

# Newsletter

No. 4

November 2014

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## Melbourne City Council's Urban Bioblitz

The City of Melbourne's Urban Bioblitz is the City Council's first major effort to record the fauna of inner Melbourne, as part of its Urban Ecology and Biodiversity Strategy.



Over the next two weeks until November 15, a number of independent citizen science activities will be on offer, as well as tours lead by amateur naturalists, biodiversity experts and ecologists, as featured in The Age, The Brisbane Times and last Friday night's Channel 7 News.

Anyone can participate individually by downloading the 12-page toolkit from the City of Melbourne website ([http://participate.melbourne.vic.gov.au/files/8814/1465/1772/BioBlitz\\_Web\\_Toolkit.pdf](http://participate.melbourne.vic.gov.au/files/8814/1465/1772/BioBlitz_Web_Toolkit.pdf)). Surveys of parks, backyards, balconies and laneways can be conducted any time during the two week period with photos and location data registered

with twitter, Instagram or Bowerbird, Australia's first social science website (<http://www.bowerbird.org.au/#about>).

In total, 50 events are happening over the coming fortnight, beginning last Friday with surveys of Fitzroy Gardens. Despite the fact that these gardens abutt the CBD and have been dominated by introduced ornamental plants and grasses for more than 150 years, there was a surprising number of insect species recorded.

Sampling of freshwater invertebrates in the ponds uncovered Predacious Diving Beetle larvae (Family Dytiscidae), dragonfly and damselfly nymphs (Order Odonata), caddisflies (Order Trichoptera), bloodworms (Family Chironomidae), backswimmers (Family Notonectidae) and Small Water Striders (Family Veliidae), amongst others.

Four Inner City Wildlife tours, focussing on invertebrates, recorded more than 50 species including Caper White Butterflies (*Belenois java*), Painted Ladies (*Vanessa kershawi*), Admirals (*Vanessa itea*), Common Grass Blues (*Zizina labradus*), Painted Acacia Moths (*Teia anartoides*), Bogong Moths (*Agrotis infusa*), Harlequin Bugs (*Dindymus versicolor*), Shield Bugs (*Poecilometis* species), Emperors (*Hemianax papuensis*), Blue Ringtails (*Austrolestes annulosus*) and Plague Soldier Beetles (*Chauliognathus lugubris*).



As may be expected, a number of exotic species such as Cabbage White Butterflies (*Pieris rapae*), Elm Leaf Beetles (*Xanthogaleruca luteola*), European Honeybees (*Apis mellifera*) and Green Vegetable Bugs (*Nezara viridula*) were also recorded.

The evening finished with three light sheets, attracting literally millions of small flies (probably Chironomids), as well as Longicorns (Family Cerambycidae), Click Beetles (Family Elateridae), Weevils (Family Curculionidae), Ground Beetles (Family Carabidae), Plant Bugs (Family Miridae), Green Lacewings (Family Chrysopidae), mosquitoes (Family Culicidae), Crane flies (Family Tipulidae) and Assassin Bugs (Family Reduviidae).



Millions of tiny Chironomids blackening the light sheet near the creek area of Fitzroy Gardens

Some of the more common species were Brown Lacewings (*Micromus tasmaniae*), Diamondback Moths (*Plutella xylostella*) and ichneumonids (*Netelia* species), as

well as the occasional Granny Moth (or Old Lady Moth) (*Dasypodia selenophora*) and Tobacco Looper (*Chrysodeixis argentiifera*).



More than 30 members of the public came along for an early start to light trapping



Moths were the dominant group at the light sheet, and a full list of species will be provided to the bioblitz by Peter Marriott and

Marilyn Hewish. Several rare and unusual species were collected, something of a surprise in the heart of Melbourne.



Photographers gather around Peter Marriott's light sheet in the Fitzroy Gardens.



Marilyn Hewish points out moths to City of Melbourne staff.

Apart from the occasional study of individual species within Fitzroy Gardens, there has never been a comprehensive faunal survey of the area so the bioblitz will dramatically increase the number of known species from the gardens. And once again insects will dominate these lists, thanks in large part to ESV members.

The Fitzroy Gardens Bioblitz was just the start. Other insect-related events of the bioblitz over the next two weeks include:

### Friday 14 November

10am-3pm – Fitzroy Gardens Bioblitz tours (leaving hourly)

7.30-11pm – Royal Park nocturnal insect Bioblitz (light trapping)

### Saturday 15 November

10am-3pm – Royal Park Bees, Bugs and Butterflies tours

10am-3pm – Westgate Park Freshwater and Terrestrial Bugs tours



Please contact Patrick Honan at [phonan@museum.vic.gov.au](mailto:phonan@museum.vic.gov.au) if you would like to participate in light trapping at Royal Park.



Gumleaf Skeletoniser larvae (*Uraba lugens*), Westgate Park

Westgate Park is the one park within the City of Melbourne dominated by native vegetation. Light trapping will be coordinated between ESV members and experts from RMIT.



Common Shining Cockroach (*Drymaplaneta communis*) from under logs at Westgate Park

Although not established until the late 1980s, Westgate Park also hosts a range of animal species, particularly invertebrates. Pre-survey

reconnoitres of Westgate Park has shown a high diversity of insects inhabiting the various lakes and stands of eucalypts and casuarinas.

More than 60 species of insects have been recorded there by the Friends of Westgate Park, one of the most active Friends groups in Melbourne.



A leech riding the back of the water bug *Laccotrephes tristis* from a Westgate Park pond

The Melbourne Bioblitz 2014 is supported by Museum Victoria, Parks Victoria,

University of Melbourne, Royal

Botanic Gardens, Australian Research Centre for Urban Ecology and Zoos Victoria.

<http://participate.melbourne.vic.gov.au/projects/bioblitz/>

## Connecting the public with the Wildlife of Gippsland Lakes

This project aims to bring together community groups, the public, amateur entomologists and scientists in surveying, documenting and showcasing the rich wildlife of the Gippsland Lakes region, and the **Entomological Society of Victoria** has been invited to participate.

The primary objectives are:

1. To carry out wildlife snapshot surveys at sites representing catchment forests, freshwater rivers and the estuarine lakes.
2. To provide opportunities for public engagement about regional wildlife and avenues for further activity and learning.
3. To support and profile community interest groups in the region and recognise the knowledge and contribution that these groups make.
4. Produce a digital field guide app for smartphone and tablet that showcases the rich wildlife of the Gippsland Lakes

The main stakeholders for this project are the Gippsland Lakes Ministerial Advisory Committee (GLMAC), Museum Victoria (MV), Parks Victoria (PV), the Gunaikurnai Land and Waters Aboriginal Corporation (GLWAC) and local special interest groups (Friends of Gippsland Lakes, Greening Australia, Birdlife Australia East Gippsland).

The project objectives will be met through a series of field surveys, public engagement events and development of wildlife identification tools.

### **Wildlife surveys**

Intensive wildlife snapshot surveys (2-3 days in duration) will be run in three habitat types in the Gippsland Lakes catchment between November 2014 and March 2015, representing:

- 1) Catchment forests
- 2) Freshwater rivers/inputs
- 3) Estuarine lakes system

A preliminary scoping survey in November/December 2014 will census all three habitat types and generate visual content (images and video) for public engagement programs in early 2015. This survey will involve staff from Museum Victoria, Parks Victoria, Gunaikurnai rangers and invite members of local special interest groups.



### Forest and river surveys

The forest survey will consist of camping onsite within a selected catchment forest. Survey techniques will include direct search, pitfall traps, flying insect traps, light sheets, small mammal trapping, reptile and frog surveys, and bird and bat recording. Animals would be collected for identification and photography, with tissue samples taken for key species.

ESV members have been invited to participate in light trapping nights and general insect surveys.

The river survey will be undertaken from a riverbank at a site to be selected, as two daytime visits with potential for camping onsite. Survey techniques will include diving and airlift vacuum samples, nets and baited traps.

For the forest and river sites, community interest group members will be invited to join the scientists in undertaking the census across all faunal groups over the two days. On the final day at these two sites, the general public will be invited to a show-and-tell style open day event where researchers showcase the wildlife species of each habitat type.

### Estuarine lakes survey

Boats are chartered over two days for surveys of different regions of the lakes system. On each boat a small team of scientists will be aided by members of the general public in a census of the fishes and invertebrate animals of seagrass beds, those that live in the sediment and bird life in these regions. Survey techniques include grabs, epibenthic sleds, small nets and sediment cores. Animals will be sorted, identified and photographed on deck with the assistance of participating members of the public.

### Public engagement events

Three categories of public engagement events are planned for this project:

1. Invitation to the general public to visit field survey sites for show-and-tell style open day events with participating scientists and ESV members, showcasing the wildlife of specific habitat types;
2. Participation in Parks Victoria summer interpretations program in the Gippsland Lakes;
3. Presentations to the general public in forums such as pubs or information centres (e.g. Science in the Pub).

During these events and through wider media coverage, Gippsland Lakes residents will be invited to contribute to the broader knowledge of wildlife in the region through the Citizen Science program Bowerbird, where individuals can load their images and recordings of wildlife for identification, feedback and contribution to collective knowledge (as well as feeding to the Atlas of Living Australia website).

### Profile community interest groups

A strong objective of this project is to raise the profile and membership of community groups already active in the Gippsland Lakes region in relation to wildlife and conservation. These groups will be invited to contribute and participate in planned surveys, providing an opportunity to video and showcase knowledge holders amongst these groups.

### Produce a digital field guide to Gippsland Lakes wildlife

In all field activities, images and data will be collected to form the basis of a smartphone/tablet app for iOS and Android platforms. This digital field guide will provide images and information on identification, biology, distribution and conservation status for more than 200 wildlife species from the Gippsland Lakes region.

Please contact Patrick Honan if you are interested in participating in the Gippsland Lakes survey ([phonan@museum.vic.gov.au](mailto:phonan@museum.vic.gov.au)). Surveys will take place over three time periods:

24-28 November 2014 (includes travelling time)  
Mitchell River - forest and river surveys

1-5 December 2014 (including travelling time)  
Paynesville / Lakes Entrance area, including marine surveys and coastal woodland surveys

February-March 2015 – four shorter surveys to capture species that were not present in November and December.

## Meet your ESV Council

**Peter Carwardine**  
Vice President, ESV



### **When did you join the Entomological Society of Victoria?**

October 1972. Zoo Le Souef was a member then, always promoting the Society and very much into beetles. There were many excursions in those days. They were family affairs, and we had practical workshops as well. David Holmes held pinning workshops, and demonstrated his 'hot pin' invention to remove corroded pins from insects. Charles McCubbin brought in a lot of children into the Society and held a competition for juniors for the best insect showcase.

### **Which positions did you hold?**

I was President twice, in the 1980s and early 1990s. At that time the Presidency only lasted two years by general agreement (although that was never stated in the Society rules). I tried to start up a junior section of the Society to cater for people in the eastern suburbs but the Field Naturalists Club of Victoria moved into that field. I also initiated the position of Excursion Officer, which I'm still doing today. I would pick out places where we'd never been, picking them off a map and we'd head out. Some were disasters but we found some really good sites.

### **What do you like about the Society?**

When I first joined, the original newsletter 'Wings and Stings' was being published but only irregularly when there was enough material. 'The Victorian Entomologist' replaced it and since then has been published every second month without fail, which is important in keeping the Society together and the information flowing, particularly for country members.

### **Your favourite insect group?**

Moths, particularly Snout Moths (Family Lasiocampidae) and Cup Moths (Family Limacodidae). I've bred a lot of species through two or three generations. The last species I bred through was a native Salt and Pepper Moth (*Utetheisa* species), through three cycles. They were everywhere a couple of years ago, in Carlton Gardens and down my way in Carnegie, but I haven't seen them since. Over the 1980s and 1990s I put together a list of all butterfly species that bred naturally at my place in Malvern over a twenty year period, about a dozen species in all.

### **What has been your entomological highlight?**

Encouraging others to take up entomology. I do wander a bit, finding and breeding moths and other odd things, such as lacewings. I remember finding a Helena Gum Moth (*Opodiphthera helena*) larva and taking it to the Museum. They were overjoyed and took lots of photos, but unfortunately it was parasitised and didn't make it to adulthood. It was the only larva of this species I've ever found.



Helena Gum Moth (*Opodiphthera helena*)

### **Any unusual skills?**

I have a technique for hypnotising butterflies in the field and then picking them up by hand without a net. I'm happy to show anyone who's



interested. I grew up on a farm and learned to catch bunnies in the same way. The butterfly technique has a success rate higher than fifty percent and means you don't need to carry a net with you when out in the field.

### What's your most unusual sighting?

I'm sure I saw a Palm Dart (*Cephrene augiades sperthias*) in my garden in Malvern, about two months before they were officially reported in Melbourne (in 1990). Not one hundred percent sure, but I'd never seen anything like it and knew it was something new. I thought about reporting it but by that time someone else had officially noted their presence in Melbourne.



### Your earliest memory of insects?

Third grade in school at Bendigo. We went for a bushwalk, big trees and small shrubbery in virgin bush only a few blocks from the school, and I saw some sawfly larvae (*Perga* species). I'd never seen anything like them before and that got me interested. In fifth grade I became in charge of the insect box at the back of the classroom, which usually held Emperor Gum Moths (*Opodiphthera eucalypti*) or similar. I was also fascinated by a book of English butterflies, that I still have today. But third grade kicked it off, and since then I've always liked larvae in particular.



Steel Blue Sawfly larvae (*Perga dorsalis*)

## Articles of interest

### Chewing vibrations prompt plant to react with chemical releases

By Chris Bennett  
US Farm Journal, November 2014

Plants know and hear when they're being eaten alive by predators. Picture a speaker at field's edge pumping out high-frequency vibrations to corn as the rows pick up the sound and ramp up production of pest-resistant chemistry.

The plant-whispering scenario sounds futuristic, but the concept might not be as far-fetched as it first seems. Plants recognize the sound of herbivores feeding on their leaves and use information based on vibrations traveling through their tissues.

At the forefront of sound and vibration research in plants, Rex Cocroft and Heidi Appel of the University of Missouri (MU), have peeled back a significant layer on the mysteries surrounding exactly how plants "hear" signals from their environment and what they are listening for. In what might turn out to be a major building block for further discovery, Cocroft and Appel's collaboration shows plants detect chewing sounds made by insects and can respond with defensive measures. Essentially, acoustic information allows plants to detect herbivore attacks and counter by releasing chemicals.

Cocroft, professor of biological sciences at MU, spearheaded the audio portion of multiple experiments. He recorded the sound of caterpillars feeding using a vibration microphone with laser technology. The lasers use reflected light to determine how fast a surface is moving back and forth. For example, when chewing, a caterpillar repeatedly removes a small strip of plant tissue until a hole appears. That feeding vibration is patterned—far more than when a caterpillar is moving around on a leaf. Later, when Cocroft's recorded vibrations were played back, the *Arabidopsis* plant responded by increasing its production of mustard oil.

"The plant that we studied is in the mustard or cabbage family and is known for producing mustard oils in the leaves," says Appel, who directed the chemistry side of the research. "A caterpillar that eats nothing but mustard oil plants can get poisoned if the levels get too high."



University of Missouri researchers Heidi Appel, left, and Rex Cocroft

When plants are attacked, they respond with defensive chemistry that can take from a few hours to a few days to build up.

Sometimes, a plant doesn't experience change right away but gets primed instead.

Appel, senior research scientist in the division of plant sciences in the College of Agriculture, Food and Natural Resources and the Bond Life Sciences Center at MU, uses the analogy of cocking a gun—preparing for a response to a later attack.

"That's what we found in this case: a priming response to the feeding vibration. If a plant had received feeding vibrations before it was attacked by caterpillars, it reacted with more defense than if it hadn't heard the feeding vibrations. A silent playback device served as a control," Appel continues.

While the first experiment showed plants responded to chewing vibrations, but not indicating if the response to the chewing vibration was unique, it left open the possibility that plants might respond to any vibration in a similar manner. However, during the second experiment, Cocroft played some plants chewing vibrations; some plants insect songs; and other plants wind vibrations. Also in the second experiment, Appel went beyond mustard oil detection and measured levels of anthocyanins—the chemical that gives flowers and red wine their color.

The results confirmed their initial discovery: An increase in anthocyanins was exclusive to the *Arabidopsis* plants that heard chewing vibrations.

Science hasn't yet shown how plants distinguish chewing vibrations from wind or other movements. However, plant cells have proteins called mechanoreceptors embedded in the membranes that signal when moved in certain ways. Appel suspects the mechanoreceptors are sensing vibration.

The next step of research will be to determine how perception and detection work inside plants. Cocroft and Appel's first experiments centered solely on *Arabidopsis*, a model plant Appel

compares to the white rat in the medical world or *E. coli* in the bacterial world. Their work also focused on a single pest, the cabbage butterfly caterpillar. The duo believes they've discovered a common phenomenon and plan on widening the research to include more plants and pests with a grant from the National Science Foundation.

"There are maybe 400,000 species of plants, and what are the chances that we just happened to pick the one species that has this ability to detect vibration? The ability for plants to pick up sound is pretty clear, but the advance from this study is unique," Cocroft notes.

"Rather than playing plants a sound that is foreign to their natural environment, we approached it from a plant perspective," he adds. "What everyday sounds would be relevant? This wasn't Beethoven's 5th; this was a chewing herbivore capable of doing a lot of damage to the plant."



A piece of reflective tape helps record the vibrations of a cabbage butterfly caterpillar feeding on an *Arabidopsis* plant.

They hope to answer three questions during their next phase of research: Does the *Arabidopsis* reaction occur in other plants and with other insects? What parts of vibration

do the plants use to identify the activity as feeding? Are the mechanoreceptors responsible for feeding detection?

Appel is hopeful other scientists will take the sound and vibration research and apply it in agriculture.

"Decades ago, basic research on plant hormones provided the understanding necessary for the eventual discovery of herbicides," she says.

"There may be an equally important discovery that arises from this work, and we certainly hope so."

Cocroft echoes the possibilities for agriculture. "Could sound be played out to plants in a field causing them to respond in a beneficial way? Sure, it's very speculative, but it's also something that could happen in the future," he adds.

## The potential dark side of Nobel-winning LEDs

By Sarah Zielinski  
*Smithsonian.com, October 2014*

Earlier this week, the Nobel Prize in Physics was awarded to three scientists who invented blue light-emitting diodes. The work was crucial for producing bright white LED lighting, which is more energy-efficient than traditional incandescent bulbs. But there's a possible downside to widespread use of LEDs: They could make light pollution worse.

The ease with which we can light up our world at night has transformed human civilization, but all that excess light can cause problems for wildlife—especially nocturnal creatures. The amount and direction of light aren't the only problems. The various wavelengths of light emitted by lamps can affect animals differently.



Insects (mostly crickets) attracted to lights at the Melbourne Tennis Centre during summer

For decades streetlights have generally used yellow, high-pressure sodium vapour lamps, which light up by sending an arc of

electricity through vaporized sodium metal. The lamps are pretty efficient and powerful. The intense yellow color they emit isn't all that attractive, though, which is why these lights have been restricted to use outdoors. Now, white LEDs are quickly replacing the sodium lamps, but a study published in the October issue of *Ecological Applications* shows why that might be an environmental problem.

"The main driver of the ecological impacts that result from a shift to white LED lighting will be the increase in emissions of short wavelength 'blue' light," Stephen Pawson, an entomologist at the New Zealand research institute Scion, said in an email. "The behavior of many animals is influenced by light in the blue portion of the

spectrum. For example, insects have specific photoreceptors for blue light. Thus large-scale adoption of 'white' lighting is likely to increase the impacts of nighttime lighting on all species sensitive to 'blue' light."

Industrial white LEDs actually start with a blue LED that is covered with a phosphor coating, which absorbs some of the short-wavelength blue light and reemits it in longer wavelengths. This combination of short and long wavelengths makes the light appear white to human eyes. In the study, Pawson and his Scion colleague Martin Bader looked at the effects of industrial white LEDs versus sodium lamps on insects. They set out the lamps in a field at night, placing sheets of a sticky material next to the lights to catch any insects that came near.

On average, the white LEDs attracted 48 percent more flying invertebrates than the sodium lamps. Pawson and Bader tested six white LEDs that differed in the amount of blue light emitted. The researchers hypothesized that certain white LEDs might be less attractive to invertebrates than others. Unfortunately, that wasn't the case. "We could not reduce the ecological affects by modifying the [LEDs] because each of them still emitted enough 'blue' light to have an effect," Pawson said in an email. He is now looking at filters to see if removing more of the blue wavelengths will make the lights less attractive to insects.

If installed as currently designed, white LEDs could exacerbate pest problems, Pawson and Bader note in their study. Midge swarms, for instance, are already known to be more attracted to white lighting. The study also highlights the importance of location when deciding on lighting. The researchers point out that gypsy moths, an invasive pest species, are also attracted to white light, so installing white LEDs near an active port, for instance, could increase the risk that the moths would lay eggs on a boat and end up invading a new region of the world.

*Editor's note: The jury is still out on whether LED lights attract insects. Although most LED lights don't emit UV light, some insects may be attracted to one or more of the colours used in the mix to produce LED 'white' lights. Some LEDs are specifically manufactured to produce UV light (eg in mosquito light traps), whilst cool white LEDs and neutral-coloured LEDs may attract insects to the same degree as fluorescent or halogen bulbs.*



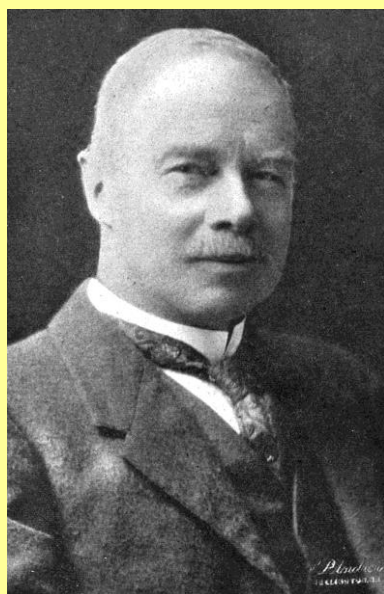
## Daylight Savings Time Invented By George Vernon Hudson, 19th-Century Entomologist

*By Joe Satran  
The Huffington Post*

Don't know much about the origins of daylight saving time? Maybe it's time to learn about the semi-annual time shift.

Benjamin Franklin is sometimes credited with the invention of daylight saving time. In 1784, he made a joking reference to something like daylight savings in a letter from France -- but apparently never thought anything of the sort would ever be adopted.

There's now broad agreement among historians that the true mastermind of daylight saving time was George Vernon Hudson (1867-1946), a specialist in insect biology (entomology) who left England for New Zealand in 1881. In 1895, when he first presented the idea to the Royal Society of New Zealand, he was mocked. Other members of the society deemed the proposal confusing and



George Vernon Hudson

unnecessary. But attitudes changed, and he lived to see his brainchild adopted by many nations -- including, in 1927, his own.

Yet the first 1,400 words of his 1700-word obituary in the society's annals include no mention of his achievement. Instead, the focus is on Hudson's

career in entomology. He was said to have "amassed the finest and most perfect collection of New Zealand insects ever formed by any one person" and was the acclaimed author of "The Butterflies and Moths of New Zealand."

How did a guy who spent most of his free time studying bugs come up with the idea of daylight saving time? It all began because Hudson became frustrated because dusk came so early in summer

that it interfered with his evening bug-collecting rounds -- his day job was at the Wellington Post Office. He figured the problem might be solved if the clock were advanced two hours in summer and then shifted back in the winter, when he wasn't bug-hunting anyway.

In a proposal in support of his idea, he explained that "The effect of this alteration would be to advance all the day's operations in summer two hours compared with the present system. In this way the early-morning daylight would be utilised, and a long period of daylight leisure would be made available in the evening for cricket, gardening, cycling, or any other outdoor pursuit desired."

When he presented his idea to the society, his peers acknowledged that it offered some benefits but insisted that "calling the hours different would not make any difference in the time. It was out of the question to think of altering a system that had been in use for thousands of years, and found by experience to be the best."

### Upcoming conferences

**Conference:** The 62nd Annual Meeting of the Entomological Society of America

**Location:** Portland, Oregon

**Date:** 16-19 November 2014

**Contact:** [www.entsoc.org/entomology2014](http://www.entsoc.org/entomology2014)

**Conference:** Entomology 2014 – Grand Challenges Beyond our Horizons

**Location:** Oregon Convention Center, Portland, Oregon, USA

**Date:** 16-19 November 2014

**Contact:** <http://www.entsoc.org/entomology2014>

**Conference:** Society of Systematic Biology Conference 2015

**Location:** Guarujá, Brazil

**Date:** 26-30 June 2015

**Contact:** <http://systbio.org/>

### **XVIII. International Plant Protection Congress (IPPC) 2015**

Mission possible: food for all through appropriate plant protection

**Conference Homepage:**

[www.ippc2015.de](http://www.ippc2015.de)

Free University Berlin

14195 Berlin-Dahlem/Germany

24-27 August 2015



## **ESA webinars**

The Entomology Society of America (ESA) offers a series of educational and professional development webinars. The live sessions are free and are open to

both ESA members and non-members. However, archived presentations are only available to members.

**Making the Most of Your Statistical Analysis.** In this webinar, Dr. Erin Blankenship from the University of Nebraska-Lincoln showcases 2-3 common analysis approaches for entomological data. For each one, she explains the appropriate statistical model, as well as the SAS code necessary to fit it. She also discusses how to interpret the results of the analysis.

**Citizen Science.** This webinar will provide an overview of what citizen science is and what citizen scientists do. Citizen science can offer researchers and participants many things, but what goes into developing a citizen science project? What are the benefits and concerns? This session will provide insight into how citizen science is being used to meet research and education needs of both project leaders and collaborating participants, using projects established at the University of Nebraska-Lincoln's Department of Entomology as examples.

**Communicating with a non-scientific community.** During this webinar, Jeff Bradshaw will discuss some thoughts, tools, and approaches concerning communication with non-scientific audiences and will provide some examples of communication workflows.

**You have been selected for an interview, now what?** Even the smartest and most qualified job seekers need to prepare for job interviews. Now that you have an interview, what are some of the things you need to do to prepare? Interviewing is a learned skill, and there are no second chances to make a great first impression. During this session, Dr. Natalie Hummel will provide you ways to enhance your interview skills.

**Approaching the Unapproachable: Tips and Tricks for Field Photography of Wary Insects** presented by Ted MacRae. During this webinar, you will learn some of the techniques

that he uses to obtain close-up and macro photographs of these beautiful beetles and also techniques for field photography of other insects as well.

**How to Write a Good Scientific Paper** presented by Dr. Tom Sappington. During this webinar, will show you how a well-structured paper allows the reader to understand: The general subject matter, background known about this topic, overall question/problem of interest and many other instructional guidance for the delivery of a good scientific paper.

**How to Efficiently and Effectively Review a Journal Manuscript** presented by Dr. Raymond Cloyd. This webinar will discuss how to efficiently and effectively review a journal manuscript by addressing factors associated with the manuscript submission and review process, decision to review, procedures affiliated with conducting an efficient and effective review of a journal manuscript, and the value of the manuscript review process.

**Creating Scientific Posters** presented by Lana Johnson. Learn how to create scientific posters that your colleagues and advisors will not stop talking about. Our expert presenter helps you learn how to display your work with award-winning design.

**Grant Writing 101** presented by Terri Fayle, Senior Grant Specialist, Kansas State University's College of Agriculture, Agricultural Experiment Station, and Cooperative Extension Service. This is the workshop you have been waiting for on grant writing. Grant Writing 101 will provide beginning researchers with some basic information.

**Improve Your Data Presentation** presented by Dr. Roger Moon. Improve Your Data Presentation provides three simple techniques that can be used to improve the effectiveness of data slides for use in spoken presentations. Authors should strive to simplify content, organize elements sensibly, and remove clutter that distracts viewer attention from the intended content.

Entomological Society of America (ESA), 3 Park Place, Suite 307, Annapolis, MD 21401-3722  
[www.entsoc.org](http://www.entsoc.org)

[http://www.youtube.com/results?search\\_query=esa+webinar](http://www.youtube.com/results?search_query=esa+webinar)

## Around the societies

### **Butterfly Conservation South Australia**

#### Remarkable fossils from Kangaroo Island

4 November 2014

Some of the best preserved Cambrian fossils in the world come from Kangaroo Island. They are about 515 million years old and include specimens with guts, appendages and some of the best preserved very early eyes. Presented by University SA Adjunct Professor Jim Jago.

#### Spider posters

BCSA has published two posters about spiders and their allies of the Adelaide region, with the support of the Adelaide and Mount Lofty Ranges Natural Resources Management Board (NRM).



### **Entomological Society of Qld**

Nine general meetings per year on the second Tuesday of the respective month.

Meetings are held at the Ecosciences Precinct, Boggo Road, Dutton Park, Qld  
k.ebert@uq.edu.au

Tuesday 11 November 2014 – Dr Jeff Skevington (tentative)

Tuesday 9 December 2014 – Christmas BBQ, notes and exhibits

Tuesday 9 March 2015 – Dr Bill Palmer, AGM and Presidential Address.

### **Society for Insect Studies**

15-16 November 2014 – Bucketty excursion

9 December 2014 – Members night

10 February 2015 – Dieter Hochuli, Wildlife versus The City

### **Australian Entomological Society**

#### Celebrating 50 years

Greeting cards by artists from Wildlife and Botanical Artists Inc.

Cards are \$5 each or set of 6 for \$25

Bright bugs coins for sale

Bright bugs set of 6 coins now available from the Australian mint.

<http://www.austentsoc.org.au/AES/Home>

### **Butterflies and Other Invertebrates Club**

#### Planning and General Meeting

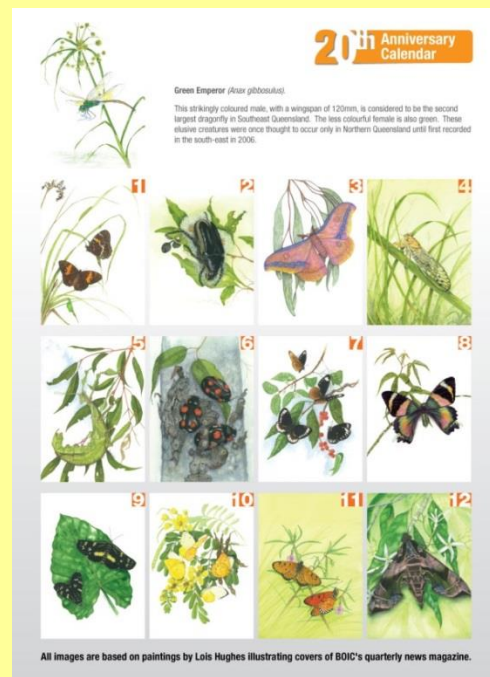
A talk by John Moss on some of the insects in his extensive collection will follow our quarterly planning meeting.

Saturday 8th November 2014 from 10am.

Where? John Moss's place at Capalaba – address provided on RSVP.

RSVP: Ross Kendall on (07) 3378 1187, 0402 254 370 or [ross@butterflyencounters.com.au](mailto:ross@butterflyencounters.com.au).

In celebration of our 20th anniversary, the Butterfly & other Invertebrates Club Inc presents their 2015 calendar of original insect & botanical art in full colour, based on the covers of our magazine, *Metamorphosis Australia*, and painted in scientific detail by our talented artist Lois Hughes.





## From the archives

### **Phasmid Spraying by the Forests Commission of Victoria**

*Published in 'The Victorian Entomologist', Vol.3, No.6, December 1973*

The following press release was provided by the Forests Commission in reply to a request for information about aerial spraying to control phasmids, particularly in the Powelltown area. It should be noted that the press release dates from 1971 and so does not necessarily reflect current policy, although no information to suggest changed policies was supplied.

#### **Aircraft to fight stick insect plague**

In an aerial spraying operation to start this week at Powelltown, the Forests Commission is fighting a plague of forest stick insects. It is threatening over 15,000 acres of some of Victoria's most valuable mountain ash forests, potentially worth more than 150 million dollars at present market value.

The minister of Forests, the Honorable E.R. Meagher, said today that over a period of two or three years such a plague would defoliate mountain ash forests so that survival of the trees is impossible. In turn, the survival of that part of the native wildlife which depends on a mountain ash habitat is jeopardised. The threatened mountain ash is mostly healthy 30 year old forest which has successfully been regenerated following complete destruction of the original forest in the 1939 holocaust.

Mr Meagher said that two Piper Pawnee aircraft, fitted with modern spraying equipment, will operate from the Sumner Ridge airstrip, five miles from Powelltown. They will be in constant radio contact with ground units at the airstrip and at control points in the area being treated.

To ensure accuracy in depositing the spray, pilots will be guided by huge brightly coloured balloons floating just above the forest canopy. The planes will fly only at 100-200 feet whilst on these flight paths. Because of the mountainous nature of the country, only most experienced pilots can be used in this work.

The insecticide being used is maldison, delivered as a microscopically fine spray which will totally

envelop individual leaves as it settles in the forest foliage. This method of application ensures maximum contact with the stick insects, to which minute doses are fatal.



The Spur-legged Stick Insect  
*Didymuria violescens*  
Image: Museum Victoria

Maldison has been selected because at this low dosage rate together with the facts that it has extremely low toxicity to warm blooded animals and that, having done its job of killing the stick insects, it breaks down rapidly under sunlight and plant action to a point where residues or side effects are

virtually impossible.

Timing of the operation is critical. Over the next few weeks the insects will mature to the egg laying stage and it is essential that they be killed before then. Winds of more than 2mph, or excessive rain, will halt spraying operations, which must be completed over the next four weeks.

19 January 1971.

#### *Editor's notes*

*The stick insect in question, although not specifically mentioned, is Didymuria violescens, known as the Plague Stick Insect, Spur-legged Stick Insect or Violet Stick Insect. In other states, Podacanthus wilkinsoni and Ctenomorphodes tessulatus sometimes defoliate large areas of forest as well. In the central Victorian forests in the 1960s, Didymuria were in such high numbers that their frass and eggs were said to be falling like rain from the canopy. The 1939 Black Friday fires destroyed more than two million hectares of forest, resulting in an even-age stand of medium sized forest in 1971. Those same trees survived Didymuria and are now 75 years old, and in the next 30 years may take over the mantle of tallest trees in the world from the Californian Redwood.*

## A Quick Relaxing Method

By V.A. Brou

*Published in 'The Victorian Entomologist', Vol.3, No.5, October 1973*

From time to time articles are presented describing improved versions of relaxing boxes. My purpose in this writing is to convey an even simpler method used by this writer for several years with great success.

Surely all collectors at some time have grit their teeth when a prize papered specimen would not soften, or when trying to spread small Lycaenids and other fragile insects, only to tear their wings in an effort to spread the specimen. Even more, small Hesperidae that have been papered are extremely difficult to spread without some damage without some damage to the specimen.



The entire relaxing operation can be accomplished without the use of any type of container. Simply remove the specimen from the paper triangle, and inject the specimen with plain tap water. Any type of hypodermic syringe will do; a 10ml syringe is perfect. A disposable syringe can be obtained at most any drugstore and will last many years. It is best to use a 20 or 25 gauge needle (US). Insert the needle directly into the thorax of the dried specimen directly under the wings. Completely fill the thorax by pushing the plunger hard until the water squirts out the rear cavity. Place the specimen back into the paper triangle it was stored in and let stand for 5-20 minutes. This will allow the antennae to soften in case the water did not enter the antennae when injected.



This method is foolproof when using good quality papered specimens, regardless of age. Specimens which have rotted because of poor drying technique or specimens covered with fungus should be watched carefully as surface wetting will occur rapidly.

I have used this method successfully on well over 10,000 Lepidoptera specimens of all types except micros. Coleopterists will find this method works quickly in softening beetles also. If a relaxing box is used in conjunction with this method, results are even better.

### Postscript

Mr D.R. Holmes, who obtained the above information from Vernon Brou, relaxes specimens for one night for preliminary examination, then injects with warm water. Allow to dry as for fresh specimens. W.N.B. Quick paints antennae with 50-50 methylated spirits and water as a precautionary measure even prior to handling.

### ESV Council:

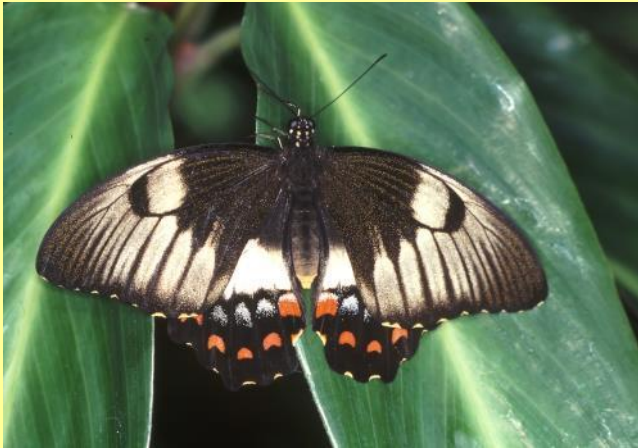
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<i>Vice President &amp; Excursion Secretary</i>	Peter Carwardine
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## Species profile

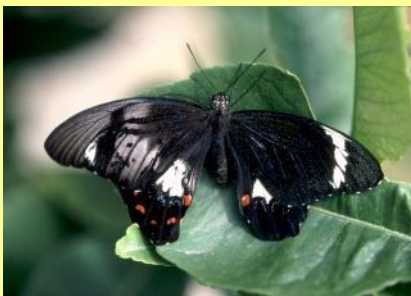
### Orchard Swallowtail

*Papilio aegeus*



#### Description and variations

Both males and females are black and white with small patches of red and blue. Males are easily distinguished from females by a much greater proportion of black on both the forewings and hindwings, particularly on the underside. A pale form of the female (called form '*beatrix*') is found in North Queensland and may be a mimic of the Pearl Owl butterfly (*Taenaris artemis*), which is found only on the tip of Cape York.



Probably more than any other Australian butterfly, this species may produce adults that are part male and part female (called

gynandromorphs), that are generally infertile. There may be bilateral gynandromorphs which are split perfectly down the middle, or mosaic gynandromorphs which are only partly male (such as a single forewing or hindwing) and mostly female, or vice versa.

#### Food plants

Caterpillars feed on nearly 40 species of food plants, including introduced citrus such as Orange (*Citrus sinensis*), Lime (*Citrus aurantifolia*), Mandarin (*Citrus reticulata*), Lemon (*Citrus limon*) and Grapefruit (*Citrus paradisa*), as well as native citrus (such as *Citrus australasica* and *Citrus australis*). Other native plants include *Flindersia*

species, *Zanthoxylum* species and *Dinosperma* species.

#### Life cycle



The eggs are round and pale yellow, 1.5mm wide and laid singly on young shoots or along the edges of larger leaves of the food plant. The egg hatches in about a

week and the young caterpillar eats the egg shell as its first meal. Until the second moult, the young caterpillar looks very much like a bird dropping, which apparently helps protect it from predation by birds. As it grows older it becomes green with irregular and variable yellowish-white markings. Older individuals also have a slight hump behind the head.

Caterpillars feed singly during the day and rest at night. Although sometimes common on citrus, there are rarely more than a few caterpillars per tree and they generally cause little damage. Behind the caterpillar's head is a bright red fleshy organ (called an osmeterium), which appears when the caterpillar is disturbed and releases a very pungent odour of rotting oranges to deter predators.

The caterpillar moults four times before pupating, but occasionally a fifth moult will take place and the resulting larger caterpillar has a different pattern to normal caterpillars. When finished feeding, it attaches itself at the rear end to the



plant with a silken pad, then threads a single strand of silk (called a girdle) from the plant and around its

middle for support. It remains in this position for about a day before shedding its skin and pupating. Caterpillars take about a month to develop from egg to pupa, depending on temperature and daylength.

The pupa varies in size (32-40mm) depending on the amount of food consumed as a caterpillar. Colour varies from green to brown, often with





darker mottling, determined in part by the pupa's location on the plant, generally green when pupating amongst leaves and brown when

further down towards the trunk. The time spent as a pupa varies within the butterfly's range, and in southern parts of the range the pupa will become dormant for six months to emerge in Spring. The determining factor seems to be daylength rather than temperature.

Adults emerge in the early morning and hang from the empty pupal case for several hours before expelling liquid wastes generated during pupation, and flying off. Adults can be seen throughout the year at Cairns but only from August to May in Brisbane, and October to May in Sydney. In Melbourne they appear during summer but generally do not breed.

### Courtship and mating

Courtship is undertaken by the male hovering above the female whilst she is flying or at rest on foliage, beating his wings and showering her with his sex scent (called pheromones). Mating occurs with the male hanging underneath the female in a trance-like state (called catalepsis), and generally lasts 45-60 minutes. During this time the female may undertake short flights with the male hanging immobile underneath.

### Behaviour

The adults' flight is slow and erratic when cruising but they can fly very rapidly in swooping arcs when disturbed. Females are often seen flying around the food plant, landing with wings vibrating rapidly to feed at flowers or lay eggs. Males may fly along set pathways, often circling a wide area continuously in the same direction, to search for females and chase other males away.

Unlike many other butterfly species, Orchard Swallowtails hold the wings out to the side when at rest. The dark colour of the adults (particularly the males) absorbs heat from the sun and in tropical areas they tend to fly mainly in the shade, keeping the body temperature to about 37°C even when the outside temperature in the sunshine is up to 43°C.

The compound eyes of Orchard Swallowtails are large with excellent vision. Those of males may have more than 18,000 simple eyes in each compound eye. They are very sensitive to movement, and the butterflies are able to direct their vision as they move, being particularly aware of vertical or horizontal movements depending on whether the individual is searching for a mate, avoiding predators or searching for flowers or foodplants.

### Natural enemies and defence



Orchard Swallowtail caterpillars are attacked by birds, particularly Silvereyes, which take them from foliage, and the adults are caught on the wing by larger birds. Both caterpillars and adults are also captured by larger predatory insects and spiders. Assassin bugs prowling through

foliage pierce the caterpillar's skin and suck out the internal fluids. Diseases such as viruses and bacteria can sometimes affect the caterpillars, leaving the shrivelled victim hanging from leaves of the foodplant, but the incidence in the wild is probably uncommon. The adults may also be trapped by the proboscis in flowers of some introduced plants.

They are also attacked by parasitic insects in all stages other than the adults. Tachinid flies lay their eggs on leaves of the foodplants and, when these eggs are consumed by the caterpillar, the fly larva hatches and begins feeding on the caterpillar from the inside, eventually killing it.

The eggs, caterpillars and pupae are also attacked by several species of tiny parasitic wasps. Tiny egg parasites lay their eggs inside the butterfly's egg, the wasp larva consuming the contents before emerging to fly off and infect other eggs. Caterpillar parasites lay their eggs on or in the host caterpillar and several dozen adult wasps may emerge from the caterpillar or pupa after it has been consumed. Caterpillars also suffer from viruses and bacteria that cause them to shrivel, leak liquid and die.

## December excursion

### **The Patch Primary School**

Sunday 7 December 2014



**The Patch School**

Respect, Responsibility, Integrity.

This year the ESV's excursion is to The Patch Primary School in the Dandenongs.

The school has an award-winning environmental programme and garden, having won the ResourceSmart schools award (biodiversity section), and the Eastern Metropolitan Region division of the School Gardens Awards. It was chosen as one of three finalists in the Education category of last year's Premier's Sustainability Awards. This was the first time a primary school had been named as finalists in these awards.

The environmental garden featured on ABC's Gardening Australia TV show and hosts the video 'Building a School Garden' on Splash (<http://splash.abc.net.au/media?id=30753>) on the ABC website.

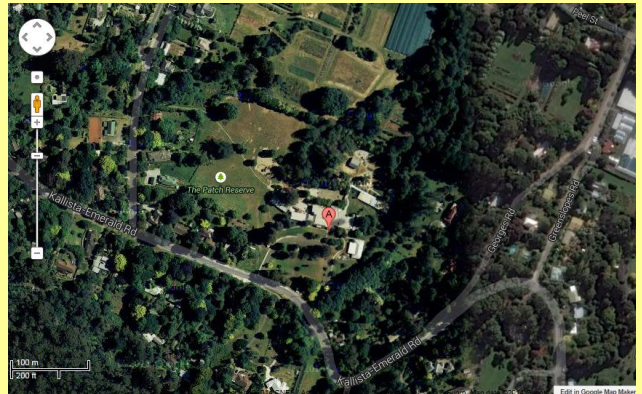


The Patch Primary School has asked the ESV to survey the site in conjunction with the students as part of a biodiversity project driven by the national curriculum.

Staff from the Atlas of Living Australia will also be present and the school is hoping to attract local if not regional media. More than \$2,500 worth of equipment has also been donated for use on the day.

The preliminary plan is for ESV members to help the students survey the school in three groups –

freshwater habitats, forested areas and other habitats. Data will be collected and photos taken, to be uploaded to the Atlas of Living Australia as well as a special section on the Citizen Scientist website Bowerbird.



Reflections from the school in the 2013 awards: "We are very proud of our garden at The Patch School and it was wonderful to watch and listen to the students selected from grades 5 & 6 who were the official tour guides as they showed the [Premier's Sustainability Awards] judges around the garden.

"The judges were astonished at the level of knowledge demonstrated by the students and their clear understanding of the processes and purpose of sound garden design. They were able to articulate the reasons behind the layout of the garden, the importance of careful plant selection, the need for and processes of extensive site surveys and analysis prior to building a garden and even the botanical names of many of our plants. It was a wonderful opportunity to showcase the scientific knowledge, leadership skills and interpersonal development of our students and their pride and enthusiasm for our garden."

Please contact Patrick Honan at [phonan@museum.vic.gov.au](mailto:phonan@museum.vic.gov.au) if you're interested in participating in the December excursion.



Contributions to the ESV newsletter are always welcome.

Contact the President, Patrick Honan, at [phonan@museum.vic.gov.au](mailto:phonan@museum.vic.gov.au)