunistic feeders because their main diet lies elsewhere, though the efficiency of pollination by the Black Rat is currently being assessed.

My major fauna study since December 2013 has been focussed on the Eastern Pygmy Possum with my project titled “Eastern Pygmy Possum Program and Recovery Plan for Ku-ring-gai Municipality”. Some of this work is done under my own Scientific Licence for the NPWS estate involving use of my own wildlife cameras. The sightings from this work are uploaded by me directly to the OEH Bionet wildlife atlas. However, I have done much of the work to date in the Ku-ring-gai LGA under my WildThings NSW pygmy possum project, coordinating the efforts of fellow field volunteers as well as performing my own work, from installation and monitoring of pygmy possum nest boxes to the wildlife camera work mentioned above. This latter work is performed under the WHS system, Scientific Licence, advice and supervision of KMC staff with observations uploaded to the KMC Biobase which has periodic releases in the OEH Bionet wildlife atlas. Involvement as a volunteer is a stepped Citizen Science process starting with recording nest box observations of pygmy possums and others.

The prime nectar and pollen producing food plants for pygmy possums is the Heath-leaved Banksia *Banksia ericifolia* (BE) and most areas where we have found them have BE present. However, I have found pygmy possums also in a small number of areas so far with just Hair-pin Banksia *Banksia spinulosa* (BS) present or with only BS flowering indicating that it too is a staple food plant. Similarly, for all other Banksia spp. flower spikes so far observed – these include Old-man Banksia *Banksia serrata*, Rusty Banksia *Banksia oblongifolia*, and Silver Banksia *Banksia marginata*. Banksias are members of the Proteaceae family. Flower spikes of another member of this family, larger shrubs of the Red Spider Flower *Grevillea speciosa* have also been found to be a food source. Another brush-flowered plant that was found to be a pygmy possum food source is the Common Red Bottlebrush *Melaleuca citrina* (syn. *Callistemon citrinus*). With an assemblage of flowering food plants such as these, with their overlapping flowering periods, it is often possible to detect the presence of pygmy possums year round in an area using just camera trapping. Caution should be exercised in this by making sure that the camera is targeted on a still nectar producing bloom for at least 2 weeks if no pygmy possums detected earlier. Even then with low population densities, I have found this may not be long enough to rule out the presence of pygmy possums and more intensive deployment of multiple cameras on multiple target blooms may be needed.

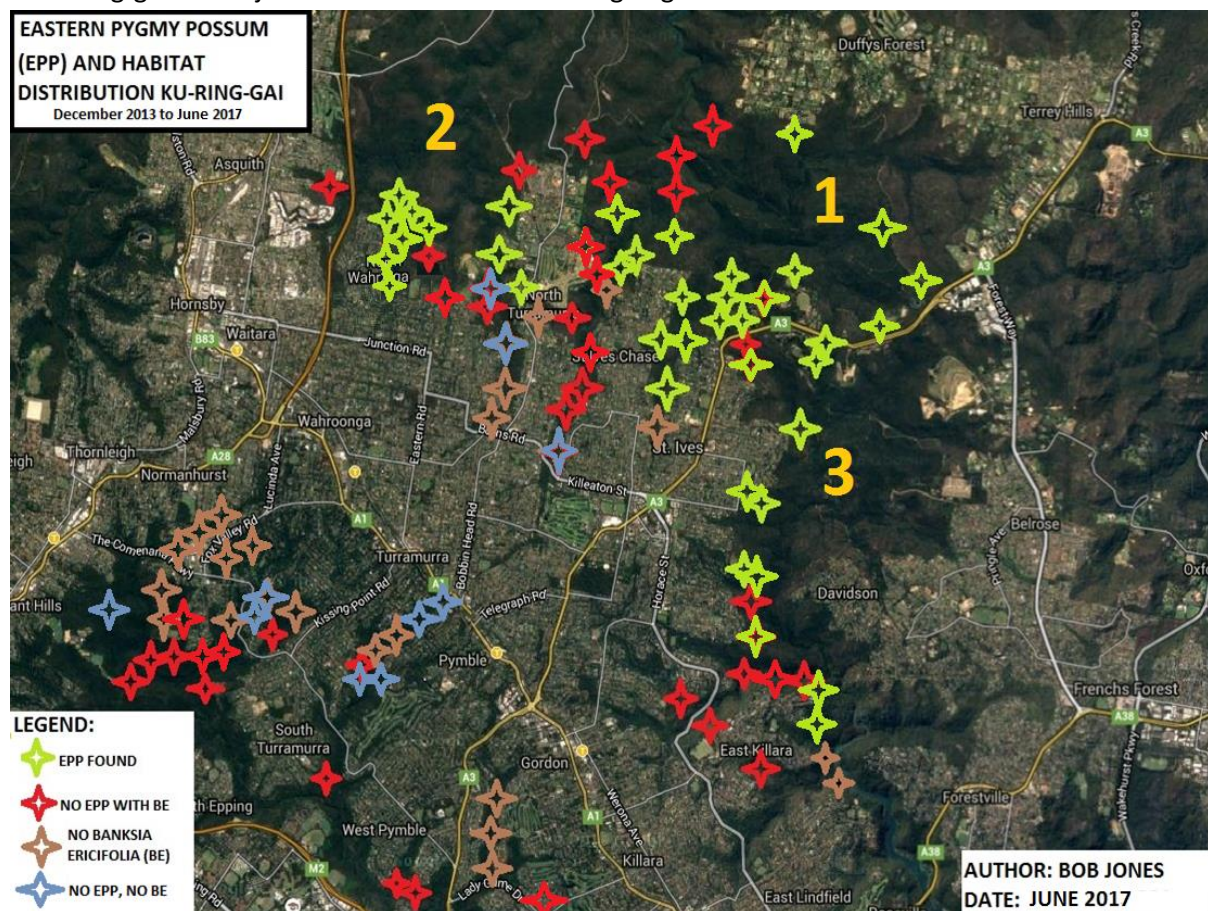
Pygmy possums sleep during the day in tree hollows and under bark piles in the forks of trees and shrubs, even abandoned birds’ nests: Paperbark Tea-tree *Leptospermum trinervium* bark, Red Bloodwood *Corymbia gummifera* and Scribbly Gum hollows for instance. We enhance the shelter available to pygmy possums by provision of special-purpose nest boxes in select Ku-ring-gai LGA bushland areas. The WildThings NSW Eastern Pygmy Possum Project now has a growing band of two dozen field volunteers looking after 26 of these nest boxes the majority of which were built, provided and put in place by WildThings NSW members. The majority of these nest boxes have been used by pygmy possums with 4 nest boxes used by pygmy possum mums to bring up at least 13 youngsters in the protection of the nest boxes.

Taking into account other habitat requirements such as shelter and presence of nesting material and nesting sites, the results in the above 2 paragraphs allow some helpful clues to those who may want to replant, restore or regenerate pygmy possum habitat such a suggested species and nest box use.

At two sites we have found the VULNERABLE native predators of pygmy possums: at one site I found Rosenberg's Goanna *Varanus rosenbergi* and at the other fellow volunteer Simon Van Der Veen found the Powerful Owl *Ninox strenua*. At some pygmy possum sites we have found the VULNERABLE *Darwinia biflora* and *Tetratheca glandulosa* and I have helped KMC Natural Areas staff Jacob Sife map a major occurrence of the former. We avoid disturbing such sites in any way apart from this and volunteer Kathy Bradfield has alerted KMC authorities to threats to such areas.

Feral predators are a major threat to the survival of pygmy possum and I have mapped 2 Red Fox "holes" in the distribution of pygmy possums showing that they cause major mortality and decline in numbers. These fox sightings are uploaded to Fox Scan <https://feralscan.org.au/foxscan/>. Both feral and domestic cats pose a similar problem and with areas surrounded by urban encroachments often devoid of pygmy possum such as the upper reaches of Cowan and Lovers Jump Creek valleys, though other factors such as unsuitable fire regimes such as suppression, too frequent or too cool burns come into play due partly to our demands for protection from wild fire but also past lack of appropriate management practices. Other threats are the break up in the continuity of habitat areas by human activities such as roads, fire and BMX trails, power line easements, fire breaks and more...

The map below shows an updated summary of my research into the distribution of pygmy possums in Ku-ring-gai and adjacent areas. This search is ongoing...



For details of the WildThings NSW Pygmy Possum Project see the following web page and its links:
<http://www.wildthings.org.au/index.php/programs-2/trap/pygmy-possum-project/>