



Understanding
Our Natural World
Est. 1880

Field Nats News No 336



Newsletter of the Field Naturalists Club of Victoria Inc. Editor: Joan Broadberry 03 9846 1218

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Governor of Victoria

Office Hours: Monday and Tuesday 10 am - 4 pm

December 2022/January 2023

From the President

Despite the persistently cold and wet weather, we have held quite a few meetings in the hall and undertaken some successful excursions. It is important that we have actual meetings where members can engage in conversation over a hot beverage and supper. Please make every effort to come along to the hall if you can. We have many excellent speakers who put a lot of effort into their presentations and deserve to have a respectable audience turn up. There will be some Zoom meetings as well, dependent upon the preferences of the speakers themselves. As always, I look forward to seeing you all at meetings. If the weather improves, I will be heading back to Mali Dunes for more working bees. I will advise the dates once they can be set.

There is little doubt that we inadvertently carry a lot of small organisms from place to place in addition to the larger, deliberate translocations and importations. It is one of the threatening processes that humans have always engaged in. Over the millennia, we have, at times, paid a terrible price for our ignorance and lack of bio-security. A relatively innocuous occurrence reminded me of the ease and speed of translocation in our modern society. I recently opened a sealed bag of kale from Queensland and was greeted by a small traveller hiding in the whorls of the kale; a tiny, striped, native ladybird beetle,



Photo 1. *Micraspis frenata*, The Striped Ladybird from kale.

Micraspis frenata (Photo 1) At other times I have encountered green tree frogs in bananas from Queensland, local tree frogs in cabbages, earthworms and slugs in lettuce and a host of invertebrates in plants from nurseries; some of which came from interstate. Many travellers, apart from humans, came with the first fleets from Europe and ultimately the rest of the world. The introduction of alien species was not restricted to land and freshwater; many marine species came attached to ships and within bilge water. Many of our human activities such as the creation of the Suez Canal and the canals between the Great Lakes of America had enormous impacts on aquatic ecosystems. Modern globalisation has seen the

There is no separate December issue of FNN. The due date for the next issue will be Tuesday
January 3rd 2023.
Seasons greetings and best wishes for the new year to our readers and to our wonderful contributors.

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CALENDAR OF EVENTS

All meetings are held at the FNCV Hall, 1 Gardenia St. Blackburn at 8 pm., unless otherwise indicated. On days of extreme weather conditions, excursions may be cancelled. Please check with leader.

December 2022

Saturday 3rd – Christmas Party BBQ (Covid permitting) 6.30 pm in the hall. Join us and help to celebrate the end of an up and down year with your fellow naturalists. As usual there will be a stupendous raffle! Contact the office admin@fncv.org.au See invitation FNN p3

Monday 5th – Fungi Group No Meeting

Tuesday 6th - Fauna Survey Group Meeting: *Members' night, including slides of recent trips and surveys.*

Contact: Ray Gibson 0417 861 651; rgibson@melbpc.org.au

Sunday 11th—Terrestrial Invertebrates Group: Location to be decided after assessing weather conditions. Check your email closer to the time for updates. Bookings essential via email. Contact Wendy Clark wendy.empathy@optusnet.com.au

Monday 12th – Marine Research Group: Meeting: *Annual members' night.* Everyone is welcome to bring along exhibits, items of interest or questions on marine invertebrates. Contact: Leon Altoff 0428 669 773; 9530 4180 AH.

Wednesday 14th - Microscopy Group No Meeting

Thursday 15th – Botany Group No Meeting.

Wednesday 21st – Geology Group No Meeting.

Tuesday 27th – Day Group No Meeting.

Friday 30th - Juniors Group No meeting.

January 2023

Monday 2nd – Fungi Group No Meeting

Tuesday 3rd - Fauna Survey Group No Meeting

Sunday 8th Terrestrial Invertebrates Group: Location to be decided after assessing weather conditions. Check your email closer to the time for updates. Bookings essential. Contact Wendy Clark wendy.empathy@optusnet.com.au

Monday 9th – Marine Research Group No Meeting

Saturday 14th & Sunday 15th - Fauna Survey Group Survey: *Rushworth Forest Nestbox Check.*

Prior bookings essential. Contact: Ray Gibson 0417 861 651; rgibson@melbpc.org.au

Wednesday 18th - Terrestrial Invertebrates Group No Meeting

Thursday 19th – Botany Group No Meeting

Tuesday 24th – Day Group No Meeting

Wednesday 25th – Geology Group No Meeting

Friday 27th – Juniors Group No Meeting

Monday 30th—FNCV Council Meeting: 7.30 pm via Zoom. Apologies and agenda items to Wendy Gare, admin@fncv.org.au. Max will email councillors the Zoom link.

The policy of the FNCV is that non-members pay \$5 per excursion and \$3 per meeting, to contribute towards Club overheads. Junior non-member families, \$4 per excursion and \$2 per meeting.



The views and opinions expressed in this publication are those of the authors and do not necessarily reflect those of the FNCV.

Members' news, photos & observations

We always have space for member photos and natural history observations. Please share with us what you have noted in your daily life, travels or garden. Email: joan.broadberry@gmail.com by the first Monday in the month.

Welcome
Welcome

Warmest greetings to these new members who were welcomed into our club at the last Council meeting:

Martin Tymms, Tzaddi Degan, Peta Hughes, Khalid Warsame, Melissa Farrelly and Mun Chin.

Science Teachers Association of Victoria "Science Talent Search" for 2022

The FNCV donated \$500 this year to the Science Talent Search.

The following is a list of students who received bursaries from our donation

Semaya Kaur: *Flower Shapes* (Upper Primary - Science Photography) \$35. Camberwell Girls Grammar School - Ormiston
 Elsie Mclean: *Brink of Extinction* (Junior - Games) \$50. Camberwell Girls Grammar School - Senior
 Gabrielle Kobayashi-walsh: *Testing 8 water samples* (Junior - Experimental Research) \$150. Genazzano F C J College
 Isabella Xie: *Australian Animals* (Middle Primary - Games) \$40. Glendal Primary School
 Ahinav Chimalkar: *Natural Selection Simulator* (Open - Computer Programs) \$65. Haileybury, Berwick Campus Secondary
 Marcel Krivonos: *How deciduous trees survive* (Intermediate - Science Photography) \$55. Kilvington Grammar School - Senior
 Jinjia (Jennifer) Wu: *Ecotopia* (Intermediate - Games) \$45. Presbyterian Ladies' College - Senior School
 Ari Demetrious: *Carrum Carrum Swamp Micro Monsters* (Upper Primary - Science Photography) \$45. The Peninsula Grammar School - Primary

Barbara Burns

FNCV Christmas Party

Saturday December 3rd 2022

Join us at 6.30 pm in the FNCV Hall, 1 Gardenia St. Blackburn

Relax and enjoy a BBQ with friends and members from all FNCV Special Interest Groups and celebrate another wonderful year of activities. All welcome!

- * The club will provide meat, veggieburgers, bread and nibbles. Please bring a salad or a sweet to share. BYO drinks. Email the office admin@fncv.org.au by Friday 25th November to let us know numbers coming and what food you are bringing.
- * We will also be holding the traditional FNCV end-of-year fundraising raffle. **Donations of prizes would be much appreciated**, e.g. wine, knick-knacks, plants, books etc. Look deep into your 'present drawer'. Deliver to the labelled box in the office or (preferably) bring them with you on the night.

Queries to Wendy in the office 9877 9860 or admin@fncv.org.au



bookshop@fncv.org.au

for any orders or bookshop queries.
 If you don't have access to email, the FNCV office
 will pass on your message.
 Kathy will then be in contact with you.

FNCV Facebook report: 26,615 followers.

(Continued from page 1)

problem of bio-security explode out of control despite strict quarantine protocols. Some incursions might be deemed to be accidents or perhaps careless implementation of containment procedures; others are simply deliberate. Wildlife smuggling is an example of a serious, deliberate, and calculated bio-security risk, notwithstanding the associated ethical issues.



Photo 3. *Hippodamia variegata* mating, Clayton, Victoria.
This may be the *novempunctata* variety,

people and vehicles need to be decontaminated before access is permitted. We will need to consider how we manage bio-security protection for Mali Dunes and prevent the accidental introduction of even more undesirable species.

Another ladybird species, *Hippodamia variegata*, Coccinellidae, was imported from Europe (Palearctic) and is often thought to be native. It now appears to be ubiquitous, having spread around the globe. I have recorded its life cycle. (Photos 2-6 adults and larva).

As naturalists we need to be careful about what we might spread from location to location as we move about. *Phytophthora cinnamomi* and Myrtle Rust, *Puccinia psidii*, are plant diseases that can be easily spread by our activities. Some of us might be in East Gippsland one day and travelling to the Otways the next. The potential to move plant pathogens and small organisms about is quite high. Cleaning vehicles and footwear between sites is critical to reducing risk. The spores of Myrtle Rust also cling to clothing and may be spread via that means. I have visited many places where both

Max Campbell

All photos: M. Campbell



Photo 2. *Hippodamia variegata*, Mt Elizabeth, Victoria

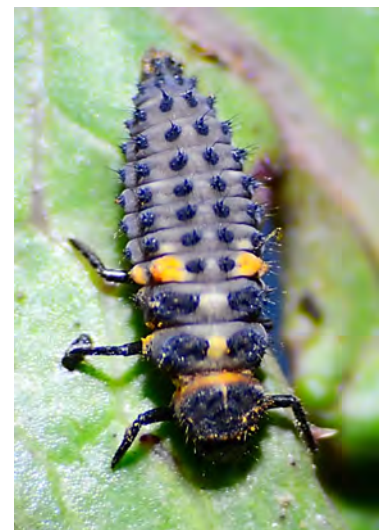


Photo 4. *Hippodamia variegata*, adult consuming aphids



Photo 5. *Hippodamia variegata*, early larva eating an aphid.

Right:
Photo 6. *Hippodamia variegata*, full-size larva.





Day Group

Coastal guide to nature and history 3. Western Victoria Speaker: Graham Patterson

Graham Patterson introduced his latest publication, *Coastal guide to nature and history 3, Western Victoria*, to the October meeting of the FNCV Day Group. This, his third book, covers the 420 km of coast between Point Lonsdale and the South Australian border and takes its place alongside, *Coastal guide to nature and history Port Phillip Bay*, (2013) and *Coastal guide to nature and history 2: Mornington Peninsula's ocean shore, Western Port, Phillip Island & French Island*, (2015).

The Western Victorian coast offers spectacular scenery including the Great Ocean Road, the Great Otway and Port Campbell National Parks, and the Discovery Bay and Bay of Islands Coastal Parks. There are also several iconic walks such as the 44 km Surf Coast walk and the 250 km Great Ocean Walk.

Coastal guide 3 is packed with information, covering virtually every aspect of this beautiful coastline. Separate chapters detail the Bellarine Peninsula and the Surf Coast, (Point Lonsdale to Lorne), Otways Coast, (Lorne to Princetown), Shipwreck coast, (Princetown to Port Fairy) and Discovery Coast, (Port Fairy to the SA border). Other chapters cover Aboriginal life, European discovery and settlement, coastal animals and plants and coastal landforms.

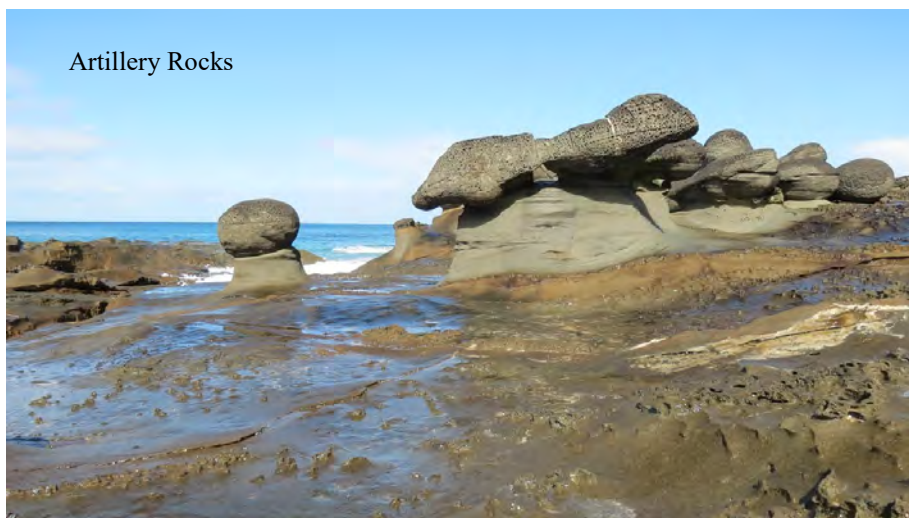
With such a wealth of material to draw from, Graham's presentation sampled only a portion of what his book contains.

Geology:

The rocks that form the coastline of Western Victoria were laid down as Australia began separating from Antarctica during the early Cretaceous period, more than 100 million years ago.

"... associated earth movements created a vast basin ... running east-west... Great rivers carried sediment into this basin, and following periods of uplift, these sediments became the sandstones, mudstones and conglomerates of the Otways. They extend about 100 km along the coast between Aireys Inlet and Princetown... Geologists label these rocks the Eumeralla Formation." (p165)

Castle Cove, containing a dipping Eumeralla formation, is a geological site of State significance (p55). Nearby, Dinosaur Cove is accessible only with difficulty, but is famous for the dinosaur fossils excavated there, some by blasting, between 1984-1993. The entrance is now sealed, with a commemorative plaque attached. Dinosaur footprints have been removed from another site, east of Skenes Creek and placed in the Melbourne museum. (p44-45)

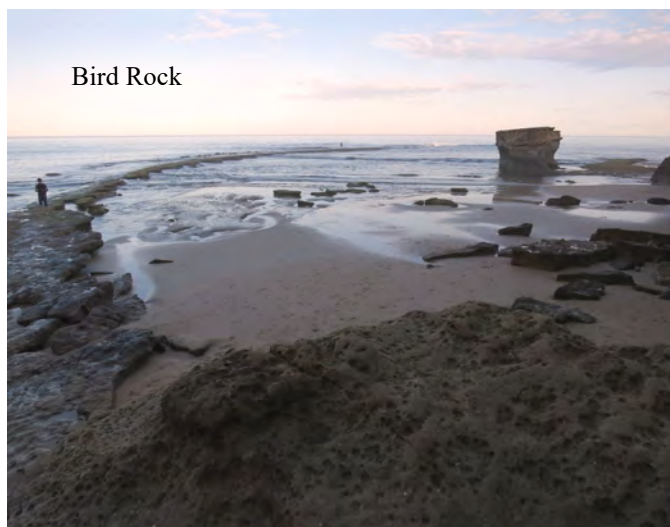


Coastal Landforms:

- Iron rich, siderite concretions on the shore platform below Mt. Defiance. (p41)
- Cannon-ball concretions known as Artillery Rocks, west of Lorne. A site of International geomorphological significance. (p41)
- Honeycomb weathering, Shelly Beach Marengo. (p48)
- Landslip site, Windy Point near Lorne. (p39)
- Bird rock, Jan Juc. (p18-19)
- Demons Bluff Anglesea. Access to the cliff edge is restricted because of the danger of landslides. (p24)
- Sinkholes formed in the Port Campbell limestone. (p83)
- Calcrete formed from windblown sand. (pp86, 122)
- Soil pipes (misnamed as a petrified forest), Cape Bridgewater. (p127)

Animals and plants:

A phenomenon known as the Bonney Upwelling occurs in the coastal waters of the Discovery Bay Maine National Park.



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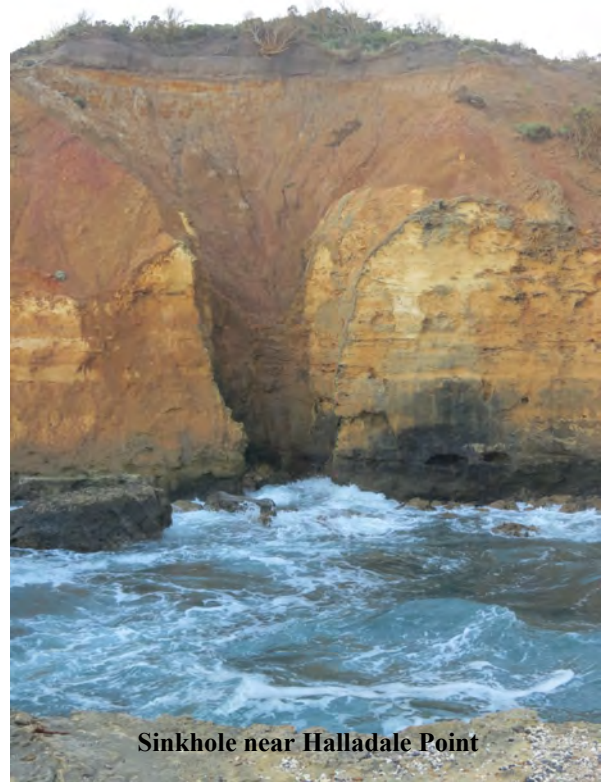
(Continued from page 5)

“Regular south-easterly winds during summer push surface waters away from the shore. This draws up cold nutrient-rich water from the deep, beyond the edge of the continental shelf, which is relatively nearby here. ... Blue Whales are increasingly seen here, attracted to the bounty of krill.” (p128)

- Pygmy Blue Whale washed up near Lorne in 1992. (p34)
- Seal colony Cape Bridgewater. (p126)
- Gannet colony, Point Danger Portland. (p119–120)
- Nankeen Kestrels photographed near Torquay. (p138)
- Buoy Barnacles, *Dosima fascicularis* on Wreck Beach. These rarely seen barnacles secrete a gas-filled float. (p65)
- Plants including: Coast Ballart *Exocarpos syrticola* shown with dark purple fruit and Muntries *Kunzea pomifera*. (pp157 and 159)

In consulting *Coastal guide to nature and history 3* while preparing this report I became more and more impressed. The amount of information and detail presented is astonishing, with the extensive use of high quality photographs, maps and diagram a huge strength. The well thought out format, present in all three of Graham's books, makes them very easy to use.

Congratulations, Graham, on another excellent publication. A ‘must have’ for all who enjoy exploring Victoria's magnificent coastline.



Sinkhole near Halladale Point

Joan Broadberry

Thanks to Graham for allowing FNN to use his images

Gannets, Point Danger



Coastal guide 3 is available for \$35 posted, from
<https://www.coastalguidebooks.net.au/>

FNCV members can obtain it from the FNCV bookshop
bookshop@fncv.org.au



Dosima fascicularis
on Wreck Beach



Exocarpos syrticola



Terrestrial Invertebrates Group

Sunday October 16th 2022

Excursion to Black Rock/Beaumaris

Target species: Peacock Spiders

Leader: Wendy Clark

A group of keen participants were led by Wendy Clark to a special area on the Black Rock foreshore where Peacock Spiders have been observed over a number of years. These gorgeous spiders belong to the Jumping Spider family, *Salticidae*. Males of the species are characterized by colourful abdomen flaps that are raised and vibrated, in a similar way to peacock's tails, as part of their mating dance. Females and immature spiders are patterned in brown, black and white.

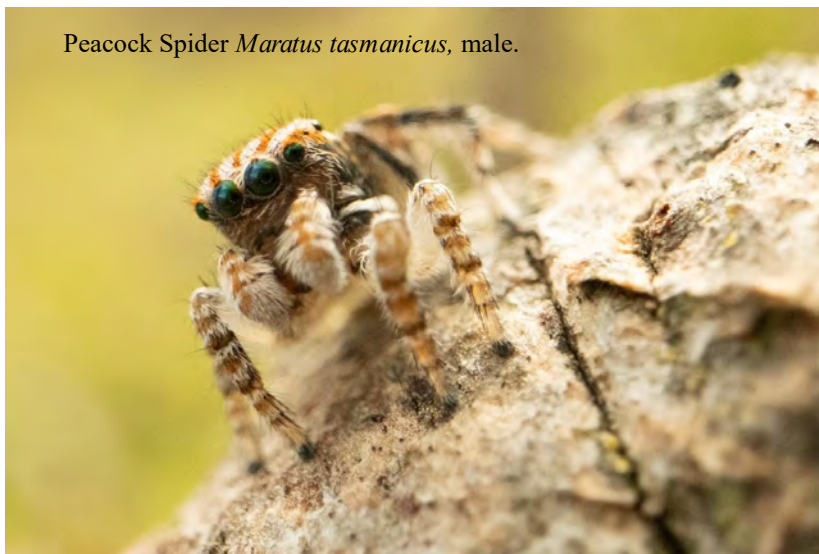
Peacock Spiders are very small, only about 3–5 mm in length. Our first and most important task was to find them. Fortunately the morning sun was shining and the breeze light. After about half an hour of careful searching the first spider was spotted, a beautiful male in full mating plumage, sitting quietly on a leaf, warming itself. We crowded together to admire his stunning bright orange and aqua-blue stripes. Many photos were taken and as time went on, more spiders were located including the plainer, but attractive, females. We were not lucky enough to observe a courtship display. The species was identified as *Maratus tasmanicus*.

Peacock Spiders hunt insects and other spiders during the day. They do not use webs to catch prey but rely on their keen eyesight. As the day warmed up the tiny spiders became more active. Searching for them was addictive and it was hard to tear ourselves away. However, eventually we relocated to our next stop, at Long Hollow Reserve Beaumaris.

Long Hollow Reserve proved to be an interesting place. It is signed as the single most biodiverse native bush remnant in the bayside area. Much of it is fenced and protected by locked gates. A notice (summarised below) indicated that part of the reserve is known as the [*Winifred Waddell Wildflower Sanctuary*](#). It was wonderful to come upon this unexpected historic link to our Club.

Wandering into the Reserve we came upon a small grassed area which I christened '*the hidden picnic ground*'. There we set-

Peacock Spider *Maratus tasmanicus*, male.



Peacock Spider *Maratus tasmanicus*, male showing colourful back.



Peacock Spider *Maratus tasmanicus*, female.



Winifred Waddell

Winifred Waddell, a gifted naturalist and teacher, was born in England in 1884. Dismayed by the rapid disappearance of native flora, she succeeded in forming a Wildflower Preservation Group in the Field Naturalist Club of Victoria in 1949. In 1952 this group became an independent body, the Native Plants Preservation Society of Victoria with Miss Waddell as honorary secretary until her retirement in 1967. The primary aim of the group was to persuade authorities around the state to set aside small fenced reserves to protect wildflowers. In 1964 she was awarded an MBE and the Australian Natural History Medallion.

More of her story is told in Gary Presland's history of the club, *Understanding Our Natural World*, pp146–147.

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bled and ate lunch surrounded by magpies and currawongs who serenaded us with duets. After eating, we explored the area and in true TIG fashion searched the foliage for invertebrates. An interesting find was a Twig-mimicking Katydid.

The group kept a sharp eye out for another species of Peacock Spider – the Plumed Peacock Spider, which had been



Twig-mimicking Katydid



Photo: J. Broadberry



Jotus sp. Jumping Spider, female.

reported in the reserve. We were quite excited to find and photograph a number of black and white Jumping Spiders, both male and female in the genus

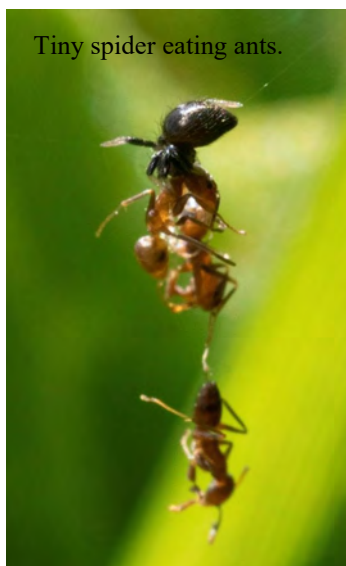
Jotus, but although we willed them to be, they were not Peacock Spiders. One of the males however was most interested in the females and was posturing and showing off his fancy legs and palps. It wasn't a full mating dance though, but still great to observe.

Quite a few other interesting invertebrates were found at the two sites. See a selection in the photos below. You can also view them on iNaturalist by clicking on this link. <https://www.inaturalist.org/projects/fncv-2022-black-rock>

Many thanks to Wendy Clark who took on the work of planning this very enjoyable outing. Carol Page has kindly organised a page in iNaturalist for the trip. A link for identifying Peacock Spiders is <https://www.peacockspider.org/>



Jotus sp. Jumping Spider, male.



Tiny spider eating ants.



Lauxaniid fly.



Jumping Spider eating a mosquito.

Joan Broadberry & Wendy Clark
All images, except where indicated, W. Clark

Caterpillars, Horned Tree Hoppers & Tyrant Ants

On the first hot days in October, I always check the Silver Wattles in my local park – Kalang Park in the Blackburn Creeklands ... and there they were!! Caterpillars of the Imperial Blue Butterfly.

This year, I managed to find them within a day of hatching. I am always surprised by how tiny they are. You can find them by looking for the Tyrant Ants that tend them.

Association with Ants

Imperial Blue Butterflies and many others of the Blues, have an association with ants. The caterpillars are quite defenceless and would be quickly eaten if not for the ants that protect them. The Tyrant Ants tend the caterpillars and pupa during the day and the *Campanotus* ants do the night shift for a sugar reward which is extra nitrogen rich as the caterpillars are feeding on Acacias. Recently it was found that the caterpillars call the ants by making clicking sounds, and even the pupa can also make clicking sounds to communicate with the ants. It was also observed that the female butterfly will only lay eggs on a tree that has the scent of ants.

Tree Hoppers hatched as well!

When I returned with a camera two days later, I found, while photographing, that the Acacia Horned Tree Hopper juveniles had also hatched at the same time. In previous years I had observed that these hoppers were in amongst the caterpillars and were also attended by the ants, giving the sugar reward as well.

It was amazing that they hatched at the same time. What sort of communication did they have to coordinate that event? Sound? Pheromones? Some other mechanism? Time to dig through the internet or if that is unsuccessful, maybe it is a project for someone to add to the store of knowledge.

Wendy Clark



Newly hatched caterpillars of the Imperial Blue Butterfly



Imperial Blue Butterfly caterpillars and juvenile Tree Hoppers, both attended by Tyrant Ants.



Imperial Blue Butterfly caterpillars attended by Tyrant Ants.



Newly hatched
Acacia Tree Hoppers
attended by Tyrant
Ant. Later they turn
green.

Tyrant Ants and caterpillars.
See if you can spot the Tree Hopper.



Imperial Blue Butterfly laying eggs.



Imperial Blue Butterfly eggs.

**Thank you to all those who
helped produce FNN 336**

Joan Broadberry, Wendy Gare, Sally
Bewsher, Pat Grey and
Sheina Nicholls.

Extracts from SIG reports given at the last FNCV Council Meeting

Botany Group: Meeting: Thursday 20th October.

Bill Aitchison, of the Acacia Study Group, ANPSA, presented on: *The botanical classification of Acacias (and some other things)*. Their diversity ranges from 641 in Western Australia to 21 in Tasmania. Bill's illustrations covered the seven sub-genus groups in Australia.

To identify: <https://apps.lucidcentral.org/wattle/identify/key.html>

See also: https://en.wikipedia.org/wiki/List_of_Acacia_species

Nine people attended.

Ken Griffiths

Geology Group: Meeting 28th September 2022

Jürgen Schaeffer has over 40 years' experience in mining, groundwater and environmental projects throughout Australasia, Norway and Africa. He spoke about our global water resources, the several types of geological water storage systems, the major groundwater storage basins in Australia (with great maps), the uses of ground water for environmental, domestic, industrial, mining, agricultural purposes and power supply. He also explained that Australia has a relatively well monitored extraction of groundwater systems in place through licences and guidelines. [Full report, p 12.](#)

It was a very interesting presentation on an extremely vital resource with a depressing conclusion as to our future water supply for the world's estimated population of 10 billion by 2050. Twenty-six people attended.

Philippa Burgess

Microscopy Group: Meeting Wednesday 19th October.

Max and Philippa led this meeting. Max had fabulous videos of microscopic animals found in mosses from Mali Dunes.

Two members who have recently joined attended. Both were extremely excited by the many supplied specimens and also samples they had brought after viewing through the dissecting microscopes.

One new member had recently purchased a new microscope and Max Campbell gave her very detailed instruction on the use, set up and care of her microscope. She was new to microscopy and was extremely pleased with the instruction she received. This is related to an online science course she is completing.

Philippa Burgess

Library News November 2022

Recent additions to the Library

The following monographs have been accessioned recently, and may now be borrowed.

Addison, Josephine (1985) *The illustrated plant lore: a unique pot-pourri of history, folklore and practical advice* [581 ADD]

Amphibians and reptiles of Victoria (1971) [597.9 AMP]

Harrison, Gordon (1978) *Mosquitoes, malaria & man: a history of the hostilities since 1880* [595.77 HAR]

Landon, Carolyn *Of friends and gardens: a history of the Cranbourne Friends of Royal Botanic Gardens Victoria* (2021) [580.744 LAN]

Levens, Laura (2007) *No legs or many: spineless and wild* [592 LEV]

Lindenmayer, D; Dovers, S; Olson, MH; Morton, S (2008) *Ten commitments: reshaping the lucky country's environment* [333.73 TEN]

Smith, J; Smith, P; Smith, K (2019) *Native fauna of the Greater Blue Mountains World Heritage Area* [599/94 NAT]

Whitley, Gilbert P (1970) *Early history of Australian zoology* [591/94 WHI]

Barker, WR; Greenslade, PJM (1982) *Evolution of the flora and fauna of arid Australia* [508.9 BAR]

Library collections on the website

Don't forget that you can search the library's collections on the FNCV website. Click 'About us' ▢ 'Library' and you will be able to download searchable lists of books, periodicals, maps and photos.

Digital issues of newsletters

Members are reminded that many rural and interstate field naturalists groups provide their newsletter to FNCV by digital means. These are all stored on the 'Correa' computer in the FNCV office. To access these newsletters, open the Library portal on the computer, and click on the 'Newsletters' icon on the desktop. Each newsletter title has a separate folder, in which are stored each issue received of that newsletter.

Dr Gary Presland
Honorary Librarian





Geology Group

Meeting, 28th September 2022

Groundwater for a Thirsty Planet

Speaker: Dr Jürgen Schaeffer

Dr Jurgen Schaeffer has over 40 years' experience in mining, groundwater and environmental projects throughout Australasia, Norway and Africa. He worked extensively in mine water management and the development of groundwater supplies for industrial, domestic, agricultural and mining projects.

Jurgen began by explaining our global water resources. It is estimated that over 90% of our water is contained in oceans, with two thirds stored in glaciers, snow and ice. One third of our water is contained as groundwater and only 0.3% of freshwater is contained in rivers and lakes.

The several types of geological water storage systems include:

Alluvium, sediment basins, fractured rock aquifers, karst aquifers, and coastal unconsolidated aquifers.

Depending on the type of storage, the water is either retained at high pressure, enabling the free flow of water through a bore, or is stored at shallow levels and is required to be pumped to the surface as it is not stored under pressure. Examples of water extraction from shallow groundwater levels include hand pumps and, in Australian agriculture, windmills.

Some aquifers take only days to collect water for storage whilst others contain water dated at two million years old. This depends on permeability and porosity.

Some of the major groundwater storage in Australia include the Great Artesian Basin, the Murray Darling Basin, the Otway Basin and the Perth Basin.

The Great Artesian Basin (GAB) is a multi-layered, confined aquifer system with artesian aquifers in Triassic, Jurassic and Cretaceous fluvial, fluvial-lacustrine and other continental and shallow marine quartzose sandstones. Ground water in an artesian basin is stored under pressure from surrounding rock layers. When a bore is sunk into an artesian basin water flows freely to the surface.

The GAB is the largest and deepest artesian basin in the world, stretching over 1,700,000 km². It is up to 3,000m deep in places. The water temperature ranges from 30 to 100°C and provides the only source of freshwater through much of inland Australia. It also supplies thermal hot spring bathing spas.

Groundwater withdrawal around the world has often had very negative impacts, and will continue to without increased monitoring and regulation. Extraction via the GAB since 1960 has recorded an over 60 m decline from previous levels. In some countries land subsistence may often be attributed to over-enthusiastic withdrawal of local groundwater.

The mining industry, a huge water consumer, after depressurising, uses groundwater for extraction of minerals. The natural environment of many countries with little regulation regarding groundwater extraction, site restoration, and environmental concerns has experienced irreparable damage due to unregulated local mining groups.

**Advertising in the
Field Nats News**

**VERY REASONABLE
RATES**

Contact Wendy in the Field
Nats Office

admin@fncv.org.au

9877 9860

(Mon –Tues 10 am—4 pm)

Australia has relatively well monitored extraction of groundwater systems in place through extraction, bore construction and aquifer interference licenses and guidelines.

Reviews and adjustments of sustainable yields are required and of course prove to be extremely lengthy processes and are not keeping up with our current and future requirements.

Management and protection of “recharge zones” is of great importance. Untreated effluents from vast feedlots can lead to contamination of the groundwater. Uncontrolled mining also requires tighter controls. Over-depletion of groundwater levels results in lower water levels in rivers and streams that permeate to fill the groundwater system.

This was a very interesting presentation on an extremely vital resource with a depressing conclusion as to the future water supply for the world's estimated population of 10 billion by 2050.

Philippa Burgess