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Contents

THE AUSTRALASIAN ARACHNOLOGICAL SOCIETY

We aim to promote interest in the ecology, behaviour and taxonomy of arachnids of the Australasian region.

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ARTICLES

The newsletter depends on your contributions! We encourage articles on a range of topics including current research activities, student projects, upcoming events or behavioural observations.

Please send articles to the editor:

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COVER PHOTOGRAPH:
Mopsus mormon ♂ (Queensland)
Michael Rix

EDITORIAL

Easter 2006 is already over and with the arrival of the colder months the peak in arachnid activity is decreasing, at least in the temperate zones of the southern hemisphere (Mind you, there are a lot of purely winter-active arachnids out there....). In contrast, arachnologist activity amongst members of our society appears to peak as I could not complain about a lack of contributions to *Australasian Arachnology 74*. This issue contains articles from Barry Richardson, Mark Harvey, Matthew Shaw and Steve Nunn. Thank you all very much for your interesting contributions!

Our website (www.australasian-arachnology.org) continues to be 'hit' frequently. I have recently started to upload pdf-files of old issues of *Australasian Arachnology* (issues 1 to 5 already online!). Have a browse through these historical issues and find out what our seasoned members where up to nearly 20 years ago! However, please remember that our website will only grow with contributions from our members. We are still missing webpages of many arachnological groups.

Some direct advertisement amongst the participants of the Arachnology Symposium at the "Invertebrates 2005" conference in Canberra last year saw a nice increase in numbers in the AAS membership. We will continue to grow if you, as a current member, will promote our society amongst colleagues and friends!

Keep the contributions rolling in (deadline for the next issue: 30 September 2006). Cheers for now,

Volker

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Right or wrong? Testing predictions of spider distributions

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Providing information and giving effective advise to those responsible for managing Australia's biodiversity is difficult due to lack of knowledge of most arachnid species. A similar situation faces those responsible for treating individuals that have been bitten by spiders. The question in each situation as to what species are likely to be found in the area of interest is often unanswerable. The situation with jumping spiders (Araneae: Salticidae) is typical. In this group of common spiders, 340 species out of an estimated Australian fauna in excess of 1000 species have been described (Richardson and Zabka 2003). Further, for those that have been described, distributions are often unknown because the number of specimens in collections is too few to give an accurate representation of range. In Europe, a large pool of professional and amateur naturalists is available who can be called upon to assist in mapping the distribution of species and groups. In Australia, naturalists have also been of great assistance in mapping the distributions of several insect groups, for example butterflies (Braby 2000).

In groups like the spiders however the number of knowledgeable individuals available to find and identify species is small and collections of most species very limited. As a consequence, efforts need to be made to use modelling methods that extract information from the limited site data available and use this to predict likely distributions. One approach is to predict the distribution of the taxon of interest on the basis of its climate envelope. The parameters for this envelope are developed using the climate profiles of the localities where the species is known to occur (e.g. Nix 1986; Richardson and McMahon 1992; Neave *et al*. 1996; Godown and Peterson 2000; Fischer *et al*. 2001; Beaumont and Hughes 2002; Meynecke 2004). The distributions of genera of Australian jumping spiders have recently been reported using this approach (Richardson, *et al*. 2006). Limitations to this approach however have been identified (Peterson and Cohoon 1999; Claridge 2002; Kadmon *et al*. 2003). It is of interest to test the adequacy of such predictions on spider species. To this end it is proposed to develop predictions of distributions of several Australian salticid species and to provide these predictions to the community of Australian arachnologists for testing.

Fig. 1: *Mopsus mormon* having a meal (Photo: Michael Rix)

This paper describes the first of these predictions and readers are invited to report specimens from locations that either support the prediction (by being from predicted areas but for which no specimens were available) or refute the prediction by reporting locations outside the predicted range where specimens have been collected.

The first species to be considered is *Mopsus mormon* Karsch, 1878 (Fig. 1). It is one of the better studied Australian species and is widespread in northern Australia (Jackson 1983, 1986, 1987; Downer 1985; Brunet 1997; Harland *et al.* 1999; Patoleta and Zabka 1999). It is a significant species, as it is one of the few jumping spiders that is known to bite humans, where it causes a painful swelling at the bite-site lasting up to a week (Musgrave 1949; Isbister *et al*. 2001). Locality records from the Australian Museum, the Australian National Insect Collection and the Western Australian Museum, were stored in BioLink (version 2.0; Shattuck and Fitzsimmon 2002) and a map showing the known and predicted distributions was made for the species. The predicted distribution map was generated on the basis of its bioclimatic envelope, using the boxcar version of BIOCLIM available in BioLink. An introduction to the logic and accuracy of the method and examples of the use of BIOCLIM to examine the distribution of continental faunas can be found in Nix (1986) and Lindenmayer *et al*. (1991).

Climatic indices

As used here, BIOCLIM estimates twelve bioclimatic indices for the location of each specimen and thence the range found for each variable for the taxon. The indices estimated are:

1. annual mean temperature (°C),
2. hottest month mean maximum temperature (°C),
3. coldest month mean minimum temperature (°C),
4. annual temperature range (2 minus 3) (°C),
5. wettest quarter mean temperature (°C),
6. driest quarter mean temperature (°C),
7. annual mean precipitation (mm),
8. wettest month mean precipitation (mm),
9. driest month mean precipitation (mm),
10. annual precipitation range (8 minus 9) (mm),
11. wettest quarter mean precipitation (mm),
12. driest quarter mean precipitation (mm).

These variables provide estimates of total energy and water inputs, seasonal extremes and a measure of conditions prevailing during potential active and dormant seasons. The range of values obtained for each variable for the taxon are then compared with the values for each point on a 20 second grid covering the Australian continent. The points meeting the criteria for the taxon are identified and mapped. The darker the colour used for each point in the final map, the more likely the taxon is to be present (cut-offs are 25 and 75 percentiles, 10 and 90 percentiles, 5 and 95 percentile, 0 and 100 percentiles for all variables).

The known and predicted distributions of *Mopsus mormon* are shown in figure 2. As well as areas close to specimen sites, several other areas are also predicted; notably the uplands of Arnhemland, Groote Island, the coast of the Northern

Territory near the Queensland border (but not either side of this area), the higher areas of the Barkly Tableland, uplands of the Queensland wet tropics and from ranges north of Hughendon northwards to the Gregory Range. The species is only predicted as far south as Broad Sound on the east coast, and Roebuck Bay on the west coast. The prediction excludes parts of Kimberly, parts of the coast of the Gulf of Carpentaria, the northern tip of Cape York, and the Atherton Tableland.

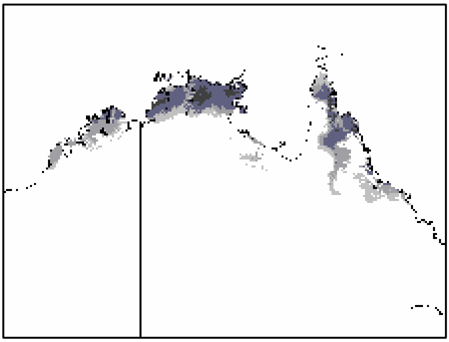

Fig. 2: Known (triangles) and predicted (shaded areas) distribution of *M. mormon* in northern Australia.

Those with relevant information should contact me by email giving information on locations or, preferably, send a specimen to ANIC with the location, collection date and collectors name. The species is easily collected by sweeping long grass or other vegetation. The animals are large for jumping spiders (1-2cm), bright green, and often aggressive (Fig. 1). Good pictures of male and female spiders can be found in Mascord (1970; under the name *Mopsus penicillatus*) and Nieuwenhaus (2006). If significant extra records are received, the revised map and the nature of the differences found between the maps will be reported to the Australasian Arachnological Society. Maps of other easily identifiable species will be presented for testing in future issues of *Australasian Arachnology*.

Acknowledgements

Thanks to Mike Gray, Mark Harvey, Graeme Milledge and Julianne Waldock, for providing specimen records for use in this project.

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Book Review

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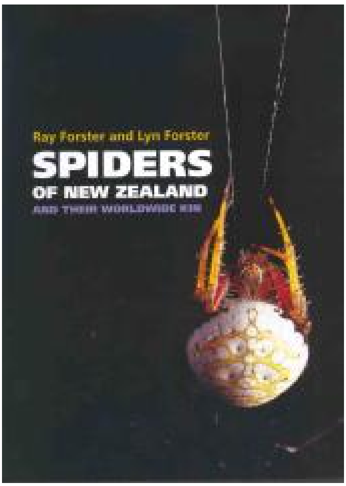
Spiders of New Zealand and Their Worldwide Kin
by Ray Forster and Lyn Forster
Published by University of Otago Press, 1999, ISBN 1 877372 13 7



For me, two facts loom large in our understanding of spiders during the late 20th century. First, the discovery that spiders and a few other arachnid orders date back to at least the Devonian (Shear *et al.*, 1989) was a stunning revelation. Nearly 400 million years of continuous arachnid life is almost unparalleled in terrestrial life on this planet, and one that continues to fill me with awe and respect for our little eight-legged friends. Second, the effect that two prominent taxonomists situated in a far-flung corner of the world had on spider classification. The earlier of these, Vernon Victor Hickman, spent his entire career at the University of Tasmania, and "only" published 24 taxonomic papers on spiders from 1927 to 1981, mostly on small Tasmanian forms. That he was able to name four new families during that time was a testament to his powers of observation. Hard on his heels was Raymond Forster from New Zealand who authored nearly 40 taxonomic papers on spiders from 1949 to 1999, largely on the austral fauna. This body of work included the massively influential 'Spiders of New Zealand' series (1967-1988) partly co-authored with other experts, covering a wide variety of families including the notoriously difficult families Agelenidae, Amaurobiidae, Desidae and their relatives. The dismemberment of the "Cribellatae", now known to be based upon a feature – the cribellum – that has been lost on subsequent occasions, was a seminal moment in spider phylogenetic research. Ray was also no slouch when it came to new families, with several emerging from his detailed observations.

Ray and his wife Lyn were also keen to popularise their research and present their observations to a wider audience. The first of these volumes, 'New Zealand spiders - an introduction' (Forster &

Forster 1973), was originally printed in 1973 and contains a wealth of natural history observations that brings spiders alive. More than two decades later their lavish book 'Spiders of New Zealand and their worldwide kin' is an extension of the 1973 treatise, but presents us with more information in a refreshing style. First published in 1999, this volume hasn't been previously reviewed in this newsletter, so while my comments may seem a tad late, there may be some readers who haven't had the good fortune to read the volume and may be interested in my views.

The book starts by introducing us to spider structure, behaviour and life cycles, followed by a review of the other arachnid orders. Ray's "other" research focus, the harvestmen, is summarised along with sections on mites and pseudoscorpions. Alas, my only criticism of the book is that the two photographs of pseudoscorpions are misidentified. Figure 3.6b is probably *Xenolpium pacificum* (Olpiidae), not *Opsochernes carbophilus* (Chernetidae) and Figure 3.6c is a species of *Synsphyronus* (Garypidae), not *Thalassochernes* (Chernetidae).

The remaining chapters are an entertaining discourse on the many, varied spiders families found in New Zealand, commencing with the four mygalomorph families, Hexathelidae, Nemesiidae, Idiopidae and Migidae. Chapter 5 deals with the most primitive araneomorphs, the 'living fossil' family Gradungulidae which is restricted to New Zealand and eastern Australia. Ray discovered and named this family in 1955, so is well placed to review their special place amongst the spiders. They compare the gradungulids with some similar looking spiders found in other parts of the world, the Hypochilidae in North America and Asia, and Austrochilidae from South America and Tasmania (fittingly named *Hickmania*!).

Chapters 6 to 16 deal with the remaining araneomorph families, from tiny litter-dwelling spiders to the large orb-weavers. Chapter 17 reviews harmful spiders in the region, with something that has become mantra to all of us who are employed professionally to deal with enquiries from members of the public, "Most spiders are not harmful". Hear, hear!

The final chapter deals with how to collect and study spiders. Appendices listing all spider families and historical notes on some early arachnologists admirably round off the book.

The publishers – University of Otago Press – are to be congratulated on the fine quality of the finished hard-back product. The layout and text are easy on the eye, and the reproduction of the artwork is amongst the best I have seen. Those of us who are familiar with the 'Spiders of New Zealand' series will recognise the distinctive and impressive artwork of Barry Weston throughout the volume.

If you don't already have a copy, I recommend that you get one soon. There is a wealth of information presented in a rambling, chatty style, reminiscent of having a conversation with the authors over a cup of tea.

Ray died in 2000 not long after the publication of this book. We have all been robbed of a fine intellect and a keen observer of spiders and other arachnids. Lyn's health is poor and she can no longer actively pursue her research. It's the sad end of an era, but their life's love is beautifully detailed in this fine publication.

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A continuing 6-year-study of a long lived semi-arid zone Australian tarantula: 2. Mating behaviour and juvenile development in captivity

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(For editorial reasons, this article on *Selenotypus sp. "glenelva"* has been split. The last issue of *Australasian Arachnology* featured the first part dealing with the life history of this species)

Collection and housing of spiders

Fifteen spiders of *Selenotypus sp. "glenelva"* were collected in January 1999 from Glenelva (Queensland/Australia). Spiders were placed into sealed containers, with cocopeat substrate, water dish and a small hide, males were given a smaller retreat than females. Two males (spiders no. 1 & 2) and 8 females (no. 3 - 10) moulted to maturity in captivity and were considered for observation as virginity could safely be assumed and offspring considered brood from captivity. Male 1 matured on 3 June 1999 and male 2 on 20 July 1999. One postmoult female (no. 6) died of unknown causes.

Mating and cannibalism

Male 1

One week after maturation, male no. 1 was introduced to the enclosure of a female (no. 3). Upon touching some silk from her enclosure, he immediately began shaking his pedipalps, seemingly recognising a potential mate via chemotactile reception. Prior to any physical contact between the pair, the male twitched leg III several times, causing his entire body to jerk. The female emerged from her retreat and approached the male cautiously. When she was close, he quickly approached her shaking his pedipalps vertically at a rapid rate. Unguis locking mechanisms are utilised by many mygalomorph species and range from tibial apophyses to cheliceral clasps (Costa and Pérez-Miles, 1998). These mechanisms lock the female chelicerae, potentially to grasp the female safely during copulation. In all Australian theraphosids, indeed in the entire subfamily Selenocosmiinae, no such unguis locking mechanisms are known. Males hold onto the female simply by pressing himself tightly to the female with his anterior femora pressed against her chelicerae (Fig. 1). Courtship lasted for 94 seconds. Before, during and after copulation, no sign of aggressive behaviour was observed.

Three days after the first mating session, the male was observed building a sperm web and presumed to be ready to mate again. He was placed into the enclosure of another female (no. 4) and copulation occurred. From that point, the male was given one week rest periods between matings and was successful introduced to every female over a two-month period. Only once again was the male noted to make a sperm web. Female no 7 killed the male during a second attempt to mate with her.

Male 2

The second penultimate was offered food one week after maturation. He was then given another two weeks to ensure his pedipalps would be charged and ready for mating. On 11 August 1999 he was carefully introduced to female no. 3, who attacked the male immediately. The male was removed and on 18 August 1999 introduced to the same female again. This time the female did show no signs of aggression and mating occurred. After another week the male was introduced to a further female (no. 5) who quickly impaled and ate the male.

Fig. 1: Male and female of *Selenocosmia sp. "glenelva"*

Juvenile development

Only three females produced an eggsac (female no. 8 on 3 Sept 1999; females no. 3 & 5 on 15 Sept ember 1999) (see Fig. 2), but females no. 3 and 5 subsequently ate the eggsac. Second instar spiderlings were found with female no. 8 deep inside the artificial burrow which allows ca. 41 days from oviposition to emergence. Of this brood, 190 spiderlings were placed into individual containers (cocopeat substrate) on 15 October 1999. All spiderlings were fed with captive bred "pinhead" crickets and mealworms cut in half once or twice a week. Fifteen juveniles were selected to observe juvenile development (Table 1).

Fig. 2: Female *Selenocosmia sp. "glenelva"* (no. 8) with eggsac.

In the first year (2000; years measured from 1 October – 1 October), spiders went through three to four instars and in the second year (2001) a maximum of only two instars were observed. By the end of the second year, three spiders had died. In the third and fourth year (2002, 2003) the number of instars decreased further to only one per year. One spider was a penultimate male (Table 1). The fifth year (2004) saw a further reduction in moults as only four spiders shed their skin. Three more specimens died that year.

Successful sexual determination in one male and three females was possible via the presence of either epiandrous fusillae in males or spermethecal buds forming in the females (Kotzman 1988). On 3 & 16 March 2005 two of the immature females moulted again and showed fully developed spermethecae. The male moulted to maturity on 8 July 2005.

Table 1: Number of instars per year for 15 *Selenotypus sp. "glenelva"* in captivity. j – juvenile, m – mature, † - death

	1	***2***	***3***	***4***	***5***
2000	4	3	3	4	4
2001	1	2	2	1	2
2002	1	1	1	1	0
2003	0	0	1(j♂)	1	1
2004	1 (j♀)	1 (j♀)	0	0	†
2005	1 (m♀)		1(m♂)	1	

	6	***7***	***8***	***9***	***10***
2000	4	4	3	4	†
2001	1	1	1	2	
2002	1	1	1	1	
2003	1	1	0	1	
2004	†	†		0	
2005			1(m♀)	0	

	11	***12***	***13***	***14***	***15***
2000	3	4	3	†	4
2001	1	†	1		1
2002	1		1		1
2003	0		1		1
2004	1 (j♀)		0		0
2005	1(m♀)		0		0

The captive bred male matured in a six-year period through eight instars (not including embryo and post-embryo) (Fig. 3). Three females reached sexual maturity also over six years, two of which matured through seven instars and one through eight instars. If these females are indeed mature, they have developed at the same rate (if not a little faster) then the male. By coupling the siblings with each other I will be able to confirm whether or not the females are mature, which would provide evidence that males may not always mature faster than females in theraphosid spiders.

Fig. 3: Male of *Selenocosmia sp. "glenelva"* bred in captivity.

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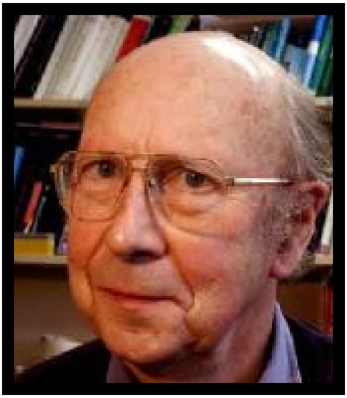
In memoriam: Nicholas Adam Locket

Born: 16 April 1931, London
Died: 18 November 2005, Adelaide.



(photgraph from: http://www.science.marshall.edu/fet/euscorpius/images/memorial_gallery.htm)

Selected Bibliography

(I have compiled this bibliography by 'googling' the internet. It is certainly incomplete but shows Adam Locket's breadth of knowledge beyond his research on scorpions.
V.W. Framenau)

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Recent Australasian Arachnological Publications

This column aims to collate arachnological publications that were issued (but not those 'in press') since the last volume of *Australasian Arachnology*. This includes:

- papers on Australasian arachnology and
- written by Australasian arachnologists (including non-arachnid papers).

Bruce, M. J. 2006. Silk decorations: controversy and consensus. *Journal of Zoology* **269**: 89-97.

Bruce, M. J. & **Herberstein, M. E. 2005.** Web decoration polymorphism in *Argiope* Audouin, 1826 (Araneidae) spiders: ontogenetic and interspecific variation. *Journal of Natural History* **39**: 3833-3845.

Harvey, M. S. 2006. The schizomid fauna (Arachnida: Schizomida: Hubbardiidae) of the Arabian Peninsula and Somalia. *Fauna of Arabia* **21**: 167-177.

Dankittipakul, P., Sonthichai, S. & **Wang, X. P. 2006**. Ten new species of coelotine spiders (Araneae, Amaurobiidae) from Thailand. *Revue Suisse de Zoologie* **113**: 3-21.

Huber, B. A. 2005. Revision of the genus *Spermophora* Hentz in Southeast Asia and on the Pacific Islands, with descriptions of three new genera (Araneae: Pholcidae). *Zoologische Mededelingen* **79**: 61-114.

Kuntner, M. 2006. Phylogenetic systematics of the Gondwanan nephilid spider lineage Clitatrinae (Araneae, Nephilidae). *Zoologica Scripta* **35**: 19-62.

Murphy, N. P., Framenau, V. W., Donnellan, S. C., Harvey, M. S., Park, Y.-C., Austin, A. D. 2006. Phylogenetic reconstruction of the wolf spiders (Aranae: Lycosidae) using sequences from the 12S rRNA, 28S rRNA, and NADH1 genes: implications for classification, biogeography, and the evolution of web building behaviour. *Molecular Phylogenetics and Evolution* **38**, 583-602.

Richardson, B. J., Zabka, M., Gray, M. R., & Milledge, G. 2006. Distributional patterns of jumping spiders (Araneae, Salticidae) in Australia. *Journal of Biogeography* **33**: 707-719.

Tu, L. & Li, S. 2006. A review of *Gongylidioides* from China. *Revue Suisse de Zoologie* **113**: 51-65.

Vink, C.J., Thomas, S.M., Paquin, P., Hayashi, C.Y. & Hedin, M. 2005 The effects of preservatives and temperatures on arachnid DNA. *Invertebrate Systematics* **19**: 99-104.