

LINNEAN SOCIETY OF NEW SOUTH WALES

LINN S'O'C' NEWS

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IN THIS ISSUE

Linnean Macleay Fellowship.....	1
Members in the news.....	1
Linnean Macleay Fellow report.....	2
Programme: talk by Dr David Mackay.....	3
Snippets from the past:	3
Gene drives: a future way to control pests?.....	3
Short history of the Entomological Society of NSW.....	4
Announcement.....	6
2018 Symposium Registration form.....	7

LINNEAN MACLEAY FELLOWSHIP

Applications are invited for the Linnean Macleay Fellowship for the year 2019. Applicants must be Members of the Society, reside in New South Wales, and have a degree in Science or Agricultural Science from the University of Sydney. Applicants are required to outline the proposed research and where it will be carried out. The Fellowship pays \$3,200.00 per annum, and the Fellow must engage in full time research on the project. The regulations governing the Fellowship are available on request from the Secretary or the Society's website. These Regulations were stipulated in Sir William Macleay's will and the Society is obliged to adhere to them. **Applications close 15. November 2018**

Members of the Linnean Society of NSW in the News.

Dr Barbara G Briggs, was awarded an AM in the 2018 Queen's Birthday list in recognition to her research as a botanist. Dr Briggs was President of the Linnean Society of NSW

in 1976; is a Life Member of the Linnean Society of NSW, the Australian Systematic Botany Society and the Ecological Society of Australia. Her special interests include plant evolution and southern hemisphere biogeography. She has published key papers on the phylogeny and classification of the flowering plant families Restionaceae, Proteaceae, Myrtaceae and Scrophulariaceae.

Dr Gregory Edgecombe FRS, former Councillor of the Linnean Society of NSW and now at the Natural History Museum, London became a Fellow of the Royal Society in 2018. His field of expertise is within Arthropoda phylogeny; Dr Edgecombe is also an authority on centipedes.

Congratulations to both recipients for a well-deserved recognition.

Progress Report from Linnean Macleay Fellowship

Dr David Mackay (Linnean Macleay Fellowship 2014-17) has published the results of his Fellowship project in a paper titled « *Small populations of fig trees offer a keystone food resource and conservation benefits for declining insectivorous birds* ».

Abstract: Novel restoration approaches are required to provide food and habitat for declining bird populations, particularly as pressures increase from growing human populations and climate change. Fig (*Ficus*) species support many frugivores but there is a gap in our knowledge about the importance of these insect-pollinated plants to insectivores. We tested the influences of fig-population size and the number of fig-wasp-producing fruit per tree on avian-insectivore visitation to fig trees in eastern Australia over a three-year period. Eighty-four bird species visited fig trees in our study; two thirds (55) of these species were insectivores. More individual insectivores (1686) than frugivores (1051) visited fig trees ($p < 0.0001$). More insectivore species visited individual fig trees in small, fragmented populations (<16 fig trees) than in large populations (>50 fig trees; $p \frac{1}{4} 0.016$). We showed that figs provide insectivores with an important, year-round, food source. We showed that this occurred in a dry, temperate ecosystem and in a mesic, sub-tropical ecosystem. Insectivore visitation was significantly correlated with the number of ripening fig syconia and the number of emerging fig wasps but not with abundances of other insects in fig trees. Temporal resource partitioning between insectivores and frugivores was identified, with insectivores foraging as fig syconia were ripening, and frugivores foraging after syconia had fully ripened. *Ficus* species are very likely to provide similar keystone resources for avian insectivores throughout tropical, subtropical and temperate regions globally. This study revises our understanding of the role played by *Ficus* trees in supporting avian-insectivore populations.

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.

PROGRAMME

Wednesday 19 September at 18:00, in the Charles Moore Room, Royal Botanic Gardens
Enter through the gate to the Herbarium Carpark on Mrs. Macquaries Rd.

Dr David Mackay, Macleay Fellow recipient
University of New England

“What’s so great about figs?and what can they tell us about climate change?”

Fig trees are integral to human history. They played key roles in the dawn of civilization. They are the trees of life and the trees of knowledge. Fig trees are awesome in the true sense of the word. Alexander the Great and his troops reached India and encountered a banyan fig, *Ficus benghalensis*, which had hundreds of trunks and covered a vast area of land, enough to shelter ten thousand people according to Alexander’s admiral, Nearchus.



Snippets from the past.

First meeting of the Linnean Society of NSW was held in the Board Room of the Free Public Library, Sydney, on 29 October 1874.

In 1885, women were admitted as Associate members and as Ordinary members on an equality with men members in 1909.

Vera A I Smith – Linnean Macleay Fellow in Zoology - was the first woman to be appointed to a Fellowship from 1 April 1919.



GENE DRIVES: A FUTURE WAY TO CONTROL PESTS ?

In elementary genetics, we learn about Mendel and his experiments with peas. Each adult parent has two genes per character but only one in the gametes (egg or sperm), so that when they combine, we are back to two genes per individual. If an individual with two dominant genes is crossed with one with two recessive genes, all the offspring are hybrid with one dominant and one recessive gene. Cross two of the hybrids and we get offspring of the ratio of one with two dominant genes, two hybrids and one with two recessive genes. This is called Mendelian inheritance and relies on a 50:50 chance of the distribution of the genes in the gametes. Then if one form of the gene has some advantage or disadvantage over the other, natural selection will increase/decrease (respectively) the frequency of that gene in the population, usually rather slowly.

But sometimes there is a bias towards one gene and then that gene will rapidly spread through the population and this is called a gene drive. Gene drives are natural and occur in nature in free-breeding populations. A classic example occurs in mice where the “t-type gamete” is preferentially passed on. But the t-type of gene is maladaptive and individuals that inherit two t-type genes have major developmental problems or are sterile. In the hybrid, gametes form in the 50:50 ratio, but the sperm with the t-type gene somehow kill off the normal sperm, hence the bias towards the t-type.

Recent advances in the gene editing technology now make it possible to construct “synthetic gene drives” and some see this as a tool to eliminate pests. There is a long wish-list. Mosquitoes, the insect that spreads the most disease could be “driven out of town”. Rabbit plagues could be a thing of the past. Any number of agricultural pests could be eliminated. It could be used for conservation and the seemingly unstoppable cane toads could be stopped. But the prominent conservationists Jane Goodall and David Suzuki have warned that the use of gene drives in natural populations “is a moral and ethical threshold that must not be crossed without great restraint”.

Implementation of a synthetic gene drive (SGD) would be risky and uncontrollable once released. New Zealand is considering using SGD to rid it of mammalian pests, but what if the new SGD species of possum in New Zealand spread to Australian possums? Other concerns are raised. It is hard to introduce another species into a closely related population and a lot of individuals would be required. SGD species would be just another form of biological control and great caution would be required.

Comparison with genetically modified organisms (GMO) of commercial crop species have been raised. There would be no commercial value in SGD species and much effort goes into containing GMO species whereas SGD species are designed to spread.

At present only a few academics in the United States are active in research into SGDs. We need to be aware of this possible new biological control method and all its attendant risks.

References

- Robin, C. (2017). Gene drives: a way to genetically engineer populations. *Australasian Science (Aust. Sc.)* 38(4) pp. 14-16.
- Scanlin, J. (2017). Driving mosquitoes out of town. *Aust. Sc.* 38(4) pp. 17-19.
- Kelly, E. (2017). Gene drives for conservation. *Aust. Sc.* 38(4) pp. 20-22.
- Fournier-Level (1917). The future of pest control lies with the pest. *Aust. Sc.* 38(4) pp. 23-24.
- Robin, C. (2017). Gene drives: a fork in the road for GMO debate. *Aust. Sc.* 38(4) pp. 25-27.
- “Brouse”. (2018). Warning of ecological risks of gene drives. *Aust. Sc.* 39(1) p. 8.
- “Expert opinion” (2018). Gene editing for conservation needs in-built protection. *Aust. Sc.* 39(1): p. 42.

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Short history of the Entomological Society of NSW

The Entomological Society of New South Wales (precursor of the Linnean Society of NSW) was founded in 1862 and, in accordance with resolutions agreed to at a preliminary meeting held on 7 April 1862, the first monthly meeting was held at 153 Macquarie-street on 5 May 1862.

The Entomological Society of New South Wales published two volumes of Transactions, each issued in five parts. The number of members was never large, the original members numbering twenty-eight and those subsequently elected about twenty-five. During the Society's existence the number of members who contributed papers was only six (H. H. H. Bradley [1], Rev. R. L. King [12], G. Krefft [2] W. MacLeay [14], H. L. Schrader [2], A. W. Scott [5])

The Society was given up when it became evident that a natural history society on a more comprehensive basis than a purely entomological society was needed for the zoological talent available in the Colony.

Volume 1(1): xvi, pages 1-74, pls. i-v. 1863.

Volume 1(2): xvii-xxxvi, pages 75-154, pls. vi-x. 1864.

Volume 1(3): xxxvii-l, pages 155-198, pls. xi-xv. 1865.

Volume 1(4): pages 199-298. 1865

Volume 1(5): pages 299-340, pl. xvi; li-lxvi, index i-vi. 1866

- Volume 2(1): pages 1-78. 1869
 Volume 2(2): pages 79-158. 1871
 Volume 2(3): pages 159-238, pls. i-iii. 1871
 Volume 2(4): pages 239-318. 1872
 Volume 2(5): pages 319-370, index i-viii. 1873

**List of papers published in the two volumes
 of the Entomological Society of New South Wales (1863 – 1873).**

- Bradley, H. H. B. 1871. Descriptions of eight new species of *Stephanopis* (Cambridge). **2(3)**: 233-238. [Read 7th August, 1871]
- King, Rev. R. L. 1863. On the Pselaphidae of Australia. **1(1)**: 37-54. [Read 3rd November, 1862]
- King, Rev. R. L. 1864a. On the Scydmaenides of New South Wales. **1(2)**: 91-99. [Read 3rd August, 1863]
- King, Rev. R. L. 1864b. On the Pselaphidae of Australia. **1(2)**: 102-106. [Read 7th September, 1863]
- King, Rev. R. L. 1865a. Presidential Address. [Obituary notice with list of published papers of William Sharp Macleay (xlii-xlvi)]. **1(3)**: xlii-l. [Read 30th January 1865]
- King, Rev. R. L. 1865b. Description of Australian Species of *Georyssides* and *Parnides*. **1(3)**: 158-161. [Read 1st August, 1864]
- King, Rev. R. L. 1865c. On the Anatomy of certain Forms of Australian Entomostraca. **1(3)**: 162-166. [Read 5th September, 1864]
- King, Rev. R. L. 1865d. On the Pselaphidae of Australia. **1(3)**: 167-175. [Read November 7th, 1864]
- King, Rev. R. L. 1866a. On the Pselaphidae of Australia. No. IV. **1(5)**: 299-315. [Read 4th December, 1865]
- King, Rev. R. L. 1866b. Description of *Anapestus Kreuzleri*: a species of Coleopterous Insect inhabiting Ants' Nests in South Australia. **1(5)**: 316-318. [Read March 5th, 1866]
- King, Rev. R. L. 1869a. Description of the Anthicides of Australia. **2(1)**: 1-24. [Read 7th January, 1867]
- King, Rev. R. L. 1869b. Description of new species of *Articerus*. **2(1)**: 54-57. [Read 1st October, 1868]
- King, Rev. R. L. 1869c. On the Byrrhides of Australia. **2(1)**: 71-75. [Read 22nd November, 1869]
- King, Rev. R. L. 1869d. Description of *Hiketes*, a new genus of Formicicolous Coleoptera. **2(1)**: 76-78. [Read 22nd November, 1869]
- Krefft, G. 1864. Notes on the metamorphosis of a dipterous insect of the genus *Batrachomyia*, (MacLeay) the larva of which is Parasitical upon various species of Australian Frogs. **1(2)**: 100-101. [Read 3rd August, 1863]
- Krefft, G. 1871. On Australian Entozoa, with descriptions of new species. **2(3)**: 206-232. [Read July 3rd, 1871]
- Macleay, W., Jr. 1863a. Presidential Address. [Review of entomological books needed for up-and-coming entomologists in Australia]. **1(1)**: xii-xvi. [Read 30th January 1863]
- Macleay, W., Jr. 1863b. Description of Twenty new Species of Australian Coleoptera, belonging to the families Cicindelidae and Cetoniidae. **1(1)**: 9-21. [Read 4th August, 1862]
- Macleay, W., Jr. 1863c. Description of Twenty new Species of Buprestidae, belonging to the genus *Stigmodera*, from the Northern parts of Australia. **1(1)**: 22-32. [Read 1st September, 1862]
- Macleay, W., Jr. 1863d. On the Scaritidae of New Holland. **1(1)**: 55-74. [Read 5th January, 1863]
- Macleay, W., Jr. 1864a. Presidential Address. [Brief summary of the earlier history of Australian Entomology]. **1(2)**: xxx-xxxvi. [Read 7th March, 1864]
- Macleay, W., Jr. 1864b. On the Insects of Australia allied to the Glaphyridae. **1(2)**: 75-90. [Read 1st June, 1863]
- Macleay, W., Jr. 1864c. Descriptions of new genera and species of Coleoptera from Port Denison. **1(2)**: 106-130. [Read 5th October, 1863]
- Macleay, W., Jr. 1864d. On the Scaritidae of New Holland. 2nd Paper. **1(2)**: 134-154. [Read 7th March, 1864]

- MacLeay, W., Jr. 1865b. On the Scaritidae of New Holland. 3rd Paper. **1**(3): 176-198. [Read 6th March, 1865]
- MacLeay, W., Jr. 1865a. Description of a New Genus of Carabideous Insects. **1**(3): 155-157. [Read 6th June, 1864]
- MacLeay, W., Jr. 1865b. The Genera and Species of the Amycteridae. **1**(4): 199-298. [Read 7th August, 1865]
- MacLeay, W., Jr. 1866. New Species of Amycteridae. **1**(5): 319-340. [Read 6th August, 1866]
- MacLeay, W. 1869. On the Scaritidae of New Holland. 4th Paper. **2**(1): 58-70. [Read 6th September, 1869]
- MacLeay, W. 1871. Notes on a collection of Insects from Gayndah. **2**(2): 79-158; **2**(3): 159-205. [Read 3rd April, 1871]
- MacLeay, W. 1872. Notes on a collection of Insects from Gayndah. **2**(4): 239-318. [Read 4th December, 1871]
- MacLeay, W. 1873. Miscellanea Entomologica. **2**(5): 318-370. [Read 7th July, 1873]
- Schrader, H. L. 1863a. Observations on certain Gall-making Coccidae of Australia. **1**(1): 1-6. [Read 2nd June, 1862]
- Schrader, H. L. 1863b. Further communication on the gall-making Coccidae. **1**(1): 6-8. [Read July 7th, 1862]
- Scott, A. W. 1863. Description of an Ovo-viviparous Moth, belonging to the genus *Tinea*. **1**(1): 33-36. [Read 1st September, 1862]
- Scott, A. W. 1864. On a new species of *Ornithoptera*. **1**(2): 131-133. [Read 7th December, 1863]
- Scott, A. W. 1869a. On the genus *Charagia* of Walker. **2**(1): 25-35. [Read 2nd September, 1867]
- Scott, A. W. 1869b. Description of a new genus belonging to the family Hepialidae, of Stephens. **2**(1): 36-39. [Read 7th October, 1867]
- Scott, A. W. 1869c. On the "*Agrotis vastator*," a species of Moth, now infesting the Sea-board of New South Wales. **2**(1): 40-48. [Read 21st October, 1867]
- Scott, A. W. 1869d. On the *Ornithoptera* Cassandra. **2**(1): 49-53. [Read 6th July, 1868]

ANNOUNCEMENT

The Royal Zoological Society of NSW wishes to advise that – after a long absence - wildlife talks will resume. The aim is for the talks/discussions to be more informal; encourage discussion and debate; and allow participants to eat and drink during the talks. The talks will be held on the 3rd Tuesday of each month at the Botany View Hotel (597 King Street Newtown) starting at 18:30. Each month will have a different speaker (or 2) with topics that will generate questions and discussion. You are invited to join us for a drink at the urban watering hole. Hear from the experts, meet up with some like-minded people and discuss how we can work together to conserve and manage Australian biodiversity. This free* event is brought to you by the Royal Zoological Society of New South Wales with the generous support of the Botany View Hotel. The Botany View Hotel is near public transport (St Peters station and buses) and parking is available next to Sydney Park.

*Drinks and food can be purchased from the bar and can be consumed during the talk.

**2018 LINNEAN SOCIETY OF NSW NATURAL HISTORY FIELD SYMPOSIUM
VOLCANOES OF NORTHWEST NEW SOUTH WALES: EXPLORING RELATIONSHIPS
AMONG GEOLOGY, FLORA, FAUNA AND FIRES**

Dates: Icebreaker - Monday evening 24 September (Coonabarabran Visitors Centre)

Symposium sessions - Tuesday & Wednesday 25-26 September 2018

Venue (Symposium sessions): Coonabarabran Bowling Club Auditorium, Edwards Street, Coonabarabran NSW.

REGISTRATION FORM

Name (please print):

E-Mail:

Affiliation:

Fee category (please circle): Full member / Student member / Retired member / Non-member

Please Note: The Field Trip is now fully booked

Please send completed registration form to

- i) linnsoc@inet.net.au as attachment (indicate date & method of payment), or
- ii) Linnean Society of New South Wales, PO Box 82, KINGSFORD NSW 2032.

Payment options August 1 – September 24

Fee category Symposium

Student member	\$45
Retired member	\$55
Full Member	\$65
Non-member	\$100

1) Bank transfer: St George Bank. Account name "Linnean Society of NSW"
BSB 112879, Account # 466447867. Please label payment 'Warr_yoursurname'

2) Cheque made out to "The Linnean Society of NSW", posted to the above address. Registrants must make their own travel and accommodation arrangements. Lunches during the Symposium Sessions are not included in the Registration Fee, but are available for purchase at the Bowling Club bistro.