

**LINNEAN SOCIETY OF NEW SOUTH WALES**  
**LINN S'O'C' NEWS**

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**IN THIS ISSUE**

New Members .....	2
Linnean Macleay Memorial Lecture .....	2
Papers in Vol. 137 (2015) of the Proceedings .....	2
Alison McCusker, 1933-2015 .....	3
Caves and Karst of Yarrangobilly .....	3
Uruguayan tarantulas in danger: pet traders strike again.....	3
Julian E. Tenison Woods .....	3
Awards from the Scientific Research Funds .....	4
Julian E. Tenison Woods Award .....	4
William Macleay Award .....	4
Betty Mayne Award .....	5
John Noble Award .....	5
Surrey Jacobs Award .....	6
Joyce W. Vickery Award .....	6
Program	
Geoff Bedford: The Rhinoceros Beetle and Coconut Palm ...	9
Dr Katie Coleborn: Stalagmites and Fire History .....	9
Dr Mike Crisp: Linnean Macleay Memorial Lecture .....	10

**INCLUDED WITH THIS ISSUE**

Record of the Annual General Meeting, 23 March 2016  
 Form for donations to the Scientific Research Funds

**NEW MEMBERS:** We welcome

Ms Leeora Gubbay-Nemes, University of New South Wales. Fields of interest: geology, igneous petrology, mineralogy.

Mr Darryl Lawler, Orange NSW. Fields of interest; palaeobotany and invertebrate palaeontology.

Ms Valentina McCormick, University of Technology Sydney. Fields of interest: microbiology of seagrasses.

Ms Julia Ryeland, Western Sydney University. Fields of interest: evolutionary behavior and ecology, conservation biology.

Mr Thomas Semple, Australian National University. Fields of interest: systematics and evolution of insects, particularly thynnine wasps.

Ms Claire Sives, University of New South Wales. Fields of interest: arid aquatic ecology, aquatic microcrustaceans, climate change, filter feeding ducks

Mr Jack Tatler, Adelaide University. Fields of interest: ecology, natural history, physiology, invasive species.

Mr Joshua van Lier, Australian National University. Fields of interest: distribution and diversity of coastal marine fishes.

Ms Maria Vozzo, Macquarie University. Fields of interest: marine and benthic ecology, habitat restoration, marine biology, conservation.

Ms Lucy Wenger, Australian National University. Fields of interest: marine ecology, habitat and behavioural ecology of fishes, phylogenetics, conservation and woodland bird ecology.

**LINNEAN MACLEAY MEMORIAL LECTURE**

Dr Mike Crisp of the Australian National University will give the Linnean Macleay Memorial lecture on the 20<sup>th</sup> of July, 2016. See the program for further information.

**PAPERS IN VOLUME 137 (2015) OF THE PROCEEDINGS**

The *Proceedings* are published on line and may be accessed free of charge by anyone at the website <http://ojs-prod.library.usyd.edu.au/index.php/LIN>

Spawning of threatened Barred Galaxias *Galaxias fuscus* (Teleostei: Galaxiidae)

Daniel J. Stoessel, Tarmo A. Raadik, Renae M. Ayres

A preliminary investigation of the reproductive biology of the Blind Shark *Brachaelurus waddi* (Orectolobiformes: Brachaeluridae)

Anne Foged, David Mark Fowler

Translation to English of speeches given in French to honour William Macleay at a picnic of the Linnean Society. 1<sup>st</sup> May 1875

Graham R. Fulton, Peter Bialek

Fruiting phenologies of rainforest plants in the Illawarra region, New South Wales, 1988-1992

Matthew Mo, David R. Waterhouse

The history and status of Apostlebirds (*Struthidea cinerea*) in the Sydney region

Matthew Mo

A new species of the fairy shrimp *Branchinella* (Crustacea: Anostraca Thamnocephalidae) from western New South Wales, Australia

Brian V. Timms

Presidential Address delivered at the 140<sup>th</sup> Annual Meeting, March 18<sup>th</sup> 2015

Robert J. King

The story of Science House and the history of the Linnean Society of New South Wales

Helene A. Martin

An alloenzyme electrophoretic study of populations of spiders of the genus *Corasoides* (Araneae: Stiphidiidae) from Australia and Papua New Guinea

Margaret Humphreys

Late Ordovician Conodonts and Brachiopods from near Greenvale in the Broken River Province, North Queensland

Yong Yi Zhen, Ian Percival, Peter D. Molloy

### **ALISON McCUSKER, 1933-2015**

Alison McCusker was a botanist of renown and a life member of the Linnean Society of New South Wales. After a science degree and research at the University of Sydney, she lectured at the University of New England. She then ventured overseas to the University of Ghana, after that at the University of Dar es Salaam in Tanzania. McCusker's leadership and initiative contributed greatly to these developing universities. Health issues prompted a return to Australia where she headed the flora division of the Australian Biological Resources Study. She was also active in environmental strategies and the recognition of heritage values. She moved on to the International Plant Genetics Resources Institute, a branch of the United Nations Food and Agriculture Organisation and was responsible for coordinating research on genetic diversity of crops in many parts of the world. Back in Australia again, she returned to work on the Flora. Alison McCusker has left a formidable and diverse legacy.

**CAVES AND KARST OF YARRANGOBILLY**, edited by Ross Ellis and Erik Halbert  
 Sydney Speleological Society Occasional Paper No 19, 389pp, 2016  
 Cost \$70, postage in Australia \$16

This handsome book is well illustrated with many photographs, some of them of historical interest. There are 16 chapters covering all aspects of access, flora and fauna, the geology and karst features and details of each of the individual attractions. The history of settlement and human activities in the area are outlined. Everything you wanted to know about Yarrangobilly and more, this book is suitable as both a coffee table book and a contribution to science.

### **URUGUAYAN TARANTULAS IN DANGER: PET TRADERS STRIKE AGAIN**

Tarantulas are some of the biggest spiders known and are captured and smuggled out of Uruguay where possession and commercialization of wild animal species is prohibited. In January of this year, an attempt to smuggle 61 tarantulas through the post was thwarted. In the past, other attempts have been intercepted: one had 80 spiders in the consignment, only four of which survived. There are serious worries about the conservation of these large spider species. Should you see them in the pet shops, support their conservation by not buying them.

### **JULIAN E. TENISON WOODS**

Julian E. Tenison Woods was born in England in 1832, one of a family of eleven children. His family encouraged learning and the study of natural history. For health reasons he spent some time in the warmer climate of France, before migrating to Australia in 1855. After a brief sojourn in Hobart and then Melbourne he moved to Adelaide where he studied to become a priest and he was ordained in 1857. He began his work as a priest in Penola and with Mary McKillop, founded the Order of the Sisters of Saint Joseph with its emphasis on education and special care of the underprivileged. After 10 years in Penola Tenison Woods was appointed Director General of Catholic Education in South Australia, a position he held for four years. Thereafter he found various roles conducting missions in NSW, Tasmania and Queensland.

He studied Natural History and it became his passion, eventually publishing over 300 scientific papers, numerous reports and several books. He was President of the Linnean Society of New South Wales in 1879 and 1880. His interests included biogeography, botany, fisheries, geology, malacology, marine invertebrates, mycology and palaeontology. Geology was his favourite. As an astute observer in many locations he was able to see the overall picture and patterns. For example whereas a new species of mollusc might in those times have been described for every new and isolated locality, he could appreciate the range of variation found within a single species. He set the foundation for modern science to build upon, in what we would now treat as different disciplines.

The Sisters of Saint Joseph have made a generous donation of \$5,000 to celebrate the 150th year of the Foundation of the Congregation by Tenison Woods and Mary McKillop. Two awards have been given to students working in fields pertinent to Tenison Woods' scientific interests: one for work on volcanoes and one for work on fish and coral reefs (see the reports in the research grants awards). Two more awards will be made next year.

## AWARDS FROM THE SCIENTIFIC RESEARCH FUNDS

The amount of money requested by the applicants far exceeded the sum available. The Society regrets that it has not been able to fund more applications or make larger awards. Successful grants are as follows:

### Julian E. Tenison Woods Award

Ms Leeora **Gubbay-Nemes**, University of New South Wales

Project: *The sources & transport mechanisms of metals in submarine arc volcanoes.*

The Kermadec Arc is the most hydrothermally-active segment of an intra-oceanic arc in the world. Hosting at least three Volcanogenic Massive Sulfide (VMS) deposits, it is seen as a natural laboratory for understanding the formation of modern VMS systems. The arc comprises a chain of 30 major submarine volcanoes that extends ~1200km northeast from the North Island of New Zealand towards Tonga. Brothers Submarine Caldera Volcano, situated 1.5km below sea level is the most hydrothermally active volcano found along the arc. It hosts the largest accumulation of VMS mineralization rich in Cu-Au-Ag (up to 90 ppm Au) and clearly shows the close association between arc volcanism and large deposits of important economic ore metals. Ancient VMS ore deposits in Australia and globally yield much of the world's significant mineral resources and were formed through analogous volcanic systems. However, the ultimate source of the metals and the role that magmatic volatiles (sulfur and chlorine) play in their transportation onto the seafloor as economic ore deposits is still largely unknown. Brothers volcano is also a unique ecological site and was recently included in the world's largest marine park, hence a better understanding of the evolution of the volcano that forms the underlying basis for the marine ecology will help in their understanding of the development of life on this volcano. Awarded \$1,250

Ms Lucy N. **Wenger**, Australian National University

Project: *Could coral reef fishes have evolved from seaweed-associated ancestors?*

Coral reefs support a spectacular diversity of fishes and evidence suggests many families of coral reef fishes have undergone dramatic radiations. Using the closely related genera *Macropharyngodon* and *Xenajulis* of coral reefs and seaweed meadows, this project will explore whether the *Macropharyngodon* radiation and *Xenajulis* could have arisen from a common seaweed-associated ancestor at Ningaloo Reef. *Macropharyngodon* spp have an unusual diet of benthic foraminifera and *Xenajulis* is a microcarnivore. Morphology, biology, ecology and gene sequence will be studied to determine the degree of specialisation and how the coral reef fish radiation may have evolved. Awarded \$1,250

### William Macleay Award for Microbiology Research

Mr Matt **Johansen**, Veterinary Science, University of Sydney

Project: *The role of cholesterol-associated genes for the early pathogenesis of Mycobacterium marinum in a zebrafish model.*

Johne's disease is a chronic intestinal inflammation in ruminants caused by *Mycobacterium avium* subspecies *paratuberculosis*. Once the animal is exposed, macrophages engulf the bacterium but many mycobacterial species are capable of persisting intracellularly. Research with other species has shown that cholesterol is a key requirement for establishment and persistence of infection and cholesterol is utilised by *M. tuberculosis* as a primary carbon-based energy source. Within the *M. a. paratuberculosis* genome there is a large cluster of genes with functions to do with fatty acids and cholesterol metabolism. This project will explore the genes involved in the cholesterol metabolism. Completing such studies in ruminants is not feasible hence zebrafish, a widely used model for mycobacterial infection will be used. Awarded \$1,200

Ms Valentina H. **McCormick**, University of Technology Sydney

Project: *Assessing the threat of anthropogenic impacts to seagrass meadows as a consequence of the un-coupling of seagrass-microbe associations.*

Evidence suggests that ecological interactions between seagrasses and associated microorganisms strongly control the physiology, health, and function of meadows. Disruptions to the delicate balance results in declines of seagrass stocks. Seagrass meadows grow in estuaries, sheltered bays etc. and have substantial economic importance as a nursery for fish. Anthropogenic pressures threaten seagrass meadows, particularly in Lake Macquarie where thermal and nutrient discharges from power stations occur. This study will monitor the ecological conditions and the microbial communities to determine if this method is useful as a management tool. Awarded \$600

Mr Arjun **Verma**, University of Technology Sydney

Project: *Population genomics and local adaptation of toxic marine microbial eucaryotes along the East Australian Current.*

Marine microbial eucaryotes (protists) are amongst the most important primary producers in the marine ecosystem. Few species cause harmful algal blooms that can contaminate food webs and seafood and pose a significant public health threat. *Ostreopsis* cf. *siamensis* is a palytoxin producing epi-benthic dinoflagellate found along 1,500 km of southeast Australian coastline and is known to produce severe toxic blooms. Population structures and variability are important to understanding the environment and for developing improved tools to monitor and predict toxic blooms. Awarded \$1,200

### **Betty Mayne Award for Scientific Research in the Earth Sciences**

Mr Kyle **Ferguson**, University of Queensland

Project: *Geochemically 'fingerprinting' fossils collected from Chinchilla, an Australian Pliocene age fossil deposit.*

The Chinchilla Sands are exposed for 65 km between Nangram and Warra, Northern Darling Downs, Queensland and are one of the richest Pliocene (5.3-2.6 million years ago) age fossil deposits in Australia. Thousands of Pliocene age fossils have been excavated from this region for well over a century and a half. However, the palaeontological importance of the collection is still poorly understood. Adequate documentation and site localities for a substantial portion of Chinchilla material makes it difficult to determine stratigraphic positioning. The Pliocene was warmer than today but similar temperatures are predicted for the end of the twenty first century, hence understanding Pliocene ecosystems and climate has become increasingly important. Awarded \$1,500

Mr Ian **Houshold**, EPA Tasmania

Project: *The role of meteoric versus endogenic processes in the geomorphic evolution of the Cliefden Caves landscape.*

Karst caves in southeastern Australia have developed through solution by naturally acidic groundwater. Caves and surrounding landscapes contain significant records of the development of surface and underground landforms but little consensus currently exists regarding the interpretation of these features. Earlier work focused on the history of surface/groundwater interaction e.g. the influence of gaining and losing streams, percolation flows etc. Later interpretations have emphasized the role of endogenic drivers (such as the production of sulfuric acid through oxidation of sulphides or production of carbonic acid). These processes rely on deep-sourced groundwater and are less dependent on shallow groundwater and surface land-forming processes. Resolution of these conflicting interpretations is needed. Awarded \$900

### **John Noble Award for Invertebrate Research**

Mr Thomas **Semple**, Australian National University

Project: *Phylogenetics, ecology and novel taxonomic techniques in thynnine wasps.*

There are currently 474 species of thynnine wasps listed in the Australian Faunal Directory and an estimate of at least 1000 additional known but not described species. Thynnines are depicted as a dominant group, second only to ants across much of Australia. This project aims to establish the first broad scale phylogeny of the thynnine wasps using DNA sequencing. Fresh DNA is required for some genera, requiring field work. As well, 3D imaging using the immensely promising x-ray micro computed tomography allows imaging of external and internal features of tiny organisms on the micro scale. This means a 10 mm wasp can be scanned at a 3-micron resolution, allowing examination of individual hairs. The immense datasets generated from scanning will be available to anyone for future study. Awarded \$2,000

### **Surrey Jacobs Award for Scientific Field Work**

Mr Jack **Tatler**, University of Adelaide

Project: *Spying on dingoes in the desert: new insights into the behaviour, energetics and resource selection of free ranging dingoes (Canis lupus dingo)*

Determining how an apex predator, such as the dingo interacts with its environment is of paramount importance for the conservation of ecological communities, and for predicting conflicts with livestock enterprises. Behaviour in the wild under natural conditions is particularly difficult to study. This project will remotely monitor animal-

attached sensors (on collars) on free-ranging individuals to determine behavioural states, make predictions about energy expenditure and understand how dingoes utilise their geographic range through time by measuring their selection of resources. Awarded \$1,500

### **Joyce W. Vickery Scientific Research Awards**

Mr Kye **Adams**, University of Wollongong

Project: *Does recreational fishing initiate abortion in a common elasmobranch?*

Characteristics of low fecundity, late maturation and slow growth rate are shared by many elasmobranchs, including sharks, rays and their relatives. Large scale and prolonged fishing activity puts them at risk. Many sharks and rays are caught by recreational fishers, with up to 82% being discarded. A baited remote underwater video showed that fiddler rays in the no-take zone of Jervis Bay increased by 90% over 4 years when compared with a recreationally fished zone. One reason could be abortion during capture and release. Stress induced abortion is especially common in yolk-sac (aplacental) viviparous species, common in many species of rays. Southern fiddler rays have a relatively low fecundity of an average of three embryos per breeding cycle and this species is rated at high risk. This project aims to determine if abortion could be responsible for the reduced number of juveniles in fished areas where ray species are commonly discarded. The study will capture the rays by SCUBA that does not cause abortion and use ultrasound to determine pregnancy and count embryos. Awarded \$1,200

Ms Phoebe A **Burns**, University of Melbourne

Project: *Environmental determinants of smoky mouse (*Pseudomys fumeus*) population fluctuations.*

The smoky mouse has a disjunct distribution and is found in a wide diversity of habitats. Species in the group exhibit short-term fluctuations but whether the population is sustainable is inconclusive from the few surveys available. This study will examine seasonal variation and whether it has a relationship with soil moisture as a proxy for rainfall, since rainfall figures are not available over much of the area. Predator pressure may also be a factor as the Victorian National Parks predator abatement programs differ in the parks where this survey will be conducted. Generally, native rodents have been in decline since European colonisation. Awarded \$1,800

Mr Ricardo **De Paoli-Iseppi**, Australian Antarctic Division, University of Tasmania

Project: *Molecular biomarkers for seabird age estimation; implications for ecological monitoring.*

The chronological age of an animal is a critical factor in many biological processes that can change with time. In animal populations, age-class distribution is both a determinant of current growth rate and a reflection of past growth rates and may reveal the effects of harvesting and other impacting human influence. This study will use epigenetic biomarkers that have proven successful in age estimation in mammals but have not been applied to birds. The sampling method for DNA will be validated on a population of known aged short tailed shearwater, the most abundant seabird in southern Australia. The method will then be applied to the population on Fisher Island (off Flinders Island) that has been studied and banded for 40 years. Awarded \$800

Daniel C **Huston**, University of Queensland

Project: *Evolutionary radiation of enenterid and gorgocephalid trematodes in Australia.*

Digenetic trematodes are a group of extraordinarily diverse parasites. Their life cycle has a main vertebrate host and a secondary invertebrate host, almost always a mollusc. There may be more than one invertebrate host. Two of the lesser-known families, Enenteridae and Gorgocephalidae have diversified almost entirely in the fishes of the family Kyphosidae. This family of circum-global herbivorous fishes is at its highest diversity in Australian waters. The taxonomy of the parasites is very confused and that of the host fishes is uncertain in many cases. Sites from north Queensland to southern Australia will be sampled and the taxonomy of the parasite studied using both morphology and molecular genetics. Awarded \$800

Ms Caitlin **Morrison**, University of Sydney

Project: *Developing toll-like receptor (TLR) markers for studying how disease impacts the orange-bellied parrot*

The orange-bellied parrot is critically endangered with only about 20 individuals remaining in a wild population. It is one of only two obligate migratory parrot species. Despite release of captivity-bred individuals and other recovery actions, the wild population has continued to decline. Risks now include low genetic diversity, inbreeding depression, disease and loss of habitat. This project aims to develop markers for the innate immune system genes, the TLR, that can be used in future studies to assess risks of disease. The TLRs are a family of genes involved in the innate immune system in animals and are the first line of defence against pathogens. Ten TLRs in birds have been

characterised to date. Particular diseases may be associated with variation in particular TLRs, eg tick-borne disease with TLR2 in rodents. Two TLRs known to be associated with viral diseases in parrots will be targeted. Awarded \$800

**Mr Ben A Parslow**, Flinders University

Project: *Systematics and host associations of the Australian Gasteruption (wasps)*

This study examines the association between the wasps and their host, native bees, using molecular phylogeny to investigate possible co-evolution. The current 113 described species will be reviewed. Traps will be placed at sample sites. The traps consist of bundles of bamboo 6-10 mm wide as these bees are solitary and most nest in dead plant stems. Successfully parasitised nests will be collected and allowed to develop in the laboratory. Awarded \$500

**Ms Julia Ryeland**, Western Sydney University

Project: *Home range and fine scale habitat use of the emu: management implications for an Australian icon.*

Emus are an incredibly adaptable species and are abundant in semi-arid environments. They are known to migrate up to 550 km to areas with an abundant food supply. Emu habitat requirements have been inferred solely on presence and absence, scat densities or from farmed populations yet their home range is unknown. Emu behaviour has been deduced from farmed populations and is unknown for the wild. This project aims to gain quantitative data on home range size, genetic diversity, how they use their habitat and what their daily behaviour patterns are. How does an urban populations compare with the rural populations? This information is important in managing populations of emus. While emus are found across most of Australia, increasingly few sightings are reported from the central arid zone and the north. Is this what we would expect from climate change? Awarded \$1,200

**Miss Charlotte Simpson-Young**, University of New South Wales

Project: *Assessing the success of ecological restoration using plant functional traits*

The recovery of plant communities after disturbance from human activity is not well understood. Restoration attempts tend to be site specific and it is difficult to generalise about methods and outcomes. This project aims to use plant functional traits (PFT) to understand and predict patterns of recovery following human disturbances across habitats. PFTs (e.g. plant height, seed size, leaf architecture, tissue density etc.) relate to how plants adapt to given environmental conditions and are broadly comparable across species. The study will test the hypotheses 1) FPT diversity in remnant bushland communities around Sydney will decrease over time and 2), remnant bushland communities with high FPT diversity will also have greater resilience and capacity to persist (e.g. high resistance to invasive species and high native seedling establishment. Awarded \$600

**Ms Claire Sives**, School of BEES University of New South Wales

Project: *Microcrustacean egg bank adaptations: now and under climatic change.*

Aquatic microcrustaceans are extremophiles: when ephemeral lakes dry up, the eggs persist in baking hot, desiccated sediments in a resting egg stage. They are known to remain viable for up to 15 years and thrive in the “boom or bust” conditions of Australia’s harsh semi-arid zone. As lakes fill, eggs hatch and microcrustacean life explodes, driving the food web and the wetland “boom”. The resting “egg bank zone” is the top 2.5 cm that may be blown away in wind storms. This project will investigate the present conditions that the egg bank survives and survival under likely conditions of a future climate change. Awarded \$1,800

**Mr Joshua R. van Lier**, Australian National University

Project: *How acute habitat disturbance affects seaweed associated fishes in the Ningaloo ecosystem.*

Tropical seaweed meadows cover vast areas of coastal ecosystems and are home to a wide diversity of tropical fish. Focusing on the fish family Labridae (includes the wrasses and parrotfishes), this study aims to determine the extent of specialisation among the seaweed associated fishes and how they respond to an unseasonal loss of meadow habitat over the short (weeks) to medium (year) time scales. Canopy height of the seaweeds is an important driver of fish abundance, so canopy height will be reduced up to 50% and the fish surveyed before and after this manipulation. Awarded \$1,000

**Miss Maria L Vozzo**, Macquarie University

Project: *Density dependent effects of transplanting Sydney rock oyster onto sea walls to enhance native biodiversity*

Seawalls lack complex microhabitat and provide less surface area for organisms to attach as compared to natural habitat. Furthermore, non-native species rapidly colonise free space on newly constructed seawalls. The Sydney

rock oyster is an important habitat-forming species and the complex structure provided by the oysters protects associated species such as invertebrates and juvenile fishes. Competition for space increases with density and predatory mortality decreases with density, hence oyster growth and survivorship may depend on density. Can we accelerate development of diverse native marine communities and reduce colonisation of non-native species by seeding seawalls with a habitat-forming oyster species? This study also aims to determine optimal density of oysters to use when ecologically engineering newly constructed seawalls. Awarded \$500

Mrs Catherine **Young**, Australian National University

Project: *Relatedness and extra-pair offspring in the group-living crimson finch.*

Crimson finches use rank grasslands for food and nest in *Pandanus* across northern Australia. They are the only finches to live and breed in stable colonies the year round. There is competition for mates with colonies having more males than females. The faithfulness of the males to their partners is unknown, but in other group-living species, up to 90% of extra pair paternity has been found. This project will take blood samples for DNA determination to establish paternity. Awarded \$500



## LINNEAN SOCIETY OF NEW SOUTH WALES

**For Security reasons**, there is now a locked gate between the carpark and the Classroom. If it is locked when you come to a lecture, just wait and someone will come and let you in.

### PROGRAM

**Wednesday 20 April, at 6 pm, in the Classroom, Royal Botanic Gardens.  
Enter through the gate to the Herbarium Carpark, on Mrs Macquaries Rd.**

### GEOFF BEDFORD

School of Biological Sciences, Macquarie University

### THE RHINOCEROS BEETLE, THE COCONUT PALM AND A VIRUS IN THE SOUTH PACIFIC

The Rhinoceros Beetle *Oryctes rhinoceros* L. is endemic in SE Asia, & was accidentally introduced into the South Pacific area early in the 20<sup>th</sup> century. Here it has since spread widely, also to Indian Ocean locations. The cryptic behaviour of adults, and larvae, appears to facilitate its spreading. An adult bores into the heart of a coconut palm to feed on sap, & this damages immature fronds which when they unfurl show characteristic V-shape cuts which reduce photosynthetic area. Repeated attacks kill the meristem resulting in death of the palm. The beetle is thus a burden on the coconut and copra industries. Oil palms are also attacked.

Males produce an aggregation pheromone.

In the South Pacific a virus, *Oryctes Nudivirus* (OrNV) was released many years ago in a number of countries – it became established & significantly reduced rhinoceros beetle populations and damage. There is evidence this reduction persists long-term.

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**Wednesday 18 May, at 6 pm, in the Classroom, Royal Botanic Gardens.  
Enter through the gate to the Herbarium Carpark, on Mrs Macquaries Rd.**

### Dr KATIE COLEBORN

University of New South Wales

### STALAGMITES: AN ARCHIVE OF FIRE HISTORY?

Wildfires dramatically change the surface environment by removing vegetation and soil microbial communities and altering soil structure and geochemistry. Karst subsurface processes such as dissolution, cave formation and speleothem deposition are sensitive to environmental change, precisely why speleothems have been widely used as recorders of surface and climate change at an annual to millennial temporal scale. The effect of fire on karst processes is poorly understood. We hypothesise that a wildfire induced change at the surface will impact karst dissolution and precipitation

processes. Firstly, sterilisation of the soil by heating causes a reduction in soil CO<sub>2</sub> concentration which is a key component in dissolution processes. Secondly, removal of vegetation alters surface albedo and soil water storage properties. This could change the hydrology and isotopic signature of speleothem-forming drip water. We also hypothesise that a wildfire will produce a unique biogeochemical signature due to a change in the organic and inorganic properties of soil, which can be transported into speleothem forming drip water. Quantifying the biogeochemical signature from a burnt landscape enables us to determine whether this wildfire signature is preserved in speleothems. This could provide the opportunity to use speleothems as recorders of fire history for the first time. Determining the impact of fire on karst processes also informs fire management and karst conservation policies.

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**Wednesday 20 July, at 6 pm, in the Classroom, Royal Botanic Gardens.  
Enter through the gate to the Herbarium Carpark, on Mrs Macquaries Rd.**

## **LINNEAN MACLEAY MEMORIAL LECTURE**

**Dr MIKE CRISP**

**Australian National University**

### **ASSEMBLY OF THE AUSTRALIAN FLORA OVER THE LAST 65 MILLION YEARS: WHAT WE HAVE LEARNED FROM DNA**

Australia has a mostly dry, open, fire-shaped landscape of sclerophyllous and xeromorphic flora dominated by eucalypt and acacia trees, with diverse shrubs from a few families such as Myrtaceae, Proteaceae, and Fabaceae. Our work uses molecular phylogenies to test hypotheses derived from the fossil record. I will describe our improved understanding of the principal forces that transformed the ancestral Gondwanan rainforest through the Cenozoic to the vegetation of today.

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Refreshments will be served from 5.30 pm

**Everyone welcomed**