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CIRCULAR OF THE ENTOMOLOGICAL SOCIETY OF NEW SOUTH WALES Inc

This month, we announce the winner of the Ted Taylor Student Prize for the best student contribution to entomology.

This month Nick Farr has kindly put together a member profile. Nick is a relative new member. Like many of us, as kids we loved insects but as adults moved in another direction. Fortunately, some of us returned to our roots. We still have plenty of members we would like to hear from, so please spare a little time.

Dinah Hales has unearthed a video profile of Keith Campbell, a previous Society member, and ex-fighter pilot in the WW2, forester and forest entomologist.

Thomas Heddle reports on the Australian Entomology Society in Albury in November 2023.

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

tcheddle

Garry Webb

Thomas Heddle

Circular editors

Ted Taylor Student Prize Competition

The Entomological Society of NSW each year offers a prize of \$1000 for the best student contributions to entomology in memory of our long-standing treasurer, Ted Taylor, who died in February 2017. Ted Taylor was a renowned forest and timber entomologist in NSW who served as Treasurer to the Society for 50 years. Entries are open to students who are currently enrolled at a NSW University at any level. Students are required to submit a text article relating to insect biology. The article should be written to engage a wide audience and be no more than 1500 words in length. The student contributions are judged by a panel of Society entomologists and outreach providers. Entries may be published in the Society's journal, *General & Applied Entomology*, or the Society's magazine *Tarsus*. All students entering receive free membership of the Society for one year.

The Society is delighted to announce the place-getters in the 2023 Ted Taylor Prize competition.

Winner: Elise Oakman, The University of Sydney

Title: Education is the key to success: The learning journey of parasitoid wasps.

Short Summary: The learning process for parasitoid wasps to find their host is unique to species. It's important to understand this, because in artificial rearing conditions, an absence of learning opportunities results in subpar integrative pest management.

Second: Sanjay Kumar Pradham, Western Sydney University

Title: Fruit fly-specific viruses in biological control: discovery and potential applications in fruit fly management.

Short Summary: Many insects carry insect-specific viruses that are detrimental to host fitness and health. This article reviews the diversity, prevalence and host effects of fruit-fly specific RNA viruses in Australian tephritid fruit flies and discusses their potential in fruit fly management.

Congratulations to them both, and students, start planning for the 2024 competition!

Member Profile

Nicholas Farr



I have always been interested in entomology. When I was young, I vividly remember both having an Uncle Milton's style Ant Farm, as well collecting dozens and dozens of Christmas beetles in a big wooden insect collecting box – good luck doing that nowadays in Sydney! I never followed this passion when I got to high school, and instead got a degree in information technology and went straight into full time work.

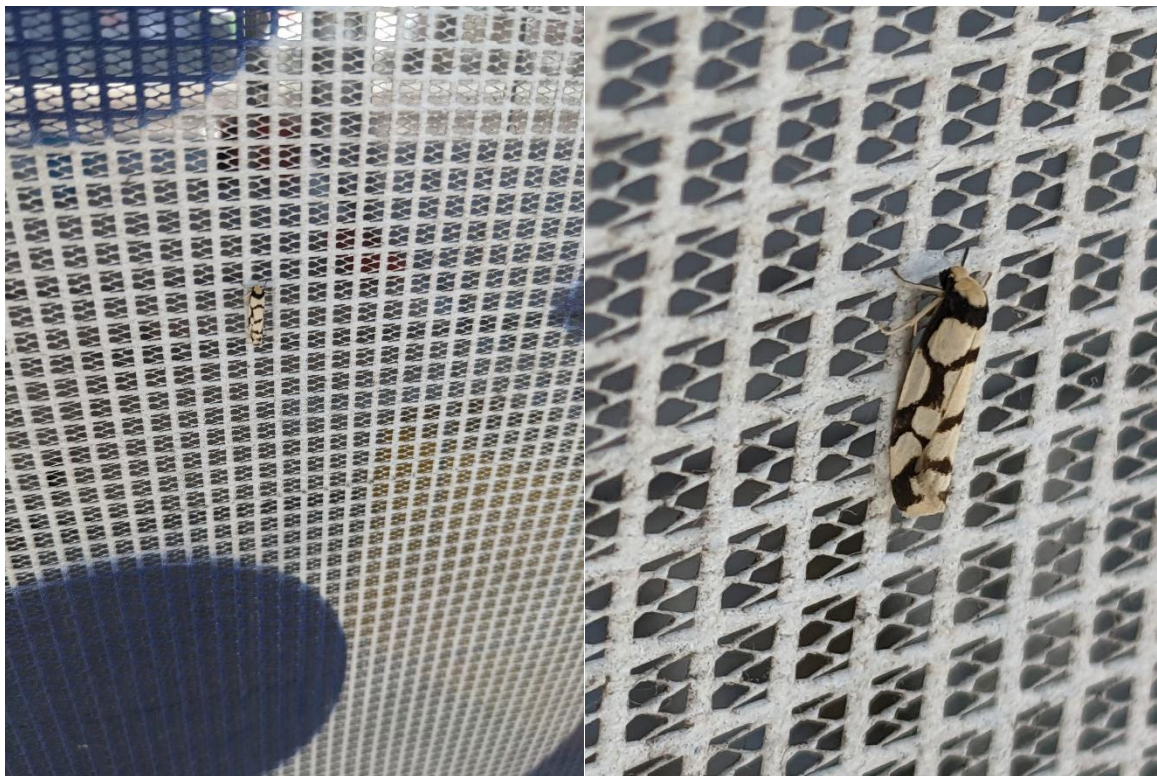
I am in my final trimester of a Bachelor of Zoology at the University of New England. I have been working through this degree online since 2019, trying to do as many entomology-focused units as I can. My degree finishes with what is essentially a “capstone project”. My current trimester-long project is around the environmental factors that affect both species diversity and morphological characteristics of native dung beetle communities in the New England National Park. It is really unfortunate that I wasn't able to do any fieldwork this trimester, due to time constraints and issues with getting permission to lay traps here in Sydney. Next year, when I finally have some time off from university, and when I am hoping

my new car finally arrives, I hope to do some personal fieldwork. I really enjoyed the collection assignment for my entomology unit, and I'm a bit upset that I never asked for it back! I want to start collecting next year in earnest.

I am hoping to go well enough to start the honours program in the second half of 2024. UNE offers a number of really interesting projects for an honours project, with the entomology-focused projects centred on native dung beetles and ants. I've always been fascinated with ants, so I'm very interested in entering that project if I can. I recently caught sight of some *Pseudoneoponera* ants wandering the UNE campus at Armidale while at an intensive school. I'd love to be able to answer questions around their biology or population genetics one day - maybe for my PhD!

I am currently a full time train driver and have been for over a decade. It's been interesting travelling along Sydney's rail network, which in effect act as radial transects from the CBD out to the city limits and corridors for Sydney's waning wildlife. Working through my degree has allowed me to take note of a few interesting trends around the network. In February, you will often see small orange *Colobopsis* sp. alate ants in some of the old wooden station buildings. In the humid evenings of December to January you might be lucky (or unlucky if you're a local!) enough to see huge alate swarms of termites on the North Shore line, from Gordon to Wahroonga. Even Central Station is an interesting place to find insect life. There are quite a few moth species – including one that I think would be a great companion to Darwin's peppered moth to highlight natural selection (see below)! With all the changes to the railway network, including the introduction of the (driverless) metro, I have no idea how long I have left being a driver! I will probably continue to do more postgraduate work, but work means I will probably have to continue to do it online and part-time, at least for now.



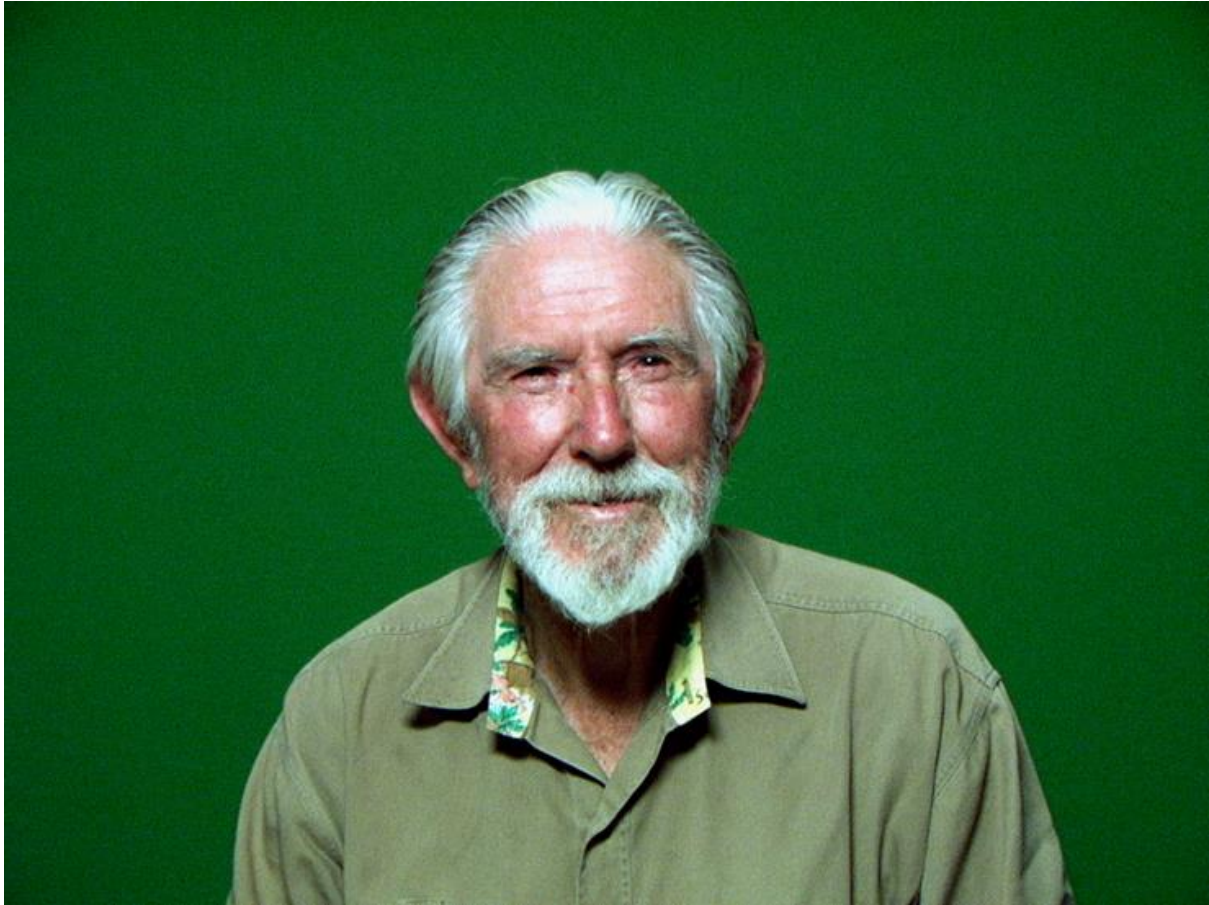


I'd very much like to pursue entomology in the future. In addition to doing all the entomology units I could for this degree, I did quite a few genetics units during my degree, and would very much like to do work around this area, particularly at a population genetics level. In addition to university work, I also enjoy macro photography, as well as keeping ants. There is a surprisingly vibrant community of (**native**) antkeepers in Australia – you can buy queen ants and custom formicariums at larger pet stores now! It'd be interesting if such a community can be engaged to help monitor ant communities and promote their importance to the public.

It was great meeting everyone at the Christmas dinner in November, and I'm really looking forward to becoming more involved with the society, as well as meeting more members, in the future.

Profile of a previous Society member

Keith Campbell



Keith Campbell DFC was a member of the Society until his death. His name came up this week as someone enquired for a copy of something he had written long ago for the Society's circular, the forerunner of Tarsus. He commenced a PhD with me in the 1970s but did not complete it. I knew he had been a pilot in the war but had no idea of the extent and details of his service, flying Spitfires on reconnaissance over Europe.

The link above gives video and text of a (very long) interview with him for a UNSW archive. He describes his early life, his war experiences, his experience as a forester and then forest entomologist and his retirement on medical grounds. I should think anyone who knew him, or was interested in WW2 history would find it fascinating.



<https://australiansatwarfilmarchive.unsw.edu.au/archive/1777>

Albany, the first in person conference since COVID for the Australian Entomology Society

Thomas Heddle

From the 12th – 16th November, 2023, the Australian Entomology Society held its annual general meeting and scientific conference in Albany, WA. For those unfamiliar with the area, Albany sits in a sheltered cove on the south coast of Western Australia with Denmark to its west, Mount Barker (not the SA Mt Barker) to its north, and Esperance a meagre 480km to its east. It was here that I, along with most of the conference participants, realised that WA does in fact get cold and wet. 25mm fell on a Tuesday, nearly flooding the UWA campus. Most of the participants had brought shorts, dresses, and sandals. Not the suitable wet weather gear required. Out of over 150 participants, NSW had 18 participants representing conservation, ecology and agricultural entomology. For some participants, it was their first conference. For others, it was an excellent opportunity to meet up with old friends and colleagues as well as make new friends.

The conference ran for three days with each day commencing with a plenary speaker. These included Dr. Sonya Broughton, Dr. William Humphreys, and Dr. Cathy Byrne. Dr. Sonya Broughton discussed her time at the Western Australian Department of Agriculture, her PhD, and return to the Department of Agriculture. Dr. William Humphreys discussed the findings of subterranean holes in the eastern goldfields, and the Yilgarn and the Pilbara regions of WA where many species previously unknown to humankind have been discovered. Finally, Dr. Cathy Byrne discussed the importance of taxonomy and her role in discovering many new species in Tasmania.

The first day of the conference hosted sessions on invasive species, viruses and vectors, ecology and biology, physiology, behaviour and evolution. Being the agricultural entomologist I am, I most enjoyed the virus and vector sessions, especially those presented by Trebicki and Nancarrow. A further highlight was by Lymbery who looked at warfare between ant species with the subtle use of my favourite childhood game, Age of Empires 2, to demonstrate that numbers are not necessarily everything.

The second day of the conference provided sessions on anthropogenic impacts and conservation, endosymbionts and microbes, pollination, taxonomy, and systematics. A highlight for myself was the endosymbionts and microbes which involved a lot of green peach aphid and oat aphid work. Interestingly, the endosymbionts were taken from different aphid species and injected into the green peach aphid. The longevity, size, and ability to carry viruses and infect plants was measured across several presentations. These presentations were a highlight for me due to the theoretical weaponization of these endosymbionts and the real world impact with virus transmission by the oat aphid and the green peach aphid.

On the third and final day, the Phil Carne Prize was contested in the morning, after which usual conference sessions resumed. These sessions discussed bush blitz, pest management and control, entomological education, collaborations, engagement, and extension. It was fantastic to see a strong representation of NSW by the members present in the pest management session where canola pests and fall army worm were both investigated by Rahman and Regmi. Overall, the presentations were all excellent and started many inciteful discussions.

The Phil Carne prize is aimed at fostering high quality entomological research in young scientists. The name of the prize celebrates contributions made by Dr Phil Carne to the science of entomology and the Australian Entomological Society. The three finalists were Patricia Henriques-Piskulich from the University of Melbourne, Peter Control from La Trobe University, and Thomas Heddle from the University of New England. The Phil Carne prize was awarded to Patricia Henriques-Piskulich who presented on gloss of prey as an antipredator strategy in fast moving prey. Patricia tested the hypothesis that glossy fast-moving animals are less likely to be struck by predators. Using the giant rainforest mantid species *Hierodula majuscula*, Patricia showed that gloss resulted in lower strike and tracking rates from mantids.

The weather finally turned around just in time for Thursday's field trip to the Stirling Ranges and Twin Creeks. Participants were taken on a tour of the majestic Stirling Ranges to explore its unique biodiversity.

The next AES conference will be held in Hobart, Tasmania, in November 2024. It would be fantastic to see another strong turnout by NSW Entomology members at next year's conference.



Francesco Martoni, Agriculture Victoria, discussing the complementarity of morphological and molecular identifications of ants for biosecurity.



Rajendra Regmi, Macquarie University, introducing his fall armyworm research and potential horticultural hosts.



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**Protect
Grow
Innovate**



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The elusive Dongara weevil damaging canola crops in WA's Mid West

Dongara weevil is an elusive new pest of canola crops in the Dongara and Mingenew regions of Western Australia.

The tiny flightless weevil chews on the hypocotyl of newly emerged canola seedlings and appears to have a high tolerance for insecticides. Weevils are active at night and shelter under clods or in deep cracks within the soil during the day.




Dongara weevil on canola seedling Looking for Dongara weevils hiding in soil

Recently described, it represents a new genus of Entiminae (Coleoptera: Curculionidae) of the tribe Otiorynchini. Molecular analyses have shown Dongara weevils form a distinct clade.




Front view of Dongara weevil head Lateral view of Dongara weevil

We are investigating the pest's host and environmental preferences to develop effective management strategies for canola growers in the Mid West region of WA.

Visible and extensive damage has only occurred to canola seedlings, and not to wheat, barley, or pea crops. Pitfall trapping has shown that adults are present in the soil throughout the cropping season, April to September.

High clay content soils appear to be more favourable than sandy soils. Weevils have been found in self-mulching cracking clay, calcareous loamy earth and grey non-cracking clay.



Dongara weevil count locations, represented by red dots, on clay soils in the Dongara and Mingenew regions

The "new" pest species may represent an exotic species not known as a pest in its place of origin, or a native species with unusual morphological features that has suddenly switched from endemic plant hosts to cultivated crops.

This joint investigation is co-funded by GRDC and DPIRD and undertaken by researchers from DPIRD, Mingenew Irwin Group and Murdoch University.



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Poster of Rebecca Severtson and Andras Szito, Western Australian Department of Primary Industries and Regional Development, exploring a new species of weevil damaging canola in WA. Unknown origins but possibly a native, present in the heavy clay soils of the Mid West.



Long time between drinks. Thomas Heddle and Alfonsina Arriaga Jimenez, both from the Insect Ecology Lab at University New England, NSW. Dung beetles are life for these two, with Thomas focusing on agricultural dung beetles while Alfonsina focuses on native dung beetles.

PHOTO CORNER

Dinah Hales has provided a photo of what she believes is a mydid fly



New Entomological Research

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

[American burying beetle: The meat-eating insect that buries bodies for its babies to feast on](#)

American burying beetle parents work together to find and bury a dead animal that its brood can consume after hatching. The American burying beetle exhibits a rare behavior for its kind — parental care. And to take it a step further, both the male and female are involved in this duty. Upon emerging from hibernation in late spring, the males and females search for mates — and importantly, a dead vertebrate. It's a bit of a Goldilocks mission to find just the right size carcass — between 2.8



and 7.1 ounces (80 and 200 grams) — for what's ahead. Once beetles find a suitable carcass and mate, and any potential competitors shooed off, the male and female get to work. Not mating just yet, but working together to bury the carcass underground.

[Fire ant outbreak in NSW contained but helicopter baiting continues](#)

An emergency biosecurity response to a fire ant outbreak in northern New South Wales appears to have contained the extremely invasive species. In November, three red imported fire ant (RIFA) nests were found in Murwillumbah, 13km south of the Queensland border. The pests were detected by a member of the public and were suspected to have been transported from south-east Queensland, where there is a widespread infestation. The invasive



species can kill people and livestock as well as damage infrastructure and ecosystems. The National Fire Ant Eradication Program response to the detection included chemically eradicating the nests, baiting the surrounding area, using sniffer dogs to search for further nests and imposing strict limits on movement of farming materials within 5km of the site.

[Why ants have invaded your home this summer](#)

The appearance of [ants](#) in your home signals summer for many Australians, as the pesky insects start searching for food and shelter indoors. With [Australia's](#) huge diversity and abundance, ants become more active in summer as they enter the colony-building phase, said Associate Professor Tanya Latty from Sydney University's School of Life and



Environmental Sciences. "An ant colony is full of adult ants and their larvae, and they're essentially looking for food to keep the community alive," she said. "It's often the smaller species that tend to come into our homes, you rarely see bull ants taking up residence in someone's home." Ants may also enter your home in search of dry land after periods of rain, when their nests are flooded, said Latty. Sneaking through doors, windows and cracked floorboards, Latty said ants cleverly communicate with each other to find food using pheromones.

[Artificial Sweetener Could Be New Tool in Cockroach Management](#)

German cockroaches (*Blattella germanica*) are a major global insect pest in urban buildings as purveyors of allergens as well as pathogens such as *Salmonella*, *E. coli*, and *Rotavirus*.

Control of German cockroaches is usually done with insecticide sprays and insecticide-loaded baits, but cockroach populations can evolve resistance to insecticides, and insecticides can also affect non-target animals. Researchers at the University of California, Riverside (UCR), are exploring the efficacy of a novel type of chemical control of German



cockroaches—the artificial sweetener sucralose (also known as Splenda). In a study published in November 2023 in the *Journal of Economic Entomology*, the researchers found that sucralose-water solutions were effective in reducing survival of German cockroaches via effects on their gastrointestinal system.

[Fire Ants May Not Use The “Cheerios Effect” To Make Rafts After All](#)

Fire ant rafts enable these invertebrates to survive floods by aggregating in floating islands of living organisms. For a long time, their formation was thought to come down to something called the “Cheerios effect” – but new research has revealed that actually, pheromones could be a better fit as a trigger for the phenomenon. The Cheerios effect describes the way that floating objects act as if they’re stuck



together, and it's all to do with how surface tension interacts with the air. It's a nifty bit of science you've probably witnessed if you've eaten the cereal of the same name, as when your bowl is a little lacking in those delicious hoops, they seem to flock together. The researchers put the Cheerios effect to the test using live and dead ants to observe how they behaved on dry and wet surfaces. The experiments

revealed that the clumping effect we observe with cereal doesn't match up to what we see in fire ants, dead or alive.

[How Supergenes Shape Evolution](#)

Conventional wisdom holds that sexual reproduction evolved because it enables organisms to shuffle, or recombine, different alleles (versions of a gene) in the next generation, producing the genetic variation that is foundational to natural selection and adaptation. But in recent years researchers have started to find that all regions of the genome do not shuffle equally. Some regions, which can contain just a few genes or sometimes hundreds, rarely shuffle. As a result, the same combination of alleles is transmitted all together to the next generation. These genetic units, called "supergenes," have so far been found in ants, butterflies, birds, fish, plants and fungi—and many more likely still await discovery.



[A spotter's guide to Australian flies and their 'great' deeds despite a few serious pests](#)

The buzz of a billion flies — it is the soundtrack of an Australian summer. The all-too-familiar bush flies and house flies are the uninvited guests at outdoor activities across the country, along with blowflies and march flies. But according to nature writer Tanya Loos, the overwhelming majority of flies are not the least bit interested in ruining your barbecue, and with more than 250,000 species worldwide, most are too busy doing good. Ms Loos told ABC Statewide Mornings, that flies, in general, suffered from an image problem. "I think there's some great flies. If you think of hover flies, they are some of the best pollinators we have for our flowers and our vegetables," she said. "Some are serious agricultural pests, though. The Australian sheep blowfly, which is actually from southern Africa, is a huge problem for the sheep industry.



[Meet the vampire spider, an unassuming arachnid that drinks human blood and has a liking for smelly socks](#)

A vampire spider that drinks human blood and is attracted to smelly socks might sound like the stuff of an over imaginative arachnophobe's mind. Still, *Evarcha culicivora* is very much a real thing. It is called the vampire spider by some, and while it isn't quite the blood-sucking fiend its name might suggest, the truth is even more bizarre and interesting. The vampire spider is a member of the imminently likeable and charismatic jumping spider family (Salticidae). Close up it has all the hallmarks of these popular spiders, except that it is a bit of a 'little brown job' (the informal term used by birders to describe brown birds that are difficult to distinguish) and is easily overlooked in favour of its larger or more extrovert cousins.



[Human Blood Is An Aphrodisiac For The Vampire Spider](#)

Human blood is the preferred meal of the East African jumping spider, *Evarcha culicivora*, but the “vampire spider” doesn’t feed directly on humans. Described as an indirect vampire, it preferentially selects mosquitos with a full belly of blood meal, and it’s a diet that makes them more attractive to their vampire spider mates. The curious dietary habits of vampire spiders were put to the test in a 2006 study that used motionless lures made of dead insects to test *E. culicivora*’s preferences. It's not surprising that they can be so selective as we know dreaming jumping spiders have very good eyesight and may even recognize each other. The study concluded that these jumping spiders were the first predator recognized to actively select for *Anopheles* mosquitoes, which was big news because, as we all know, mosquitoes spell bad news. Female *Anopheles* are the world’s deadliest animal according to the Centers for Disease Control and Prevention. Why? Because they spread so many diseases. Malaria, dengue, West Nile, yellow fever, Zika, chikungunya, and lymphatic filariasis are just a few diseases spread by mosquitoes, meaning they kill more people than any other creature in the world.



[Why is my home swarming with tiny ants, and what can I do about it?](#)

Warmer temperatures are often synonymous with the smell of sunscreen and longer evenings spent outdoors. But for those who live in southern areas of Australia, a sure-fire indicator that the weather is heating up is the appearance of those tiny little ants in your kitchen. You know the sight — long lines of little brown or black ants snaking their way over cupboard doors and into half-opened chocolate blocks, somehow finding their way to that microscopic bit of discarded food under the dinner table. So what are these ants, and why do they seem to make an appearance when the weather gets warmer? The heat is on. Ants, like many insects, are cold blooded, Associate Professor Tanya Latty from the School of Life and Environmental Science at the University of Sydney explains. "As the weather gets colder, they tend to become less active — you might still see them around, but they tend not to be moving around quite as much as they would in warmer weather," she says. "Over a Canberra winter, I'd expect most ant species would not hibernate, but go into their nest and into a resting phase."



[Deadly tree beetles on path of destruction at Kings Park](#)

Infested trees will be removed from Kings Park in a bid to protect the world-renowned botanic garden from the spread of a destructive tiny beetle wreaking havoc across Perth. Polyphagous shot-hole borer has been confirmed in more than 80 suburbs across Perth since it was first detected in August 2021. The exotic pest burrows into trees and infects them with a



fungus that slowly kills them from the inside, with the removal of infected trees the only way to control the spread. Infested trees will be removed from Kings Park in a bid to protect the world-renowned botanic garden from the spread of a destructive tiny beetle wreaking havoc across Perth. Polyphagous shot-hole borer has been confirmed in more than 80 suburbs across Perth since it was first detected in August 2021. The exotic pest burrows into trees and infects them with a fungus that slowly kills them from the inside, with the removal of infected trees the only way to control the spread.

[Aussie homeowner's shocking find in doorframe: 'Swarm of millions'](#)

Australians have seen nature throw some pretty crazy things at them during a surprisingly wet and wild start to summer – but some weren't prepared for this. Over the weekend residents in NSW had their homes overrun by a "swarm of millions" of tiny insects, barely able to see their door frames or out of their windows due to the sudden mass of invaders. Residents in Lismore — situated in the state's Northern Rivers region — were dumbfounded to find the insects on Saturday night and admitted they had no idea what they initially were. "I was just doing the dishes and noticed strange orange dots all over my glass sliding door," resident Crystal Lea told Yahoo News Australia. "I went to investigate and turned my verandah light on and they were everywhere, all over the walls, ceiling and windows."



[Backpacker's 'frightening' discovery exposes Australia's 'unspoken rule'](#)

Visitors to Australia are continually stunned by our diverse flora and fauna. But even on his sixth time holidaying down under, a German backpacker was left "frightened" after stumbling upon a strange sight on a nature trail. Although a "beautiful" place to visit, the tourist, who was visiting Victoria recently, pointed out that "everything is somehow much bigger here" referring to our selection of native reptiles, bugs and animals, and while walking through the Yarra Ranges National Park spotted something unusual on the ground. "I came across these huge dead larvae on a hike. I've never seen anything like it before," the backpacker, shared on Reddit. "Does anyone know what species they belong to or have aliens landed here?" he continued and revealed that he discovered the critters while on the way to the popular Keppel Lookout near Marysville.



[Can Insect Repellent Keep Flies Away Even After Death?](#)

Flies and maggots have been helping detectives solve homicides for centuries, and modern-day forensic entomologists use insect evidence to estimate the time and often location of death. But what happens when the victim sprayed themselves with DEET or another insect repellent to keep mosquitoes, ticks, and chiggers from biting? Will that have any effect on how quickly flies colonize the body?



That's precisely what researchers investigated in a study published in November in the *Journal of Medical Entomology*. "There are a lot of factors that need to be researched when it comes to postmortem intervals, or PMI, estimation," says Cecilia Torres, lead author

of the study and a forensic technician with the Albuquerque, New Mexico, police department. “One factor that had not been thoroughly investigated yet was the effect of insect repellent.”

[Matabele ants recognize infected wounds and treat them with antibiotics](#)

The African Matabele ants are often injured in fights with termites. Their conspecifics recognize when the wounds become infected and initiate antibiotic treatment. The Matabele ants (*Megaponera analis*), which are widespread south of the Sahara, have a narrow diet: They only eat termites. Their hunting expeditions are dangerous because termite soldiers defend their conspecifics—and use their powerful mandibles to do so. It is therefore common for the ants to be injured while hunting. If the wounds become infected, there is a significant survival risk. However, Matabele ants have developed a sophisticated health care system: They can distinguish between non-infected and infected wounds and treat the latter efficiently with antibiotics they produce themselves. This is [reported](#) by a team led by Dr. Erik Frank from Julius-Maximilians-Universität (JMU) Würzburg and Professor Laurent Keller from the University of Lausanne in the journal *Nature Communications*.



[Ant face patterns like swirls and stubble might have practical value](#)

Looking at face patterns in photos of more than 11,000 kinds of ants struck entomologist Clint Penick as a fine pandemic-lockdown project for his students. From that socially distanced slog came the idea that the texture patterns might offer practical benefits, says Penick, of Auburn University in Alabama. For instance, some soil-dwelling ants with raised, swirling facial ridges — “almost psychedelic,” he says — could be getting extra protection from abrasion. The ridges lie so close together that sand grains can’t fit in between, he reported at the Entomology 2023 meeting in November. Most ants have a smooth outer surface, or cuticle. But some grow elaborate patterns, such as tiny indentations “like dimples on a golf ball” or netted patterns like “cracks in mud,” says Penick, who started the project while at Kennesaw State University in Georgia. Ant taxonomists use more than 150 terms to describe the different cuticle patterns, with different names for some subtle distinctions. “They drive people like me crazy,” he says.



[Why bug-fed farm animals could become humanity's new protein source](#)

When I was studying for my PhD back in the late 1990s, I read an article trumpeting the ‘next big thing’ in food. To be honest, the next big thing didn’t sound very appetising. Apparently, within the next decade or so, we would all be eating beetle burgers. Entomophagy, eating insects, is common in many parts of the world. Given the ethical problems of farming livestock, insect farms



were, the article boldly declared, the future of food. Raised without welfare issues, insects are excellent at converting foodstuffs we can't use into protein that we can. What's more, they require far less space than livestock and contribute far less greenhouse gases than cattle. But despite some clear advantages, a quarter of a century later diners in the developed world still aren't feasting on flies or baking with beetles. The reason for this is obvious: while more than 1,000 species of insects are eaten around the world, most commonly in the tropics, Western societies generally don't eat 'bugs'. As the bushtucker trials of *I'm a Celebrity Get Me Out of Here* demonstrate, insect-eating is an idea many people find disgusting.

[7 places you never realized you could pick up bed bugs](#)

No household pest is a welcome guest, but bed bugs are particularly disliked — and for good reason. These small insects are quick to spread and infest a new home once they've made their way inside, preferring to nest in soft furnishings and fabrics. They appear as brown, flat, oval-shaped bugs that can grow to 3/16ths of an inch in length, but are often hard to spot until the infestation is already well underway. More often, people notice they have an issue when they begin to get bitten; bed bugs feed on human blood and can leave very itchy welts behind if the person is allergic. The good news is that bed bugs don't cause any long-term harm and aren't dangerous to human health, minus the annoyance of the bites themselves. However, eliminating them requires a lot of work and possibly even a fumigation of your home. It is much easier to prevent getting bed bugs in the first place than it is to treat an existing bed bugs problem. By knowing where bed bugs like to hide, you can take necessary precautions to keep yourself from accidentally bringing an insect or two into your home. Here are seven popular places that you can pick up bed bugs.



[Getting to the bottom of how red flour beetles absorb water through their butt](#)

The humble red flour beetle (*Tribolium castaneum*) is a common pantry pest feeding on stored grains, flour, cereals, pasta, biscuits, beans, and nuts. It's a remarkably hardy creature, capable of surviving in harsh arid environments due to its unique ability to extract fluid not just from grains and other food sources, but also from the air. It does this by opening its rectum when the humidity of the atmosphere is relatively high, absorbing moisture through that opening and converting it into fluid that is then used to hydrate the rest of the body. Scientists have known about this ability for more than a century, but biologists are finally starting to get to the bottom (ahem) of the underlying molecular mechanisms, according to a March paper published in the Proceedings of the National Academies of Science. This will inform future research on how to interrupt this hydration process to better keep red flour beetle populations in check, since they are highly resistant to pesticides. They can also withstand even higher levels of radiation than the cockroach.



[Rarest insect in the world now on display at San Diego Zoo](#)

For the first time in North America, you can now view the rare insects in a specialized habitat at the zoo's Wildlife Explorers Basecamp, the San Diego Zoo Wildlife Alliance announced this week. The Lord Howe Island stick insect breeding program at the San Diego Zoo works to help sustain populations of the rarest insect in the world. Previously thought to be extinct on the Lord Howe Island Group — a cluster of volcanic islands in the Tasman Sea between



Australia and New Zealand — and rediscovered in 2001, two pairs were taken to the Melbourne Zoo for breeding to help save the species. Since 2012, the two zoo's have been working together to save the species. Also known as tree lobsters, the Lord Howe Island stick insect is a large, flightless, nocturnal insect that can grow up to 6 inches in length.

[March of the red crabs: months of preparation for annual mass migration on Christmas Island](#)

The welcome mat has been rolled out for scores of red crabs as they make their annual coastal dash on [Christmas Island](#). Each year, the first substantial rain of the wet season triggers [tens of millions of adult red crabs](#) to leave their forest homes, in the interior of the island, and march towards the coast to mate and spawn. Christmas Island is 1,500km from the Australian mainland and lies 350km south of the Indonesian island of Java. Staff at the Christmas Island national park have spent months preparing for the mass migration, setting up kilometres of temporary roadside barriers to channel the migrating crabs to the safety of underpasses and overpasses. They also divert traffic away from the crabs as they scurry to the coast. "Over many years we've also targeted the red crab's biggest threat, the invasive yellow crazy ant," he said in a statement on Sunday. "By reducing their numbers, the red crab population numbers are higher than we've seen in



decades which is an outstanding result not only for the red crabs, but for the entire island ecosystem." Crazy ants were first detected on the island in the 1920s, but it wasn't until the first super colonies formed in the late 1980s that they became a problem. The ants have killed tens of millions of red crabs over the years by spraying them with potent formic acid.

[Anxiety high among NSW beekeepers as questions remain about a future with varroa mite](#)

The nation's peak beekeeping industry body says anxiety is high in the sector — three months after NSW [walked away from trying to eradicate the deadly varroa mite.](#)

The NSW Department of Primary Industries (DPI) led efforts for 15 months to try to rid Australia of the bee parasite before that goal was considered unattainable. Australia was previously the only major honey-producing country in the world free of varroa.

The eradication efforts saw billions of bees euthanased and hive movements restricted in infested areas. Three months after announcing the transition from eradication to managing the pest, beekeepers are still left wanting answers. Australian Honey Bee Industry Council chief executive Danny Le Feuvre said the impact of varroa had been "unmeasurable" and many felt unprepared for what was ahead. "It would be devastating, particularly having to make the sacrifice for industry and then deciding that it's not achievable," he said.



[Newest variety of insect known as the assassin bug liquefies its prey](#)

Nikolai Tataranic pulls over at the side of a dirt track in outback Western Australia. He has spotted something that, to him, has great potential: a tree with stringy and loose bark. Dr Tataranic starts peeling off the bark absent-mindedly. He does not yet know it hides an assassin. The tiny invertebrate's profile matches what you would expect from someone who has been hiding in the outback for a long time: skinny. With a flick of the wrist, Dr Tataranic, an entomologist at the West Australian Museum, locks up the assassin bug in a vial. As a newly found species, this bug is now in custody in the museum's archives, more than 800 kilometres from his hiding spot in WA's northern Goldfields.



[Amber analyses show that insects already had a variety of defense strategies in the Cretaceous](#)

Analyses of amber show that insect larvae were already using a wide variety of tactics to protect themselves from predators 100 million years ago. Early life stages of insects fulfill important functions in our ecosystems. They decompose dead bodies and wood, forming soil and returning various elements into material cycles. Not least, they are a major food source for many larger animals such as birds and mammals. This has led to many [insect larvae](#) developing structures and strategies for reducing the danger of being eaten. These include features like spines and hairs, but also camouflage and concealment. Over millions of years, a wide variety of such adaptation strategies have developed. Researchers at LMU and the universities of Greifswald and Rostock have studied particularly well-preserved fossils from Burmese amber and have been able to demonstrate that such anti-predator mechanisms had already evolved very diverse forms in insect [larvae](#) during the Cretaceous period 100 million years



ago. This includes well-known strategies such as that employed by lacewing larvae, which carry various plant and animal materials on their back to give them camouflage, or the ploy of mimicking the appearance of certain plant parts.

[Billions of cicadas are about to emerge in Illinois, and scientists don't know what will happen](#)

This spring in Illinois, USA, 17- and 13-year cicadas are due to emerge at the same time, something that last occurred in 1803. What will happen? Like buses, you don't see one for years and then billions of them appear at once. And when they do finally show up, the periodical cicadas of North America – larger, noisier relatives of the planthoppers – radically alter the



ecology of their forest habitat, according to new research. These periodical cicadas come in two varieties – one has a 17-year life-cycle; the other a 13-year one. Both spend the vast majority of their lives as nymphs below ground, sucking sap from tree roots. But when their time is up, they emerge above ground en masse and moult into winged adults. They mate and lay eggs, swamping predators through sheer weight of numbers.

[Aussies warned over 'hitchhiker' bugs in backyard: 'They're sneaky'](#)

You'd definitely know if you provoked them, with their unmistakable stench that anyone with a sense of smell is unlikely to quickly forget. And although they've been deemed a "nuisance pest" over the danger they could pose to the agriculture industry should their population numbers explode, many people might not know what to do if they come across the humble "stink bug". The term actually covers a handful of related species. The brown marmorated bug — a mottled brown, oval-shaped insect is the one Australians should be most concerned about. They are common on other continents and have been found in Australia at the border in imported goods multiple times, after "hitchhiking" on imported goods. They have an insatiable ability to destroy vegetable crops, fruit and trees.



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