

The BowerBird Bugle

12 August 2016 Ken Walker (kwalker@museum.vic.gov.au) Museum Victoria. Edition 45.

Hi All – Over the past 2 weeks, I have been thinking a lot about the passing of time and milestones along the way. Last week, my youngest child Elizabeth turned 18 – I finally no longer have a “child” in our household – but I am now feeding 3 adults who leave on every light in the house and stand under showers for an inordinate amount of time – how dirty can they be??? (:->!

Another time milestone also occurred in the past 2 weeks. Some may remember me talking about the discovery on BowerBird of the invasive South African praying mantis. Adam Edmonds posted the first image back in September 2015 which he had taken in his Mum’s backyard at Geelong. The image was photographed in April 2014.



Adam was able to find photos of the same mantid species he had taken in his Mum's backyard backing from 2009.

Since then this mantis species has been found in Brighton and Werribee so it is probably now well established.

One of the problems we had naming the species is that the taxonomy of the genus *Miomantis* is based almost solely on the diagnostics on the male genitalia – but we had only so far seen females.

Then in April 2016, Tamara Wright photographed both sexes in Werribee. The males have a characteristic reddish pronotum. While Tamara took images, she did not collect the specimens so we could not do a male genitalia examination to confirm the species – which we suspected to be *Miomantis caffra*. This species invaded New Zealand in 1978 and is now out competing the local NZ mantids.



In February 2016, an image of a *Miomantis* ootheca was posted on Facebook from Brighton and a BowerBird member sent me a link. I followed up with the Facebook person and visited their house to collect the freshly laid ootheca.

Fortunately, the Museum has a Live Animal section of five full time staff. They were brought on to maintain the 55 live invertebrate exhibits in the Museum's Bugs Alive! exhibition. So, I took the ootheca down to them and Maik agreed to try to breed through nymphs to try and get the first adult male.



Miomantis ootheca collected from Brighton in Feb 2016

The mantis eggs began to hatch several weeks later and apparently from when the first nymph emerged to when the last nymph emerged was a 6 week period. Such an extended emergence time is a survival technique used by many insects. If 100% of the eggs hatch on day one and there has just been a

fire or some catastrophic event had occurred, such all leaves on a tree had been removed, then all 100% of the newly hatched egg immatures would die due to lack of food. However, many insects have staged hatchings of their eggs. Perhaps 80% will hatch day 1, and then in a week or two perhaps another 10% will hatch and then in another week or two another 5% will hatch and finally more than a month since the first eggs hatch, the final 5% will hatch. This way the species spreads the chances of survival of an egg batch over a month or two period to give it the best chance for some of the young to find favourable conditions and continue the species. It's a very clever survival technique. Initially, the newly nymphs were all housed in a single Perspex container in which a dozen or so fruit flies were added each week as a food source. As the nymphs grew, each was placed separately into honey jar bottles with a gauze lid cover. Once a week, Maik would add about 6 house fly pupae into each honey jar container. Over the following week, the flies would emerge and provide food for the developing mantis. We finished up with 10 adult female and 6 adult males of *Miomantis* – finally, we had an adult male which would allow us to determine the correct species.

I dispatched one the male specimens, set his wings and body. After a week or so, we posted the set male specimen to the Australian praying mantis expert, Graham Milledge at the Australian museum. Graham reported back that the male genitalia confirmed the species as *Miomantis caffra* – Phew: from February to August to get a definitive answer. We intend to breed the remaining adults and perhaps to display them live as an educational exhibit in the Bugs Alive! exhibition for what to look out for and to report sightings back to the Museum.

And, it all started with a photo on BowerBird.

Following along with the time theme, I was amazed to see the first bee record for the season in Melbourne dated 6 August 2016.

Wow, that's early as we have had a wet and cold winter so I am very surprised to see any bee, other than the honeybee, out and about. This little lovely – *Lasioglossum calophyllae* – was photographed in Vermont south.

This is the first August record for this species in Melbourne on ALA – great data update.



Photo by Christine.

One of the many values of working in a Natural History Museum is having easy access to a wide range of expert taxonomists working on a wide range of animals – both vertebrates and invertebrates.

Reiner Richter posted this lovely snail image and the Museum just so happen to have one of Australia's few snail experts – indeed, Dr Adnan Mousalli sits in the room next to me.

Adnan identified this snail as Mollusca: Gastropoda: Hygrophila: Rhytididae: *Austrorhytida capillacea* – the Southern Carnivorous Snail. ALA shows its distribution extends from SE Queensland down through eastern NSW, throughout much of eastern Victoria and west to about the Otways, Vic.



Austrorhytida capillacea Location: Mt Baw Baw Photo by Reiner Richter

Enter the world of the miniature

I was stunned when I saw a series of images, taken by Tony D from Tasmania, of some of the smallest of our invertebrates – and images with such clarity and resolution. These insects are all less than 5mm in body length – some about 2mm!



Booklouse: Psocoptera Location: Geeveston TAS Photo by Tony D



Katianna Springtail – Collembola Location: Huonville TAS Photo by Tony D.



Katianna Springtail – Collembola Location: Geeveston TAS Photo by Tony D



Dicyrtomidae Springtail – Collembola Location: Geeveston TAS Photo by Tony D



Dicyrtomidae Springtail – Collembola Location: Geeveston TAS Photo by Tony D



Entomobrya varia Springtail – Collembola Location: Geeveston TAS Photo by Tony D



Katianna australis Springtail – Collembola Location: Geeveston TAS Photo by Tony D



Katianna cf. mucina Springtail – Collembola Location: Geeveston TAS Photo by Tony D



Liposcelis sp. Booklouse – Psocoptera Location: Franklin TAS Photo by Tony D

Eagle eyes

I am always amazed at what people find, photograph and share. These records show a keen eye to record and document a local habitat. Here are a few records that I found intriguing.

Here is a parasitic Torymidae wasp walking over the egg case of the Green mantis – *Orthodera ministralis*



Location: Wamboin NSW Photo by Liz O'Donnell

I found this image of interest. Initially, it was thought to perhaps be a millipede but the “considered opinion” is that it is indeed a Lycidae beetle larva.



Location: Crowea WA Photo by Cheryl.

Here is an identified Lycidae beetle larva that has similar characteristics to the above image.



Lycidae: *Porrostoma* Location: Sandfly TAS Photo by Tony D.

The eagle eyes of Laurence Sanders, which have already spotted many amazing behaviours, found a crab spider in the process of shedding or moulting its skins. An amazing set of images – thanks Laurence.



Images of crab spider moulting. Location: Emerald, Qld. Photos by Laurence Sanders

Here are several more of Laurence's crab spider images.



Crab spiders. Location: Emerald, Qld. Photos by Laurence Sanders

A discussion about Citizen Science.

Did you know there is a citizen science project that has now been running for 116 years! In America, the Audubon Society runs that an American Two Week Annual Bird Count. The large amount of data supplied from 116 years of observations is enormous. Species migrations have been tracked, waxes and waned in species populations observed, introduction of exotic species as well as extinctions of local species have all been documented. It is an amazing dataset.

Over the past year or so, I have noticed more and more peer-review papers being published in scientific journals about citizen science. I am keen to read these papers to learn what other people are thinking and doing in the field of citizen science. I recently spoke with a sociology lecturer at Melbourne University who was keen to delve into the psyche of citizen science to try probe such questions as:

- To understand why people volunteer their time and efforts to citizen science.
- What do citizen science people want in return?
- What kind of citizen science to they want to do?
- How can scientists engage with them more?

Last year, I gave a few talks to the U3A groups otherwise known as the “University of the Third Age”. I found the group to be somewhat akin to a Probus group but with much more focus on particular topics – obviously the groups I spoke to were interested in Natural History and the audience engaged well with me asking a series of ideological and practical questions: They wanted to learn which was great.

I would like to tell you about two papers I recently read about citizen science which gave me new insights into what we do on

BowerBird. Both papers have only just been published in well-recognised journals. These citations for these papers are:

Roman Lukyanenko, Jeffrey Parsons and Yolanda F. Wiersma (2016). "Emerging problems of data quality in citizen science" Conservation Biology Volume 30, No. 3: 447-449.

Victoria Martin, Liam Smith, Alison Bowling, Les Christidis, David Lloyd and Gretta Pecl (2016). "Citizens as Scientists: What Influences Public Contributions to Marine Research?" Science Communication Vol. 38(4) 495–522.

Both papers recognised there are at least different types of citizen science models:

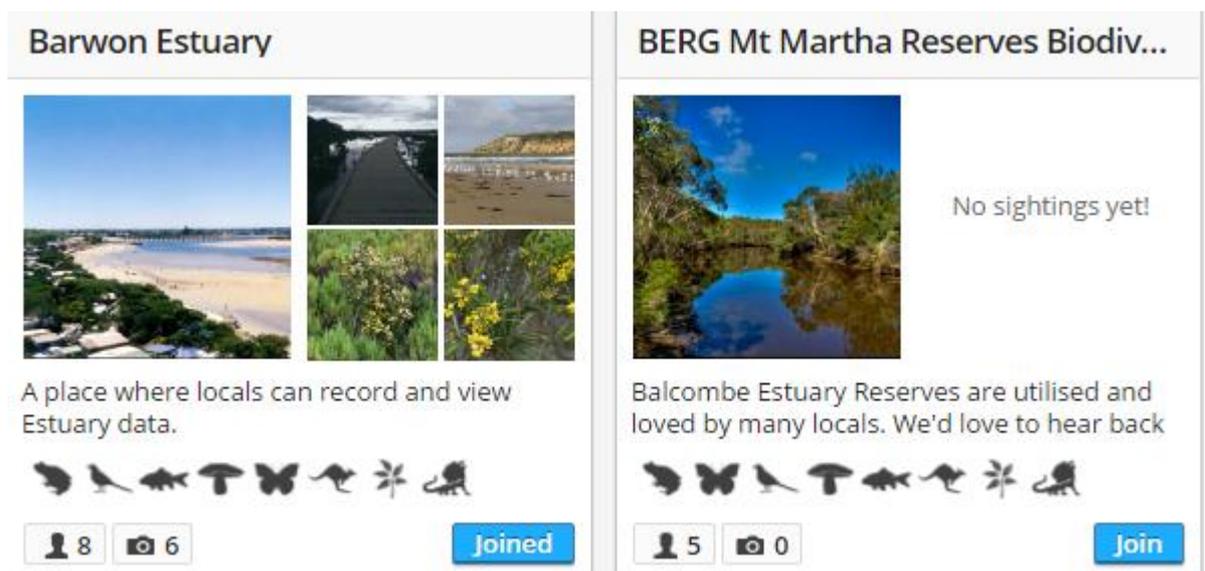
Contributory or Participatory citizen science. In this type of citizen science, scientists request public assistance to collect or analyse data. There are many good examples of this form of citizen science. One of the best known, involving participants worldwide is Galaxy Zoo. Galaxy Zoo is an initiative that began as a targeted project in which citizens were engaged in the relatively simple task of classifying images of galaxies as one of three shapes. The goal was to distribute a large workload among a large number of people. Citizen participation grew quickly, which led project sponsors to create an online forum to accommodate the large volume of comments and questions. Through this forum, a number of unanticipated categories of celestial bodies arose, including two from Dutch school teacher Hanny Van Arkel, who noted the "green peas" phenomena and a new body that became known as "Hanny's Voorwerp".

Within Australia, well known participatory citizen science programs include "The Annual Koala Count" or "Dolphin Watch" or "Prawn Watch" or "Cat Tracker" etc. The characteristic of these projects are that they typically target a single, relatively

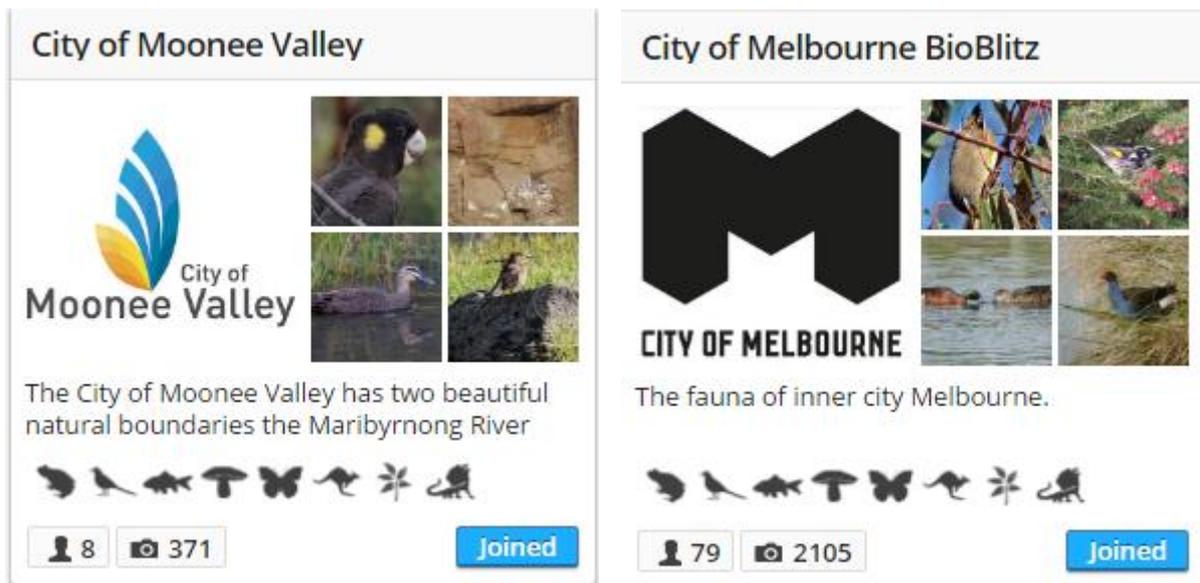
easily identifiable animal species or group and have a defined time limits for observations. For example, the Koala Count only accepts sightings across a two week period each year.

Another characteristic of participatory citizen science is that there is little communication between the scientists and citizen science participants. The information flow is one way from citizen scientists to the professional scientists. In some of the participatory programs, volunteers are specifically trained in methods of data collection or identification.

Another form of participatory citizen science is a targeted survey at a particular location. Several examples come to mind. The Atlas of Life in the Coastal Wilderness conducts regular surveys along the central NSW coastline. There are several such projects on BowerBird targeting specific locations:

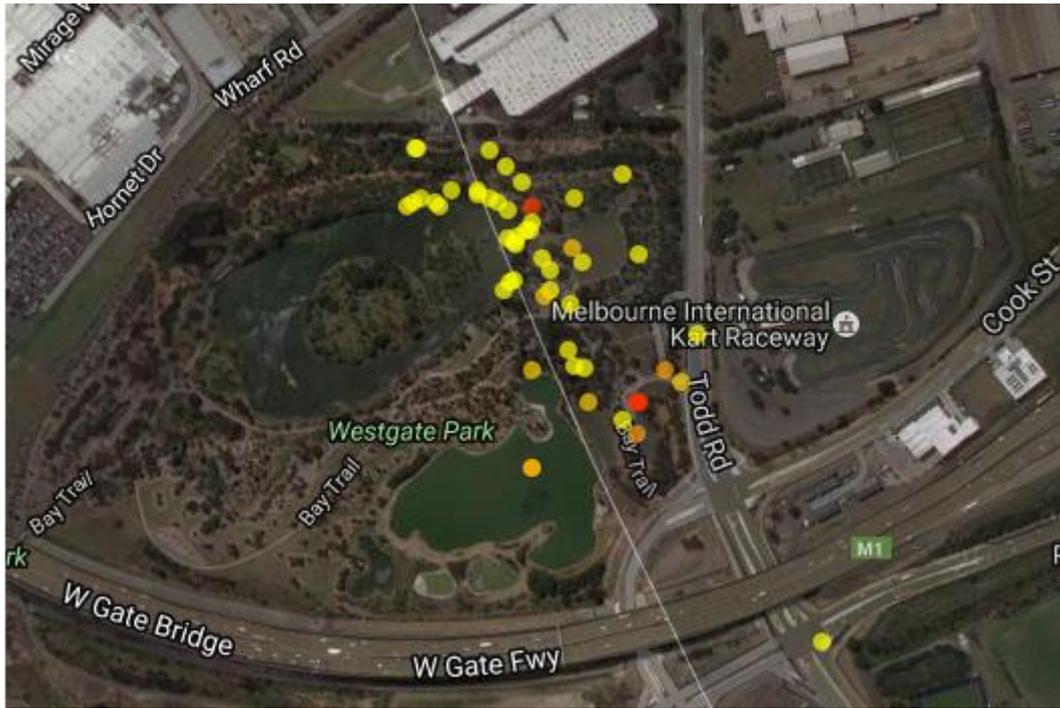


Several Melbourne City Councils have BowerBird projects that encourage their residents and others to document the biodiversity within the council limits. The City of Melbourne BioBlitzes have been great successes for the council and I know that a number of BowerBird specificity joined this project to contribute.



At least on BowerBird, these targeted projects tend to attract small, but dedicated, numbers of members.

A major difference with targeted locations on BowerBird is that the BowerBird participants themselves rather than scientists have selected the locations in which to develop a dataset. The residents or a community have decided independently to create a dataset. And, these projects usually always feed into and share their data across other more general projects. The map below shows all record for any taxon (plant or animal) on ALA for the Westgate Park, Melbourne area. There are two basic colours for records on the map. All yellow records came from BowerBird and specifically from the City of Melbourne BioBlitz records on BowerBird. There are just two other red dots amongst many yellow records. Without the concentrated efforts of the City of Melbourne BioBlitz, that area would be relatively unknown biologically.



Another good example of targeted location projects on BowerBird are Graeme Cock's series of Townsville Projects with each project providing a combination of targeted location and targeted taxon such as: Townsville – Plants, Insects, Spiders etc.

<p>Townsville Plants</p>  <p>Pictures of the plants of Townsville, including weeds and plants of the parks and gardens.</p> <p>✱</p> <p>16 328 Join</p>	<p>Townsville Insects</p>  <p>Pictures of insects from Orthoptera, Blattodea, Mantodea, Coleoptera, Trichoptera.</p> <p>🦋</p> <p>22 1447 Join</p>	<p>Townsville Spiders</p>  <p>Pictures of the spiders and other arachnids from around Townsville.</p> <p>🦋</p> <p>12 213 Join</p>
<p>Townsville wasps, ants & bees</p>  <p>Pictures of the wasps, bees and ants from around Townsville.</p> <p>🦋</p> <p>20 1331 Join</p>	<p>Townsville Lizards, Snakes & Frogs</p>  <p>Pictures of snakes, lizards and frogs from around Townsville.</p> <p>🦋</p> <p>13 38 Join</p>	<p>Townsville Bugs (Hemiptera)</p>  <p>Pictures of the True Bugs (Hemiptera) of Townsville.</p> <p>🦋</p> <p>10 700 Join</p>

Opportunistic citizen science. The second citizen science model is called “opportunistic” citizen science – which best describes how we use BowerBird. The *Victoria Martin et al* paper wrote of “opportunistic” citizen science as such: “In these projects, volunteers contribute data as they encounter the objects of interest (e.g. birdwatchers are encouraged to send sighting details to the eBird project via www.ebird.org).

Opportunistic citizen science has been greatly enabled through technology such as digital cameras and mobile devices. We consider this method of citizen science to present the greatest opportunity to involve large numbers of the public in scientific research, no matter their background. In addition, opportunistic citizen science may gain volunteers who would not normally contribute to scientific research but may engage through a shared interest outside of science.”

I believe that BowerBird is proof of those words. BowerBird is a combination of eclectic observations whose themes emerge through the build-up of a critical mass of records – “almost by accident” and “some through design”. Just look at the largest BowerBird Project: the “Insects & Inverts” – 417 members with 26,148 uploaded records. Those are amazing statistics all from a common interest in insects and people willing to share.



Insects & Inverts

Insects are one of the world's mega-groups - such a diverse show of species. Insects are not

417 26148 [Joined](#)

I remember when I alone created the Australian Bee BowerBird project and now there are 332 people have joined this project and they have uploaded 2178 records showing the most wonderful live behaviours of bees – some of which I had never seen before.



What I enjoy seeing are the smaller spin-off projects from larger projects such as the “Insects & Inverts” project. Spin-off projects decided to: Flies, Moths, Beetles, Dragonflies, Galls, Crustaceans, Arachnids, Millipedes and many more.

Recent citizen science studies show volunteer motivations include the following:

- Making a contribution to scientific research
- Learning new skills
- Interaction with others
- Environmental concerns
- Altruistic reasons
- Personal satisfaction
- Public recognition
- Education of others, or
- Simply that a project aligns with their interests.

More recent research has compared the data gathering and analysis of professional scientists with citizen scientists. For professional scientists, there 4 dimensions of data quality:

- Data accuracy and
- Data precision
- Sufficient sample size; and,
- Standardized sampling procedures.

These data quality dimensions are congruent with good scientific practice and thus suggest that the criteria used to measure the quality of citizens' data should fit the standards of professional science. In this sense, "Contributory or Participatory" citizen science amounts to asking citizens to fill in the blanks in a story written by scientists. Think of the Annual Koala Count – the scientists want to know where and when you saw koala and the program automatically records "no sighting" for every 15 minutes between user based sightings – in other words, the program creates null events. The study and data fields are initiated and designed by scientists and they involve citizen science filling in the blanks. It's a nice model that has worked for the past 116 years for the Audubon Society Annual American Two Week Annual Bird Count.

Intriguingly, research found that because citizen scientists generally lack formal scientific training, they view problems differently to trained scientific professionals. Citizen scientists view issues in light of their own knowledge and interests, creating fertile ground for discoveries.

This perspective – that citizen scientists view problems differently than scientists – means that the quality of data should be defined as more than simply consistency with data collected under scientific protocols.

Quality of data also includes the extent to which the design of a specific project facilitates citizens' abilities to spot something interesting, unexpected, or novel. Rather than seeing inexperience and lack of formal scientific training as threats to data quality, it was suggested these characteristics actually improve data quality, provided that researchers are able to understand how to take full advantage of them.

It is also important to consider that citizen scientists are *not* a homogenous group. Citizen scientists can be characterised as members of "communities" – but there are different types of "communities". Communities can be defined occurring at two opposite ends of a spectrum. At one end is the large, ubiquitous groups of people who assemble to achieve a collaborative task. We call such a large group "crowd sourcing". They tend to be a disparate group of people with differing skill levels, commitment to the topic and even different levels of knowledge of the subject matter. At the other community scale are the "like-minded" communities who gather because of a shared interest in a subject. They often possess enhanced skills levels for a particular subject as compared to the divergent assemblage of people associated with "crowd-sourcing" events. "Like-minded" community members tend to be a subset of a general community brought together by a single focus or goal. They could be considered as "expert amateurs" and thus not representative of the full suite of potential participants in large "crowd-sourced" online citizen science projects.

For me, the Annual Koala Count is an example of "crowd-sourcing" model for citizen science which differs completely to the community "like-minded" model of citizen science used by BowerBird. Projects in BowerBird are created by a single person and really only gain critical mass through the deliberate

decision of another person who make a conscious effort to join that project. This conscious decision making process probably ensures the “like-minded” community share common values and goals and are more likely to be achieved through collaboration. Think of the many BowerBird projects that offer like-minded people to join, participate and contribute - Fungus, Birds, Fish, Insects, Reptiles, Plants etc. There are over 300 different BowerBird project so the selection of choice is significant. One of the nice aspects I have noticed within a BowerBird community is the mentoring offered by more experienced members of the group keen to share their knowledge and expertise to the benefit of others. I have not seen such mentoring occurring in larger, disparate “crowd-sourced” groups. The BowerBird developers always said we wanted BowerBird to mimic a typical Field Naturalist Club where older more experienced members will often take under their wing a newer and younger member with an interest shared by the older members. That model has worked for more than 100 years. The “problem” with the Field Naturalist Club physical model is that they usually meet once a month or every couple of months and the meeting probably lasts for only a few hours. BowerBird is a 24/7 virtual Field Naturalist Club.

I am being cheeky here but with a project such as the crowd-sourced Annual Koala Count, once you have seen one koala you are not going to see major variations on the koala theme. The goal then becomes almost like a game to see how many koala records you can accumulate. That’s a bit different to going hunting for any kind of fungus where you will potentially see many different shapes, sizes and colours in a wide variety of habitats and things you have never seen before. I like to call such an activity one of Discovery and Surprise – which attracts me more than searching for a single species ... although there

is great value in better understanding the population spread of a single species.

There are a number of “opportunistic” citizen science models currently on the web. Think of Facebook or Flickr which often display wonderful natural history images and people have a go at identifying them. For me, the problem with these citizen science websites is that the individual record often do not contain sufficient data for it to be used scientifically. In the Museum, we say a specimen without spatial and temporal data can only be used for public programmes – display or education. Whereas a record with where and when data provides a dots on a distribution map and an entry on a time scale. This is data that can be shared with science and can contribute significantly.

My other problem with such website is the lack of peer-review of identifications. Let me give this example. A person posted the below moth on Flickr.

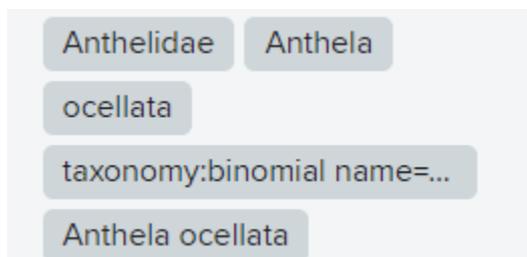


The person provided spatial and temporal data – 29 April 2009 and Exmouth, Western Australia, Australia. The Flickr moth was identified as *Anthela ocellata*.

In one part of the record, the owner suggested hesitation with the identification but then provided a series of computer Tags that allowed the data to be extracted and used elsewhere in which the qualifying identification hesitation was lost.

Anthelidae>Anthela ocellata? Moth 9575

Notice the ?



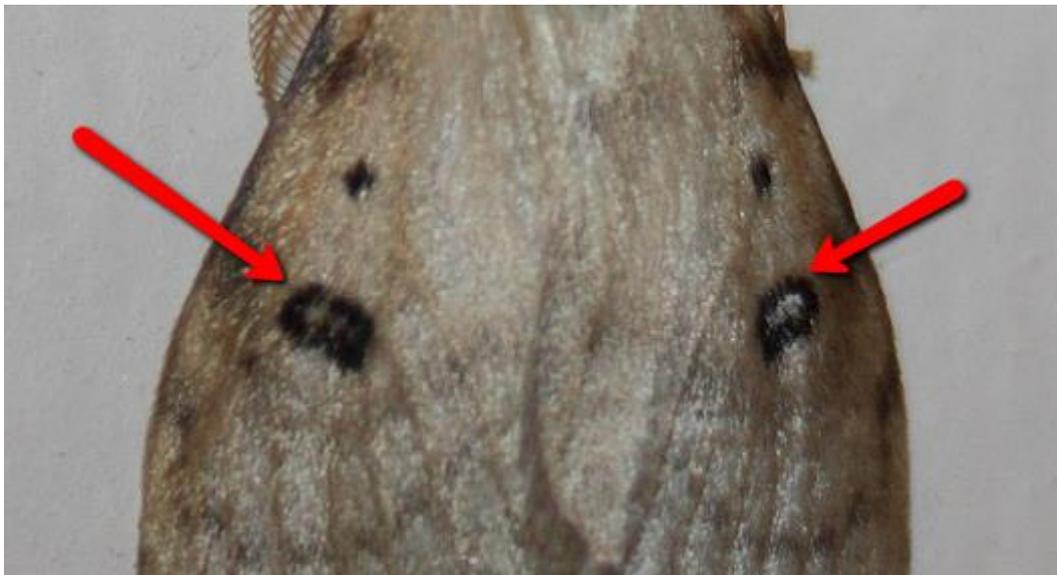
These embedded Tags in the record allow ALA to upload the image and data and add the Flickr record to the ALA dataset – particularly for that species – *Anthela ocellata*. A look on the ALA distribution map for that species shows that this record is the only record in WA for that species which is restricted to the eastern states of Australia. The Flickr identification is incorrect.



The problem the Flickr model is changing the incorrect identification. On ALA the incorrect record can be “Flagged” but it cannot be changed. I have flagged this record on ALA but it remains unchanged. The only way to change the record would be to join Flickr and post a comment of the record that it is incorrect. It is then up to the Flickr record owner to be alerted to the comment or revisit their record and agree to make the change. If ALA takes regular full Flickr record updates, then a change to the Flickr record would hopefully be reflected on the ALA distribution map.

It was in fact a BowerBird member who alerted me to this incorrect identification and they provided me with the correct identification. They wondered if I could change the identification but I cannot. I can see how the incorrect identification was made.

The Flickr moth has characteristic markings on the forewings as see below.



However, the true *Anthela ocellata* wing markings are different to the Flickr moth. In *Anthela ocellata*, each forewing has two markings instead of only one marking as seen in the Flickr moth and the *Anthela ocellata* markings are completely black which differs to the Flickr moth which has silver scales in the middle of the wing markings. Small but significant differences.



A true image of *Anthela ocellata*.

The correct identification of the Flickr moth is *Leptocneria binotata*. The below ALA screen shots shows this species has only one set of markings per forewing and the middle section of the marking has silver scales which correctly matches the Flickr image.

The disappointment of this mis-identification is that an ALA distribution map for *Leptocneria binotata* shows the species has only been records from near Darwin and just into northern WA at Wyndham in East Kimberley (BTW – this is a BowerBird record). The species has never been previously recorded in central coastal WA at Exmouth. What a waste of great data.

The mis-identification cannot be changed directly on ALA and cannot be directly changed on Flickr.



Leptocneria binotata Butler, 1886

species Accepted Name authority: Australian Faunal Directory

Overview

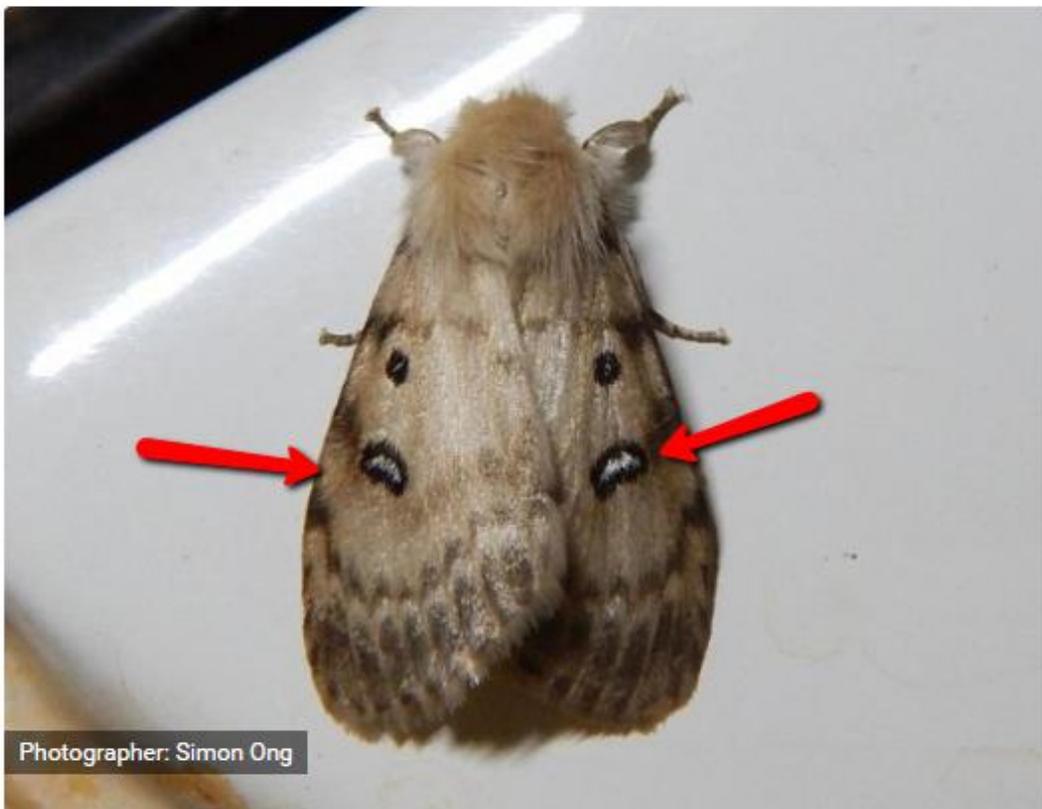
Gallery

Names

Classification

Records

Literatu



Photographer: Simon Ong

We BowerBird developers thought a lot about identification of records on BowerBird and we decided to introduce “peer-review” for every record. To achieve this goal we had to break every BowerBird record into two parts. The first part we called “The Truth” and it includes the Title, Record image(s), GPS and Date – plus we wanted information for searching so we asked what was the image about – Invertebrates or Plants or Reptiles. We considered that most people would get these pieces of data correct.

But then anything else that can get added to the record such as an Identification, a Tag or a Comment were all just “Opinions” and as such they can be incorrect. But we made them easily fixable !! Although only one BowerBird member can create a record, any BowerBird member can suggest an different identification and a single record can have multiple identifications. If there are multiple identifications, then we allow the BowerBird community to VOTE which identification is correct.

Multiple identifications can be used in two ways:

- Identification Upgrade. The below record was initially identified as “Aranea” on 26 August 2015. It’s good to know it is a spider and the record was uploaded by AIA but the identification level is minimal. The addition of a Family identification to Theridiidae almost a year later has significantly improved the level of information provided by the identification. The two identifications were made by two different people and are of equal weight until someone from the BowerBird community Votes for one of the identifications. This signals which is the preferred identification and ALA will always upload the identification with more votes if presented with a record with more than

one identification. Another nice aspect of Voting is that the original record would have been uploaded to ALA back in August 2015. Each Sunday, ALA uploads the entire BowerBird dataset (although there is currently an issue with ALA uploads) and compares every existing BowerBird on ALA to see if any changes have occurred since uploaded. The next time ALA uploads the BowerBird dataset, it will update the identification to the one add today! How much easier is that to the Flickr method?

The screenshot shows two entries in the BowerBird interface:

- Entry 1:** User: Gippsland Lakes - Mountains to the Sea, Date: 26 August 2015. Identification: Araneae (order). Taxonomy: Animalia: Arthropoda: Arachnida: Araneae. Votes: 0.
- Entry 2:** User: Liz O'Donnell, Date: 12 August 2016. Identification: Theridiidae (family). Taxonomy: Animalia: Arthropoda: Arachnida: Araneae: Theridiidae. Votes: 1.

- Identification correction. The multiple identification ability on BowerBird easily and quickly allows an incorrect identification to be fixed by any member of BowerBird. The below example shows a spider was originally identified as belonging to the Funnel-web spider genus *Atrax* in the Family Hexathelidae. I was unsure of this identification so I sent the images to Australia expert in this group, Dr Robert Raven at the Queensland Museum who nominated the genus *Misgolas* in the Family Idiopidae. Those are significant changes to the

identification and were so easily done. Notice the Vote down for the *Atrax* ID and Vote Up for the *Misgolas* ID.

The screenshot shows two entries in a list. The first entry is for 'Atrax (genus)' with a taxonomy of 'Animalia: Arthropoda: Arachnida: Araneae: Hexathelidae: Atrax' and a vote of -1. The second entry is for 'Misgolas (genus)' with a taxonomy of 'Animalia: Arthropoda: Arachnida: Araneae: Idiopidae: Misgolas' and a vote of 1. Both entries feature a green butterfly icon. The user 'Ken Walker' is identified as the poster, with a date of '12 August 2016'.

Correctly identifying a record is so important when sharing information – the web is a great place to magnify incorrect information. Hopefully on BowerBird, the process of peer-review is easy and effective which can only improve the data quality of the BowerBird and other websites that share its datasets.

Well, I hope you found these thoughts and discussion of some recently published papers of interest. Citizen science is here to stay and its impact will only increase with time. The more we can understand the dynamics of citizen science the better we can deliver to this diverse, informed and passionate community.

For me, it's like playing with a new "toy". What makes it work? What else can it do? I never considered that aspect? All of which makes citizen science a very interesting new, but old, dimension of science.

I decided to give you a break from the Bee identification series. Hopefully in the next Bugle, Michael Batley will tell us all about the classification and taxonomy of Blue Banded bees belonging to the genus *Amegilla*.

The first Bugle Advertisement – Ta Dah !!

Hi, I'm Kit Prendergast, the PhD student looking at native bees in the suburbs of this biodiversity hotspot and the interactions honeybees have with our native pollinators.

I'd LOVE to get you all on board and do some citizen science with me! I'm setting up a Facebook page for my project "Bees in the 'burbs in a biodiversity hotspot"! I'd love if you could fill in a spreadsheet regarding your suburb, approximate size of your property, number of flowering plants, whether your garden has native plants, veggies, ornamental plants, trees, lawn, and bare soil, "bee hotels" and then, here's the exciting part...when you happen to see a bee, jot down the date, and whether it's a honeybee or a native bee.

I've also got another spreadsheet for you to record and share your sightings of native bees you encounter in bushlands or reserves. If possible, take a photo, and upload it into the albums I'll set up for each month with your name and date you saw it, and if possible, approximate time.

I'll help in IDing the native bees for you too! I'll regularly update you of my study progress, as well as share the latest buzz about bees with you.

I know many of you have a passion for helping our pollinators and the wonderful services they do for native plants, garden plants, and veggies. Have fun sharing (or boasting!) pics of the bees that visit your backyard, and welcome all your friends, family and enemies too to participate!

<https://www.facebook.com/groups/1041684025880609/files/>

And, don't forget that there is already a BowerBird bee project for Western Australia called:



You can also lodge your records in this project. Don't forget to share your WA bee records with the general "Australian Bees" project and then you will have an additional 300+ sets of eyes to appreciate the WA fauna and to assist with identifications.

Your Fungal Fix for this month.

It goes without saying that fungal images still abound on BowerBird – and, I'm loving them. Here is a small selection.



Marasmiaceae Location: Gembrook VIC Photo by Reiner Richter



Boletaceae Location: Yellingbo VIC Photo by Reiner Richter



Cortinarius sp. Location: Morwell National Park, Vic Photo by Tamara Leitch



Colus pusillus Location: Northcliffe WA Photo by Cheryl.



Flavoparmelia rutidota Location: Jeeralang Junction VIC Photo by Matt Campbell



Fistulinella mollis Location: Chiltern VIC Photo by Friends of Chiltern Mt Pilot National Park

And finally, what's a Bugle without Mark Berkery's

Nature Place

He is a charmer, colourful fellow, proud headdress, garden ranger, deadly hunter.

When nature is left to itself everything finds a place. The plants feed the caterpillars, they feed all sorts – including spiders, they feed the lizards and they feed the birds.

Everything produces something for the tiny stuff to start it all over again, a perpetual motion machine requiring all the parts to be functioning, as intended.

There is no panic in the garden. They all go about their business without fear of future, or losing what's known. And the end comes, naturally, inevitably.

Living, eating, sleeping, working, playing, mating and dying is what it's about. When that can be done without a mental emotional problem it's a pleasure ...

... that passes understanding.





Now – I have a lot of fun writing the Bugle each month and I would like to share that fun. If anyone has a BowerBird related story they would like to tell, please send me your story and I will include it in the next Bugle.

As always from BowerBird .. that's your lot for this week.

Haveagoodweekend all Happy photographing ...

Cheers – Ken

(If you wish to leave this email list, please contact me directly at kwalker@museum.vic.gov.au – else share with your friends)