

PREDATION BY AVIFAUNA ON EUROPEAN WASP SPECIES IN TASMANIA

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The first colonies of *Vespula germanica* (Plate 1), European wasp, found in Tasmania were located in 1959 at Battery Point (Spradbury & Maywald 1992). It was suspected that the insects had been introduced from New Zealand, where they had been flourishing since the 1940s (Thomas 1960). A second introduced vespid, *Vespula vulgaris*, English wasp, was found in Tasmania in 1995 and was shown to be confined to the southern region where it appears to be better adapted to survival in the wet forest than *V. germanica* (Matthews *et al.* 2000).



Plate 1. Exotic *Vespula germanica* (right) and native *Thynnus zonatus* (left). Image by the authors.

Both species are voracious predators and vicious stingers with the capacity to impact negatively on the natural ecosystem of our State. However, it would appear that eradication is impractical, as *V. germanica* has colonised almost the entire land mass, notwithstanding various attempts at population control. Despite the capacity to inflict a painful sting and displaying nature's yellow and black warning colours, these insects have been accepted as food by some of our native insectivorous and omnivorous bird species.

The following list (Table 1) is comprised of Tasmanian bird species, to date, found preying on *Vespula* species over the summer/autumn period. Birds capture wasps using a variety of techniques, including foliage gleaning, the probing of bark cracks and crevices, aerial interception (hawking) and collection of foraging individuals from food sources exploited by wasps.

We have been collecting data since 1995, consisting of personal observations and the analysis of regurgitated material obtained from beneath favoured perches and nest sites (Plate 2).

Vespid remains are easily identifiable from regurgitated pellets as, though faded and disarticulated, the body parts retain their distinctive shape and aposematic patterning (Plate 3).



Plate 2. Pellet of raven.
Image by the authors.



Plate 3. Close-up of head and abdominal segments of *Vespula* individuals in pellet of raven. Image by the authors.

For each of the species listed, the quantity of wasps in the diet was found to increase in late summer and autumn, perhaps reflecting wasp abundance, as this coincides with the peak in wasp activity. Male wasps do not have a sting, however, they are only available in mid to late autumn and the period of predation is not restricted to this time.

Table 1. Observations of vespid remains from different bird species.

SPECIES	LOCATION	DATA TYPE
<i>Artamus cyanopterus</i> (dusky woodswallow)	Bracknell; Cluan; Bruny Island	pellet analysis foraging observations
<i>Coracina novaehollandiae</i> (black-faced cuckoo-shrike)	Bracknell; Liffey	pellet analysis
<i>Gymnorhina tibicen</i> * (white-backed magpie)	Liffey	pellet analysis foraging observations
<i>Strepera fuliginosa</i> (black currawong)	Liffey; Bruny Island; Collinsvale	pellet analysis foraging observations
<i>Strepera versicolor</i> (clinking currawong)	Liffey; Collinsvale	pellet analysis foraging observations
<i>Corvus tasmanicus</i> (forest raven)	Liffey; Collinsvale	pellet analysis foraging observations
<i>Colluricincla harmonica</i> (grey shrike-thrush)	Liffey; Bruny Island	pellet analysis foraging observations
<i>Falco berigora</i> * (brown falcon)	Liffey	pellet analysis foraging observations
<i>Dacelo novaeguineae</i> (laughing kookaburra)	Liffey; Bracknell; Bruny Island	pellet analysis foraging observations

* Birds were injured and in rehabilitation.

The individuals in rehabilitation, (3 *F. berigora* and 1 *G. tibicen*) were observed to capture and eat wasps that were feeding on portions of meat inside the enclosures in which they were housed.

Of great interest, is the ability exhibited by these species to have, in a relatively short time, on an evolutionary scale; accepted a new and potentially harmful food source whilst completely ignoring the winged males of the native flower wasp *Thynnus zonatus*, which is similar in size, carries the same warning colours arranged in a similar pattern and occurs in large numbers on flowering shrubs in summer (Plate 3).

Artamus cyanopterus (dusky woodswallow) and *C. novaehollandiae* (black-faced cuckoo-shrike) are the only species on the above list that are known, in Tasmania to predate upon *Apis mellifera* (honeybee) and so are capable of dealing with

potentially harmful stinging prey, as are both *Strepera* species (currawongs), which have recently been found to feed on *Myrmecine* ants.

A number of hypotheses exist that may explain this observed behaviour of *Vespula* predation, including the following:

- *Vespula* species are the most abundant and readily available medium to large diurnal flying insect on offer in the late summer / autumn period, so it is possible that hungry birds simply cannot ignore them.
- The native flower wasp, *Thynnus zonatus*, is equipped with a hefty sting, however, there may be other reasons for it being avoided, for example, they may be unpalatable.
- Bird bills may be impervious to the sting of *Vespula* species. However, if this were the case we would expect many more species of generalist foragers to be exploiting the resource but observations show this not to be so.
- *Vespula* species and especially queens engorged with fat, which enables them to survive winter hibernation, are such a rich food source that the recorded species are willing to risk being stung in order to procure such fine fare.

At present insufficient information exists to satisfactorily explain the observed feeding behaviour of these native bird species, however, we anticipate that further research and the passage of time may provide a better understanding of this evolving dietary modification.

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