## A Peek into the World of Phasmids

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Photo by Tom Armstrong

The Australian bush is a dangerous place if you are a large arthropod who spends a great deal of time hanging about in trees. There is no shortage of birds, reptiles and bats that take no prisoners when it comes to their food gathering enterprises.

Earlier in the year (March 2023), one of these large arthropods was brought to my attention and an understanding of how they attempt to outsmart predators became a temporary priority. The insect was *Extatosoma tiaratum* or the spiny leaf insect [photo above]. Upon first approach, this particular, most likely gravid female took on a scorpion pose, curling her abdomen toward her head. Her contortion did a better job of making the body shape resemble that of the surrounding vegetation. As convincing as that was, this specimen needed to activate its second technique, actively swaying in the wind. This involves the animal gently moving back and forth to help authenticate its leaf charade. Studies by Xue Bian et al in 2015, demonstrated that this movement was dependent on wind strength, indicating how the insect utilises environmental cues. According to other readings, if you were to really give them the "irrits", they are quite capable of dishing out a skin piercing wack with their rear legs. No thanks!

Being a gravid female, the next act of deception, although not directly aligned with her arboreal stealth, is remarkable, nonetheless. As an adaptation to better the success of her offspring, the egg has evolved to resemble the food source of the local ant population, as well as having an outer layer made up of edible lipids. The ants chow down on this outer treat and deposit the remaining pseudo seed in the colony's underground waste storage. A perfect and safe location of the development of a spiny leaf insect egg, free from predation or damage. Furthermore, the spiny leaf insect nymphs come out of the egg resembling the ants themselves, just for one last evolutionary flex

While I have never seen an egg, I have recently (Sept 2023) seen a freshy hatched nymph scaling a tree at full pace. It had the appearance of ants within the *Leptomyrmex* genus, also known as Spider Ants (right).



Spider Ant (Image adapted from Kueda, iNaturalist)

On an encounter with another species, *Tropidoderus childrenii* (Children's stick insect) her camouflage attempts had failed, and as a result was being devoured by the local Pied Butcher bird. This presented an interesting opportunity to look more closely at the intricacies of the insect's design, in particular, the similarity of wing parts to that of leaf structure. What struck me was

Spiny leaf insect nymph (Image adapted from Tilgate nature centre)

not only the similarity in shape but also the appearance of a venation pattern in the wing covers, resembling, what I believe, looks like that of the *Eucalyptus grandis* (Flooded Gum) or the *Eucalyptus pilularis* (Black Butt) [image below].

The adaptations of insects in the order Phasmatodea in general are fascinating and I feel privileged to have had an opportunity to get a glimpse of the impressive adult females in native habitat. With adaptations in breeding and camouflage so closely linked to other species of both flora and fauna, I do wonder how this may increase their vulnerability in times of dramatic change. It would be interesting to know the flexibility in the breeding cycle, would it work with another genus of ants? Do eggs hatch without the intervention of ants? And also the effectiveness of their camouflage against other leaf shapes and venation patterns. How would their camouflage effectiveness compare between a Eucalypt vs an Acacia species?



Images of the Children's stick insect, captured by Tom