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News Bulletin of The Entomological Society of Victoria Inc.

THE ENTOMOLOGICAL SOCIETY OF VICTORIA (Inc)

MEMBERSHIP

Any person with an interest in entomology shall be eligible for Ordinary membership. Members of the Society include professional, amateur and student entomologists, all of whom receive the Society's News Bulletin, the Victorian Entomologist.

OBJECTIVES

The aims of the Society are:

(a) to stimulate the scientific study and discussion of all aspects of entomology,
(b) to gather, disseminate and record knowledge of all identifiable Australian insect species,
(c) to compile a comprehensive list of all Victorian insect species,
(d) to bring together in a congenial but scientific atmosphere all persons interested in entomology.

MEETINGS

The Society's meetings are held at the Activity Room Ground Floor, Museum Victoria, Carlton Gardens, Melway reference Map 43 K5 at 7:45 p.m. on the third Tuesday of even months, with the exception of the December meeting which is held earlier in the month. Lectures by guest speakers or members are a feature of many meetings at which there is ample opportunity for informal discussion between members with similar interests. Forums are also conducted by members on their own particular interest so that others may participate in discussions.

SUBSCRIPTIONS

Ordinary Member	$35
Overseas Member with printed bulletin	$65
Country Member	$31 (Over 100 km from GPO Melbourne)
Student Member	$23
Electronic (only)	$20
Associate Member	$ 7 (No News Bulletin)
Institution	$40(overseas Institutions $80)

Associate Members, resident at the same address as, and being immediate relatives of an ordinary Member, do not automatically receive the Society's publications but in all other respects rank as ordinary Members.

LIFE MEMBERS: P. Carwardine, D. Dobrosak, I. Endersby, R. Field, T. New, K. Walker.

Cover and logo design by Ray Besserdin 2017

Cover photo: Male *Hemigomphus heteroclytus* (Stout Vicetail) at Beechworth on 31 January 2019, waiting by the creek for females. He is in the obelisk posture, pointing his tail towards the sun to minimize heat absorption. See Reiner's story on p. 37.

Minutes of the Entomological Society of Victoria General Meeting,
Tuesday 19 February 2019 19:45 Melbourne Museum

Attendance
Members: Linda Rogan, Ken Harris, Carol Page, Sharon Mason, Lyn Meredith, Martin Lagerwey, Anthony Kurek, Daniel Kurek, Ben Kurek, Gordon Ley, Julia McCoey, Josh Grubb, Martin Steinbauer, Tamara Morgan, Glenise Moors, Stuart Ley, Roch Desmier de Chenon, Peter Marriott
Guests: Thomas Burns
Speakers: Duncan Jaroslow, Melissa Griffin, Tamara Morgan.
Apologies: Peter Carwardine, Ray Besserdin

The general meeting was opened and all were welcomed by President Peter Marriott.

Previous Minutes: General meeting Tuesday 16 October 2018 v. 48 no.6 p. 109 and Notes from the excursion on Saturday 1 December 2018 v. 49 no.1 p. 1 onwards.
Moved: Joshua Grubb Seconded: Julia McCoey Carried.

Business:

2019 Australian Natural History Nominations: The Australian Natural History Medallion is awarded annually in recognition of services to Australian natural history. It is administered by the Field Naturalists Club of Victoria Inc. We are invited to nominate someone from the field of entomology for this award. This will be discussed further at the next Council meeting. Please let any Council member know of any one you would like to have nominated. Nominations must be received by **1st May 2019**.

"Plummeting insect numbers threaten collapse of nature" The Guardian: Gordon Ley raised the topic of this article and discussion by membership followed. One response the Society can make is raising awareness of insects and their importance.

First monthly insect of the month survey: Julia announced the insect of the month for March will be mantids. She is organising our first "Insect of the month survey". Maik Fiedel's mantid articles from 2015 will be sent out to those who are interested. Julia will send out an email and information on facebook with details of how to participate.

Council nominees for AGM: Peter Marriott announced that after many years serving as President, he will not re-stand for election this year. We encourage members, including new members, to nominate for the committee. We will require president, vice-president and secretary for 2019. Nomination forms are available via secretary@entsocvic.og.au

Webmaster: Josh Lagerwey has agreed to take on the role of webmaster.

Introduction of speakers:
Duncan Jaroslow **Biology, Ecology & Impact of Giant Pine Scale in Australia p.22,**
Tamara Morgan **Ecosystem restoration: rewilding with macrodetritivores p.25,**
Melissa Griffin **The evolution of harem polygyny in insects p. 28.**

Afterwards, the three speakers were thanked for their clear and fascinating presentations of their research projects.

Meeting closed.

The notes which follow are condensed and edited from the presenters' notes by Linda Rogan and vetted by each speaker.

Duncan is a PhD student at La Trobe University. His presentation was a look at his thesis research which is still a work in progress. The following is condensed from his presentation notes.

He introduced us to *Marchalina hellenica* the Giant Pine Scale (GPS), which he is investigating. This insect is native to the coastal regions of the eastern Mediterranean where it is common in pine forests and valued as a source of honeydew utilised by honey bees in making honey. This honey is commonly known as 'forest honey', and at least 60% of Greek and Turkish honey is produced in this way.

However where the scale has been introduced into neighbouring islands such as Sicily and Sardinia, it has become a pest causing significant damage to forests not accustomed to this infestation.

For this reason, it is very concerning to Victorian pine plantation industry that this insect has been detected southeast of Melbourne on *Pinus radiata* which is a new host species.

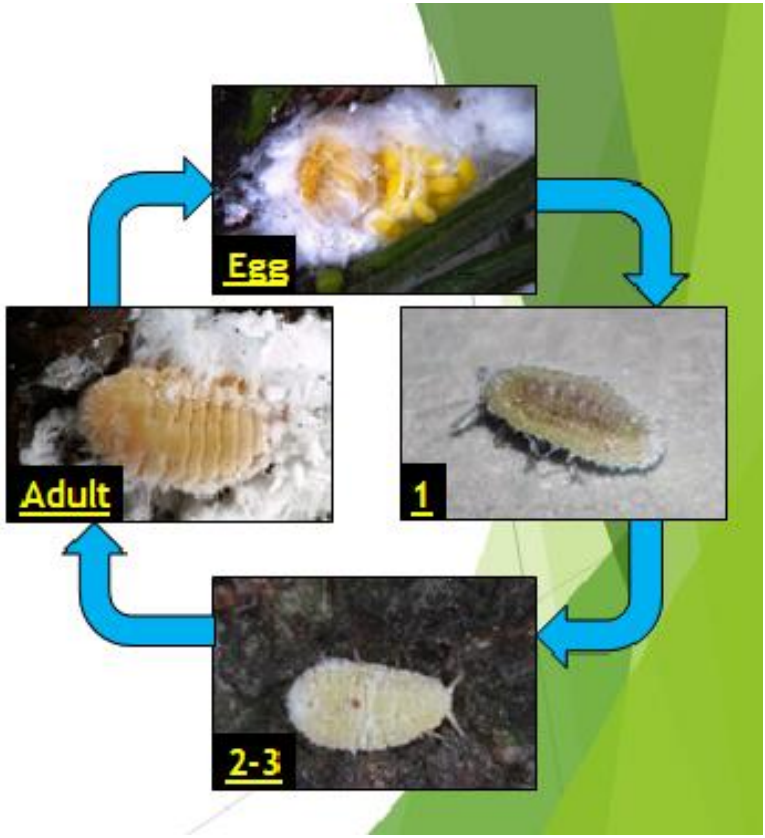
This scale insect has an annual life cycle. Although males exist and sexual reproduction occurs, They are extremely rare and most females produce viable offspring on their own.

GPS eggs hatch around late spring/early summer and the 1st instars (1st juvenile stage) are termed 'crawlers' and are ~1mm. They disperse from their point of origin by crawling to other parts of the tree or entirely new trees. Their crawling speed is quite slow, but there are many opportunities for assisted dispersal.

Once the crawler finds a suitable host and feeding position, it deploys its stylet, a syringe-like mouthpart that probes into the host tree's vascular system. After feeding commences, the GPS develops into the 2nd instar stage, around early autumn.

Around this time, they begin secreting sticky, cotton-like filaments and honeydew. The GPS then continues to feed overwinter until adulthood, this 'overwintering' instar stage is considered to be the 3rd instar stage.

By Spring, most GPS have matured into adulthood, and are about 14mm in size. During the adult stage, they can self-fertilise potentially more than 300 eggs, and often crawl away from their feeding positions to a hiding spot, so their eggs can develop in safety.



Life cycle of *Marchalina hellenica*

Photo Credit: Agriculture Victoria (2018, August 1) Victorian State Government - DEJPR. Retrieved January 29, 2019. http://agriculture.vic.gov.au/agriculture/pests-diseases-and-weeds/pest-insects-and-mites/giant-pine-scale

Although GPS primarily feeds on a number of pine tree species, they are able to establish themselves on spruce, cedar and fir.

As it appears to be impossible to eradicate this insect, it will be necessary for the industry to maximise its management techniques. For this to succeed, additional information is required. Duncan's research focuses on finding more information on four aspects of GPS life in Victoria:

First, determining where GPS is now and where they can potentially live.

The south-east regions of Victoria provide a suitable, cool temperate climate with plenty of pine plantations. The direction these infestations have been spreading reflects this. However, an understanding of the insect's biological limits is required to complete this picture. For example, determining the temperature limits of GPS can help identify regions they are biologically capable of surviving. In addition to these limits, it is important to understand the timing of their life cycles. This can help identify when GPS distributions are likely to expand and therefore determine when a particular management technique is going to be most effective.

It is also important to learn how they disperse to new locations and how quickly they do it. This will involve identifying their movement rates, as well as assisted dispersal mechanisms, like animal or wind dispersal. As an example, deer in the Dandenong region will often rub or scrape their antlers against trees. It's not unreasonable to think that deer transport GPS that stick to its antlers or fur.

Investigating these factors will help identify areas that are at high risk of infestation. Also, a distribution model, based on their biology and dispersal, can provide insights into how their distribution may change in light of increased timber production or climate change.

Second, their preferred hosts and what makes a tree susceptible to GPS.
Here, Duncan will determine factors predisposing a tree to infestation and whether or not GPS can actively search for its food source in the crawler stage.

Giant Pine Scale on pine tree in control sector of the trial. Photo Duncan Jaroslow

Predisposing factors may include soil characteristics, position relative to other trees and topography.

To determine if GPS actively search for a host, Duncan will be conducting behavioural experiments on how GPS identifies a host tree as 'suitable'."

Third, their ecology, specifically, what GPS is affecting other than their host tree.
There is a possibility of GPS facilitating invasion by other pests that use their honeydew as a food source. Perhaps more concerning, is that at high population densities, GPS have been linked to massive reductions in insect biodiversity. This may be due to the masses of cotton-like filaments physically displacing insects that typically reside on the pine tree.

The last component is investigating the consequences for an infested tree.
Like all scale insects, GPS survive using the water and nutrients sucked out of its host. With large numbers of scale insects present the tree may suffer from drought-like stress. e.g. reduced growth rate and reduction of protective resin. Normally a boring insect may be encased in resin pockets and killed. However, with reduced water availability, the tree has difficulty producing and refilling these pockets, making it more vulnerable to attacks.

So, this project component will involve monitoring the health and defence capabilities of pine trees, as well as evidence of secondary attacks that illicit a resin response, and compare these factors between different severities of GPS infestations. This will allow us to identify important GPS infestation milestones and more accurately estimate the wider consequences of infestations.

There are many unanswered questions regarding the GPS presence in Australia. The project presented here attempts to inform management efforts by providing further information

about the extent of the actual and potential GPS presence; the trees most at risk; GPS interaction with local species, and the consequences of leaving an infestation untreated.

Health deterioration in host trees may take multiple years to develop, which has led some to down-play or dismiss the threat GPS poses, despite the possibly severe long-term effects.

The consequences of ignoring GPS infestations in Victoria are unquantified, and it is difficult to draw conclusions from their Mediterranean cousins. Yet, GPS is certainly capable of significantly damaging Victoria's pine plantations, even a 1% decrease in annual productivity would result in an annual loss of ~$10M. Furthermore, the loss of important ornamental trees would be publicly unacceptable.

Duncan hopes all will agree there is a great deal of both instrumental and intrinsic value in the research proposed here. However, this project is still in its early stages, so there is still plenty of planning and data collection to be done.

Tamara presented, "Ecosystem restoration: rewilding with macrodetritivores", an overview of her honours project by the same name. The notes that follow are an edited and condensed version of her presentation notes.

Human activities have had destructive effects on a large percentage of Australia's ecological systems. Most efforts at ecosystem repair in the past have been revegetation focussed mainly on replanting degraded land via direct seeding and/or tubestock.

Another form of active restoration is rewilding which often involves the re-introduction of large animal species. An example in Australian is the re-introduction of locally extinct digging mammals, such as the greater bilby and burrowing bettong, into predator free sanctuaries. The burrowing and digging habits of these two species provided refuges for other animals as well as influencing vegetation patterns and soil processes. Detritivore activity and feeding was also found to be influenced, in particular the termite. This influenced decomposition and most likely nutrient cycling.

However, overall invertebrates have been largely ignored in ecological restoration.

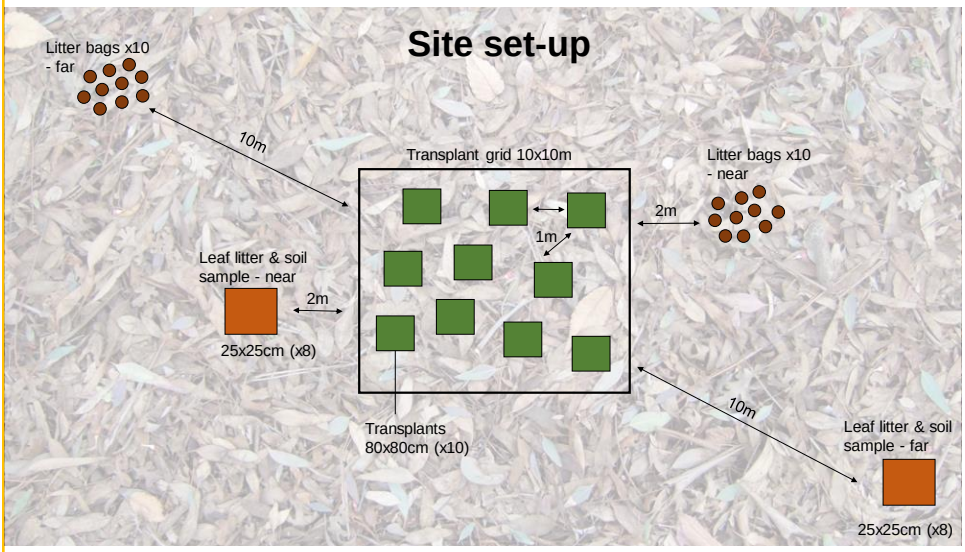
Tamara's project focusses on macrodetritivores that play such an important part in litter decomposition and are an essential food source for many animal species. These are small litter-

dwelling invertebrates, which include woodlice, millipedes, earthworms, and amphipods. They consume large amounts of organic matter and excrete faecal pellets which contain highly fragmented leaf litter. These pellets also contribute to soil structure and are a food source for coprophagous (faeces-eating) animals, such as earthworms.

The aim of this study is to determine whether leaf litter and soil transplants are an effective method of restoring local macrodetritivore communities and decomposition to revegetated agricultural land.

The hypothesis is that the diversity and abundance of macrodetritivores in revegetated treatment sites will begin to resemble that of remnant sites with the introduction of leaf litter and soil transplants. Therefore decomposition rates in treatment sites would also begin to resemble that of target remnant sites.

Study sites were selected with the assistance of local Landcare, Hughes Creek Catchment Collaborative in the Broken Goulburn region in Victoria, almost 2hrs north of Melbourne.
The sites consist of 6 replicates of:
1)revegetation treatment
2)revegetation control
3)remnant control
This makes a total of 18 sites.



All 18 sites were set-up as seen in this diagram

The revegetated sites are located on private properties and have been historically cleared for agricultural use and restored using tubestock. These were planted between 12 and 20 years ago and they were producing a decent leaf litter layer. Although all of the revegetated sites are fenced from livestock, it has become clear livestock do get in and property owners often let their livestock in to graze.

Remnant sites are local Conservation Reserves managed by Parks Victoria which are geographically close, but isolated from the revegetated sites

Some initial observations which can be seen so far are:

Remnant


Diplopoda, Paradoxosomatidae


Blattodea, *Calolampra sp.?*


Symphyla

Diplopoda, Polyzoniida

Above are some samples of macrodetritivores which Tamara has collected from remnant bushland reserves.

Millipedes include some Polyzoniida (which are definitely a native millipede order) and Paradoxosomatidae, are found in remnant sites,
Cockroaches – possible *Calolampra* sp. which seems to be appearing regularly in all sites, though could be more than one species,

Symphyla – this particularly large species (shown above) only appears in remnant vegetation so far.

A range of other taxa from a mix of sites were shown.

Tamara is still collecting her data and is yet to start statistically testing the hypotheses. Her expectation is macrodetritivores will be dispersing from the transplant grid, which her samples and litter bags should reveal.


An interesting find in all sites has been *Maratus* sp. (Peacock spider).

As the project is being conducted over a short period of time, this may limit how far macrodetritivores have dispersed from the transplants. She expects to see evidence at 2m from the grid, but perhaps not at the 10m mark yet.

Overall, it is expected leaf litter and soil transplants will be an effective method of restoring local macrodetritivore communities and decomposition to revegetated habitat and provide an effective ecological restoration method that can be utilised by land management organisations. All photos except the title slide by Tamara.

Melissa, a PhD student at Deakin University, presented on the progress of her research into what drives aggregations of insects for mating and how this relates to "harem polygyny" as observed in mammals.

The basic definition of harem polygyny is a mating system where one male is associated with a group of females. Most often he is the only male. This system is largely described in mammals and the most well known examples are fur seals and red deer.

Common features of this mating system in mammals is sexual dimorphism in males, maternal care by females, females generally only mate with a single male and these aggregations often remain together for the whole breeding season.

For this research Melissa is looking at two species of insects known to form breeding aggregations *Ips grandicollis* the five-spined bark-beetle in Australia and *Hemideina thoracica* the Auckland tree weta endemic to New Zealand. Both have previously been referred to as participating in harem polygyny.

For insects the 'harem' may be very short-lived. This is one of the reasons the term "harem polygyny" where females are aggregating, may not be the best term for a mating system in insects.

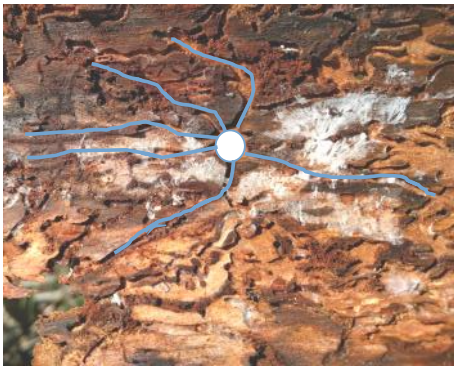
Melissa is investigating three factors coming into play to drive insect mating aggregations. Where there is an uneven ratio of males to females, does this increase aggregations or affect the number of females mating with a single male? Where habitat is limited does this increase female aggregation? What are potential benefits to females of remaining in a group with a single male?

Ips grandicollis the five-spined bark-beetle

The five-spined bark beetle is an introduced pest of Australian pine plantations. It only attacks trees that have been recently felled or are stressed from fire damage or drought. It is perhaps their harem polygynous mating system that make *Ips grandicollis* such a prolific pest with males able to sire many more offspring in an average harem than in a monogamous pair.

The formation of harems in *Ips* begins when males arrive first at recently felled or stressed trees. Males initiate the building of a nuptial chamber under the bark. They then release pheromones attracting females to them which make individual galleries radiating out from the

Ips grandicollis (above) Photo source: https://bugguide.net/node/view/686974 Copyright © 2012 Mike Quinn



Female egg galleries which radiate from the central chamber (above) photo by Melissa.

males chamber. Each gallery most often represents one female. Once they have built galleries females lay their eggs in small niches along the sides. Males on average are associated with 3-4 females but have been found with up to 7 females.

Does resource availability affect the number of females per male in *Ips grandicollis*?
This experiment actually took place in a pine plantation in Queensland where the warmer climate means the beetles are active all year round rather than just the summer months as in Victoria. I had access to two blocks of pine giving me two environments: An unharvested block and a block that was recently harvested which would likely have a higher population of bark beetle present. I then had two experimental set ups of high and low resource availability in the form of cut pine billets split across both environments. These were left for two and a half week for the beetles to infest. The bark was then removed from all the logs and measurements around the harems made.

Initial results show the resources added did not affect the number of females in each harem. The wider environment the logs were placed in did. Harems in the harvested block were larger that those in the unharvested block. This is likely an effect of the population increase in this block. The large amount of debris left after logging attracted large numbers of beetles and these continued to join harems in any available pine.

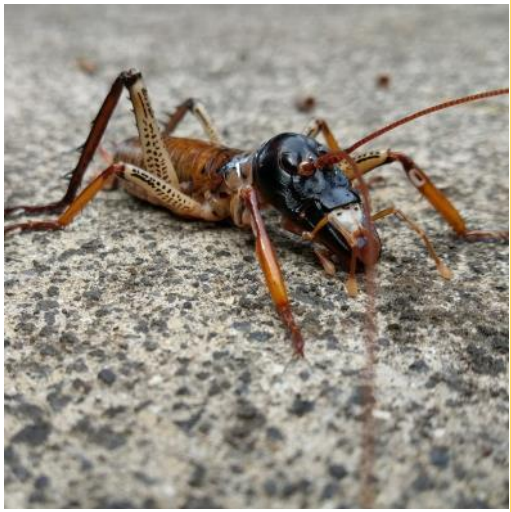
Hemideina thoracica the Auckland tree weta

Hemideina thoracica has not had as much research conducted as some of the other species of tree weta. Therefore the field observations made into the mating behaviour and general ecology will contribute to greater understanding of this species.

Observations were made and videoed of various males competing against each other for access to females within an artificial roost. In these observations the larger male was always the winner and where equal sized, the harem "owner" always won.

Other night time field observations showed a number of pairs mating in the foliage.

This suggests that the aggregations in the roosts are not essential for mating. So the previous categorising of harem polygyny, where groups are essential for mating, may not be an accurate description for tree weta. Both females and males were observed mating multiple times with different individuals in a single night.



Hemideina thoracica. A male Auckland tree weta. Photo by Melissa

In summary, harem polygyny is not a good descriptor of tree weta mating behaviour. When this is used it overlooks a lot of other interesting behaviour that tree weta exhibit. Tree weta seem to be extremely polygamous and this may contribute to their success in urban areas. There needs to be more nocturnal observations of their more natural behaviour rather than diurnal observations where they are found in roosts.

Tree weta mating at night in the foliage. Photo by Melissa

In general the use of the term harem polygyny to describe insect mating behaviours may stem from a lack of understanding or knowledge of the mating system; and the use of this term may neglect other interesting behaviours that are occurring. Increasing knowledge of general ecology for pest like *Ips* helps inform management decisions and for endemic species like tree weta this information helps manage their conservation in the future.

Thanks to these three students who each gave us such interesting views into their research in progress. Editor

Moth surveys in Elwyn St. Bentleigh East during December 2018 and January 2019

Daniel Kurek, dkurek2211@gmail.com

Introduction

Following the Entomological Society of Victoria excursion to Organ Pipes National Park in December 2018, my father and I decided to set up our own moth sheet in the backyard of our house in East Bentleigh to see what moths we could attract. We both learnt a great deal about how to set up a sheet during the end of year trip and I had always wanted to set one up myself. With what we learnt, we decided to have a go. We were not out to prove any particular hypothesis but to simply to have a bit of fun, see what moths we could attract and to prove to ourselves that we could do it.

Location Overview

Our house is located in a quiet suburban street in Bentleigh East, and is surrounded by other similar homes. Our backyard has a nice garden with a number of fruit trees (e.g. lemon, peach, grapefruit, orange, mandarin). Our neighbour's garden is very overgrown and she has a very large tree in her backyard, around 15m in height, where many animals such as such as birds, possums, bats and insects congregate.

Materials and Methods

We set-up the moth sheet in our backyard by simply hanging a bed sheet on our clothesline, and securing it with pegs. To keep the sheet tight and to prevent it from flapping in any wind we weighted the bottom of the sheet down with bricks. We used two 50W ultraviolet globes to attract the moths to the sheet.

Light sheet as set up.

Below is a list of all the materials we used:
Clothes line (to hang the sheet from).
1 x large queen sized cotton bed sheet
2 x 50W ultraviolet globes (Bug Zapper replacement globes).
2 x lamp fittings for the globes
1 x 5m x extension cord
1 x power board

We set up the moth sheet almost every night from the 7/12/2018 to the 6/1/2019, and recorded observations for 22 days during this period. On each night we only observed for approximately two to three hours from dusk (which was approximately 9.00 pm). We photographed every species of invertebrate that we could. As we didn't have a macro lens on our camera we couldn't photograph some of the very small creatures.

Results

The Tables 1 and 2 summarise the moths and invertebrates that we observed during the survey period. Table 3 shows the weather and moon cycle data recorded on the nights with the highest and lowest number of observations.

Table 1 – Moths observed during the survey period, and then number of days they were observed.

	Scientific Name	Observed
1	*Nacoleia rhoeoalis*	20
2	*Phrissogonus laticostata*	17
3	*Agrotis munda*	16
4	*Olbonoma triptycha*	12
5	*Isotenes miserana*	12
6	*Etiella behrii*	10
7	*Heteromicta pachytera*	9
8	*Achyra affinitalis*	8
9	*Epiphyas postvittana*	8
10	*Sigillictystis insigillata*	7
11	*Uresiphita ornithopteralis*	7
12	*Chloroclystis filata*	6
13	*Proteuxoa sanguinipuncta*	6
14	*Helicoverpa punctigera*	5
15	*Edosa fraudulens*	5
16	*Thema psammoxantha*	5
17	*Ptyoptila matutinella*	5
18	*Araeopaschia (Genus)*	4
19	*Arrade leucocosmalis*	4
20	*Anestia ombrophanes*	4
21	*Cydia pomonella*	4
22	*Athetis tenuis*	3

	Scientific Name	Observed
23	*Hellula hydralis*	3
24	*Dysbatus (Genus)*	3
25	*Garrha ocellifera*	3
26	*Gauna aegusalis*	3
27	*Hypsopygia acerasta*	3
28	*Chrysolarentia mecynata*	3
29	*Epyaxa subidaria*	3
30	*Chrysodeixis argentifera*	3
31	*Endrosis sarcitrella*	3
32	*Endotricha pyrosalis*	2
33	*Stathmopoda melanochra*	2
34	*Euphronarcha luxaria*	2
35	*Maroga melanostigma*	2
36	*Hygraula nitens*	2
37	*Parocystola acroxantha*	2
38	*Persectania ewingii*	2
39	*Tracholena sulfurosa*	2
40	*Monopis icterogastra*	2
41	*Mythimna convecta*	1
42	*Austrocarea iocephala*	1
43	*Agrotis infusa*	1
44	*Hellula undalis*	1

	Scientific Name	Observed
45	*Culladia cuneiferellus*	1
46	*Gastrinodes argoplaca*	1
47	*Diatenes aglossoides*	1
48	*Epidesmia hypenaria*	1
49	*Anachloris subochraria*	1
50	*Heteroteucha translatella*	1
51	*Persectania dyscrita*	1
52	*Achroia grisella*	1
53	*Pyralis farinalis*	1
54	*Microdes villosata*	1
55	*Doratifera vulnerans*	1
56	*Nomophila corticalis*	1
57	*Orgyia anartoides*	1
58	*Scopula rubraria*	1
59	*Proteuxoa hypochalchis*	1
60	*Crypsiphona ocultaria*	1
61	*Simplicia armatalis*	1
62	*Sinpunctiptilia emissalis*	1
63	*Spectrotrota fimbrialis*	1
64	*Stangeia xerodes*	1

Table 2 – Invertebrates observed during the survey period, and then number of days they were observed.

	Scientific Name	Observed
1	*Phyllotocus macleayi*	17
2	*Cyclocephala signaticollis*	15
3	*Heteronyx* (Genus)	12
4	*Harmonia conformis*	8
5	*Chrysopidae* (Family)	8
6	*Anoplognathus* (Genus)	6
7	*Syllitus rectus*	6
8	*Cydnidae* (Family)	5
9	*Pentatomidae* (Family)	4
10	*Anisocentropus bicoloratus*	3
11	*Xanthogaleruca luteola*	2
12	*Cyclochila australasiae*	2
13	*Cicadellidae* (Family)	2
14	*Enicospilus* (Genus)	2
15	*Dermaptera* (Order)	2
16	*Notonectidae* (Family)	1
17	*Leptogaster* (Genus)	1
18	*Scolypopa australis*	1
19	*Braconidae* (Family)	1
20	*Elateridae* (Family)	1
21	*Eretes* (Genus)	1
22	*Netelia* (Genus)	1
23	*Xystrocera* (Genus)	1
24	*Alleculinae* (Subfamily)	1
25	*Asilinae* (Subfamily)	1
26	*Lebiini* (Tribe)	1
27	*Curculionoidea* (Superfamily)	1

Table 3: Weather data on days with most / least observations

Day	08/12/18	15/12/18	13/12/18	30/12/18
Temperature Deg C	17	19	17	18
Humidity %	94	64	94	68
Wind Speed Km/h	20	13	19	17
Wind Direction	S	NNE	SW	S
Daily Rainfall mm	0	7.2	11	1.8
Moon Phase	WaxCres	FQ	WaxCres	WanCres
Moon Visibility %	1	50	32	38
Moths	39	34	7	1
Other Invertebrates	6	10	1	10
Total	45	44	8	11

Legend

Most Observations

Least Observations

WaxCres = Waxing Crescent Moon
FQ = First Quarter Moon
WanCres = Waning Crescent Moon

Discussion

I really enjoyed putting the moth sheet out every night and observing insects each night regardless of the weather conditions. I was very surprised by the diversity of insects that I saw in my backyard during the survey period, with 65 confirmed species of moths (Table 1) and 27 species of other invertebrates (Table 2). Note: Not all of the invertebrates were identified to the species level.

I was told that I should expect to make the most moth observations on a warm humid evening that had a light breeze, about 3 days before through 5 days after a new moon. The reasons for this were:

- On dark nights (around the new moon), artificial lights like moth lamps might cause moths to lose track of the natural moon light and be attracted to the moth lamps instead;
- As moths are small creatures they can't afford to lose much water and risk drying out when weather conditions are very hot and dry. This may cause them to be less active as they may seek shelter to escape the extreme weather conditions.
- A light breeze might help moths to disperse more widely resulting in more moths finding their way to a moth sheet. Very high winds are more likely to result in moths taking shelter.

So what did I observe?

I made the most observations on the 8/12/2018, which was the day after the new moon. On this date I also recorded the highest humidity during the entire survey period, 94%. The temperature on this day was a mild 17 degree C and the winds were light, 20km/hr. These conditions aligned closely with the optimum observation conditions that I was advised of.

I made the least number of observations on the 13/12/2018, which was 6 days after the new moon. The weather conditions on this date also closely aligned with the optimum observation conditions, with 94% humidity, 17km/h winds and a temperature of 19 degrees C. The key difference from the 8/12/2018 observation was that the survey location recorded 11mm of rain on that day which was the second highest rainfall day for the month, (the highest being 14mm on the 14/12/2018). It is possible that the rain made the moths less active resulting in fewer observations.

References

East Bentleigh Weather Data: https://www.timeanddate.com/weather/
East Bentleigh Rainfall Data: https://www.willyweather.com.au/

Acknowledgements

I would like to thank Cathy Powers for help in identifying 17 of the moths in Table 1.
Also, a very big thank you to Victor W Fazio III https://www.inaturalist.org/people/13444 who assisted with many moth and invertebrate identifications.
Thank you to Peter Marriott for inspiring and advising on the project from the beginning.

See pp.35 and 36 for photographs of some of the moths and invertebrates observed.

Congratulations to Daniel for carrying this project to completion including this interesting report for the Bulletin. Editor

Moth 1 - *Nacoleia rhoeoalis*

Moth 2 - *Phrissogonus laticostatus*

Moth 11 - *Uresiphita ornithopteralis*

Moth 13 - *Proteuxoa sanguinipuncta*

Moth 20 - *Anestia ombrophanes*

Moth 24 - *Dysbatus* sp.

Moth 26 - *Gauna aegusalis*

Moth 27 - *Hypsopygia acerasta*

Moth 30 - *Chrysodeixis argentifera*

Moth 34 - *Euphronarcha luxaria*

Moth 35 - *Maroga melanostigma*

Moth 41 - *Mythimna convecta*

Moth 48 - *Epidesmia hypenaria*

Moth 55 - *Doratifera vulnerans*

Moth 57 - *Orgyia anartoides*

Phyllotocus macleayi

Cyclocephala signaticollis

Syllitus rectus

Anisocentropus bicoloratus

Eretes sp.

Cuspicona sp.

Dragonfly Observations in Northern Victoria

Reiner Richter reiner@rnr.id.au

This summer (2018-2019) I had the opportunity to make several trips inland and spent time exploring the lower Ovens River (north from Wangaratta) and the Murray River (mostly a little downstream from Yarrawonga). Part of the reason was to try and get photographs of some inland dragonfly species that I hadn't seen very often. Time was spent during the day observing insects sunning themselves or waiting at breeding sites and also spotlighting at night for roosting ones. Early in the morning is a good time to observe insects still roosting (before they warm up) but on many of the days it became quite hot so the insects were active earlier.

The first visit to the area this season became an aborted trip through the alps after my camera played up. I camped near Wangaratta and while spotlighting I saw a Nighthawk dragonfly *Apocordulia macrops** (Figures 1,2). Despite searching previously at known sites (as well as this location) this is the first time I had seen the species. Mine are now probably the only "natural" photos of them as the previous ones are museum specimens or individuals reared from larva collected during water sampling. With a new camera and suitable weather I decided to return a few days later and this time saw two males roosting on the first night.

Figures 1,2 Nighthawk dragonfly *Apocordulia macrops* males.

During this trip I also visited a site along Reedy Creek below Woolshed Falls Beechworth, where a few years ago I had seen some less common dragonflies. Again I saw a few species including my first ever female Unicorn Hunter *Austrogomphus cornutus* (Figure 3).

Figures 3,4 Unicorn Hunter *Austrogomphus cornutus* female left, male right.

Two other species of interest were Royal Tigertail *Parasynthemis regina* (Figure 5,6) and Stout Vicetail *Hemigomphus heteroclytus* (Figure 7). The latter is difficult to distinguish from Southern Vicetail *Hemigomphus gouldii*, which is much more common in Victoria. The only way I can tell is by getting a good view of the male's appendages and referring to the key.

Figures 5,6 Royal Tigertail *Parasynthemis regina* female (left) and male (right).

Figure 7 Stout Vicetail *Hemigomphus heteroclytus* male, inset is a close-up of the tail.

After returning home and looking at the map I noticed the reserve extends almost all the way to Eldorado, with numerous potential access points and camp sites, so this was a place to visit on the next trip. When I returned I saw some female *Hemigomphus gouldii* (but still haven't got good photos of them) as well as numerous more *Austrogomphus cornutus*.

Figure 8 Inland Hunter *Austrogomphus australis* male.

Along the Ovens River north of Wangaratta I encountered a few of the Inland Hunters *Austrogomphus australis* (Figure 8). At one site there were two and I didn't realise one was a female – I was amazed at how adept it was catching a couple of Pygmy Grasshoppers (Tetrigidae) from her perch as they jumped past. It was only upon processing the photos that I noticed this was a female – males at breeding sites are generally not that interested in prey.

Figures 9,10,11 Gold-fronted Riverdamsel *Pseudagrion aureofrons,* clockwise from upper left female, mating pair and male.

On the final day along the Murray River I also finally managed to get some good photos of a mature female Gold-fronted Riverdamsel *Pseudagrion aureofrons** (Figures 9,10,11), a species not very common in Victoria south of this river.

I did see a Twinspot Hunter *Austroepigomphus praeruptus* at Miepoll again, and also at a new location at Wahring a short distance away, but only males and no good photos.

For all the observations I recorded during these trips look at the following iNaturalist project I created for them:
https://www.inaturalist.org/projects/rr-2019a

Some of the photos of Odonata taken on these trips will appear in my upcoming book to be published by the Society.

Minutes of the Entomological Society of Victoria Council Meeting
Tuesday 19 March 2019 Melbourne Museum

Attendance: Peter Marriott, Peter Carwardine, Julia McCoey, Joshua Grubb, Linda Rogan, Martin Lagerwey, Sharon Mason, Lyn Meredith

Apologies: Maik Fiedel, Ray Besserdin

Previous Minutes: Minutes of EntSocVic Council 15 January 2019 in VE 49 no.1 p. 13.
M: Peter Carwardine S: Sharon Mason

Treasurer's Report:
The statement of receipts and payments for the year ended 31 December 2018 was presented. This can be seen on pp. 42-43.
As required by the Associations Incorporation Reform Act (2013) a copy of Schedule 1, Re. 15 Form 1 was signed by two members of the Council.
M: Joshua Grubb **S:** Peter Marriott

Editor's report:
The April Bulletin is well advanced and Linda was pleased to have more than enough for this issue including a significant contribution by one of our new young members Daniel Kurek. This Bulletin will be 24 or 28 pp.
Reports on March Mantid Month are continuing to come in and will be reported upon in the June Bulletin.
General Business:

1. **Future meetings**: see attachment 1 for schedule so far.
   Ideas for future speakers include orchid pollinators, peacock spiders *Maratus* sp.
   A suggestion for the August excursion is the Museum live exhibits.

2. **Officers and council for 2019:**
   Nomination forms were filled out for those members present who expressed willingness to serve on Council for the coming year. Council is still seeking the participation of additional new members.

3. **Twitter account:** Josh reported this is going well with about 176 members so far. It was discussed that we need to check with Steve about how he is keeping such interesting stories appearing on facebook.
   Julia suggested a banner competition to add variety to the current facebook banner.

4. **Publications report:**
   Peter M. reported that a booklet will be coming out soon from the mothing team on the Otway's Biodiversity survey. Funding for this will be from the Museum.
   The very exciting book on *Odonata of Victoria* by Reiner Richter with assistance from Ian Endersby is ready for publication. Peter Marriott moved that the Society should sponsor the printing of this book and Council was enthusiastically in support.
   M: Peter Marriott S: Linda Rogan

5. **EBSCO Contract:**
   It was moved that in line with other fees, the Institutional Electronic sub price will be $35 and this will be the amount listed on the contract.
   M: Linda Rogan S:Joshua Grubb

(Continued on page 41)

EBSCO paperwork is to be signed pending clarification of the appropriate entry for the Society's principal place of business (Licensor).

6. **New webmaster:** We welcome Josh Lagerwey as our new webmaster. Handover is expected to happen this week and the aim is that updating of activities will be done before the AGM in April.
7. **March Mantid Month:** Linda has received some responses via email and Julia reports some interest on facebook. Julia will compile a report for the June Bulletin.
8. **New nametags for members with new logo?** Defer for Ray Besserdin's input.
9. **Le Souëf Memorial Award:** It was noted that this award has not been awarded over the last couple of years. Council plans to re-institute the process with the aim of resuming presentation of the award for 2019.
   More information is on our website entsocvic.org.au under Le Souef Memorial Award.

Meeting closed. For future meeting see the back page of the Bulletin.

Vale John Kissane
DOB 30 May 1922
DoD 24 Oct 2018 at age 96

John was one of five children whose Secondary schooling was at Parade College in East Melbourne then St Kevin's College in Toorak.

He was a hard working and successful student with a very early interest in his outdoor surroundings, a born Naturalist.

After working for a time at the Herald and then The Titles Office he joined the Christian Brothers in his early twenties.

The qualifications he then gained enabled him to teach Physics, Chemistry and Mathematics at a senior level. He taught in NSW, WA and Victoria.

He joined the Field Naturalists Club of Victoria in 1978 and the Entomological Society's records show him becoming a member in 2005.

When I met him he was in his eighties and he still had the desire to educate others. His knowledge of botany and entomology, particularly Coleoptera, was extensive and he was a keen birdwatcher. He also still had a thirst for learning.

He had taken up watercolour painting on retirement and was still attending weekly classes in the city until it became too difficult for him to make the journey.

He had a huge reference library and which took up most of the space in his room at the Hostel where he was living, and his microscope was set up on his desk. He was always keen to share his passions with his fellow Brothers.

I am one of many whose lives have been enriched by knowing him.

Carol Page

THE ENTOMOLOGICAL SOCIETY OF VICTORIA INC.
STATEMENT OF RECEIPTS AND PAYMENTS
FOR THE YEAR ENDED 31 DECEMBER 2018

GENERAL ACCOUNT

INCOME				
	Subscriptions			
	Member		3,521	
	Institute		336	
	Donations		276	
	Interest		231	
	Back issues		93	4457
EXPENDITURE				
	Journal Costs			
	Printing	3,148		
	Postage	1,346	4494	
	Corporate Affairs Fees		57	
	Picture frames		100	
	Website		65	
	CBA Merchant Fee		40	4756
SURPLUS/(DEFICIT) FOR YEAR				(300)
	Add balance brought forward from 2017			(2996)
	Balance carried forward to 2019			(3296)

LESOUËF MEMORIAL FUND

INTEREST INCOME			
	Commonwealth Bank Fixed Deposit		231
Less			
	Award Expenditure	0	
	Science Talent Search	100	100
SURPLUS/(DEFICIT) FOR YEAR			131
	Add balance brought forward from 2017		2955
	Balance carried forward to 2019		3086

PUBLISHING ACCOUNT

INCOME			
	Book sales		
	(Moths of Victoria part 1)	243	
	(Moths of Victoria part 2)	339	
	(Moths of Victoria part 3)	213	
	(Moths of Victoria part 4)	224	
	(Moths of Victoria part 5)	316	
	(Moths of Victoria part 6)	350	
	(Moths of Victoria part 7)	361	
	(Moths of Victoria part 8)	650	
	(Collecting & Sampling Insects)	10	
	Postage	204	
	Gippsland moth book printing	3750	
	Donations	16	
	Commonwealth Bank Fixed Deposit	0	6676
EXPENDITURE			
	Book printings	3599	
	CSI reimbursement	12	
	Postage	0	
	Credit Card Fees	134	3745
SURPLUS/(DEFICIT) FOR YEAR			2931
	Add balance brought forward from 2017		8765
	Balance carried forward to 2019		11696

STATEMENT OF ASSETS AT 31 DECEMBER 2018
GENERAL ACCOUNT

Bank Account	(3296)
Commonwealth Bank Fixed Deposit	5000
	1704

LE SOUËF MEMORIAL FUND

Bank Account	3086
Commonwealth Bank Fixed Deposit	5000
	8086

PUBLISHING ACCOUNT

Bank Account	11696
Commonwealth Bank Fixed Deposit	10000
Value of Inventory	16894
	38590

Next Meeting is the AGM 16 April 2019 with 7:45 pm start
Special presentation by Ross Field

It will take more than a wall to stop these immigrants!
Monarch migration in North America

Ross Field at the entrance to the El Rosario Monarch Reserve

All are invited to join us at Toto's for dinner at about six p.m. Corner of Queensberry St. and Lygon St.

The Annual General Meeting of the Entomological Society of Victoria Inc.
will be held on Tuesday 16 April 2018

Nominations are invited for the positions of President, Vice President, Honorary Secretary, Honorary Treasurer, Editor, and up to eight other Councilors.

A member is eligible to be elected or appointed as a Council member if the member is 18 years or over; and is entitled to vote at a general meeting. We encourage all members, including new members to consider serving on the Council.

The signed nomination form which is available from secretary@entsocvic.org.au should be in the hands of the Secretary 7 days prior to the AGM.

Thanks to Ray Besserdin, Carol Page and Ian Endersby for assistance in producing the *Victorian Entomologist.*

CONTRIBUTIONS TO THE *VICTORIAN ENTOMOLOGIST*

The Society welcomes contributions of articles, papers or notes pertaining to any aspect of entomology for publication in this Bulletin. Contributions are not restricted to members but are invited from all who have an interest. Material submitted should be responsible and original. The Editor reserves the right to have articles refereed. Statements and opinions expressed are the responsibility of the respective authors and do not necessarily reflect the policies of the Society.

Contributions may *preferably* be E-mailed to Internet address: **editor@entsocvic.org.au**. or posted to the Hon. editor in ***Microsoft Word for Windows*** with an enclosed hard copy. Tables should fit an A5 page with 1 cm borders i.e. 12.5cm width x 18cm height as a maximum size and complex tables should be in .pdf format. Preference will be given to articles with 5 or fewer pages of solid text and articles longer than this will be returned to the author for reconsideration. The main text of the news bulletin is prepared in 9 pt font Source Sans Pro (please do not use fixed point paragraph spacing). The deadline for each issue is the third Friday of each odd month.

Notice to contributors to ESV Bulletin regarding the EBSCO database. All Bulletins are listed in the EBSCO database and is now available in EBSCOhost .

ADVERTISING

The charge for advertising is $5.00 per half page.

The *Victorian Entomologist* is printed at ImpactDigital

CONTENTS

DIARY OF COMING EVENTS

Next Meeting Special presentation by Ross Field
It will take more than a wall to stop these immigrants! Monarch migration in North America
At our AGM
16 April 2019
Note 7:45 pm start
See p. 44 for details

General Meetings:

Month	*Date*	*Planned event*
June	18	Members' presentations night
August	20	Winter excursion: possibly the live exhibits at Melbourne Museum
October	15	TBA

End of year event in late November or early December to be announced.

Council Meetings are held at the Museum Victoria at 5:15 pm

The Society's Home Page on the World Wide Web is located at:
www.entsocvic.org.au

Also find us on facebook.

Scientific names contained in this document are *not* intended for permanent scientific record, and are not published for the purposes of nomenclature within the meaning of the *International Code of Zoological Nomenclature*, Article 8(b). Contributions may be refereed, and authors alone are responsible for the views expressed.

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