

Embracing the Wombat's Parasites

Words and images by Alison Pouliot

Mention the word *parasite* and some people instantly begin to scratch. It is not a word that always sits comfortably, conjuring odious images of ticks or leeches or freeloading *Homo sapiens*. On the contrary, organisms that are deemed *indicators* (e.g. frogs) or *pollinators* (e.g. bees) are usually held in higher regard because their significance to humans is more readily apparent.



The reproductive sporophores of the vegetable caterpillar, *Ophiocordyceps robertsii*. Photography © Alison Pouliot.

Unlike the partners in mutually beneficial symbioses, parasites do not believe in reciprocity. However, even though they do not directly avail their hosts, parasites inadvertently help others and are vital to forest function. Through their effect on processes such as competition and predation, parasites play a critical role in the maintenance of biodiversity, directly influencing energy flows and nutrient cycling.

The pictured parasitic fungus is one of the vegetable caterpillars called *Ophiocordyceps robertsii*. It could easily be mistaken for a twig and passed by. Originally named

Cordyceps robertsii, it was the first of the *Cordyceps* recorded in Australasia and is thought to be one of the largest in the world. This species usually parasitises moth larvae from the family Hepialidae, such as the Victorian swift moth, *Oxycaenus diremptus*. These poor old moth larvae get a rough ride as they are also parasitised by other *Cordyceps* including *C. gunnii*, *C. hawkesii* and *C. cranstounii*.

The process of parasitisation is believed to begin when the caterpillar inadvertently consumes fungal spores that are caught up in leaf litter. The caterpillar's innards provide ideal habitat for the spores. As the caterpillar burrows beneath the soil in preparation for pupation, the spores begin to germinate. The resulting mycelium feeds on the caterpillar and completely fills its body cavity, effectively consuming it from inside out, killing it in the process and transforming it into a mummy. Once satiated, the fungus sends up its reproductive structure (stroma) above the soil surface to release its spores and the cycle begins again. It is perhaps little wonder that *Cordyceps* attract the macabre fascination of zombie aficionados.

Entomopathogenic fungi (those that grow in or on the bodies of insects) are thought to play an important role in regulating insect populations (as well as those of other arthropods such as spiders, mites and ticks). In tropical forests, *Cordyceps* are the most frequently encountered fungi on arthropods and by preventing any one species from gaining the upper hand, help to control population dynamics. Insects are of course vital to forest function but when a particular species rapidly increases in numbers, say following local disturbance such as fire or more global processes such as climate change, they can have catastrophic effects on vegetation, especially monocultures. The default human response of hitting them with chemical insecticides usually increases the insects' resistance, perpetuating the problem. However, the agricultural and forestry industries are investigating the use of entomopathogenic fungi as a form of biological control to suppress target species below what they consider to be *economic thresholds of harmfulness*.

Several hundred species of *Cordyceps* have been described worldwide, occupying diverse habitats from aquatic environments to deserts. In forests they are found in soil, leaf litter, the forest canopy and almost everywhere in between, infecting about 65 percent of all insect orders. Five species have been recorded in the Wombat and surrounds and more are likely to be revealed.

Few organisms in nature elicit less compassion than body cavity-invading fungal parasites that cause the slow demise

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of their hosts. If there is one person who can convincingly do so it is David Attenborough. The segment from his Planet Earth documentary provides an astonishing glimpse into the staggering diversity of *Cordyceps*. Through their aesthetics and ecological significance, Attenborough challenges the viewer to switch attitudes from revulsion to enthralment. In doing so he re-enchants the forest floor from a place of death and decomposition to something alluring and wondrous, something that might even be worth saving, even if only for its wondrousness. The Wombat Forest also abounds with thrilling and fascinating life forms that collectively contribute to a functioning forest, so perhaps keep a look out for suspicious-looking twigs on your next visit.

If you'd like to join a fungus foray or workshop this autumn, several are running from Trentham, Creswick, Blackwood, Woodend, Ballan and beyond. For dates, details and bookings visit www.alisonpouliot.com ■

Left: Once removed from the soil, the mummified caterpillar can be seen with the stroma protruding from its head. Photography © Alison Pouliot.

Greater Gliders

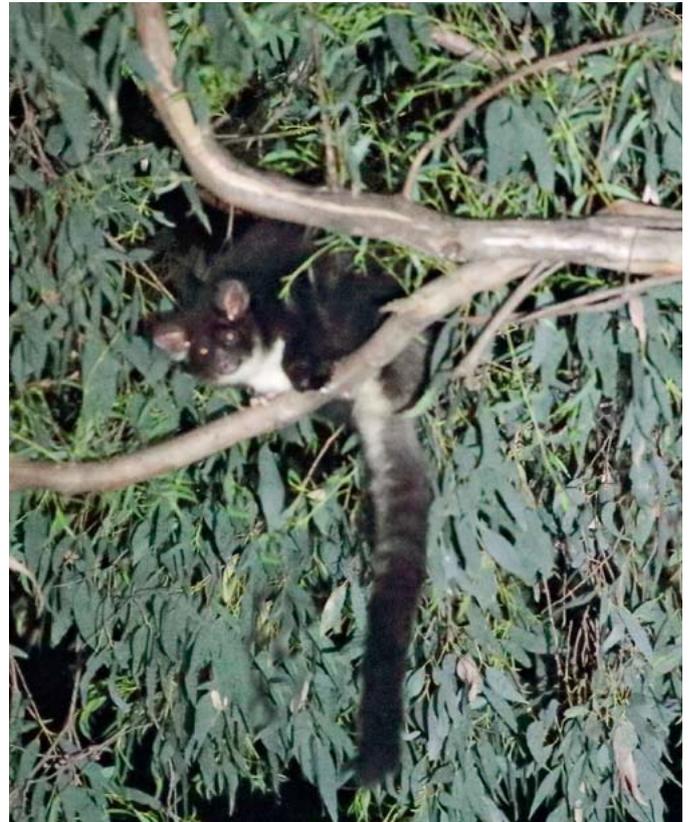
By Gayle Osborne

One of the very special creatures of the Wombat Forest is the Greater Glider. There are no estimates of population size or population trends, but our spotlighting expeditions are showing some reasonable numbers.

We spot lit along one track on 24 February 2017 and located six gliders. We returned to this track on 11 February 2018 and saw eleven gliders in approximately 800 metres.

Our first sighting occurred as we were standing at the car as dark was falling and there was a dull thud as a glider landed on a tree. Not only had a glider landed, but two gliders were emerging from a hollow. Along the track where another glider was emerging from a hollow, a second glider was making its way along branches towards the emerging glider.

Further along the track we saw other gliders on branches as well as gliders in the canopy. Usually we only see gliders emerging from hollows or high in the canopy feeding. It is very rare to see them exposed on a branch and that got us thinking about mating season, which starts in February, with births occurring between April and June.



Greater Glider *Petauroides volans*. Photography © Lynda Wilson.

This does not explain the discrepancy between the two years but we may have been observing gliders seeking mates during our visit this year. ■