LINNEAN SOCIETY OF NEW SOUTH WALES

LINN S'O'C' NEWS

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IN THIS ISSUE

NEW MEMBER

We welcome our new member:
Dr Kirtsten J. Davies: field of interest, ethnoecology

E-MAIL COPY OF THE NEWSLETTER

Would you prefer to receive an e-mail copy of the Newsletter, instead of the paper copy? If so, e-mail me at h.martin@unsw.edu.au and give me your e-mail address. If you have already requested an e-mail copy, many thanks.

We will still be printing paper copies of the Newsletter, so if you prefer a paper copy, you need not do anything, and it will come, as usual.

We can also send an e-mail alert a week before a lecture is due. If you would like to be on this list, make sure we have your e-mail address.

AWARDS FROM THE SCIENTIFIC RESEARCH FUNDS

Betty Mayne Scientific Research Fund

COUZENS, Aidan, School of Biological Sciences, Flinders University.
Project**:** Using micro-computer tomography (mCT) to reveal molar enamel patterning in extinct Australian marsupial herbivores.
Using this method, the 3D distribution of enamel in a tooth can be examined. The enamel cap over a tooth forms the wearing surface and the project seeks to clarify whether there is an association between thicker enamel and zones of wear. There is evidence that the enamel on the teeth of marsupial herbivores has become thicker in the last 15 million years and this has ramifications for the diet, the environment and climatic change. Awarded $1.500.

NGUYEN, Jacqueline: School of Biological, earth and Environmental Sciences, University of NSW.
Project: Evolution of fossil and modern birds of Australia.
Songbirds (basal passerines) are endemic to Australia and New Zealand and are represented by fossils from Riversleigh Qld and St Bathans NZ. There are over 500 undocumeted specimens from Riversleigh, and this project will describe them and determine from modern representatives of Australasian passerine families a phylogenetic framework against which the systematic placement of the fossil taxa can be tested. Awarded $908.

Joyce Vickery Scientific Research Fund

AJANI, Penelope, Department of Biological Sciences, Macquarie University.
Project: Microalgal biodiversity in the coastal waters of NSW.
Species of the cosmopolitan diatom genus *Psuedo-nitzschia* have been implicated in biotoxic episodes in NSW oyster-growing estuaries. The toxicology and taxonomy of individual species remains unclear and this project aims to resolve these problems so that a rapid assessment tool for future monitoring may be developed. Awarded $1000.

BARRY, Dr Katherine L., Department of Biological Sciences, Macquarie University
Project: Sexual cannibalism, female deception and the evolution of male mate choice.
Female sex pheromones lure males intent on mating, but do poorly-fed females of the cannibalistic preying mantis use these signals to lure males to boost her nutrition? How do males choose a female when he is likely to be eaten? And what strategies do the males use after copulation in an attempt to survive? These questions will be investigated. Awarded 1400.

DEAUX, ELOISE C., Department of Biological Sciences, Macquarie University
Project: The form and function of Dingo vocalisations.
An old study suggests that dingoes have three main classes of vocalisations: howl, howl-bark and bark, whereas other dog species have between 10-12 basic calls. It is thought that the more social the species, the more vocalisations there are. Dingoes share many traits with other dog species, so this project will study the dingo vocalisations and a more complex system is expected. Awarded $700.

DELGADO-VELEZ, Carlos, Institute for Conservation Biology and Environmental Management, Wollongong University
Project: Bird-parasite interactions along a gradient of urbanisation.
Some native species adapt to an urban environment while others do not. Stress levels influence the parasite load. This project will determine the chronic stress level by assessing crucial hormones in faeces and see if it correlates with the degree of urbanisation. Awarded $700.

DENNISON, Siobhan. Department of Biological Sciences, Macqurie University
Project: Mating system and avoidance of inbreeding in the social Great Desert Skink.
The Great Desert Skink cooperatively constructs extensive burrow systems in which it and close kin live. This level of cooperation and parental care is unknown amongst other reptiles. Little is known about the population and group dynamics within the species. This project will study the mating system to find out how they avoid inbreeding. Awarded $1400.

FABRICANT, Scott A. Department of Biological Sciences, Macquarie University.
Project: Predator perception of colour patterns in the Hibiscus Harlequin bug (*Tectocoris diopthalamus*)
The Hibiscus Harlequin bug is bright iridescent blue and orange, a warning that it is probably distasteful to predators, and there is a high degree of variability. But the colours we see are not necessarily the colours that a predator may see. To a predator that is unable to see reds, it may be inconspicuous. To birds capable of seeing ultraviolet and all the colours, it should be conspicuous. To insect predators such as wasps and assassin bugs that have a UV-blue-green vision system and lacking a red receptor, it should be inconspicuous. Brightness and contrast have a role also. These visual systems will be investigated in an attempt to explain the variability in colour in the Hibiscus Harlequin bug. Awarded $1100.

KOHLI, Gurject Singh, School of Biotechnology and Biomolecular Science, University of NSW
Project: The genus *Gambierdiscus* (Dinoflagellata) in NSW.
This genus is usually found attached to sea grass, macroalgae, sand and coral rubble, but it can also occur in the plankton. There are currently eleven species. They produce toxins that are concentrated in filter feeders and up the food chain. Ciguatera fish poisoning, caused by *Gambierdiscus,* is the most common seafood related disease worldwide. It is a tropical disease, but Ciguatera was found for the first time in southern NSW waters, reported in 2010. With global warming, it could become more common in NSW. This project will study the genus in NSW waters. Awarded $500.

LETTEN, Andrew D., School of Biological, Environmental and Earth Sciences, University of New South Wales.
Project: How does fine-scale climate variability influence patterns of plant community diversity?
Most studies of the influence of climate change and biodiversity focus on shifts in mean climate variables, rather than elevated variability about the mean and increased extreme weather events. The influence of this increased variability on plant communities in the Wollomi and Yengo National Parks will be studied. Awarded $1200.

McCURRY, Matthew R. Monash University.
Project: Morphological convergence in tooth morphology during terrestrial-marine transitions
Similar types of dentition are found in unrelated groups that have similar diets. The terrestrial and marine environments differ in physical characteristics and prey items, and their influence through evolution on the tooth morphology on members of the one group will be studies. Awarded $500.

PRYCHID, Chrissie, University of New England
Project: Floral development of the Roundhead Bristle Rush (*Chorizandra sphaerocephala*, Mapanioideae)
The flowers of the Mapanioideae differ from the expected standard of the monocot flower. The complete ontogenetic series of the development of the floral structures will be studied and will decipher the morphological character homology of the reproductive structure. Awarded $1500.

RENDON-CASTANEDA, Dalila A., Australian Cotton Research Institute, Narrabri
Project: Predator/prey interactions between the wolf spider and different life stages of the cotton Bollworm, *Helicoverpa armigera.*
Genetically modified cotton contains a bacterial gene that produces Bt toxins that should contain the pest larvae of the bollworm. However, the genetic makeup of field populations of bollworm has the potential to confer resistance to Bt toxins. A variety of agricultural practices may be adopted to combat the build-up of a resistant population. Minimum tillage encourages an increase in the predator wolf spider population. Tests

will be done to establish at which stage of larvae/pupae predation of wolf spiders is most effective. Awarded $700.

SMITH, Helen M. University of Sydney
Project: Wildlife responses to Black Rat invasion the Sydney Harbour National Park
Ecosystems with intact faunal assemblages are more resistant to invasion of exotics than disturbed ones. Fragmented ecosystems, as occurs in cities are most vulnerable to invasion. The impact of black rat invasion on the native fauna will be assessed. Large scale eradication of the rats have had mixed results with re-invasion a major problem. Awarded $800.

STARRS, Danswell. Australian National University.
Project: Does nocturnal egg predation exert early mortality in nest guarding fish?
There is a very high mortality rate in the early stages of the life history of fish. Fish produce millions of eggs but very few are added to the adult population. Predation causes high losses in early larval stages, decreasing in later larval stages. The extent of loss due to egg predation is not well known. This project will assess the survival of eggs of the nest-guarding Southern purple spotted gudgeon in the face of predation by the invasive Oriental weatherloach. Awarded $700.

BOOK REVIEW

Australian High Country Owls by Jerry Olsen
CSIRO Publishing, Collingwood, November 2011
Paperback, 376 pages, AU$ 69.95
ISBN: 9780643097056

As an Australian birder, it has stuck me that I have seen more owls and seen those far more easily overseas than here in Australia. Jerry Olsen's comments echo this: not only is owl diversity higher in some other regions, but in many places owls are more visible, and hence more easily studied, so far less is comparatively known about Australian Owls. While Australia has only two genera, *Tyto* and *Ninox*, it lies within a centre of diversity for both. This book consolidates Olsen's own research, primarily around Canberra, but also focuses on wider studies of Australian owls, with some comparisons with other species, primarily from North America, which aim to give us some insights into aspects of the biology of Australian owl species.

The introductory section discusses the definitive features of owls, (including both families - Tytonidae and Strigidae), of *Ninox* species and of Southern Boobooks. All these entities are taxonomically delineated, but the taxonomy of owls in Australia can be contentious. Christidis & Boles (2008) consider Southern Boobook (as *Ninox boobook*) to encompass all races found in New Zealand, Australia (including Tasmania) and the extinct Lord Howe Island and Norfolk Island races; this is in contradistinction to various authors who have previously considered the New Zealand *novaezealandiae* to be a distinct species, and for the Tasmanian taxon *leucopsis* to belong either with *novaezealandiae* and the Tasman island forms, or as a distinct species. Both the Sooty Owl and Masked Owl have also been interpreted in varying degrees of speciation. While Olsen follows the official Australian list of Christidis & Boles (2008) in the species accounts in the first appendix, he notes these differing taxonomic opinions throughout the book.

The next section on studying owls begins with a chapter on the early history of owl research in Australia, followed with more detail given into methods of how researchers study owls. Those studying owls in Australia often do not see owls during their surveys, and most owls are detected by calls. Telemetry (radio tracking) is often used to study owl's movements, and thereby revealing their territories and home ranges; in order to do this, the owl must be caught, and there is a chapter covering catching owls and the various traps and methods used.

The following section is concerned with diet and hunting methods of medium sized owls, both for summer and winter. Juveniles of the Southern Boobook take only invertebrate prey but adults will take small vertebrates including birds. The North American Northern Hawk-Owl and Long-eared Owl, of similar size

to the Southern Boobooks, have different hunting strategies and preferences. Our largest owl, the Powerful Owl, prefers medium sized arboreal mammals. In Powerful Owls, the male is bigger than the female, in contrast to most other owls. Olson also contrasts the great Grey Owl and versatile Great Horned Owl with Powerful Owl and offers some interesting points based on the relationship between wing shape, habitat and habits.

The section on breeding is the longest, and various chapters cover all stages from pre-breeding behaviour to fledging. Olsen's own research into Southern Boobooks (and occasionally Powerful Owls) in the Canberra area plays a large part here, often shedding light on aspects of the owl's behaviour that was otherwise unknown. For instance, he uncovered the fact that what had assumed to be paired Southern Boobooks duetting to each other was mostly two (or more) birds engaged in territorial duels. Timing of breeding, variation in calling patterns, territorial borders and female desertion (where males take over parenting responsibilities of fledglings and females leave the breeding area or 'turn off') are just some of the topics discussed. Population dynamics and the concept of limiting factors are also investigated, with comparative chapters on predator/prey dynamics in Snowy and Tawny Owls.

Owl conservation is the subject of the next section, with chapters on conservation of Australian owls and conservation techniques, case studies of issues facing conservation of owls in North America (Burrowing and Spotted Owls). There is also a chapter on the Little Owl, introduced in the United Kingdom and New Zealand, where Olsen poses the question "do Little Owls compete with Southern Boobooks in New Zealand?" (a hesitant 'yes' is suggested but more questions than than answers are raised) and touches lightly upon the issue of feral species which are endangered in their home range.

The last section, 'Wallacea', looks into owls in the biogeographic interzone region of the same name, which bridges Asia and Australasia. Other than the introductory chapter, this is more specifically about Sumba, an Indonesian island in the region where Olsen has worked and where a new species of *Ninox* was recently confirmed, with some believing it to be a Scops Owl of the genus *Otus*. Sumba has an interesting mix of owls similar to Australia although with a number of endemics (subject to taxonomic viewpoint for some taxa). Island endemicity is a feature of both *Ninox* and *Tyto* species (again somewhat depending on taxonomic interpretation), which brings other conservation issues to the fore, especially in the light of cultural attitudes and practices that involve persecution of these birds.

The first appendix lists accounts of each species in Australia, with distribution maps, and entries on a wide range of aspects for each species in Australia, including Christmas Island. The taxonomy follows the official Australian list of Christidis & Boles (2008) but the taxonomy of the subspecies is complex. A second appendix offers information on the rehabilitation of Australian owls that would come in handy for anybody faced with this task.

The book covers a lot of ground and I, who didn't really know much about owls am left better informed for having read it. The information is generally covered well. Some chapters give greater depth to narrower topics whilst others consolidate a broad topic and coverage is correspondingly thinner; here you may be left feeling a little hungry for more detail. While the arrangement of the sections is logical and much thought has gone into the sequence of chapters and ideas throughout the book, the flow of ideas and chapters seems at times to be a little disjointed. At the end of the section on Wallacea, the final chapter, entitled 'Eviction', gives an insight into pressure faced by Southern Boobooks in Canberra as a result of habitat degradation; while it is presented as a perspective on similar conservation issues faced by Sumba owls, it nevertheless seems awkwardly placed. Conversely, the section on breeding flowed well, not surprising given that the chapters reflected a temporal perspective of the breeding cycle.

However, when Olsen is writing about his field studies in Canberra he is particularly captivating and seems to be at his best. I'm probably being a little anthropomorphic but personally I found the most enthralling chapters to include those which dealt with some patterns of individuals' behaviour, such as the poignant 'a lovers' triangle' and 'fledgling behaviour', where a clutch of fledglings wander into a neighbour's territory and are ultimately fed by those neighbours while their parents watch on from the territorial border. Overall Australian High Country Owls is a great source of information; while it has its

greatest appeal to those with a specific interest in owls or nocturnal birds, it is a worthy addition to any birder or natural historian's bookshelf.

Frank Hemmings

ASSASSIN BUGS: THE MASTERS OF DISGUISE AND PREDATORY DECEPTION: a talk given by Matthew Bulbert.

Bugs are defined by their mouthparts and most are plant eaters. About 7,000 species of assassin bugs have been described and they are unusual in that they catch and eat live prey. Only one species in the assassin bug family does not eat live prey and it feeds on blood. It is found in the southern US and is known as the Kissing bug. It feeds mainly on animals, but will suck blood from humans and may transmit Chagus disease that is found mainly in low socio-economic rural areas.

Catching prey is not easy for a predator and they adopt various strategies to catch prey. Assassin bugs (and other predators) may adopt the ambush and active pursuit strategy. Some assassin bugs have specialised hairs and secretions that cement bits and pieces to their back to act as camouflage. They may carry the dead bodies of their prey for camouflage. These ambush assassin bugs eat ants and termites.

The lurers and active hunter assassin bugs are specialists in spiders. They will pluck the web until the spider comes over. If the spider does not respond, they pluck the web, stop and move in a bit, then pluck the web, repeating the moves until they reach the spider. It may take up to four hours.

The lurers and trappers may smell good and have sticky traps. The remarkable feather-legged assassin bugs, of Africa, Southeast Asia and Australia belong to this category. They are found mainly on tree trunks, especially ones with flaky bark. Their back legs have long hairs and look like a bottlebrush. Glands at the bottom of the hairs secret substances that may paralyse the prey. The feather legged assassin bugs eat ants that may be much bigger than the bug, and this could be costly. How do they do it?

The assassin bug waves its feathered leg at anything that passes by. It even waves it at Matt. Most of the passers by just ignore it and only ants respond. If an ant comes over and grabs the leg, it whips around and stabs the ant. It always waits to be attacked first. That way, the ant is busy and the position exposes a vulnerable spot at the back of the head, where the assassin bug stabs it. The ant may be much bigger than the bug, and if the bug cannot find the right spot, it may ride on the back of the ant until it does. It is the only known predator that waits to be attacked first.

LINNEAN SOCIETY OF NEW SOUTH WALES

PROGRAMME

SECURITY HAS BEEN INCREASED at the Botanic Gardens: there is now a locked gate between the carpark and the Classroom. If the gate is closed when you come to a lecture, just wait and someone will come and let you in

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

Prof. MIKE ARCHER

School of Biological, Earth and Environmental Sciences, University of NSW

OVERVIEW OF EARLY MAMMAL EVOLUTION, THE WHAT, WHEN, WHERE AND WHY

There is an extraordinary diversity of pre-Cenozoic mammals, many in rich early Cretateous depoaits in China. They were living with the dinosaurs and some were known to eat dinosaurs. This was long before the meteor landed 65 million years ago and took out the big guys.

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Wednesday 19 September, at 6 pm, in the Classroom, Royal Botanic Gardens.
Enter through the gate to the Herbarium Carpark, on Mrs. Macquaries Rd.

Prof. BRETT NEILAN

School of Biological, Earth and Environmental Sciences, University of NSW

THE EVOLUTION OF MICROBIAL TOXINS AS A BLUEPRINT FOR DRUG DISCOVERY

In many aquatic ecosystems world-wide, including drinking water supplies, cyanobacteria (blue-green algae) can proliferate into so-called “harmful algal blooms”. Members of this bacterial phylum have been evolving on Earth for around 3 billion years and can produce an unparalleled array of bioactive secondary metabolites, some of which are potent toxins. The past ten years has witnessed major advances in our understanding of the genetic basis for toxin production by a number of groups of cyanobacteria. Understanding the role of these toxins in the producing microorganisms and the responses of their genes to a changing climate may suggest the means for controlling toxic bloom events in water supplies. The information

gained from the discovery of these toxin biosynthetic pathways has enabled the genetic screening of various environments for drinking water quality management. In addition, the information gained from studying the toxins has also provided the information needed to screen other environments for new drugs. This seminar addresses the evolutionary history of one of the oldest life forms on Earth, the molecular genetics underlying bacterial toxin production, and the exploitation of microbes for pharmacy.

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Wine and cheese will be served from 5.30 pm before each lecture.

EVERYONE WELCOME