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CIRCULAR OF THE ENTOMOLOGICAL SOCIETY OF NEW SOUTH WALES Inc

In this edition Graeme Smith has provided two interesting articles while on his epic round-Australia trip with his wife Louise, in search of all things Zygentoma. Dinah Hales poses the question : what is an entomologist and who can truly call themselves an entomologist?.

In the February edition of Tarsus we published a segment of Keith Campbell. Dinah has provided a link to a photo of Keith. [WARRANT OFFICER K.G. CAMPBELL, DFC. | Imperial War Museums \(iwm.org.uk\)](https://www.iwm.org.uk).

In the April edition of Tarsus, we had a quiz about females in entomology. One unfortunate omission was Melinda Moir, the current president of the AES. Apologies to Melinda.

Included is a call-out for [Bioplatforms Australia](https://www.bioplatforms.com.au).

We encourage members to provide items of entomological interest to include in the newsletter.

We provide hyperlinks to entomological stories and research that may be of interest to members.

Kind Regards

Garry Webb

Thomas Heddle

Circular editors

All council members have accepted nomination for positions.

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Event Co-ordinator (Dinner etc)	Mary-Lynne Taylor
Representative for Australian Entomological Society (Myrmecia)	Dr Dinah Hales

In search of the identity of Australia's first "silverfish".

Graeme Smith

The first Australian species of silverfish was described as *Acrotela producta* by Escherich (1905). He placed it in the genus *Acrotelsa* because of its triangular urotergite X and its pectinate bristles. Escherich noted that inner processes on the last urosternite of the female were greatly "produced" (elongated) compared to other species of silverfish known at that time. We now know that most species of *Acrotelsella* have this character. In 1935 Silvestri created a new genus (*Acrotelsella*) with *A. producta* as the type species but with very little further discussion of the reasons behind this, and no diagnosis.

Since then, many other species of the genus *Acrotelsella* have been described, mostly from Australia, but also from the Caribbean, Vietnam, India and the Seychelles. The morphology of several of these species, further supported by molecular data suggest that the genus may need to be split into a few genera. The identity of *Acrotelsella producta* (Escherich, 1905) is therefore becoming more important and needs to be better described.

The type series of the *Acrotelsa producta* is in the collection of the Hamburg Museum so it should be possible to redescribe the species according to current morphological criteria. However, it is very challenging to get DNA from specimens stored in 70% ethanol for much more than a year and the types have been in 70% alcohol for more than a century.

The original description by Escherich recorded the type locality as "Peak Downs", noting that this was somewhere in the north of Australia. After a bit of homework, I found that the original Peak Downs homestead had been dismantled and reconstructed in the town of Capella in central Queensland. I visited the town in 2011 and was informed by an elderly gentleman running the service station, of roughly how to find the original location. I drove out to this area but there was hardly a tree to be seen, only large areas of cropping land and grazing country. I did find silverfish in some remnant bush beside a creek but none were *Acrotelsella*. I could see some tree-covered hills in the distance but the roads were muddy and my vehicle not up to the challenge. After almost sliding the Honda off the road I gave up, hoping to return again sometime.

During COVID lockdowns my wife Louise and I got cabin fever and decided to buy an old Toyota troopy converted as a camper. We spent quite some time and too much money trying to get it to be the reliable vehicle we wanted. In March this year we rented out our house for 12 months and we have been on the road since then. I'm writing this from Limmen National Park on the SW corner of the Gulf of Carpentaria. On our way north we managed to travel through some bushland that is only about 20km from the original type locality of *Acrotelsa producta*. Stopping for lunch I started searching through leaf litter at the side of the road and managed to collect half a dozen adult specimens which appear to belong to *Acrotelsella*. These are now stored in 100% ethanol and I look forward to getting home in March next year to have a look at them. I will eventually need to borrow the type specimens from the Hamburg Museum and gain their permission to dissect and mount some (which they have usually agreed to) before I will know whether I have been successful.

We are now on our way towards Western Australia, where, in 1905 the Hamburg Museum mounted an expedition to collect fauna. The material they collected was described by the famous Italian entomologist Filippo Silvestri and the specimens can mostly still be found, either in Hamburg, Berlin or in Italy. Silvestri did amazingly high quality work but our knowledge has improved over the century and we now use characters that were not even reported in many of the early papers. I have examined the types of one of Silvestri's WA species (*Visma stilivarians* (Silvestri, 1908)) and found

that it contained several species, based on new criteria. So, I am hoping for my WA collection permit to come through in time so that I can revisit some of the 105 type localities (or at least the nearest bushland) and to try to collect fresh material for DNA sequencing. Let's hope the troopy holds together long enough to get us home next year. I will have plenty of work to keep me busy.



Dragonfly overnighting in Limmen National Park

Graeme Smith

While enjoying a pre-dinner drink at our campsite we noticed some dragonflies hovering around the end of some branches of a small tree. On closer examination we could see that many of the leaves on this tree were actually dragonflies. They were still there when we left at eight thirty the next morning.



What is an Entomologist?

Dinah Hales and Garry Webb

This question arose during the writing of a history of our Society. A previous president sought to define the term "entomologist" quite narrowly, basing it on the hours of formal undergraduate university study devoted to insects. This definition clearly excludes many of us who did general science or agriculture degrees, even when followed with higher degrees on entomological topics, such as DH. Such a background for "entomologists" would "clearly bring the profession into disrepute". Both authors fall outside the definition of an entomologist based on hours of undergraduate study of insects. Also outside the fold are people with technical college qualifications, and gifted amateurs who learned by their own efforts, research, and contact with others. So did Ted Taylor (who had no formal higher education in entomology) but was one of the most knowledgeable entomologists and influences on the career of GW. And we fall even further outside, if we accept the contention by an academic that, within Australia, only graduates from the erstwhile University of Queensland Department of Entomology could call themselves entomologists. We have to admit that Barbara (UQ graduate) nearly always wins the Society's annual quiz.

The Oxford Dictionary is more generous. Entomology is "that branch of natural history which deals with insects", and an entomologist is "one who studies entomology". Those definitions probably include nearly all of us, although the trick word could be "studies". How much study, and in what form? Note that the definition does not say that one has to be a taxonomist to be an entomologist.

This brings us to the next question. What is a professional entomologist? When does an amateur entomologist become a professional entomologist? "Professional" is a term generally used to describe an occupation requiring university qualifications, e.g. medicine, law, architecture, engineering, science, history, teaching. Some sources suggest that certificates from non-university training also justify the term professional. The history of the entomological societies in NSW has often had break-points determined by the perceived "professional" or "amateur" backgrounds of groups of members. Our current society broke away from a precursor group partly to leave behind "amateurs". Ironically a later break was to leave behind the "professionals".

Some of the "amateur" entomologists we have come across over many years are highly knowledgeable about their particular groups, and in some cases are Australian or world experts. Max Moulds, for example, was a professional long before he did any university studies. Len Willan has never done university studies, but his knowledge of Australian moths has made him a driving force behind the CSIRO website Australian Moths Online.

Pest control operators and managers have always been welcomed as members of the society. Are they amateurs? no. Are they professionals? Probably not strictly at the operator level, by the definitions above. Many PPMs are very knowledgeable on the pest species they deal with, and not just from a control point of view. Those who do the groundwork in disease prevention related to insect disease vectors are similarly in a grey zone.

It seems to us that acceptance as a professional entomologist is determined not by narrow definitions, but by knowledge, ability, commitment, ethical behaviour and power of critical thinking. What do you think?

New Entomological Research

(Right Click on the titles (or CTRL Right Click) to see the full articles)

[Interactions between bee gut microbiotas and pesticides](#)

A major review by University of Ottawa researchers has provided the first field-wide summary of how pesticide exposure affects social bee gut microbiotas and what pesticide-induced disturbances mean for bee hosts. The researchers present the results of their review in the article "*Pesticide-induced disturbances of bee gut microbiotas*", published in *FEMS Microbiology Reviews*. It is well known that social bees, such as bumble bees, honey bees, and stingless bees, are very important pollinators for agricultural and native plant communities. "These bees have highly specialized gut microbiotas that provide benefits to the bee hosts, such as protection from pathogens and parasites," explained first author Michelle Hotchkiss, a PhD candidate in the Faculty of Science at the University of Ottawa.

[Hornet's Genetic Secrets Uncovered: The Key to Their Global Invasion Success](#)

Researchers at UCL sequenced the genomes of two hornet species, uncovering rapid genome evolution that may explain their success as invasive species, which could help manage their populations and ecological impact. The genomes of two hornet species, the European hornet and the Asian hornet (or yellow-legged hornet) have been sequenced for the first time by a team led by UCL (University College London) scientists. By comparing these decoded genomes with that of the giant northern hornet, which has recently been sequenced by another team, the researchers have revealed clues suggesting why hornets have been so successful as invasive species across the globe. Hornets are the largest of the social wasps; they play important ecological roles as top predators of other insects. In their native regions, they are natural pest controllers, helping regulate the populations of insects such as flies, beetles, caterpillars and other types of wasps. These services are critical for healthy, functional ecosystems, as well as for agriculture. But hornets also tend to be very successful as invasive species. They can become established in areas they are not native to and cause potentially huge ecological and economic damage by hunting important pollinators, such as honeybees, wild bees and hoverflies.

[Trash Bug Versus Mealybug: Unique Insect Interaction Filmed for First Time](#)

As an entomologist with the Florida Department of Consumer Services, Division of Plant Industry, I receive shipments of plant material from all over the world. Any day may come with a surprise: a new pest species established in the state, an intercepted exotic species coming from overseas, or perhaps a species unknown to science. Each year I provide over a thousand identifications of scale insects, mealybugs, and whiteflies to make regulatory decisions that protect Florida's agriculture and our native ecosystems. A sample I was sent in late 2022 turned out to be particularly exciting. A plastic bag filled with sugar apple (*Annona* sp.) leaves was delivered from South Florida, from inspectors looking for an identification of the mealybug pests. There, amid a teeming infestation of coconut mealybugs (*Nipaecoccus nipae*), was a "trash bug" busily piling wax onto its back, seemingly unbothered by being shipped across the state and now observed under bright artificial lights.

First-instar mealybugs, called crawlers (the small yellow organisms seen here), can disperse via phoresy, or being carried by other, more mobile insects. In a new study documenting interactions between lacewing larvae and mealybugs, a lacewing larva was observed actively placing live mealybug nymphs onto its back, the first time this behavior has been documented. Shown here is a *Ceraeochrysa claveri* lacewing larva feeding on a nymph of a coconut mealybug (*Nipaecoccus nipae*). A live first-instar mealybug (yellow) is present on the left side (from the viewer's perspective) of the back of the lacewing. (Photo by Erin C. Powell, Ph.D.) "Trash bug" is a colloquial name often used for green lacewing larvae (Neuroptera: Chrysopidae). You may have seen them bumbling around the garden like a walking piece of lint. The nickname refers to the behavior of many lacewing larvae that adorn themselves with assorted natural materials: lichen, plant trichomes, tiny bits of wood, prey remains, even spider silk.

[The grain moths have finally reached Antarctica](#)

Last February, researchers at an Antarctic research station spotted something alarming: a moth. Normally, a moth is not a particularly frightening sight. But in Antarctica, where there are no native moths, spotting the insect could only mean one thing—a non-native species had been introduced to the continent. To make matters even more interesting, the moth in question turned out to be *Plodia interpunctella*, commonly known as the Indianmeal moth or the grain moth, a common household pest worldwide. In the past few years, grain moths have been spotted at a few different research stations around Antarctica, slowly moving further south. So far, the insects have had a limited impact on the field stations, and scientists believe they are likely unable to survive for very long in the harsh, cold climate of the frozen continent. But this recent sighting, right off the northwest coast of the Antarctic Peninsula, is the furthest south the species has ever been documented—and a reminder of the growing threat that invasive species pose to Antarctica's fragile ecosystem, especially as the climate continues to warm.

[Secrets in the canopy: scientists discover 8 striking new bee species in the Pacific](#)

After a decade searching for new species of bees in forests of the Pacific Islands, all we had to do was look up. We soon found eight new species of masked bees in the forest canopy: six in Fiji, one in French Polynesia and another in Micronesia. Now we expect to find many more. Forest-dwelling bees evolved for thousands of years alongside native plants, and play unique and important roles in nature. Studying these species can help us better understand bee evolution, diversity and conservation. Almost 21,000 bee species are known to science. Many more remain undiscovered. But it's a race against time, as the twin challenges of habitat loss and climate change threaten bee survival. We need to identify and protect bee species before they disappear forever. Pollinators abound in forests. But scientific research has tended to focus on bees living closer to the ground. We believe this sampling bias is replicated across much of the world. For example, another related Oceanic masked bee, *Pharohylaeus lactiferus* (a cloaked bee), was recently found in the canopy after 100 years in hiding.

[How Crickets Can "Upcycle" Bad Grain Into Useful Animal Feed](#)

There's fungus among us, and it's everywhere. That's especially true for corn. The fungus *Fusarium verticillioides* is most commonly associated with corn, and it produces a toxin called fumonisin. This mycotoxin ("myco" being a prefix meaning fungus) isn't too

much of a problem because it's closely monitored in the animal-feed industry, but it can cause health issues for both livestock and human consumers if the toxin levels are too high. But what does this have to do with insects? Researchers at the U.S. Department of Agriculture's Agricultural Research Service (USDA-ARS) are exploring how contaminated grain could still be put to use by feeding the grain to crickets. Ryan Paulk, lead author of [a new study published this month in the *Journal of Economic Entomology*](#), wanted to explore the impact that fumonisin would have on crickets. A growing trend in agriculture is to use insect meal in animal feed because of high protein content of insects like crickets and their ability to feed on waste byproducts. However, if the crickets consume grains with mycotoxins, Paulk and colleagues wondered, could there be potential mortality and growth problems in the crickets, or could the crickets perhaps sequester the mycotoxins without harm?

[Invasive bees defy evolution to cover Sydney-sized area](#)

Thousands of colonies of invasive Asian honey bees infesting an area the size of Greater Sydney came from a single swarm, defying evolutionary expectations. That's the finding of a team of researchers, who say the discovery is bad news for the honey industry and biosecurity officials but could be good news for threatened species. Asian honey bees arrived in Australia in 2007 - likely from Papua New Guinea - and took hold in Queensland, where more than 10,000 colonies cover a 10,000 square kilometre area. The massive population in the state's north has overcome a "genetic bottleneck", whereby gene pools are very limited - to thrive there. That is despite the assumption high genetic diversity is important for populations to adapt, researchers said. "Our study of this bee population shows that some species can quickly adjust to new environments despite starting with very low genetic diversity relative to their native-range populations," University of Sydney researcher and study co-lead author Ros Gloag said. "While this might be bad news for environments coping with newly arrived invasive species, it's potentially good news for populations that have temporary crashes in the face of climate change or other natural or human-induced disasters, such as bushfires."

[Deadly plant kills its pollinators but nurses their young](#)

Jack-in-the-pulpit flowers – famed for trapping and killing their pollinators – might also serve as a nursery for the insects' eggs, revealing a more nuanced and mutually beneficial relationship that challenges existing assumptions. These [pitcher-shaped plants](#), of the genus *Arisaema*, lure in their primary pollinators, fungus gnats, by mimicking the looks and [scent of musty mushrooms](#). But once the insect dips into the flower's spathe in pursuit of this pungent treat, it cannot crawl out because the flower's elongated hood interior is too waxy. The gnat jostles and struggles inside the mottled, reddish-green cup, spreading pollen around and thoroughly pollinating the plant, but it eventually tires itself to death. At least this is what botanists [have long thought](#). But when [Kenji Suetsugu](#) and his team at Kobe University in Japan incubated 62 flowers of the Asian jack-in-the-pulpit species *Arisaema thunbergii*, they noticed something odd. The helplessly trapped gnats laid their eggs in the flowers' crowns. When the flowers began dying, these larvae fed on their shrivelling and decaying flesh and then popped out as adults a few weeks later.

[Australian program to eradicate red fire ants is a 'shambles', Senate inquiry told](#)

A Senate inquiry into the spread of fire ants in Australia has heard that the government program tasked with their elimination is an "absolute shambles" and that an independent eradication body is urgently needed. The highly invasive insect is believed to have [entered Australia in the 1990s](#) and was discovered at Brisbane port in 2001. A program spanning state, territory and federal governments was created to eradicate red imported fire ants and it has been allocated more than \$1.2bn of federal and state funding. Of that, \$593m covers 2023 to 2027. But the program was heavily criticised by stakeholders, academics, local government and community members on the first day of public hearings in Brisbane on Monday, with delays in funding blamed for allowing the insects to spread to more than 700,000 hectares in south-east Queensland and for recent outbreaks in northern New South Wales.

[Fire ants could cost 'half a COVID' every year](#)

Australia could lose 2.8 per cent of its GDP to fire ants - the equivalent of "half a COVID" each and every year, biosecurity analysts have warned. The government-funded Centre of Excellence for Biosecurity Risk Analysis has offered a new estimate of the hit Australia will take if the super pest is allowed to spread unhindered. "We project the combined damage to agriculture, recreation and tourism will exceed 1.5 per cent of Australia's GDP and that the silent costs to the environment will be 1.3 per cent of GDP," chief executive Andrew Robinson told a parliamentary inquiry. "Jointly this is 2.8 per cent of GDP which is approximately half of a COVID, every year." Agriculture would take the biggest hit, he said. The inquiry has heard from a succession of experts and stakeholders who say 20 years of eradication efforts have failed, with the ant spreading to the north, south and east of the containment zone in southeast Queensland.

[Red imported fire ants Senate inquiry hears NSW farmers call for urgent action to manage pest's spread](#)

The head of a peak NSW farming body has called for practical biosecurity solutions to deal with fire ants, instead of "people swanning around" on overseas research trips. On Tuesday, NSW Farmers president Xavier Martin aired frustrations at the Senate inquiry into Red Imported Fire Ants (RIFA), exploring the impacts and spread of the pest. Native to South America, the invasive pest was first discovered in Australia in 2001 and in late 2023 it spread from Queensland into northern New South Wales. Mr Martin said farmers were "infuriated" and did not feel their agriculture levies were being used effectively to manage red imported fire ants "[There are] chronic failures ... all over the place." He said levies paid by industry were increasing but he did not feel the rewards were being reaped. "We've had two decades of people swanning around on overseas trips ... it's been really infuriating for our levy-paying members who are taxing themselves on produce at the farm gate."

[Polyphagous Shot Hole Borer – A New Invasive Borer Found in WA](#)

The polyphagous shot hole borer (PSHB; *Euwallacea fornicatus*), an invasive pest, has been detected in Perth, Western Australia. The tiny beetle is part of the ambrosia group of beetles (bark beetles and pinhole borers). However, it is not a pest of timber in service, but rather a major threat to live trees and of particular concern to the nursery, fruit and nut tree industries. As it attacks a wide range of trees (as its polyphagous name suggests), if it becomes established it could affect general amenity trees and have a significant environmental impact. Although not a pest of timber in service, pest managers have a role

to play in helping in its detection to prevent establishment in Australia. The polyphagous shot hole borer was first detected in east Fremantle (WA) in August of 2021 when a member of the public reported symptoms of dieback and dead branches in their maple tree. Native to Southeast Asia, the small, dark brown/black beetle (pictured above) is around 2 mm long and the adult beetles bore into live trees. In Australia, the box elder maple (*Acer negundo*) is considered the main reproductive host and amplifier tree. Other key hosts for surveillance include maple (*Acer*), oak (*Quercus*), plane (*Platanus*), coral (*Erythrina*), avocado (*Persea*), locust (*Robinia*), fig (*Ficus*) and poplar (*Populus*) trees.

[Extinct Termites Caught Mid-Sexy Time In 38-Million-Year-Old Amber](#)

Some 38 million years ago, a termite couple snuck off to engage in some prehistoric sexy time, only to be swamped in tree resin and immortalized in amber for eternity. How embarrassing. This incredible 38-million-year-old amber specimen was unearthed at the Yantarny mine in Kaliningrad, Russia. Inside the clear specimen, you can see two members of the extinct species *Electrotermes affinis* engaging in courtship behavior. "Termite fossils are very common, but this piece was unique because it contains a pair. I have seen hundreds of fossils with termites enclosed, but never a pair." Dr Aleš Buček, study author and head of the Laboratory of Insect Symbiosis at the Czech Academy of Sciences, said in a statement. The position of the pair is unusual – and not just because they were trying to "spice things up" in the bedroom. Today's termites typically engage in courtship behavior called "tandem running," in which they line up vertically with the male's mouth touching the female's backside. However, this unfortunate duo became stuck side-by-side with the female's mouthparts touching the tip of the male's abdomen.

[SA fruit fly outbreak worries growers as restrictions imposed](#)

Farmers say an outbreak of Queensland fruit fly in an Adelaide suburb could cause disruptions to the supply of fresh produce to the city and are raising questions about how the pest got there. The outbreak was declared at Salisbury North, triggering a restricted produce movement zone in the foodbowl of the Northern Adelaide Plains where tomato, eggplant and capsicum are produced. The discovery of six Queensland fruit flies in traps by the state's Primary Industries Department is the first detection in metropolitan Adelaide since restrictions ended in 2022. Andrew Vorrasi, who has farms at Direk near the outbreak zone, will be unable to harvest the rest of his tomatoes this season unless he puts his produce through an expensive treatment process. The SA Produce Market director said he was concerned about how the restrictions would impact the supply of fruit and vegetables for consumers who were already struggling with the cost of living.

[Rare moths among citizen scientist's 15k nature observations](#)

Citizen scientist Dion Maple has a special interest in moths. He even sets up black lights at night to attract different species. His favourite is the crayon emerald. "When I found it, I couldn't believe it existed because it looks like someone drew it with crayon," Mr Maple says. "It's a rare species too, so that's my favourite record so far." The CSIRO says there are relatively few specimens of the rare crayon emerald in the Australian National Insect Collection. It's just one of about 15,000 observations Mr Maple has made to the iNaturalist app, which collects citizen scientists' photos and descriptions of flora and fauna. "I knew it was getting close to the record and I happened to be at work, saw a moth on the wall of one

of the buildings, got a picture, threw it up then found out it ended up being that record," he says.

[Brazil's staggering dengue fever crisis is a warning to the world](#)

Not since the darkest days of the covid-19 pandemic, when hospital systems all over this country ruptured under the weight of the disease, has Brazil witnessed such scenes. But this time, it's not the [coronavirus](#) that has led states all over the country to declare a state of emergency and even spurred the construction of a field hospital in the capital, Brasília. It's dengue fever. The disease is ripping through much of South America, where scientists say rising temperatures due to climate change have both extended the territorial range of the mosquito that carries dengue and increased its proliferation. In the first two months of this year, Paraguay [registered nearly](#) 100,000 suspected cases — more than five times the typical rate. Peru, racked by its own outbreak, has declared an emergency in much of the country. Argentina, too, has seen an explosion of cases. But the disease has surged with particular virulence in Brazil, where epidemiologists expect the number of dengue cases to reach into the millions — more than doubling the previous record — and potentially kill thousands of people.

[Cicadas pee in jet streams like bigger animals](#)

Cicadas are known for emerging in the billions. These groups chatter so loudly that fiber optic cables can pick up the noise. However, the way that they pee is also making waves this year. Instead of urinating in tiny droplets that they flick from their butts like other insects and small organisms, cicadas pee in high speed jets more similar to large mammals. This unique urinary habit is detailed in a study published March 11 in the journal *Proceedings of the National Academy of Sciences* (PNAS). The insects that generally eat xylem sap from trees and pee in droplets since it uses less energy to excrete the sap. However, cicadas eat so much sap that individually flicking away each drop would be too taxing. Using this much energy to toss away pee droplets would mean that they needed to eat even more tree sap.

[Critically endangered stonefly with 'remarkable' lifespan faces extinction as Victorian government decision condemned](#)

A critically endangered stonefly, which can outlive most other insects, may become extinct after the Victorian government made an "incredibly disappointing" decision. That's the claim from the Victorian National Parks Association, which was frustrated on Monday after the government rejected an application for the Mount Donna Buang wingless stonefly to be granted a critical habitat determination. The determination would have meant long-term protection for the stonefly, which was remarkable because of its lifespan of more than two years, the association said. Houseflies live up to 25 days and many insects for less than a year.

[How big-headed ant \(*Pheidole megacephala*\) invasion influenced lion prey choice](#)

Some ant species are among the worst invaders in the world, and an invasion can come with strong consequences for ecosystem functioning. One infamous invasive species is the big-headed ant (BHA) *Pheidole megacephala*. While the BHA probably originated in somewhere in tropical Africa or Madagascar, it developed invasive characteristics and BHA supercolonies are now spreading in African savannahs where they did not occur before. In their study, [Kamaru et al.](#), investigated a fascinating symbiosis disruption in Laikipia, Kenya, where the invasion of big-headed ants lead to a drastic lowering of vegetation cover, since

the invasive ants were killing native acrobat ants (*Crematogaster* spp.) which were protecting their symbiont whistling-thorn tree (*Vachellia drepanolobium*) from elephant feeding. As demonstrated by their research, such an open landscape leads to changes in the hunting behavior of lions, as they cannot rely on ambush predation anymore. Altogether, this study highlights a fascinating example of the unforeseeable consequences of ecosystem disruption by ant invasion. In this interview, Jacob R. Goheen gives us further insights into their investigation.

[When steering balls of poop, dung beetles use the stars to navigate](#)

A dung beetle is a deceptively humble creature. Humble, in the sense that they literally eat and raise their young in poop. Deceptive in the sense that they perform incredible feats of strength, play an underappreciated ecological role, and can even (in some cases) appreciate our place in the cosmos. Dung beetles are all members of the scarab family. And if the word "scarab" evokes ancient Egypt for you, there's a reason. The scarab-headed god Khepri was, in fact, a dung beetle. Ancient Egyptians had seen these beetles rolling balls of dung, and connected them to the sacred, dung ball-like orb of the sun itself, as well as concepts of renewal and rebirth. In any terrestrial ecosystem, a fresh pile of poop is an entire universe. Beetles eat dung, flies lay eggs, other insects come to eat the larvae of these animals. It's a beautiful stinky circle of life. It's also dangerous and competitive, which is why one group of dung beetles has a strategy for success: get some poop, pack it into a ball, and roll it the hell out of there. These balls are sometimes 50 times their weight, and they'll move them as far away as 200 meters before burying them underground.

[Confusion over '80cm egg' dangling from Aussie tree](#)

Confusion has erupted over the origins of an 80cm "shopping bag-looking thing" that was spotted high up a tree on an Aussie mountain, with one amateur photographer questioning what on earth the humungous "egg" actually is. The Brisbane-based wildlife enthusiast snapped the picture and uploaded it to social media earlier this week, but was confused over what they'd photographed. Joking that they thought it was a "drop bear egg", the user asked the public for help in correctly identifying it. Nestled toward the tree's canopy, the strange-looking sac was spotted in Mount Coot-Tha, west of Brisbane's CBD. "Anyone know WTF this thing is? Spotted on Mt Coot-Tha about 30m up a tree," the confused Aussie wrote. "I estimate it must be nearly 80cm in height and initially I thought it was a shopping bag, but now think more likely a Drop Bear Egg." Dozens of people responded to the poster's query, each sharing their opinion on what they thought the formation was. But speaking to Yahoo News Australia, entomologist with Sydney University, Dr Tom White, set the record straight. White confirmed the item in question is in fact a paper wasp nest — "and a very healthy-looking one at that".

['Spectacular' new orchid species is pollinated by moths](#)

Despite their reputation for being easy for aspiring plant parents to destroy, orchids can be found all over the planet. There are more than [25,000 known species of these plants], with more discovered every year. An international team of scientists have now found a new species of orchid in Madagascar with an impressive nectar spur and has a tie to Charles Darwin. *Solenangis impraedita* is described in a study published March 11 in the journal *Current Biology*. Madagascar is known for flowers with long floral tubes that are pollinated by long-tongued hawkmoths. The most famous orchid species on the island is *Angraecum sesquipedale*, which is also called Darwin's orchid. The famed naturalist

and orchid enthusiast had a theory that the flower was pollinated by a moth that was unknown at time. About 41 years after this prediction, scientists officially described the large hawkmoth proving Darwin correct. The newly discovered species is appropriately named *Solenangis impraedicta*. In Latin, *impraedicta* translates to “unpredicted” and is a nod to Darwin’s eventually correct prediction that a specific moth is the orchid’s primary pollinator. The newly discovered orchid has a nectar spur that is almost 13 inches long, despite having petals that are less than one inch. These tube-like projections from a plant’s petals produce and retain nectar for pollinators like bees, butterflies, and moths. *Solenangis impraedicta* has the third longest spur scientists have ever recorded.

[Red imported fire ants posing major threat to Australia](#)

Red imported fire ants could cost Australia up to \$22bn in losses by the 2040s, a major research institute has warned, arguing the federal government may be low-balling the biosecurity threat from the invasive species. The Australia Institute says eradicating the ants has not been properly resourced and the government’s own economic modelling on the ants underestimates their danger. “Government commissioned modelling assesses only a 15-year time frame and ignores the \$2.5bn per year in damages that fire ants will cause beyond 2035,” the institute said in a research paper released on Wednesday. “Extending the government commissioned analysis to a 20-year time frame shows every dollar invested in eradication will bring between \$3 and \$9 in benefits. “This analysis shows that RIFA will cost Australia more than \$22bn by the 2040s. “This means that it is less costly to spend \$200m or even \$300m per year every year for the next 10 years, which would be a total of between \$2bn and \$3bn, to eradicate RIFA now.”

[Fire ants are threatening the Aussie way of life for some families. Here's what you need to know](#)

Colleen Lavender has raised her kids to love the outdoors and every opportunity they have, they're on their bikes or going for a walk. That all changed when her 11-year-old daughter Lily was playing in a park a fortnight ago in the Scenic Rim town of Jimboomba, south of Brisbane, where they live. Lily accidentally disturbed a fire ant nest, setting off an angry swarm of ants to attack her body. She was left with more than 50 red welts capped with angry white pustules along her arms. With fire ant nests in their backyard and along local roads and parks, the Lavenders have changed their active habits to avoid the invasive species. She's worried the continued spread of the ants could change the outdoors lifestyle Australians know and love. "We're careful what we do now, we don't walk around barefoot anymore like Aussie kids used to do," Ms Lavender said.

[National Fire Ant Eradication Program rolls out across NSW Northern Rivers region](#)

Residents and landholders across a 5-kilometre area of South Murwillumbah in New South Wales are being told to expect helicopters and crews of pest controllers as efforts ramp up to eradicate an incursion of fire ants from Queensland. The rollout of the ground efforts in the Northern Rivers region has already begun, while helicopter crews will begin next week, with 80 per cent of bait dropping expected to take place from the air. National Fire Ant Eradication Program (NFAEP) head of operations Graeme Dudgeon said poor weather had so far restricted helicopter access. "We can't bait in wet weather because the bait is affected, so still a little bit more time before we start," he said. The NSW Department of Primary Industries (DPI) in November confirmed the detection of three red imported fire ant nests in South Murwillumbah, 13 kilometres south of the border. A 5-kilometre exclusion

zone was imposed, with the invasive species capable of flying long distances and hitching rides on products like bails of hay and manure. The detection in NSW triggered the NFAEP response, which is part of a \$600 million eradication plan developed by the Australian governments — the world's largest ever program to eradicate the ants.

Defence land could be weak spot in ant war

There are mounting concerns defence sites could be acting as havens for fire ants after the first detection of the super pest in the Murray Darling Basin. Farmers are on high alert after 78 nests were discovered at Swartz Barracks at Oakey, west of Brisbane. The pest's arrival in the basin is of grave concern, given warnings fire ants could harness river flows to quickly invade new parts of Australia. The Invasive Species Council believes the Oakey infestation could be years old, given how many nests there are. Fire ants campaigner Reece Pianta is waiting on genetic testing that will confirm if the outbreak is linked to the long-standing fire ant battleground centred on Brisbane and the Gold Coast. He says there's lots of defence land in and around southeast Queensland's fire ant biosecurity zones. But the national eradication program, delivered by the state government, "appears to be finding it hard to respond to fire ants detected on federal land, including defence land".

Ross River virus detected in record number of Queensland mosquitoes

Entomologists have detected the Ross River virus in a record-breaking number of this summer, sparking a warning for Aussies to protect themselves from mosquito bites. The record-breaking number of Ross River virus detections coincides with a high number of cases among Queenslanders, Queensland Health says. Ross River virus is spread from mosquitoes to humans, with symptoms including swollen and painful joints and rashes. Most people who catch it will recover within a few weeks, but some experience joint pain and fatigue for months after they are first infected. Acting chief health officer Dr Catherine McDougall said between November last year and April this year, samples from more than 1,225 mosquito traps were tested for Ross River virus, with 116 traps testing positive. "This is the highest number of tests returning a positive result for the virus in a single season since the surveillance program started in 2016," Dr McDougall said.

Termites show Haranga the way to 8th uranium anomaly at Senegal's Saraya

Haranga Resources Ltd (ASX: HAR) – which is chasing uranium in Senegal – has discovered an eighth anomaly at its flagship Saraya project through infill termite mound sampling (TMS) at the Diobi East prospect, revealing concentrations of 52 parts per million (ppm) equivalent uranium (eU3O8). The company aims to continue auger drilling at the project, while also undertaking further TMS and processing across the whole of Saraya before the wet season begins in Senegal. Later this month, Haranga is also hoping to achieve a resource category upgrade for Saraya – which is currently in the inferred category at 16.1 million pounds (Mlb) U3O8 – based on previous metallurgical work, as well as a potential update to the mineral resource estimate (MRE) in June, once drill assays from exploration work have been returned. Managing director Peter Batten said the termite mound sampling had given the company much to go on for future exploration. "As the termite mound sampling programs near completion, it is clear that there is a line of anomalism running down the spine of the permit," he said.

[Can't See the Wood for the Trees](#)

In order to understand what makes timber more or less susceptible to termite attack, it's important to understand a bit about wood and how it is made. From a chemical point of view, wood is a natural polymer consisting primarily of cellulose, hemicellulose and lignin. Together they provide the structural support to the tree. Cellulose and hemicellulose are carbohydrates found in the primary cell walls. Lignin is an aromatic alcohol found in the secondary cell walls, where it binds the cellulose fibres and serves many biological functions including water transport, mechanical support and resistance to decay and insect attack. Tree trunks and branches are made up of a series of layers. Wood is the collective name given to all these layers (except the bark). The heartwood is actually the dead material in the centre of trunks and branches. The next layer is the sapwood, which is a living layer. Another name for the sapwood is the xylem and it moves water and nutrients up the plant from the roots. Outside the xylem is the phloem, which moves sugars, produced inside the leaves via a process known as photosynthesis, down the plant. In between the xylem and phloem layers is a thin but remarkable layer called the cambium. This is the growth layer and will lay down new cells to the outside which become the phloem and new cells to the inside to add to the xylem. The old layers of phloem become the bark and as the old layers of the xylem die, they turn into heartwood. During this ageing process, when the xylem cells die on the inside of the sapwood layer, creating the outer layers of the heartwood layer, the cells become storage vessels for the various by-products (extractives) from the biological processes in the plant. The extractives can be divided into three major sub-groups: aromatic phenolic compounds, aliphatic compounds (fats and waxes), and terpenes and terpenoids. The composition and quantity of these extractives will determine the level of resistance of the heartwood to fungal and timber pest attack.

[Bladderwort: How a Carnivorous Plant Could Be Used in Mosquito Control](#)

Can you imagine being unexpectedly sucked into a room, the door shuts forever behind you, and you slowly dissolve into mush? It sounds like something out of a horror film. Or it could be the nightmare of mosquito larvae who wander too close to plants in the genus *Utricularia*, also known as bladderworts. Carnivorous plants have fascinated scientists and naturalists for centuries, and bladderwort is no exception. It is a rootless, aquatic plant with hundreds of little sacs attached to its underwater stems. These hollow sacs generate low pressure inside, and, when a tiny aquatic creature like a mosquito larva brushes up against a bristle, it opens the bladder, sucking in anything nearby and slowly digesting it. With over 220 species of bladderwort worldwide, there has been interest in recent years in using this plant as a biological control method for mosquitoes that spread disease. A study published last week in the *Journal of Medical Entomology* explores the use of the bladderwort *Utricularia aurea* to help control three species of dangerous mosquitoes in India.

[Creepy new 'assassin' spider discovered](#)

Dubbed Whitsunday hinterland pelican [spiders](#), these creatures are a "bizarre group" of predators found in Australia, according to a new study. Over the past year, Australian researchers visited Conway National Park in the Whitsundays, Queensland, several times to survey local wildlife and search for pelican spiders, also known as Austrarchaea. Pelican spiders, which are sometimes referred to as "assassin spiders", feed on other creatures by capturing and manipulating them with their "long, spear-like" legs, according to a study published on May 14 in the peer-reviewed *Australian Journal of Taxonomy*.

The experts were searching for the “poorly researched” pelican spiders in the park and found eight unfamiliar-looking spiders, the study said. The researchers then realised they had discovered a new species. *Austrarchaea andersoni*, or the Whitsunday hinterland pelican spider, has a reddish-brown colour and an unusual body shape, the study reports.

[Warning as WA’s Pilbara and Gascoyne regions record Murray Valley encephalitis cases](#)

Three people have been infected with the potentially deadly Murray Valley encephalitis virus in Western Australia. Many people can have the virus but no show symptoms, however about one-in-1000 become unwell, and in rare instances it can cause a severe brain infection known as encephalitis. Encephalitis can leave lifelong neurological complications or death, and has no specific treatment other than hospital care. Murray Valley encephalitis is most common in Australia in northern regions. There is a vaccine for Japanese encephalitis, but not MVE. This week Western Australia’s Department of Health has issued warnings as a second and third case have been recorded. Department managing scientist, Andrew Jardine, said this warning came after an earlier case of MVE in the Pilbara region and was a reminder to residents in northern WA to stay alert.

[Termites on Tour: How Climate Change Is Bringing Pests to Your Doorstep](#)

Rising global temperatures could lead to more widespread termite infestations, increasing damage costs beyond the current 40 billion USD per year, with researchers calling for immediate action to mitigate this threat. With the rising temperatures of climate change, homeowners face a new type of threat: invasive termites. Previously unaffected areas could see an influx of termites, and the financial implications are substantial. Currently, termites cause over 40 billion USD worth of damage each year, and as their population expands, this cost is sure to grow. In a new study published in the open-access journal *Neobiota*, PhD student Edouard Duquesne and Professor Denis Fournier from the Evolutionary Biology & Ecology lab (Université libre de Bruxelles) unveil the unsettling reality of invasive termites’ potential expansion into new territories. Their study shows that as temperatures rise and climate patterns shift, cities worldwide, from tropical hotspots like Miami and Lagos to temperate metropolises like Paris or New York, could soon find themselves under siege by these tiny yet destructive pests.

[A pest of our own making: revealing the true origins of the not-so-German cockroach](#)

German cockroaches thrive in buildings all over the world. They’re one of the most common cockroach species, causing trouble for people both here and overseas. But in nature, they’re nowhere to be found. Just how this urban pest evolved and populated our dwellings was unknown – until now. We used DNA sequencing to study the German cockroach (*Blattella germanica*) and trace its origins back to east India and Bangladesh. It’s a fascinating story about how humans enabled the evolution and spread of one of our most hated pests.

[Why You Should Always Put Your Suitcase in the Hotel Bathroom, According to an Entomologist](#)

There’s just something about walking into your hotel room after a long flight, flinging your suitcase (and yourself) on the bed, and officially entering vacation mode. It just feels all sorts of right, doesn’t it? Well, apparently, there’s one thing about that equation that’s all sorts of *wrong*, according to experts. Namely, the whole flinging-your-suitcase-on-the-bed part. Believe it or not, the best place to put your luggage when you’re staying in a hotel isn’t on the bed. Or on the floor. Or even shoved inside the closet on one of those luggage rack

things. Nope; the smartest travelers know to store their suitcases in the hotel bathroom—or better yet, inside the tub. The reason behind it is simpler than you might think, but it might make your skin crawl: bed bugs. These teeny tiny critters hide inside beds, couches, and clothing, and feast on the blood of humans to survive. (Sounds like something out of a horror movie, doesn't it?) And if they're present in the room, they'll happily jump from the bed to your luggage and into your clothing, if given the chance.

[Mosquito Meal: Study Shows Pests' Potential as Livestock Feed](#)

What do a quail farm, mass trapping of mosquitoes, and vector-borne diseases have to do with sustainable livestock feed?. It might be the beginning of a well-funded research project using mosquitoes as a protein source. The story goes like this: Alexandra Chaskopoulou, Ph.D., and her research team in northern Greece were performing surveillance work on mosquito populations that could potentially vector harmful pathogens like West Nile virus. Using standard light traps in cultivated rice fields, they collected up to 90,000 mosquitoes per trap in just 12 hours. However, they only need a small sample of these collections to check for pathogens and survey the mosquito population. So, what do you do with the extra hundreds of thousands of mosquitoes?. A local, backyard quail farmer asked if he could use them to supplement his quail feed. Chaskopoulou obliged and checked in with the farmer later. She learned that the quails had doubled their hatching success rate, and the birds were healthier!

[Q&A on Mosquito-Borne Illnesses with New York Times Reporter Stephanie Nolen](#)

The spread of mosquito-borne illnesses and invasive species has created a growing public health concern that has public and private stakeholders seeking new and innovative solutions. Unfortunately, some of the strategies for thwarting mosquito-borne illnesses have had the unintended consequence of reversing years of progress, reported The New York Times Global Health Reporter Stephanie Nolen in her "Tiny Insect, Giant Menace" multimedia series published last fall in The New York Times (bit.ly/48TgEJO). Climate change, barriers such as bed nets, insecticides becoming less effective because of overuse and a lack of foundational funding for mosquito-borne disease strategies are just a few factors Nolen found in her travels to five countries in Africa and Latin America for this project. PCT caught up with Nolen for a one-on-one interview to discuss her multi-dimensional series on the rapid evolution of mosquitoes, scientists using genetic engineering to block malaria-carrying species from spreading the disease and her personal journey following insects into drainage pipes, bedrooms and rainforests.

[Board Certified Entomologist: Two Scientists Share How the Professional Certification is Advancing Their Careers](#)

The Entomological Society of America has nearly 7,000 members, but only 440 scientists are Board Certified Entomologists. The BCE designation shows colleagues, employers, clients, and collaborators that the holder is an expert in both broad entomological knowledge and a chosen specialty. Even many scientists with Ph.D. degrees in entomology or related fields have earned their BCE to set themselves apart and highlight their commitment to professionalism and dedication to insect science. This spring, *Entomology Today* spoke with two Board Certified Entomologists to learn more about the BCE program, what it takes to study and prepare, and the value it confers in the profession.

Jennifer A. Henke, M.S., BCE, is the laboratory manager at the Coachella Valley Mosquito and Vector Control District in Indio, California, and 2024 president of the Entomological

Society of America. Henke earned her BCE in October 2023, with a specialty in medical and veterinary entomology.

Meredith R. Spence Beaulieu, Ph.D., BCE, is the university program manager of the Global One Health Academy at North Carolina State University in Raleigh, as well as a member of the ESA Science Policy Committee. She earned her BCE in 2019, also with a specialty in medical and veterinary entomology.

The following Q&A has been edited for clarity and length.

[Tiny queens, supergenes, and much more](#)

In the paper “Social antagonism facilitates supergene expansion in ants” published in *Current Biology*, Giulia Scarparo, Marie Palanchon, Alan Brelsford, and Jessica Purcell investigated the genome of *Formica* ants and discovered a novel supergene variant on chromosome 9 in *Formica cinerea*. This supergene promotes queen miniaturization and is exclusively found in multi-queen colonies. The authors speculate that it is disfavored in single-queen colonies and thus socially antagonistic. Here, first author Giulia Scarparo highlights the main points and shares some pictures of the field work.

[Chance or pattern? Stick insects show repeatable evolution in action](#)

Stick insects have more going on the surface of their skinny bodies than meets the eye. Some species of these bugs can blend in with plants to avoid predators. How they evolved this camouflage is part of an evolutionary mystery: do specific physical traits evolve by chance or if they follow a predictable pattern? After combing through 30 years of data, a team of scientists may have found evidence of repeatable evolution in stick insects. The findings are described in a study published May 24 in the journal *Science Advances*.

[How do insects survive downpours?](#)

On the whole, insects do not fly in wet weather, says entomologist Richard Jones. Instead, they find a roost and sit tight until the deluge is over. However, research on mosquitoes using high-speed video footage shows that, as they head for shelter, they can survive being hit by raindrops many times bigger and heavier than themselves - the equivalent of humans being struck by cars. The phenomenon - which probably applies to all tiny flying insects - has been described as "boxing with giant balloons". The drops do not burst on hitting an individual, but knock it aside, a result of water surface tension and the water-repellent nature of the insect cuticle. Occasionally, a large raindrop will completely surround or adhere to an insect, dragging it down. Provided the bug is flying high enough, it will usually break free before impact. Nonetheless, heavy showers are a danger to flying insects.

[A former ski champion visited multiple Australian museums — and walked out with hundreds of dead butterflies in his pockets](#)

With his marriage on the rocks and fearing his wife was having an affair, ex-champion skier Colin Wyatt decided to cope the only way he could think of. He began stealing rare butterflies. What unfolded over the following months in the late 1940s would become a bizarre search spanning multiple museums and crossing international waters. It would also involve thousands upon thousands of tiny flying insects. The first sign of trouble came in early 1947 — some 825 specimens of rare Australian butterflies had disappeared from the Melbourne Museum's George Lyell collection. When Melbourne raised the alarm, other museums checked their own collections. Adelaide Museum had found a door open several weeks earlier. When they checked, more than 600 specimens were missing. A further 1,500

butterflies were taken from the Sydney Museum. Many of them had been kept in cases in a small room not usually accessible to the general public.

[Beetle in a Haystack: Environmental DNA Reveals Invasive Pest Incursions](#)

Budget-crunched rural communities often take advantage of the old saw about one man's trash being another's treasure—by charging a fee to handle big cities' municipal waste. Taking cash for trash, however, could have hidden costs, because harmful organisms can ride along with waste and gain a foothold in the communities that accept it. Searching for unwelcome hitchhikers in mountains of waste can be like looking for the proverbial “needle in a haystack,” according to a team of scientists whose recent research may make the task much easier. In a study published in May in the *Journal of Economic Entomology*, researchers at the United States Department of Agriculture's Agricultural Research Service (USDA-ARS) and the University of British Columbia describe how they employed a method for detecting DNA, first used in the 1980s to study microbial diversity in the environment, to reveal otherwise covert invasive agricultural insect pests hidden in green yard waste. DNA can be shed by organisms into the environment through droppings, bodily fluids, skin cells, and tissue fragments, all of which can be collected and sequenced. The sample sequence is then compared with DNA sequences in reference banks in hopes a match is found, identifying the organism.

[Perth Zoo, Rottnest trees felled as borer spreads through 88 suburbs](#)

More than 3000 of Perth's trees, now including Perth Zoo and Rottnest Island's, have been destroyed as one of the state's biggest-ever biosecurity operation ramps up. The trees were felled to stop the spread of the polyphagous shot-hole borer, in the biggest-ever biosecurity operation undertaken by the state government. Figures up to mid-May that the Department of Primary Industries and Regional Development provided to *WAtoday* lay out the shocking destruction wreaked by the South East Asian pest, which kills trees via boring holes in trees, in which it plants a fungus that it plants and farms for food – but which stops trees transferring nutrients, slowly killing them. By mid-May department officers had inspected more than 1.75 million trees on more than 60,000 properties, clocking up more than one million kilometres between them. This has resulted in the destruction of thousands, including beloved exotic species such as figs and London plane trees, in cherished public spaces like Hyde Park and King's Park.

ENTOMOLOGICAL PHOTOS BY MEMBERS

Dinah Hales has provided some interesting photos from her backyard.

Male and female moth (*Orgyia* sp.?) showing female pupal exuviae, cocoon with larval bristles, eggs. On grapefruit, Beecroft.



Mature caterpillar of the Dainty Swallowtail, *Papilio anactus*. On lime, Beecroft.



Nymphid adult (Neuroptera). On lemon, Beecroft. Eggs of this species are on stalks and arranged in an elongated horseshoe shape.



Call-out from Bioplatforms Australia

My name is Aude Touffu, I am a project manager at [Bioplatforms Australia](#). This is a heads-up on our [Integrated Pest Management Omics initiative](#) ahead of our request for partnership in early July.

As a brief introduction, Bioplatforms provides access to 'omics technologies in support of life science researchers working across human health, agriculture, biodiversity and industry. The IPM Omics Initiative aims to provide fundamental omics datasets to accelerate the identification and understanding of pest and native beneficial insect populations in Australia. Our goal is for the sequencing data to have a broad utility that will benefit the productivity and sustainability of Australia's primary industries. The initiative is based on a co-investment model, where researchers offer their time and samples whilst Bioplatforms covers the cost of the sequencing. The data is then freely available after a 12-month embargo.

We will be having an open call for partnership in late June/early July and we would like to advertise it to as many people as possible who are working in the invertebrate field.

I can be contacted at Aude Touffu atouffu@bioplatforms.com.

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