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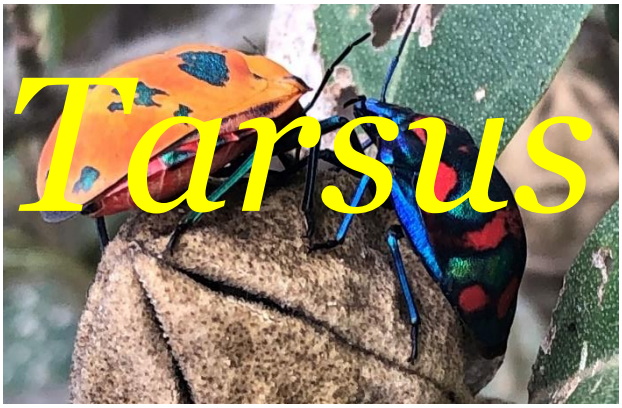

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CIRCULAR OF THE ENTOMOLOGICAL SOCIETY OF NEW SOUTH WALES Inc

Hello Members,

Unfortunately, the cupboard is a little bare at present. Remember, we survive on the enthusiasm of members providing input into Tarsus and General and Applied Entomology. We rely on members sharing their stories, entomological or otherwise.

This edition has some interesting hyperlinks to entomological stories on the net.

Kind Regards

Garry Webb

Circular editor

New Entomological Research

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

Roaches Are Making You Sick, and Getting Rid of Them Could Clean Your Air

Scientists at North Carolina State University have discovered a clear relationship between the extent of cockroach infestations in homes and the concentration of allergens and endotoxins present in those environments. When pest control measures successfully reduced cockroach numbers, the levels of both allergens and endotoxins dropped substantially. These results indicate that removing cockroach infestations may significantly enhance indoor environmental health by lowering exposure to these harmful substances. Endotoxins are components of bacterial cell walls that are released when bacteria die. Because cockroaches are omnivorous and consume a wide variety of materials, they maintain a complex and diverse gut microbiome. Earlier studies have shown that cockroaches release considerable amounts of endotoxins through their feces, although humans and household pets can also contribute to endotoxin levels. In this study, researchers determined that much of the endotoxin found in household dust originated from cockroach droppings. "Endotoxins are important to human health, as inhalation of these components has been shown to provoke allergic responses," said Coby Schal, the Blanton J. Whitmire Distinguished Professor of Entomology at NC State and co-corresponding author of a paper describing the research. "Past surveys in U.S. homes found endotoxin levels much higher in homes with self-reported evidence of cockroaches; that association is stronger in low-income homes than in single-family homes."

Enemy of My Enemy

As the pink glow of dusk filters through the Amazonian canopy, first one, then two, then three tiny humming frogs (*Chiasmocleis royi*) emerge from a burrow and settle onto the leaf-strewn understory. From the same dark tunnel, about a dozen tarantula spiderlings (*Pamphobeteus* sp.) spill out and skitter onto the surrounding litter. The fiercely protective mother of the brood follows soon after, her delicate high-stepping legs contrasted by massive fangs capable of subduing snakes, small opossums, and—more often than not—frogs. But rather than leap away from certain death, the humming frogs shuffle closer, mere inches from the spider's menacing mouth. And there the two species set up for the evening, each seemingly indifferent to—or in cahoots with—its unlikely forest-mate.

As the World Becomes Drab, Butterflies Follow

The world is becoming less colorful. For butterflies, bold and bright wings once meant survival, helping them attract mates and hide from prey. But a new research project suggests that as humans replace rich tropical forests with monochrome, the color of other creatures is leaching away. "The colors on a butterfly's wings are not trivial—they have been designed over millions of years," says researcher and photographer Roberto García-Roa, who is part of a project in Brazil documenting how habitat loss is bleaching the natural world of color. Whether dazzlingly red, deep green, or ghostly pale, the richness of a tropical forest provides butterflies with a diversity of habitats in which to communicate, camouflage, and reproduce. As humans replace tropical forests with environments such as eucalyptus monocultures, however, those requirements are changing. In a plantation, the

ecological backdrop is stripped bare and drab species do better. Being bland—like your surroundings—becomes an advantage.

The Surprising Medicine Hidden in Honeybee Pollen

A honeybee hive, packed with pollen, wax, and honey, functions like a heavily guarded vault—well-defended, yet irresistible to any invader able to breach its walls. Scientists have already identified more than 30 different parasites that attack honeybees, including protists, viruses, bacteria, fungi, and arthropods (and that list continues to grow). Because of this constant threat, beekeepers are always searching for new and natural ways to safeguard their colonies. Researchers in the United States suspected that a promising and environmentally friendly solution might already exist in the bees' own pollen stores. They proposed that endophytes—beneficial bacteria and fungi that live inside most plants—could have evolved to protect their hosts' pollinators. If keeping pollinators healthy helps these microbes spread, they might produce natural compounds with antimicrobial properties.

Spiders Hijack Firefly Glow to Build Deadly Traps

Ecologists have discovered that a nocturnal spider uses the glow of trapped fireflies to draw in new prey. This unusual case of a predator turning its victim's mating signal into a hunting advantage was recently reported in the British Ecological Society's *Journal of Animal Ecology.* At Tunghai University in Taiwan, researchers observed sheet web spiders (*Psechrus clavis*) catching fireflies in their webs and then leaving them alive as they continued to shine for nearly an hour. On several occasions, the scientists even saw the spiders returning to inspect their glowing captives.

Warn, hide or stand out? How colour in the animal world is a battle for survival

The animal world is incredibly colourful, and behind this colour palette is a constant game of survival. Most animals use camouflage, covering themselves in stealthy patterns to hide from predators. Others display bright and bold colours to warn potential predators they are not a good meal. This second strategy is known as aposematism or warning colouration. Although less common than camouflage, it has evolved hundreds of times in butterflies, beetles, bugs, sea slugs, poison frogs and even birds. One long-standing question is why species use one of these strategies over the other. Is one of these strategies usually more successful? Under which specific circumstances does one strategy beat the other? Our new study, published today in Science, helps answer these questions.

This Bug Waves at You in the Forest. The Reason Surprised Scientists

The matador bug's flashy leg-waving isn't a mating ritual but a predator deterrent, revealing a surprising defense strategy shared by multiple insect species and hinting at broader evolutionary patterns. Walk through the forests of Panama and you might spot an insect that appears to wave at you. Scientists at the Smithsonian Tropical Research Institute (STRI) have been examining this behavior for some time. The matador bug (Bitta alipes) carries vivid reddish "flags" on its hind legs and puts on a complex leg-waving display. Why it does this has remained unclear — until now. An early idea focused on sexual selection: males might wave their flags to attract females. Tests did not support that view. Both males and females waved, and the display did not accompany courtship or competition. That raised a deeper question: if it is not a mating signal, why would such a conspicuous and apparently costly behavior evolve?

This Mysterious Creature Has the Most Chromosomes on Earth

The Atlas blue butterfly, scientifically named *Polyommatus atlantica*, has been confirmed as the multicellular animal with the greatest number of chromosomes ever recorded. This butterfly carries 229 pairs of chromosomes, a striking contrast to many of its close relatives that typically have only 23 or 24 pairs. Scientists at the Wellcome Sanger Institute and the Institute of Evolutionary Biology (IBE: CSIC-UPF), Barcelona, discovered that the increase resulted from chromosomes splitting into smaller sections over time, rather than being duplicated. Details of the first genomic analysis of this species were published in *Current Biology*. The findings open the door to exploring why such an unusually high chromosome count evolved. Because chromosome alterations are also seen in human cancer cells, studying how this process occurs in other species may provide valuable insights for medical research.

10 deadliest insects on the planet: Discover the world's most dangerous insect

There are plenty of contenders for the top 10 deadliest insects in the world. Forget great white sharks and grizzly bears, insects are actually the most dangerous group of animals in the world to humans. This is in a large part due to their proficiency at carrying and spreading deadly diseases, from malaria to the black death. Many species of insect feed on vertebrate blood, putting them in a prime position to carry nasty bacteria, viruses, and parasites from victim to victim, and often from animal to human. There are plenty of contenders for the top 10 deadliest insects in the world. Forget great white sharks and grizzly bears, insects are actually the most dangerous group of animals in the world to humans. This is in a large part due to their proficiency at carrying and spreading deadly diseases, from malaria to the black death. Many species of insect feed on vertebrate blood, putting them in a prime position to carry nasty bacteria, viruses, and parasites from victim to victim, and often from animal to human.

All the Life We Cannot See

It's easy to assume, as many people do, that our planet is well explored. In the past few centuries, humans have summited Earth's highest peaks, dived its deepest ocean trenches, and trekked to the North and South poles, documenting the diversity of life along the way—the many birds, butterflies, fish, and other creatures with which we share our big planet. Life on Earth is now largely known. Except it isn't. The more that scientists study the planet's biodiversity, the more they realize how little of it we know. They estimate that for every species we've discovered, there are likely at least another nine or so that remain undiscovered or unidentified, meaning around 90 percent of life on Earth is unknown.

The Insect Apocalypse Hits Fiji: 79% of Native Ants Are Vanishing

Seventy-nine percent of endemic species are showing declines, underscoring how fragile island biodiversity is in the face of ecosystem changes. Insects play essential roles in ecosystems, from pollinating plants to driving decomposition and maintaining nutrient cycles. Their diversity and abundance are crucial for ecological stability, yet recent evidence of widespread declines has raised serious concerns about how insects are adapting to modern environmental pressures. Determining whether these declines reflect long-term trends is key for global conservation strategies and for uncovering the causes of what has been called the "Insect Apocalypse."

In a study published in *Science*, scientists from the Okinawa Institute of Science and Technology (OIST) applied a community genomics approach to investigate ant populations in Fiji as a model for broader insect biodiversity. By sequencing genomes from museum specimens, they reconstructed the ants' evolutionary history, traced when species first colonized the islands, and examined long-term population dynamics.

Deadlier than varroa, a new honey-bee parasite is spreading around the world

For decades, beekeepers have fought a tiny parasite called *Varroa destructor*, which has devastated honey-bee colonies around the world. But an even deadlier mite, *Tropilaelaps mercedesae* – or "tropi" – is on the march. Beekeepers fear it will wreak even greater havoc than varroa – and the ripple effects may be felt by the billions of people around the world who rely on honey bee-pollinated plants. Tropi's natural host is the giant honey-bee (*Apis dorsata*), common across South and Southeast Asia. At some point, the mite jumped to the western honey-bee (*Apis mellifera*), the species kept by beekeepers around the world. Because this host is widespread, the parasite has steadily moved westwards. It has now been detected in Ukraine, Georgia and southern Russia, and is suspected to be in Iran and Turkey. From there, it is expected to enter eastern Europe, then spread across the continent. Australia and North America are also at risk.

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