NATURA Far South Coast

Observing and understanding the flora and fauna of Bermagui/Wallaga Lake's forests and shorelines

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Before I begin sharing some of this month's marvellous observations with you I'd like to start this issue of NATURA with some exciting news and a big shout-out to fellow citizen scientist and passionate naturalist Colin Leel. Colin lives in Alice Springs and, in 2020, resurrected and revamped his wonderful website **Ausemade – Showcase Australia** which highlights all that our great southern land has to offer …. the landscapes, the art, the culture and, of course, our wonderfully rich and diverse flora and fauna. By extensively using and sharing the images and stories of contributors and guest authors from around the country the Ausemade website is now a one-stop shop providing a wealth of information on all things Aussie, and I feel very privileged indeed to be listed as one of Colin's guest authors and have some of my iNaturalist observations highlighted and shared on such a platform. Early this month Colin very kindly, and generously, made all of the NATURA back issues available online through the Ausemade site. Colin, I can't thank you enough and think you and your website are AWESOME! The links for Colin's website and for the NATURA back issues are here Ausemade – Showcase Australia and here NATURA Far South Coast – Ausemade, and I would encourage all of you to take the time to browse at least some of the website's content …. you won't be disappointed. Personally, of late I've been particularly enamoured with Gary Taylor's observational writings and accompanying photographs of our native bees on the Ausemade website and have also been slowly working my way through the Ausemade blog where all manner of topics are discussed. A blog entry of particular interest to me was Phil Warburton's "Rediscovering our long-lost insects", partly because Phil is a local lad and naturalist living in the Eurobodalla and partly because his writings and excellent photographs pertain to species which could be encountered here in the Bega Valley Shire. For any of you that may be interested in reading it (I highly recommend that you do) the link for this blog article, written in February of this year, is here Rediscovering our long-lost Insects – Ausemade . I should probably also add that, despite the same surname, Gary Taylor is NOT a relative of mine and there is absolutely no nepotism involved in my mentioning of his work.

I have given much of this month's NATURA issue over to detailed information about Imperial Hairstreak butterflies because, although considered a common species, they have a patchy and very localised distribution across the Bega Valley Shire and, until this month, had not been seen along the coastal fringe. The butterflies also exhibit several very interesting behaviours including host plant selection, mating strategies and a close connection to ants that is worthy of investigation. Also this month I will be introducing you to Vampire Moths (yes folks, you read that right … VAMPIRE moths!) and, although both were sadly deceased, a stick insect and a praying mantis I found.

At right – Because of their bold, cheeky and engaging personality Jacky Dragons are one of my favourite lizards and this moth I spent quite some time with the one shown here. This little dragon was sunning itself on a log on the Montreal Goldfield and was unperturbed by my extended presence.

IMPERIAL HAIRSTREAKS

In February of this year I was very surprised to discover a small population of Imperial Hairstreak (*Jalmenus evagoras*) butterflies fluttering around a single, very stunted Black Wattle (*Acacia mearnsii*) plant on the Montreal Goldfield site north of Bermagui. Although these lovely butterflies were a very common and delightful seasonal presence on my property at Wandella and could often be seen flying in great clouds around many of the smaller Black Wattle trees during the summer months I noticed that Imperial Hairstreaks were conspicuously absent from my new home environment following my move to Wallaga Lake in early 2017. Even with my hours upon hours of observational walks since my 2017 relocation I did not see a single Imperial Hairstreak in my new local area and, as much as I missed seeing these beauties, resigned myself to the fact that they simply weren't a local or coastal species – at least, not until now!

The sudden and unexpected appearance of the Imperial Hairstreak population on the Montreal Goldfield was definitely a discovery worth monitoring and subsequent visits to the site throughout February revealed not only flying adults but also several caterpillars and a dozen or so pupae on the one Black Wattle where I had first observed them. Despite a thorough check no other Black Wattles on the goldfield seemed to be attracting the attentions of the butterflies nor could I find any other populations in the forests surrounding Bermagui. Even knowing that these butterflies were common and lived gregariously in very localised colonies I was completely baffled – WHY had Imperial Hairstreaks so suddenly appeared where previously there had been none? And WHY was there apparently just a single population of them on a single tree? My only conclusion was that perhaps, following the 2019-2020 bushfires and the subsequent broad-scale loss of habitat and host plants, whatever few butterflies had survived the blaze had gradually worked their way across to the coast to establish colonies where they could. A check of the data available on iNaturalist confirmed that, as I had observed both in Wandella and at Wallaga Lake, Imperial Hairstreak butterflies are much more common in hinterland rather than coastal locales, and that records of the species along the coast were, at best, patchy and quite rare. Please, if any of you have your own hypotheses or observations of Imperial Hairstreak populations and movements that might shed some light on this very unexpected but welcome turn of events I'd love to hear from you.

During March the number of Imperial Hairstreak butterflies, caterpillars and pupae increased on the goldfield, and two other Black Wattle trees close to the one where I had first observed them became new host plants to support the growing population. I also received a text message from a fellow local naturist and keen observer – he too had found a single small Black Wattle tree covered in these beautiful little butterflies. Barry very kindly led me to "his" colony of the butterflies on the banks of the Bermagui River and confirmed that, like myself, he had never seen Imperial Hairstreaks in the local area before. In the words of Lewis Carroll …. curioser and curioser! By the end of March, and with the season's last life cycle complete, the only evidence to be found of the Imperial Hairstreak butterflies were the empty pupal cases left behind in the trees which had hosted and fed the caterpillars. As I write this I am already anticipating next summer to see if any eggs successfully overwinter and hatch to establish another population population of Imperial Hairstreaks in the local area.

Imperial Hairstreaks (*Jalmenus evagoras*) belong to the butterfly family **Lycaenidae** and although not a large butterfly – they have a wingspan of about 4 cm - are very pretty, especially when flying or resting in gregarious groups of a dozen or more individuals. The upper wings are metallic blue in colour with black margins and a small black bar that extends into the blue section of each forewing. Each hindwing is decorated with 2 orange spots and some thin white lines. Each hindwing also has an extended thin black tail tipped with white. It is thought that these tails act as a decoy to confuse predators such as birds because, when the butterfly is at rest with its wings closed, the tails looks like antennae and make the back end of the butterfly look like the front end. It seems to work because it is not uncommon to see rather tatty-looking Imperial Hairstreaks minus their tails and with a few snips taken out of the wing edges. You can assume with reasonable confidence that butterflies in this sad and sorry state are the lucky individuals that have dodged a proverbial bullet and managed to escape the clutches of a hungry predator, but the sight of them does leave me wondering how much longer they may survive without their inbuilt defence system in place. The under-surfaces of the wings are cream or buff in colour with black streaks, pale orange-brown subterminal bands and black edges. A pair of orange spots at the base of each hindwing are similar to those on the dorsal side. I have noticed over the years that the base colour of the underwing can vary quite considerably between populations, For example, Barry's Bermagui butterflies (gotta love a bit of coincidental alliteration!) were a very pale cream while my Montreal Goldfield butterflies were a much darker and richer buff, almost tan brown. I have been unable to find any literature that can explain this variance but have noted that each separate population is made up of either pale individuals or darker ones, but never both. I have also observed that while one *Acacia* may be hosting a cream population, just metres away another plant of the same species may be hosting a darker buff population. My current but unsubstantiated hypothesis is that differences in the nutritional values of the plants on which the larvae are feeding may be responsible, but this is in no way a certainty so please don't quote this theory as fact.

Above - The photo at far left shows an Imperial Hairstreak butterfly that has barely escaped with its life following attack from a predator. The damage to its wings suggests that a bird was the most likely aggressor. Although still able to fly this battle-weary individual was far less graceful in flight than its more fortunate brothers and sisters, and spent more time at rest and less time in the air than other butterflies fluttering in the vicinity. The next 2 photos show the difference in underwing colouration of Imperial Hairstreaks from separate populations. The middle photo shows a butterfly from Barry's Bermagui colony while the next photo shows a butterfly on the Montreal Goldfield. In this last photo you can clearly see the white-tipped tails and how easily they could be mistaken as antennae on the front rather than back end of the insect. Notice also how the orange spots on the edge of the hindwing help add to this deceptive illusion – they could quite easily be mistaken as the insect's head and eyes.

HOST PLANT SELECTION – Although adult Imperial Hairstreak butterflies feed on the nectar of a variety of plants the larvae feed exclusively on the leaves of *Acacia* (wattle) species which have fern-like bipinnate leaves. At least 28 such species have been documented as larval food plants across the butterfly's range along the Australian east coast but here in the Bega Valley Shire, and despite the presence of several potentially suitable *Acacia* species, I have only found the butterflies and their caterpillars and pupae in attendance on a single wattle species with *Acacia mearnsii* (Black Wattle) their only apparent food plant of choice.

Female Imperial Hairstreak butterflies are very fussy when it comes to selecting an *Acacia* on which to their eggs. Naturally, the plant must be able to provide the right nutritional value so that when the larvae hatch they can thrive and grow. For this reason, plants displaying the darker green leaves that indicate a higher nitrogen and water content are favoured. It's worth noting that, regardless of the host plant species selected, trees less than 2 metres tall are strongly favoured. This, and the tendency of the butterflies to fly low down and close to a host plant, makes it easy to observe and photograph not only the butterflies themselves but their larvae and pupae.

A secondary major factor in host plant selection is the presence of suitable attendant ants that will not only provide the larvae and pupae with protection from predators but also provide the adults with mating and egg-laying cues. This crucial requirement means that, although larval food plants may be present in large numbers in any given area, it is often only one or two trees that can provide both the nutrients ***and*** the ant colonies needed to successfully support a ***deme*** (breeding population) of Imperial Hairstreak butterflies. The very specific host plant and attendant ant requirements of the butterfly also means that, although considered common, colonies of Imperial Hairstreaks may only be sporadically present within their range and populations very localized. This is something that aligns with my own personal observations of the species.

At right - . Imperial Hairstreak butterflies exhibit a high level of site fidelity with the majority of adult butterflies remaining in close proximity to the host plant on which they fed as larvae. For this reason, and because they are gregarious and rarely stray more than 20 metres away from their host plant, the butterflies can often be seen congregated in groups of a dozen or more individuals on or near a single tree. This tree will be supporting the next generation of butterflies with larvae, pupae and eggs all present. Eggs that do not hatch during the current season will overwinter and may see, but not necessarily guarantee, the reappearance of an Imperial Hairstreak population at the same location over successive seasons. The photo shown here is a good summation of an Imperial Hairstreak's life with an adult butterfly, caterpillars and both eclosed and uneclosed pupae on a Black Wattle (*Acacia mearnsii*) with attendant *Iridomyrmex* ants present in good numbers. I took this photo whilst revisiting Barry's Bermagui butterflies for a third time. Only time will tell if they will return for a second season at this location …. until then, it's very much a waiting game.

IMPERIAL HAIRSTREAKS and ANTS – Imperial Hairstreaks, and indeed many of the species within the Lycaenidae family to which they belong, have a close mutualistic relationship with ants. Known as ***myrmecophily,*** a term which literally means "love of ants", this association has benefits for both species.

Imperial Hairstreaks have a myrmecophilous relationship with ants of the genus ***Iridomyrmex*** but it is 2 species of Tyrant Ant - ***Iridomyrmex anceps*** and ***Iridomyrmex rufoniger*** **-** that they are most frequently associated with. These ants greatly enhance the reproductive success of the butterflies, and the survival rate of their larvae and pupae, by providing protection from predators such as spiders and insects that may want to prey on them, and by defending them against attack by wasps and other parasitoids that may want to use the larvae as an egg-laying site and food source for their own young. As a reward for this protection the caterpillars and pupae provide the attendant ants with food in the form of honeydew, a sweet, sticky liquid made up of sugars and amino acids. In the case of the larvae, this honeydew is secreted through small glands known as ***perforated cupola organs*** (CPOs) which are scattered over the caterpillar's skin. Honeydew produced by the pupae is secreted via a large gland known as the ***dorsal nectory organ*** (DNO) which is located in the middle of the 7th abdominal segment. It's a harmonious win-win situation for both species. It's worth noting that although the Imperial Hairstreak butterflies cannot survive without their benevolent protectors the ants are not reliant on the butterflies for survival and feed on honeydew obtained from other sources as well as insects and nectar when the butterflies are not present.

LIFE CYCLE - Across their range Imperial Hairstreak butterflies are in flight from late October until April but here in the Bega Valley Shire are more commonly sighted between January and March. Although the butterflies complete multiple breeding cycles each season the exact number can vary depending on location and environmental conditions such as temperature and availability of food resources. In cooler, more southerly locations such as we have locally two cycles are typically completed each season but in warmer, more northerly locations three or even four cycles may be achieved.

The first cycle each season commences when eggs which have overwintered under the bark of an *Acacia* tree hatch. The tiny larvae stay close together in an aggregate group as they move out to begin feeding, typically following trails of ant pheromones so they can feed safely in company with and under the guard of the ants. Larvae which hatch later may follow silk trails laid down by earlier larvae to locate the group and their attendant ants. Although older, larger larvae such as the one shown below may move away from the communal group to feed more independently they invariably return to the group, especially when they are close to pupation. The larvae feed for an average of 4 weeks before pupating. **A fun fact -** The larvae of Imperial Hairstreak butterflies have spiky dorsal tubercules and s thick cuticle to protect their internal organs from ant bites. Apparently, even though the two species share a close connection, unfortunate mishaps may occasionally occur and the caterpillars are not prepared to take any chances!

At left - An Imperial Hairstreak caterpillar feeding on the leaf of a Black Wattle. Note the *Iridomyrmex* ants - possibly and most probably the species *Iridomyrmex rufoniger (*Tufted Tyrant Ant*)* **-** that are simultaneously feeding on the honeydew secreted by the caterpillar and providing protection from marauding parasitic wasps and other predators. With a length of approximately 20 mm this caterpillar is an older individual that will soon re-join a communal group as it readies itself for pupation.

As they did when they were feeding, the larvae of Imperial Hairstreaks remain in a gregarious group to pupate. Prior to pupation each caterpillar uses a special gland near its mouth to produce silk. By using its mouth to manipulate the silk the caterpillar creates a silken pad between the leaves of the host plant. After the pad is complete the caterpillar uses a series of minute hooks which are located at the end of its body – the ***cremaster*** - to secure itself to the silk and, when firmly anchored, sheds its last larval skin to reveal the pupa

beneath. The pupa remains attached to the silk pad until the butterfly emerges. Because many caterpillars will pupate in close proximity to each other their individual silk pads form a thick web, and it is not unusual for a single tree to contain two, three or more clusters of pupae and larval webbing. It is also not unusual for these clusters to contain both pupae and the empty pupal cases of an earlier generation, especially late in the season.

At right - A communal group of about 10 pupae amongst the foliage of a Black Wattle. Note the larval silk webbing to which the pupae are attached, and the swarm of attendant *Iridomyrmex* ants.

A fun fact - Both the larvae and the pupae of Imperial Hairstreak butterflies attract their ant protectors not only by providing food but by producing chirping sounds that communicate when the ants' attendance is required. These sounds are also used by the caterpillars to communicate with each other so that group adhesion can be maintained, and to locate nearby pupae when they themselves are nearing pupation. This ability was described by Orr and Kitching in 2010 ….. how extraordinary!

The pupal stage of an Imperial Hairstreak's life cycle lasts about 7 days with male butterflies emerging before the females. After their emergence the male butterflies remain close to the host plant on which they fed as larvae as they wait for the females to ***eclose*** (emerge) but may also visit and investigate other nearby trees for the presence of pupae. In these instances they use the attendance of ants to locate healthy pupae which might produce a mate. Mating commences within minutes of the emergence of the first females. Both the male and female butterflies have a short lifespan with females, on average, living for just 3 or 4 days. The males live for longer and may survive for 7 or more days. In 1989 Pierce and Hill published a joint paper which, in part, described how female Imperial Hairstreak butterflies could increase both their ***fecundity*** (fertility) and lifespan by feeding on flowers with a higher concentration of sugar in their nectar. Experimentation in a controlled environment showed that, when given access to a diet containing higher sugar levels, a female could lay up to three times more eggs and extend her lifespan from four to twenty-eight days. Whether a female butterfly living out in the field could survive for such a long period of time is yet to be determined, and seems unlikely.

Female Imperial Hairstreak butterflies typically ***oviposit*** (lay eggs) in holes and cracks in the bark of *Acacia* trees. The trunk of the tree is the most common location, but some females also lay eggs on leaves. Eggs laid in spring and summer hatch quickly so that two or more life cycles may be completed each season but eggs laid towards the end of the season, ie from late February to April, will overwinter and then hatch when the weather warms. Because the females use the presence of ants as a cue for oviposition they frequently lay their eggs on the host plant on which they themselves fed and pupated as juveniles. **A fun fact –** *Iridomyrmex* ants will actively encourage female butterflies to lay eggs on their *Acacia* tree so that the resultant larvae can supply them with a source of honeydew. They do this by gently nibbling the tip of her abdomen as she probes the bark in search of a suitable site to oviposit. I find this snippet of information both fascinating and horrifying because, in my opinion, no-one should have their bottom nibbled on by ants!

MATING BEHAVIOUR - As mentioned above, the first butterflies to eclose each season are males. These males actively search for potential mates by patrolling and investigating the clusters of uneclosed pupae clumped together on the branches of *Acacia* host plants. During these investigations the males will often alight on or near the pupal cluster and use their antennae to tap each pupa in turn to determine its age and nearness to eclosion. About 12 hours before emergence the pupae secrete pheromones which attract the males in great

numbers. This leads to the formation of a clustered ***mating ball*** of up to 20 highly competitive males all jostling and jockeying for position on or near pupae as they anticipate the emergence of a female. This type of mating behaviour is known as an ***explosive breeding strategy*** and is not common in butterflies. A paper written by Hughes, Chang, Wagner and Pierce and published in 1999 went so far as to note that Imperial Hairstreak butterflies "*appear to represent an extreme manifestation*" of this strategy, and that its use excluded the preferential choice of a mate from the reproductive process. The paper also cited research suggesting that, because of the explosive breeding activity engaged in by the species, female Imperial Hairstreaks were expected to mate immediately upon their emergence from the pupal case and that they also had a lower tendency than other species to mate more than once. Personal field observations made by Naomi Pierce, a co-author of the paper referenced here, noted that female Imperial Hairstreak did not mate for a second time and that, once their wings had hardened, female butterflies vigorously rejected any attempts at copulation by males. For these butterflies it's definitely a case of first come, first served!

Below - The photo at left shows a male Imperial Hairstreak using its antennae to tap uneclosed pupae as it attempts to determine how soon a potential mate may emerge. Note the second male that is looking on intently, and the *Iridomyrmex* ants that are swarming all over the pupae. The second photo shows 4 males clustered around a clump of pupae while 3 other males continuously patrol the area from the air. Having observed all the pushing and shoving that occurred as these male butterflies jostled for prime position all I can say is …. thank goodness butterflies don't have elbows! If they did, I can guarantee that they would have been used.

When a female butterfly emerges from her pupal case she is greeted almost immediately by one or more keen-as-mustard males. Even before her wings have had a chance to fully expand and dry, the luckiest … or perhaps more accurately, the pushiest …. of these males joins up with her to copulate. Wet, crumpled and set upon …. what a way to start your life! Paul Whitington of Wonbyn wrote in his ***Life in a Southern Forest*** blog dated January 2019 that he had observed a male mating with a female Imperial Hairstreak that had crawled from her pupal case less than a minute before. He also noted that the pair remained joined for over half an hour, and that during that time the male had to fend off repeated attempts by other males to dislodge and usurp him. If you'd like to read Paul's account of the situation, and view his video of the encounter, you can do so here The life of the Imperial Hairstreak — Life in a Southern Forest (southernforestlife.net

At left – Female Imperial Hairstreaks usually mate within a minute or two of their emergence from their pupal case and accept only one sexual partner during their lifetime. The photo shown here was taken on the Montreal Goldfield this month and is a very a surprising and unexpected observation of mating behaviour that is not at all typical of Imperial Hairstreak butterflies. Not only has the female had time to dry her wings and make her maiden flight whilst still a virgin but copulation is occurring away from her pupal case on the host plant and without interference from other lusty male butterflies.

Although the females mate only once male Imperial Hairstreaks will mate up to seven times during their lifetime and, because they are not territorial, will readily leave one host plant to join a mating ball on another. Despite the fact that female pupae are often larger, the male butterflies are so desperately eager to mate that they don't always take the time to determine the sex of an eclosing butterfly and will often attempt to copulate with a newly-emerged male - how embarrassing for everyone involved!

At right – This photo shows an interesting interaction between two Imperial Hairstreaks that I observed on the Montreal Goldfield this month, but the precise nature of this interaction is unclear. My summation of the situation at the time was that I was watching a pair of butterflies engaged in a courtship dance. Silly me! Having now extensively researched the mating behaviour and strategies of the butterflies I now believe this to be a feisty female butterfly vigorously and vehemently rejecting the advances of a male. If this is the case, the lower butterfly in the photo is the male as this is the insect that flew in to instigate the interaction. Alternatively, this photo could show a turf war between two butterflies of undetermined sex (2 males? 2 females? 1 male and 1 female? …. it's difficult to tell with this species) who were each trying to take possession of a particularly desirable perch. If this is the case the battle was very brief, very half-hearted and lacked the aggressive posturing and face-to-face confrontation that one would expect during such a clash. It certainly appeared to be less combative than the butterfly battle observed by Kerri-Lee Harris in January 2018 and written about in the Life in a Southern Forest blog that she co-author's with her partner Paul Whitington. You can read her account and see her wonderful still images here Butterfly battles — Life in a Southern Forest (southernforestlife.net Whatever the exact nature of the behaviour seen here is there is only one thing I can say for certain ….. it definitely does ***not*** show a courtship dance as I very incorrectly first thought.

VAMPIRE MOTHS

I first encountered the moth species shown below in February 2021. My initial thought as I gazed at this adorable and rather sweet-looking creature was that, with its long, fluffy nose and large, beady eyes, it looked not dissimilar to a mouse, albeit one that had apparently had a run-in with the farmer's wife who had then cut off its tail with a carving knife. I'm sure you can well imagine the mild shock and horror I felt when I discovered that the moth currently sitting on my kitchen window sill was, in fact, ***Calyptra minuticornis***, a species of Vampire Moth! While I frantically searched online for more information I contemplated whether I should perhaps hang cloves of garlic around my neck or arm myself with a stake (given the size of the moth I decided that a toothpick would be adequate protection if needed). In the end, I decided that moving the moth outside and double-checking that all the windows and doors were securely closed would be adequate protection against any possible attack from this tiny vampire.

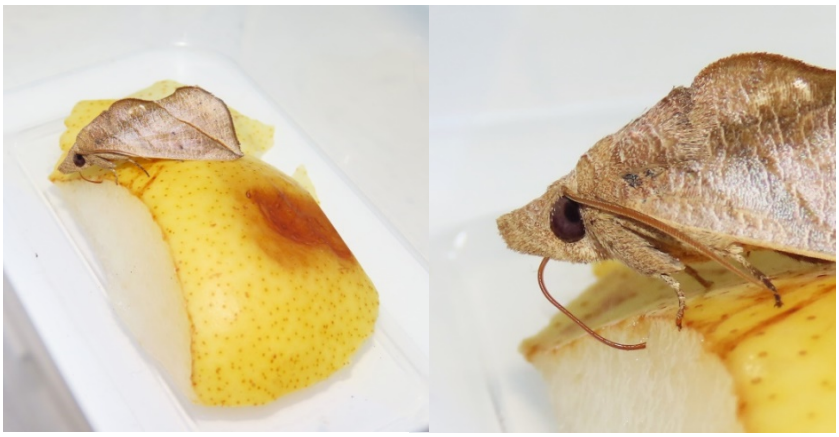
Two weeks after my first encounter with the species a second vampire moth appeared, this time on my front verandah. Although wary of it I no longer felt the need to over-react and begin reaching for garlic or toothpicks. In the 3 years since these first encounters I saw no more vampire moths but I often found myself thinking about them and wishing that another one would stop by for a visit. This month that wish was granted with multiple vampire moths appearing almost every night for a period of three weeks during March. Marvellous!

Worldwide, there are 18 species of Vampire Moth, all of which belong to the genus *Calyptra* in the moth family Erebidae. Vampire moths use their powerful proboscis to piece fruits so they can feed on the juice. All 18 species also sometimes feed on the blood of vertebrates, including humans. It is this habit that gives the Vampire Moths their slightly alarming common name but, unlike other blood-sucking insects such as mosquitoes and march flies, it is not the females but the males that indulge in a feed of blood. If the opportunity arises this blood is presented to the female as a nuptial gift to aid in the development of her eggs.

Calyptra minuticornis is the only vampire moth species found in Australia. As a native species, the moth can be found along Australia's eastern seaboard with a range that extends from the Lockhart River in far north Queensland down to the NSW/Victorian border but sightings of the moth are rare in the more southern extent of its range. Here in the Bega Valley Shire I appear to be the only person who has observed and photographed adult moths but one other person, botanist Jackie Miles, photographed and documented larvae feeding on Snake Vine (*Stephania japonica*) in Brogo in early March 2020**.** Jackie noted that "*these larvae almost stripped the plant … over summer*." Outside of Australia, *Calyptra minuticornis* is found in New Guinea, Indonesia, India, Sri Lanka, Cambodia, Thailand, Japan and other south-east Asian countries. The larvae of *Calyptra minuticornis* are black with an orange head and variable yellowish-white spots, lines and patches along the body. As observed by Jackie, the larvae grow to a length of about 50 mm and feed on the leaves of Snake Vine (*Stephania japonica*). Pupation takes place in leaf litter inside a cocoon placed between dead leaves that have been joined with silk. The adult moths have a wingspan of about 45 mm but typically rest with their wings folded tent-like over their bodies. In this position, and as seen in the photo above, the moth closely resembles a dried brown leaf with the diagonal lines on the wings very much looking like the leaf's veins. If this moth was sitting anywhere other than on my white kitchen bench I think it would be very difficult to spot.

Vampire moths have a specially developed mouthpart known as a ***proboscis*** that enables them to pierce the skin of both fruit and animals with even the tough hides of elephants and buffalo providing no protection against the male insect's bite. Both the male and female moths have a hollow, tube-like mouthpart that is divided into two halves. When inserted into fruit this mouthpart can be used like a straw to extract juice. In order to pierce an animal's skin so that blood can be extracted the males, however, need to employ a rather more aggressive approach to feeding. First, the insect rocks his proboscis from side to side, applying pressure until the skin is pierced. With phase 1 complete the moth then begins to rock his head backwards and forwards to drill the proboscis deeper into the skin until a blood vessel is reached (is it just me or does this sound not dissimilar to drilling for oil?). Once a blood vessel has been "tapped" in this way, the victim's own blood pressure then supplies the power to raise hooks on the proboscis to ensure the moth cannot easily be dislodged while it is feeding. (Forget oil drilling … this is now beginning to read like a full-blown horror story worthy of a John Carpenter movie! I wonder if I should drop him a screenplay synopsis? Even with just the information here the script has pretty much written itself.)

Because I was curious, and perhaps slightly mad, I decided to catch one of the many vampire moths that visited my house during March to see if I could encourage it to feed. Having decided that an overripe pear could hardly be ignored by a hopefully hungry moth I placed a slice of the fruit and the moth in a dish and then sat back to watch and wait. Success! Within a minute, the moth had climbed up onto the slice of pear and inserted its proboscis so that it could feed on the juice. This moth fed for about 5 minutes before disengaging from the fruit. Six days later I caught and fed a second moth. Lacking pears in my fruit bowl I decided to plump for a banana. Although the moth dilly dallied for some time it did eventually begin to feed, and for a longer time than the first moth. This second moth fed for almost 15 minutes before withdrawing its proboscis. Subsequent research revealed that, on average, vampire moths feed for 12 minutes at a time. This average feeding time remains consistent regardless of whether the moths are feeding on fruit or blood.



For your edification I have managed to find a "Top 10" list of preferred victims of vampire moths on the ResearchGate website. In order of preference, and starting with the most favoured, these animals are elephants, rhinoceroses, tapirs, mules, water buffaloes, zebu, sambar deer, pigs, horses and nilgai antelopes. I'm very relieved to see that humans have not made this list but, knowing that these moths ***will*** feed on human blood I have learnt this about their bites …. human skin penetrated by the proboscis of a vampire moth may turn red and develop an itchy rash that can be painful for several hours. Although the bite poses no known health risks, those who have experienced it rate the discomfort as greater than that of a mosquito. I'm not sure just how reassuring I find this information.

DEAD THINGS

As you would expect, I prefer to photograph creatures while they are still alive but this month I found myself photographing two dead insects, Both insects were large, fabulous and not often encountered and, although saddened by their demise, the discovery of their bodies did give me the opportunity to study them in greater detail than I am usually afforded when out in the field. In both cases it also gave me the opportunity to examine and photograph an anatomical feature that I had never seen on either insect whilst they were still alive …. their wings!

The first dead insect, a **Children's Stick Insect** with the rather cumbersome scientific name ***Tropidoderus childrenii***, was lying on leaf litter at the base of a Spotted Gum (*Corymbia maculata*) in the Bermagui State Forest. After carefully shaking off the tiny ants that were feeding on it I carried the insect home so that I could more easily photograph it.

Australia is home to about 200 species of stick insect and, because they belong to the insect family **Phasmatidae**, are sometimes referred to ***phasmids***. Children's Stick Insects live in the forests of eastern Australia where they feed on the leaves of various eucalyptus and gum tree species. Although both sexes are well camouflaged amongst the foliage on which they feed, the insect displays a high degree of sexual dimorphism. The females are usually a beautiful apple-green colour, but can also be cream or a very pale pink or purple. The males look very different to the females and are much more slender with a light reddish-brown body and a distinctive red, white and green stripe that is clearly visible when the insect is viewed from the side. Despite their large size - when fully grown they may reach up to whopping 140 mm in length – and

differences in appearance, both the male and female Children's Stick Insects are masters of camouflage and are very difficult to spot amongst the foliage of the trees on which they feed.

Both the male and female insects have 2 pairs of wings. The forewings are short and stiff. The hindwings are large, transparent and much more delicate than the forewings, and have a purplish-blue patch near the base. The males are strong fliers and will fly from tree to tree in search of a female. The females are much more heavy-bodied, especially when laden with a massive load of eggs, and rarely fly. When they do, their flight is very clumsy and is usually undertaken over very short distances.

Below – The **Children's Stick Insect (*Tropidoderus childrenii*)** that I found in the Bermagui State Forest. This insect is a female and, although she is missing a few body parts …. namely 4 legs and a head ….. her wings are in near- pristine condition. The photo at left shows her dorsal side while the photo at right shows her ventral side. Note the vivid blue patch that, although already starting to fade, is still bright. This patch will add to her fright factor if she is under threat and raising her wings menacingly at a predator. Also note the broad, flattened femur edged with saw-like teeth on this insect's remaining 2 legs, and how much they add to this insect's leaf-like appearance. As a mature female, and even though she is headless, this Children's Stick Insect is nearly 140 mm long and even in death was an impressive specimen.

When attacked, Children's and other stick insect species are able to drop off one or more limbs to escape a predator in much the same way as a lizard can lose its tail. This type of defence mechanism is known as ***autotomy***. The term is derived the Greek *auto* meaning "self" and *tome* meaning "severing". Children's Stick Insects will also extend and flash their large wings to reveal the bright blue markings at the wing base to startle and ward off attackers. A fun fact – Regardless of the species stick insects can often be observed rocking from side to side or swaying back and forth. I'm sure many of you have seen them do this and may have wondered why. The answer is very simple ….. camouflage! By moving in such a way the insect is mimicking the movement of the leaf or twig that it is pretending of be. How clever of them!

At right - A male Children's Stick Insect I photographed in the Beauty Point Nature Reserve in 2020. This was the first time I had ever seen one of these beautiful insects and was, until this month, the only one I had ever encountered. Note how different to the above female it looks, and the rather racy Italian red, white and green strip along its side. While males such as this one look very twig-like the females are shaped and coloured to look more like leaves..

I found the body of the second insect – a **Purple-winged Mantis (*Tenodera australasiae*)** - on my front verandah. Australia is home to about 118 mantis species and, with a body length of 80 - 90 mm when fully grown, the Purple-winged Mantis is one of the largest. Like all mantises this species is carnivorous and uses its large, powerful front legs to catch prey but, unlike smaller mantises that only feed on insects, the size of a Purple-winged Mantis allows it to also catch and consume small vertebrates such as frogs and lizards. Unlike some species of mantis, both sexes of the Purple-winged Mantis have wings and are capable of flight. Despite their impressive wing size these, and in fact all, mantises are clumsy fliers and will usually only fly short distances. The male insects are more inclined to take to the air than the females, especially when in search of a mate. Regardless of the sex, mantises will often use a combination of jumping, gliding and flying to reach their desired destination. When threatened, Purple-winged Mantises will rear up on their hind legs, extend their forelegs menacingly and flash their large, brightly-coloured hind wings to startle and alarm a would-be attacker. Although I've never seen this behaviour myself I'm sure it must be very intimidating and be a very effective form of defence. **A fun fact that may … or may not … apply to Purple-winged Mantises –** an often recounted fact about praying mantises is that the female will eat the male during or after mating. While this is true for many species, not all behave in this way (hence my earlier disclaimer). Female mantises, and indeed all invertebrates that carry out this rather barbaric practise, eat their sexual partners to gain valuable nutrients necessary for the production of eggs. In the case of praying mantises, females will often rip off and eat their mate's head …. and sometimes a leg or two …. during copulation. In such instances, the male mantis quite literally loses his head over his girlfriend! Perhaps even more disturbingly, the partially dismembered and now headless males are often undeterred from the task at hand and will continue to copulate for up to 12 hours!!! Now ***that's*** what I call determination!

Praying mantises have two pairs of wings. Regardless of the species, all male mantises are winged so they can seek females over a larger distance but only some species, including the Purple-winged Mantis, have winged females. The forewings of a mantis are tough, leathery and partially see through. When the insect is at rest these forewings fold along the insect's body and protect the large, clear and far more delicate hindwings that are folded underneath like a fan. The first photo below shows the Purple-winged Mantis I found deceased on my front verandah. In order to more easily and effectively photograph the insect's wings I have used tiny pieces of Blutack to hold the wings in position because, although the insect is dead, I didn't feel comfortable using pins to achieve the positioning I was after. Because the wings were so pristine, beautiful and delicate I also thought it would be a shame to poke even tiny holes in them. The second photo shows a live Purple-winged Mantis that I photographed on my back verandah in March 2021. In this photo you can see how the forewings fold along the body to protect the hidden hindwings that are folded underneath. Because my mantis-sexing skills are not up to scratch I'm unsure of the sex of either insect shown below.

Although I've taken up more than enough of your time this month I have two more observations I'd quickly like to share with you before I go. The first is the rather unusual little fern shown at left – a **Forked Comb Fern (Schizaea bifida)**. This fern is found in eastern and southern Australia, and in NSW grows in coastal heathland and eucalyptus woodlands. Although considered fairly common across its range there are only 5 observations of the species in the Bega Valley Shire, two are which are mine. Both of these observations were made on the Montreal Goldfield with the previous observation made in December 2022. In at least one state (SA) the plant is listed as vulnerable, and it is known from only a few local and widely scattered sites in Victoria.

The Forked Comb Fern is a stiffly erect fern that grows to a height of up to 45 cm. The narrow, flattened fronds are topped with the combs that give this and other comb ferns their common name. Like all ferns, the Forked Comb Fern is non-flowering and produces spores in order to reproduce. The spore cases develop on the margins of the comb segments. Although admittedly limited, the online literature regarding this fern stated variously that the plant is an understory plant that grows in semi-shade, that its known habitats include peatlands, open bogs and swamps, that it grows in moist to wet peaty soil amongst grasses, that it likes consistent humidity and that it is drought intolerant. Much of this information is contradictory to the locations on the Montreal Goldfield where I have found the plant growing. In both instances, the fern was growing in an open area in full sun, and in poor, gravelling soil. As yet, I have no answers or explanation for the presence of Forked Comb Ferns at this location.

The second is this photo of King Parrot that visited my garden several times during the month. This bird is a young male that, early in the month, was still exhibiting some green mottling on his head but by mid-March, and as seen here, had developed his full and proper mature plumage. This bird is feeding on the fruit of a camellia bush and perfectly illustrates the fact that, although plantings of native flora are always the best and wisest option in our gardens, many of our native fauna species are not botanically racist and will make good use of any plant that provides suitable habitat and/or food. The camellia bush in which this particular bird is feeding is one of three planted along one of my property's boundaries and is rarely devoid of a bird or two. Small birds such as finches and wrens frequently use the camellias as a stop-off point before traversing the expanse of grass to get to the other side of the yard, and whipbirds often use it as a perch from which they can call to their mates. The wattlebirds are particularly enamoured of these shrubs and use them as both a fertile feeding ground full of tasty munchy, crunchy insects and as a nesting site. Over the past seven years I have seen a multitude of young wattlebirds successfully hatched and raised in the protective, dense foliage of these and other camellias in my yard. Despite the regularity of this occurrence it's something that never fails to delight me.

Until next month, be kind to each other and the environment, Deb deb_taylor142@hotmail.com