

CIRCULAR OF THE ENTOMOLOGICAL SOCIETY OF NEW SOUTH WALES Inc

This month there is no member profile. We still have plenty of members we would like to hear from, so please spare a little time.

We encourage members to provided 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

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Thomas Heddle Garry Webb

Circular editors

New Entomological Research

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

Insect Superheroes: Researchers Unearth Secrets of Leaf-Cutting Ants

While they may not possess the ability to jump over high buildings in a single leap, leaf-cutting ants are undoubtedly superheroes of the insect world. These tiny powerhouses can haul leaf fragments weighing up to six times their own body mass, which they use to foster fungus growth in their nests. However how do these insects ascertain the size of the leaf pieces they meticulously trim using their mandibles? Do they use



their bodies as a simple ruler, or do they use information about the position of their bodies to adjust how far they cut, adapting to the thickness of a leaf while dismembering it? Knowing that the insects alter the trajectory of a cut when sculpting Parafilm of different thicknesses, Flavio Roces from the <u>University of Würzburg</u>, Germany, decided to find out how the ants govern the size of the portions they trim.

Unveiling the enigmatic world of moths: from ancient pollinators to whistling wonders

When you think of moths, do you see holes in your clothes, pests in the pantry, or pesky insects drawn to night lights spoiling your social BBQ? Or worse, do you have an irrational fear of moths? (That's called <u>mottephobia</u>). Would it surprise you to learn moths are not the poor cousin of butterflies? They're incredibly diverse and deserve a second chance.



There are about <u>160,000 species of moths</u> known to science. Compare that to 17,500 species of butterflies. Moths vary enormously in their size, what they like to eat, how they reproduce and how they live their lives.

Top 10 largest insects in the world

Insects come in many different forms and in all sorts of shapes and sizes, encompassing a huge range of diverse species from the smallest <u>ant</u> to the largest <u>cockroach</u>. They are all hugely important they make up over half of all living organisms on Earth. They help to pollinate plants, make foodstuffs such as <u>honey</u> and can be used in medicines. But which is the biggest? And which ones look like they have been photoshopped and cannot possibly



be real? We bring you the biggest bugs in the world, from the longest to the heaviest. So put that bug spray and swotter away and let us bee (ahem) intrigued.

Scientists are asking some Americans to send in dead insects from their yards

The Lepidoptera Research Collection is asking residents in Alabama, Georgia, Kansas, Nebraska, Oklahoma, and Texas to take part in a new citizen science initiative designed to help scientists study declining populations of important pollinators like moths and butterflies. The group requests that residents send in dead specimens found in their communities. The six states were chosen for the pilot program because they lie in the migration



butterfly. Scientists often attribute these species' decline to rampant pesticide use and habitat loss, but they now note additional contributing factors spurred by a warming planet, such as higher temperatures during the fall. A report in Science showed an average yearly drop of 1.6% in butterfly populations from 1977 to 2018, and The New York Times noted a loss of about 900 million butterflies, or about 90% of the monarch butterfly population over the last two decades.

World stunned by Aussie 'creature from hell'

path of the endangered Eastern monarch

A terrifying mystery insect from Western Australia dubbed a "creature from hell" has finally been identified. People from around the world have been left scratching their heads after a clip of a horrifying insect rearing its body in an aggressive way went viral. The chilling video has been viewed over 10 million times on TikTok and has attracted thousands of comments from



stumped viewers across the globe. The strange blue-greyish creature appears to be half stick insect, half scorpion, but also has wings and a tail that goes up and down menacingly in a 'stabbing' motion.

Plastic-Eating Critters and Bacteria Could Solve a Huge Environmental Issue

On an overcast spring morning in 2012, Federica Bertocchini was tending to her honeybees close to where she lived in Santander, on Spain's picturesque northern coast. One of the honeycombs "was plagued with worms," says the amateur apiarist, referring to the pesky larvae of wax moths that have a voracious — and destructive — appetite. Bertocchini picked out the worms, placed them in a plastic bag, and carried on with her beekeeping chores. When she retrieved the bag a few hours later, she noticed something



strange: It was full of tiny holes. The scientist's interest was piqued. Had the hungry worms simply chewed up the plastic, or had they changed its chemical makeup, too? Quick tests in

her lab confirmed, surprisingly, the latter: Something in the worms' saliva had degraded the plastic. "From that point, the research started," says Bertocchini, a developmental biologist formerly with the Spanish National Research Council. She is now the co-founder of <u>Plasticentropy</u> — one of the numerous start-ups and research groups that have sprouted in recent years seeking bio-inspired means to recycle plastic. This biological recycling, as it's called, could offer more effective and environmentally friendly alternatives to some of today's problem-riddled recycling methods.

Scientists Discover 7 "Cryptic" New Species of Walking Leaves

A team of international researchers, including experts from the University of Göttingen, has identified seven new species of leaf insects, also known as "walking leaves." These insects are part of the stick and leaf insect order and are known for their unusual appearance: they look confusingly similar to parts of plants such as twigs, bark, or – in the case of leaf insects – leaves. Their advanced camouflage not only



serves as a defence mechanism against predators but also poses a challenge for scientific study. Through genetic analysis, the scientists were able to uncover "cryptic species," which look identical externally but are genetically distinct. This research has significant implications not only for the systematic classification of leaf insects but also for the conservation of their biodiversity. The findings were recently published journal *ZooKeys*.

A battlefield for ants? New study on ant warfare shows we could manipulate their fights

Humans are not the only animals <u>that go to</u> <u>war</u>. Ants do so too, and on a similarly catastrophic scale. Battles play out daily – in human conflicts, among animals in nature, and across the virtual worlds of video games. How these battles progress depends on the combatants involved and what their battlefields are like. In a new



study <u>published in PNAS today</u>, we used mathematical models on video game simulations to test how battlefield dynamics change warfare outcomes. We then confirmed these concepts in the real world – using ant battles.

The Orchid and the Fruit Fly – Scientists Discover Unique New Plant-Animal Relationship

For the first time, orchids that consume fungi have been observed offering their flowers to fungi-eating fruit flies in return for pollination services. This discovery represents the first evidence of nursery pollination in orchids. This unique new plant-animal relationship hints at an evolutionary transition towards mutualistic symbiosis. Orchids are well known to trick their pollinators into visiting the flowers by imitating food sources, breeding grounds, or even mates without actually offering anything in return. The



fungi-eating, non-photosynthetic orchid genus Gastrodia is no different: To attract fruit flies

(*Drosophila* spp.), the plants usually emit a smell like their common diet of fermented fruits or decaying mushrooms.

How bees can monitor pollution for us – everything from toxic metals to antimicrobial resistance

When it comes to understanding contamination, honey bees can do the hard work for us. While foraging for nectar, pollen and water, bees are constantly picking up contaminants from their environment. Because we know their lifespan and approximate foraging range, chemical analysis can provide a snapshot of the levels of contaminants in their foraging area at that time. With the help of backyard beekeepers, our two studies traced toxic metals and antimicrobial resistance genes across



two urban centres: Sydney, Australia, and Nouméa, New Caledonia. European honey bees have long been used as sentinel species to monitor for pests and diseases, including Varroa mites and chemicals at airports. Bees can also be used as biomonitors to understand contaminants across our urban environments. As the popularity of urban beekeeping has grown, there has been more research on honey bee biomonitoring of a range of contaminants, including metals, pesticides and so-called "forever chemicals", known as PFAS, in honey.

Giant Grasshoppers Have Descended On New Zealand, And It's Great News

The wētāpunga is the largest of over 70 species of wētā that are unique to New Zealand, explains the <u>Auckland Zoo</u>. The institution knows its wētās, being behind the recent release of 300 juvenile wētāpungas across two islands in the Bay of Islands. The release follows a captive breeding program that's been running since 2012, taking



specimens from the wētāpunga's final stronghold on Te Hauturu-o-Toi/ Little Barrier Island in the Hauraki Gulf. While the most recent wētāpunga release wasn't the first, around 1,200 have been released since 2020, it was considered one of the most delicate being the first to release juveniles rather than adults. The enormous insects join seven other endangered species that have been returned to the islands in recent years as part of Project Island Song, a community conservation group that has been working towards restoring the region's native flora and fauna for two decades.

Aussie woman's horror as hundreds of white bugs take over bathroom

A "weird" and unsettling discovery in a woman's bathroom had many people scratching their heads (and their bodies) after a video showing <u>hundreds of tiny</u> <u>white bugs</u> was shared online. Desperate for answers, the concerned mum took to <u>Facebook</u> with the hope of identifying the little critters that had taken over her bathroom vanity in their hundreds. She



noticed they'd moved in sometime last week. "Please help," the woman began in her social

<u>media</u> post. "I've noticed this on my bathroom vanity. I thought it was dust or something so cleaned a part of it and it reappeared. "I looked closely and they're MOVING!!! size of a grain of salt," she added before asking how to clean it.

Gardener shares simple solution to eliminate the pesky aphids destroying your plants

Joshua Meekins (@the_garden_is_growing) posted a popular Instagram Reel explaining his favourite natural technique to fight <u>aphids</u>, insects that feed on plants and suck nutrients from your garden, effectively weakening what you're growing. "We have aphids on our snap peas, but I am not freaking out because we have the ultimate aphid hunter," he said. While Meekins used to apply an organic insecticidal <u>soap</u> to combat aphids, he now



creates a sanctuary for ladybugs that will do all the work. <u>Ladybug larvae</u> are little black bugs with orange spots or stripes. Their preferred diet before they metamorphose into ladybugs? Aphids. A single ladybug larva can consume roughly <u>400 aphids</u> in three weeks before transforming into a ladybug, at which point it will continue to incorporate aphids into its diet. The aphids in your garden won't stand a chance against these hungry larvae.

See how insects are turned into zombies by these fungal parasites

Living in or on other organisms offers many advantages – if you can pull it off. Your host may not be entirely amenable to you taking up residence, but they can provide you with all the shelter, resources and travel you might require. You may even provide your host with some advantages in return: many of the bacteria that live within our guts, for example, help us with aspects of digestion. Such mutually beneficial relationships are known as mutualisms, and are quite common. But



not every organism that lives in or on another organism brings benefits – sometimes, these passengers can cause harm. When an organism is harmful to its host, we call it a parasite.

40 new spider species found in Australia

Australian researchers have discovered up to 40 new species of spider in Queensland. Dr Jeremy Wilson and Dr Michael Rix of the Queensland Museum Network have spent the last six months collecting 136 specimens of burrowing wishbone spiders across the state. The pair are working on a year-long project to revise Australian wishbone spiders and have been surprised by the



diversity they have found in eastern Australia, including 40 new species of spider in Queensland alone. Dr Wilson said the spiders exhibit a variety of different silken burrows and occur in different habitats. "As well as discovering this incredible diversity, prior to the fieldwork we didn't really understand the amazing variety of behaviours exhibited by wishbone spider species in Queensland, with the spiders constructing a variety of different silken burrows and occurring in different habitats" he said.

Discovery of black mass clinging to suburban tree stuns Aussies

It's not every day you see a tree covered in masses of furry insects. In fact, some claim it's been 20-odd years since they last saw what was spotted in Melbourne this week. Huddled together on a tree trunk in a suburban street was a bunch of black, hairy bugs with distinctive yellow tips — for many, a familiar and nostalgic nod to their childhood.



One Melburnian however was shocked, asking "simply... what is this?" in an online post where they shared the picture on Tuesday. The poster appeared baffled by the sight of what's often mistaken as caterpillars. The black grubs, however, are what's commonly known as "spitfires", which are technically called sawfly larvae, which turn into a wasp. Explaining how they got their nickname Associate Professor of Biology, Dr Darrell J Kemp, explained it refers to their behaviour. "If disturbed they whip themselves around and regurgitate their foregut contents (usually a soupy mess of part-digested eucalypt foliage). That's nasty enough to deter most predators I guess," he told Yahoo News Australia.

Scientists Transform Flies Into Biodegradable Plastic

Imagine using insects to extract chemicals for creating biodegradable plastics, which later can be decomposed by those very bugs. This idea is not as far-fetched as it sounds. Scientists recently discussed their advancements, including the extraction and refinement of these insect-sourced chemicals, as well as their transformation into effective bioplastics. The researchers presented their findings at the fall meeting of the American Chemical Society (ACS). ACS Fall 2023



is a hybrid meeting being held virtually and in-person Aug. 13–17, and features about 12,000 presentations on a wide range of science topics. "For 20 years, my group has been developing methods to transform natural products — such as glucose obtained from sugar cane or trees — into degradable, digestible polymers that don't persist in the environment," says Karen Wooley, Ph.D., the project's principal investigator. But those natural products are harvested from resources that are also used for food, fuel, construction, and transportation."

<u>Trapped: Australia's extraordinary alpine insects are being marooned on mountaintops as</u> the world warms

We may not pay invertebrates much thought, but they're the <u>workhorses of all ecosystems</u>. Insects and other invertebrates do essential jobs such as <u>pollinating plants</u>, <u>improving soils</u> and controlling pests. They're also food for many larger animals, which <u>moves nutrients</u> up the food chain. Invertebrates are vulnerable to rising global temperatures. In response to climate change, many are <u>moving</u> to cooler areas, be that across land



towards the poles, or upward in elevation. But not all invertebrates have that option. In Australia, invertebrates already living at the highest possible elevation – on mountain summits – have nowhere higher to go. So how will they cope? And how can we help them? Answering these questions is important. Invertebrates underpin Earth's ecosystems – so if their numbers decline, the ecological damage will be felt far and wide.

The past, present, and future of insects for human consumption

Entomophagy, the practice of eating insects, has a rich history in cultural contexts, with roots varying across different regions. Insects are considered a delicacy or staple food source due to their nutritional benefits, cultural significance, and abundance. Despite declining rates of entomophagy due to Western influence and industrialization, the consumption of insects remains important in many societies. Recent efforts have been aimed at promoting sustainable and nutritious food

sources, which has challenged cultural biases against insect consumption. In a recent study published in *Insects*, researchers review data using insects as a sustainable and environmentally friendly source of protein, vitamins, and minerals. To this end, entomophagy was explored from a nutritional, historical, and cultural perspective to emphasize the gradual acceptance of eating insects in Western nations.

Mosquitoes: Fact and fiction when it comes to bite prevention

No one likes mosquitoes. Their bites can cause uncomfortable and sometimes painful reactions and put a damper on even the best summer soiree. They can also carry diseases and viruses such as Eastern equine encephalitis (EEE), the most dangerous virus spread by insects in North America, and West Nile virus, the leading cause of mosquito-borne disease in the U.S. West Nile Virus was recently detected in a few



Massachusetts counties, and the next few weeks will be peak risk, according to Sam R. Telford, III, professor in the Department of Infectious Disease and Global Health at Cummings School of Veterinary Medicine at Tufts University, a commissioner for the Central Massachusetts Mosquito Control Project, and a member of the state Mosquito Advisory Group. It's important to remain vigilant and protect yourself from mosquitoes. Products such as citronella oil advertise themselves as effective against mosquitoes, but citronella has been proven less effective than other products such as DEET. Newer to the market are patio products such as appliances that heat repellents to keep groups safe outdoors, and were



shown to be highly effective against four species of mosquitoes. Wearables, on the other hand, sound like a great idea but studies show they do not reduce mosquitoes' attraction to humans.

Research sheds light on why leafcutter bees may prefer some leaves over others

Leafcutter bees earned their name by the way they cut circular bits of leaves to use as building materials for their nests. But the bees seem to prefer some leaves more than others, and researchers now think they know why. A University of Arizona study found that leafcutter bees prefer leaves that harbor the common mold Aspergillus, a type of fungus found indoors and outdoors. The results of the study suggest that the mold could play a role in enhancing the health and survival of leafcutter bees, which are native pollinators of North America and can be found in regions where flowering plants grow.

Biologists find what colours a butterfly's world

As butterflies flit among flowers, they don't all view blossoms the same way. In a phenomenon called sexually dimorphic vision, females of some butterfly species perceive ultraviolet colour while the males see light and dark. University of California, Irvine biologists have discovered that in at least one species, the variation results from a vision gene's jump onto a sex chromosome. It's the first known finding that this kind

of genetic change causes sexually dimorphic vision. The study appears in *Proceedings of the National Academy of Sciences*. The UCI team determined this while investigating the Heliconius butterfly genus. Some of its <u>species</u> see ultraviolet colour, an array wider than the visible light spectrum that humans perceive. A substance produced by the opsin gene accounts for these butterflies' visual capacity.

Fire ants likely already south of Queensland border

The discovery of fire ants just 5 kilometres from the Queensland–New South Wales border means it is likely the potentially deadly invasive species has already breached state lines. Lori Lach, a James Cook University insect ecologist and member of the scientific advisory group for the National Red Imported Fire Ant Eradication Program (NRIFAEP), said the <u>detection of fire</u> <u>ants in the Tallebudgera Valley</u> last week was bad news for northern New South Wales. "I'm not a betting

person but I certainly wouldn't bet my life that they're not already there," Dr Lach said. "There's a good chance that they are already." Dr Lach said, unlike other invasive ant species, fire ants had retained the ability to fly, which could be aiding their spread.

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More than half of Earth's species live in the soil

More than half of all species live in the soil, according to a study that has found it is the single most species-rich habitat on Earth. Soil was known to hold a wealth of life, but this new figure doubles what scientists estimated in 2006, when they suggested 25% of life was soil-based. The paper, published in the journal Proceedings of the National Academy of Sciences, found it is home to 90% of fungi, 85% of plants and more



than 50% of bacteria . At 3%, mammals are the group least associated with soils. "Here, we show that soil is likely home to 59% of life including everything from microbes to mammals, making it the singular most biodiverse habitat on Earth," researchers write in the paper, which is a review of existing literature. The actual figure could be even higher as soils are so understudied, they say.

When Cheating Pays – Researchers Uncover Unique Survival Strategy of New Zealand Insect

Scientists have revealed the unique 'cheating' strategy used by a specific insect native to New Zealand to evade predation – by imitating a species known for its high toxicity. In the natural world, toxic species usually advertise their harmful nature, often by displaying bright and contrasting colours like black, white, and yellow, a characteristic commonly seen in wasps and bees. In a similar vein, the cyanide-producing stonefly from New



Zealand, *Austroperla cyrene*, produces strong 'warning' colours of black, white, and yellow, to highlight its threat to potential predators. In a new study published in *Molecular Ecology*, University of Otago Department of Zoology researchers reveal that an unrelated, non-toxic species 'cheats' by mimicking the appearance of this insect. Lead author Dr. Brodie Foster says by closely resembling a poisonous species, the *Zelandoperla fenestrata* stonefly hopes to avoid falling victim to predators.

What is the biggest spider in the world?

From spiders the size of dinner plates, to others with inch-long fangs, these mythically-large arachnids roam the earth. Throughout history, tales of giant spiders have gripped the human imagination — from Arachne, the half-woman, half-spider figure in Greek mythology to J'ba Fofi, the rumoured monkey-size spider of the Congolese rainforest and Shelob, the monstrous arachnid who keeps Frodo the hobbit on his toes in "The Lord of



the Rings." But are there real-life spiders that inspired these stories and myths? What, in fact, is the biggest spider in the world? While none are quite as enormous as those fictional beasts, the real world contains giant spiders galore. Just take <u>giant huntsman</u> spiders (*Heteropoda maxima*), which are the world's largest spiders by leg span. Measuring 11.8 inches (30 centimetres) across, these arachnids can reach the size of a dinner plate.

Ancestral Origins Unveiled: Caterpillar Venom Traces Back to Bacteria

Scientists have found toxins in the venom of asp caterpillars punch holes in cells the same way as toxins produced by disease-causing bacteria such as E. coli and Salmonella. Researchers have discovered that the venom of the notorious asp caterpillar, which behaves similarly to toxins from diseasecausing bacteria, could play a pivotal role in developing lifesaving drugs. Their findings reveal



that this venom evolved from bacteria over 400 million years ago. Despite caterpillar venom being largely understudied, its ability to puncture holes in cells offers a promising potential for targeted drug delivery or selective cancer cell destruction.

Gnathia jimmybuffetti - Scientists Discover New Isopod Species in the Florida

The small crustaceans represent the first discovery of a new gnathiid isopod in the Florida ecoregion in a century, and they've been named in honour of the singer-songwriter, Jimmy Buffett. An international team of researchers from the Rosenstiel School of Marine, Atmospheric, and Earth Science at the <u>University of Miami</u>, and the Water Research Group within the Unit for Environmental Sciences and Management at North-West University in South Africa,



has discovered a previously unknown species of marine cryptofauna in the Florida Keys. Cryptofauna refers to the small, concealed organisms that form the bulk of oceanic biodiversity. The roughly three-millimetre-long isopod is one of only 15 species from the genus *Gnathia* currently known in the region.

The First Bees Evolved on an Ancient Supercontinent More Than 120 Million Year

The first bees evolved on an ancient supercontinent more than 120 million years ago, diversifying faster and spreading wider than previously suspected, a new study shows. Led by Washington State University researchers, the study provides a new best estimate for when and where bees first evolved. Newly published in the journal *Current Biology*, the project



reconstructed the evolutionary history of bees, estimated their antiquity, and identified their likely geographical expansion around the world. The results indicate their point of origin was in western Gondwana, an ancient supercontinent that at that time included today's continents of Africa and South America.

'Horrid' find in Melbourne backyard after rainfall: 'What is going on?'

When a Melbourne man discovered "masses" of black insects in his garden, he wondered "what was going on". Thousands of tiny, wriggly critters had moved onto his property following a bout of rain, invading his outdoor pavers. Desperate for answers, the Melburnian shared photos on Facebook claiming they had been there for over a week. "We found a mass of millipedes on and around these slabs. They are alive but barely moving," he said on Sunday, adding the "magpies are ignoring them". Photos of the insects show hundreds of them piled up in the cracks between his

pavers and spread out across the concrete. While "barely moving" the man said, "individuals were very active when put in the sun". The critters in question are likely Portuguese millipedes — an invasive species mostly found in southern Australia – Dr Owen Seeman, Collection Manager for Arachnida at Queensland Museum, said. "The photos aren't good enough to see the key feature – a little spine on their "bum" [the last segment]," he said. "They're well-known for moving *en masse* after good rainfall and they're often active in the winter."

Natural pest control: Tree species diversity increases spider density

Despite their reputation as creepy critters, spiders actively serve as some of the most environmentally friendly pest regulators. Spiders actively feed on flies, moths, roaches, and mosquitoes and thus playing a critical role in eliminating parasites and various diseasevectors. According to a recent study led by the <u>University</u> of Maryland (UMD), a simple way to take advantage of

these natural ecosystem services is to provide tree-

dwelling spiders a more diverse habitat. "We found that there's a strong link between the species diversity of tree habitats and the population density of the spiders that live in them," said senior author Karin Burghardt, an assistant professor of Entomology at UMD. "Spiders really like complex habitats, so having a large variety of tree species with different structural features like height, canopy cover, and foliage density will help increase spider abundance and also the natural pest regulation they provide."

In a first, scientists find genetic cause for 'virgin birth' in animals

For the first time, scientists tinkering with fruit fly genes have <u>succeeded in inducing virgin birth</u> in an animal that normally reproduces sexually. The findings could have implications for food security, because virgin births may be becoming more common among crop pests, the researchers say. The researchers induced virgin birth, also known as parthenogenesis, in a species of fruit fly called *Drosophila melanogaster*. The genetically tweaked

fruit flies could then pass down their virgin-birthing ability to following generations, but it happened only if no males were around for mating, the new study found. "Fruit flies are incredibly special because they are basically the first model organism and have been studied for over 100 years," said Alexis Sperling, a researcher at the University of Cambridge and first author of the paper. In biology, <u>model organisms</u> are nonhuman species that are studied extensively to gain insight into particular biological phenomena.





Australian ant honey inhibits tough pathogens, new research shows

The medicinal value and potent antimicrobial activity of <u>honey</u> has been a topic of considerable interest in recent years, particularly in light of the alarming rise in antibiotic resistance. While most honey comes from honey bees (*Apis mellifera*), <u>other insects</u> such as stingless bees, wasps and even ants can produce honey-like products from plant nectar. One of these insects is the honeypot ant *Camponotus inflatus*, found throughout the central desert region of Australia. We set out to determine whether its honey might be



medically useful. Our results, <u>published in PeerJ</u>, show the honey has powerful antimicrobial effects, particularly against certain heat-tolerant yeasts and moulds which resist most current antifungal drugs.

The feral flying under the radar: why we need to rethink European honeybees

Australia's national parks, botanic gardens, wild places and green spaces are swarming with an invasive pest that is largely flying under the radar. This is yet another form of livestock, escaped from captivity and left to roam free. Contrary to popular opinion, in Australia, feral colonies of the invasive European honeybee (*Apis mellifera*) are not "<u>wild</u>", threatened with <u>extinction</u> or "good" for the Australian environment. The truth is feral honeybees compete with native animals



for <u>food</u> and <u>habitat</u>, disrupt native <u>pollination systems</u> and pose a serious biosecurity threat to our honey and pollination industries. As ecologists working across Australia, we are acutely aware of the damage being done by invasive species. There is rarely a simple, single solution. But we need to move feral bees out of the "too hard" basket. The arrival and spread of the parasitic <u>Varroa mite in New South Wales</u> threatens to decimate honeybee colonies. So now is the time to rethink our relationship with the beloved European honeybee and target the ferals.

Weather Anomalies and Insects: First-of-a-Kind Study Unveils Surprising Patter

With greenhouse gas emissions causing Earth's climate to steadily heat up, we're seeing an increasing number of extreme and anomalous weather events. But predicting and analyzing the effects of what is, by definition, an anomaly can be tricky. According to scientists, museum samples could provide some answers. In a first study of its kind, a team from the University of Florida utilized specimens from natural history to demonstrate that abnormal hot and cold days can extend the activity span of butterflies and



moths by almost a month. "The results are not at all what we expected," said lead author Robert Guralnick, curator of biodiversity informatics at the Florida Museum of Natural History. Most studies view climate change and its consequences through a periscope of average temperature increases. As the temperature goes up over time, the plants and animals in a particular region become active earlier in the spring, delay dormancy until later in the fall, and slowly shift their ranges to align with the climate in which they're best suited to survive.

"Debugging" insect-related conspiracy theories

Belief in conspiracy theories, science-related or otherwise, arises in part due to a cognitive bias called illusory pattern perception—"misperceiving meaningful patterns in what are in fact random stimuli" (van Prooijen et al. 2018). This is akin to seeing Elvis on the back of a pentatomid bug (Prigg 2012), a resemblance recognized even by entomologists, who call *Catacanthus incarnatus* the "man-faced stink bug," but in most contexts, it is far less innocuous. This bias is amplified by other biases that can help perpetuate conspiracy theories. Among these are "confirmation" or "myside" bias—the tendency of individuals to process information in ways that conform with their pre-existing beliefs or opinions, and "us versus them" thinking—holding more positive attitudes toward individuals or groups that share more similarities with the individual deciding whom to believe. In cases of science skeptics, the "them" often comprise academia and scientific associations lumped together with other "sinister" governmental institutions (Weigmann 2018). It might be informative to highlight a couple of the most recent widespread insect-related conspiracy theories. One that is currently making the rounds asserts that a shadowy global liberal elite cabal is planning to enslave the masses and force them all to eat insects (Jingnan 2023).

Sex lives of orchids read like science fiction

Recent research, published in the Botanical Journal of the Linnean Society, used the database to reveal that orchids show remarkable diversity of highly specialised pollination strategies that differ across global regions. The recently published database contains over 2900 orchid species, detailing information on the identity of their pollinators and how they attract them. Importantly, the database reveals patterns of reproductive biology by habitat, geography and



taxonomy. "From these data, we identify general patterns and knowledge gaps limiting our understan ding of orchid biology at the global level," Dr Phillips said. Charles Darwin used orchids to study evolution, believing their elaborate flower was an adaptation to enhance the probability of transferring pollen between plants – thereby increasing their offspring's fitness. "Because of the unusual floral traits and often unconventional pollination attraction strategies, orchids have been at the forefront of understanding floral adaptations to pollinators," Dr Phillips said.

How to start a butterfly garden and create a space that looks and feels more beautiful in 6 easy steps

A backyard that attracts colourful, fluttering butterflies isn't only beautiful to observe. It's beneficial to the plants, trees, shrubs and anything else that grows there. Along with their beauty, butterflies provide pollination, natural pest control and a food source for birds. Whatever you're growing in your garden, whether flowers, fruit or vegetables, butterflies contribute to its abundance and biodiversity. With butterfly populations in serious decline across the globe – and the



Migratory Monarch now on the IUCN Endangered Red List of Threatened Species – it's an important time to attract and support these pretty pollinators to your <u>backyard</u>.

How spider web silk could save men's sex lives

Spider webs could give men a boost in the bedroom. A landmark study saw strands of silk spun by the arachnids implanted into the genitals of men who were unable to get aroused as a result of nerve damage caused by prostate cancer surgery. The experts extracted gossamer strands from the golden silk orb-weaver spider - whose webs are capable of surviving tropical storms -



and six men in their 50s had them attached to both ends of a severed nerve. The spider strands had the desired effect as half of the men saw their sexual function return within three months while two others reported a libido boost. Dr. Nina Harke, of Hannover Medical School in Germany, said: "Spider silk is a promising new biomaterial. It's safe, supports nerve regeneration and it's tough and elastic."

Washing With the Wrong Soap? It Could Turn You Into a Mosquito Magnet

Various theories have been proposed explaining why mosquitoes are drawn to certain people while others escape unscathed. A group of scientists from <u>Virginia</u> <u>Tech</u> have found that using certain types of soap could increase attraction to mosquitoes, while others might deter them. However, the impact of these soaps varied among individuals due to interactions between the soaps and each individual's unique odour profile.

Their findings were recently published in the journal *iScience*. "It's remarkable that the same individual that is extremely attractive to mosquitoes when they are unwashed can be turned even more attractive to mosquitoes with one soap, and then become repellent or repulsive to mosquitoes with another soap," says senior author and neuroethologist Clément Vinauger. Humans have been using soaps and other perfumed personal products since antiquity. We know that soaps change our perception of each other's body odour, but it's less clear whether these products also change how mosquitoes perceive and discriminate between us as possible blood donors. Mosquitoes don't feed on blood alone — in fact, their main food source is plant nectar—so dousing ourselves with plant-derived or plant-mimicking scents could potentially confuse their decision-making.

'Unbelievable' discovery in Aussie backyard: 'The world is a better place'

An Aussie gardening enthusiast has been left stunned by an incredible discovery in her yard, describing the colourful scenes as "unbelievable". The NSW woman spotted a large bunch of striped ladybeetles huddled together on tree leaves and branches in the garden of her Bingara home, a small town in the state's north. "Striped Lady Beetles huddling for winter," she wrote on a



hobbyist entomology page on Facebook this week. "The numbers that reside at the old pepper tree are unbelievable! Beneficial I am hoping".



<u>French botanist Théodore Leschenault travelled to Australia in **1800-1803**. His recently recovered journal contains a wealth of intriguing information</u>

In the storeroom of a square-towered château in Burgundy, my genial hosts gestured towards a large, wooden chest of drawers. I pulled open a compartment and began sorting through bundles of old papers – house records from the 18th and 19th centuries. I was there, in 2015, on the trail of Théodore Leschenault, a botanist who had travelled to Australia in the years 1800 to 1803 with the expedition of discovery led by Nicolas Baudin. The château belonged to Leschenault's descendants, who had invited me to explore the family archives. There was a register detailing his divorce from his young wife Marguerite due to their "incompatible temperaments". There were shells and rocks bearing faded ink



labels. And there was a printed invitation to a funeral service held for him at the Madeleine church in Paris in 1826 after he died of a stroke. All this was valuable research material but I felt a slight sense of disappointment. The original manuscript journal of his voyage to Australia was not there.

From many individuals to one whole

In the recent review article "How to become one: the proximate mechanisms of self-assembly behaviour in social insects (Insecta: Hymenoptera, Apidae)" published in Myrmecological News, Daniele

Carlesso and Chris R. Reid review the current literature on the collective behaviour of ants, specifically the selfassemblages (i.e., three-dimensional structures). Selfassemblages are dynamic, quickly formed and



disassembled. Carlesso and Reid discuss, among others, which factors influence selfassemblages and indicate areas for future studies. Here, Madeleine Beekman highlights the main points of the review.

Buzz-Off: New Genetic Technology Developed To Stop Malaria-Spreading Mosquitoes

As envisioned, this first-of-its-kind African mosquito suppression system would reduce child mortality and aid economic development. Malaria remains one of the world's deadliest diseases. Each year malaria infections result in hundreds of thousands of deaths, with the majority of fatalities occurring in children under five. The Centers for Disease Control and Prevention recently announced that five cases of mosquito-borne



malaria were detected in the United States (four in Florida and one in Texas, the first reported spread in the country in two decades. Fortunately, scientists are developing safe technologies to stop the transmission of malaria by genetically editing mosquitoes that spread the parasite that causes the disease. Researchers at the University of California San Diego led by Professor Omar Akbari's laboratory have engineered a new way to genetically suppress populations of *Anopheles gambiae*, the mosquitoes that primarily spread malaria in Africa and contribute to economic poverty in affected regions. The new system targets and kills females of the *A. gambiae* population since they bite and spread the disease.

Humans set budgets when facing an uncertain future. So do ants

Imagine you are looking for a parking spot at a crowded event. You find one far from your destination. Do you decide to take it, or invest more time into hunting a better spot which may or may not exist? You might resolve this decision by "budgeting": limiting the resources (time) you will spend looking for a better option before settling for the inferior one. This strategy, which allows us



to cut our losses when things don't pan out as we had hoped, is commonly used when we cannot know the payoff of our choices in advance. Making decisions under uncertainty is a problem we all face. In <u>new research</u> published in the Proceedings of the National Academy of Sciences, we show weaver ants (*Oecophylla smaragdina*) – much like humans – manage it by budgeting their investment into a task with an uncertain payoff. Weaver ants link their bodies together to form bridge-like structures called "hanging chains", which they use for crossing gaps encountered along trails. Chains span several times the size of an individual ant and, most strikingly, are self-organized.

The furry puss caterpillar's venom packs a painful punch. Now new research shows it came from an unlikely source

Did you know venom – a toxic substance injected by one animal into another – has evolved around 100 times? In our laboratory at the University of Queensland, my colleagues and I study all kinds of venomous animals. One reason we do this is to find new molecules that can be used in medicines, or as bio-friendly insecticides. Scientists have used venom toxins from snakes, spiders and scorpions in various medical contexts, including to lower blood pressure, protect against stroke, and label tumours



during surgery. There are several other groups of venomous animals, such as assassin bugs and robber flies, which have been largely neglected – yet their venom may prove to be just as useful to humans. In research published today in the Proceedings of the National Academy of Sciences, our team investigated the venom from a group of caterpillars called asp caterpillars, which are notorious for their ability to cause excruciating pain. They're also called puss caterpillars since they sport long, soft hairs that have been dubbed "toxic toupées". We were surprised to find the main painful toxins in asp caterpillars belong to a family of molecules usually found in disease-causing bacteria. We discovered that a gene that codes for this kind of toxin hopped from bacteria to the ancestors of moths and butterflies millions of years ago, in a phenomenon called horizontal gene transfer.

Insect Armageddon: The Chaotic Consequences of Climate Change

Across the globe, new species constantly emerge as separate groups of organisms branch off and evolve in divergent paths. But what occurs when climate change becomes a variable in this complex equation? That's the question Thomas H.Q. Powell, assistant professor of biological sciences at Binghamton University, State University of New York, and his lab seek to answer in a recent paper published in Ecology Letters. In the 1850s, the apple maggot fly — a major agricultural pest — began to diverge into two populations in the Hudson Valley. One continued to live on the fruit of the region's native hawthorn trees. The other shifted to a new food source: apple trees, originally introduced to North America by English colonists. "The entomologist who discovered this actually corresponded with Darwin about it potentially



being an example of the origin of species in real-time. It wasn't until the system was picked back up by researchers in the late 20th century that we found out he was right," Powell said.

Should beetles be named after Adolf Hitler?

In 1934, a German paleontologist named a giant flying insect from the Carboniferous period Rochlingia hitleri, after Adolf Hitler, who had just taken power in Germany, and Hermann Röchling, an anti-semitic steel manufacturer and member of the Nazi Party. Three years later, an Austrian amateur entomologist named a brown, eyeless beetle from Slovenian caves Anophthalmus hitleri because he admired Hitler. In recent years, neo-Nazis have reportedly paid thousands for specimens, pushing the beetle toward extinction. Some researchers have argued for years that A. hitleri and other species names, including the many that honor racists and colonizers, are offensive and should be changed. A few societies have taken steps toward doing so. But not the International Commission on Zoological Nomenclature (ICZN), and its stance has ignited fierce debate.



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