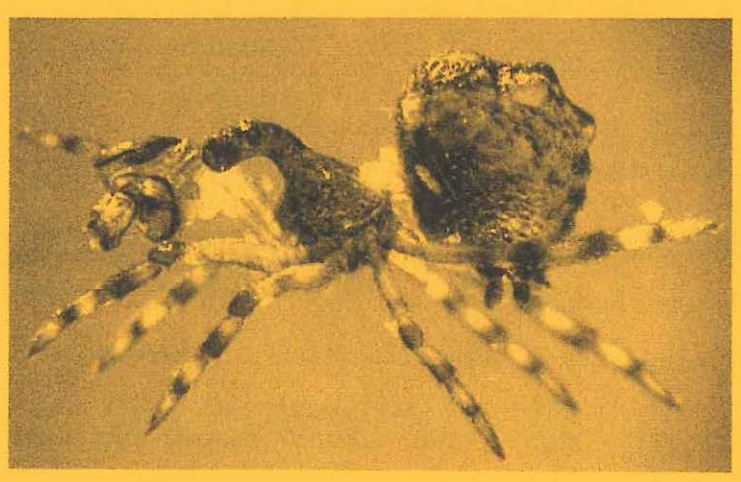
AUSTRALASIAN ARACHNOLOGY



Number 65: October 2002

Price $2
ISSN 0811-3696

THE AUSTRALASIAN ARACHNOLOGICAL SOCIETY

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

MEMBERSHIP

Membership is open to amateurs, students and professionals, and is managed by our Administrator :

Richard J. Faulder
Agricultural Institute
Yanco, New South Wales 2703.
Australia.

email : faulder@agric.nsw.gov.au

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Status box on the envelope indicates the last issue paid for.

Previous issues of the newsletter are available at $2 per issue plus postage.

ARTICLES

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

Please send articles to the Editor:

Dr Tracey Churchill
Museum & Art Gallery of the Northern Territory
GPO Box 4646
Darwin NT 0801
Australia.

email: spider@octa4.net.au

Format: i) typed or legibly printed on A4 paper or ii) as text or MS Word file on CD, 3 ½ floppy disk, or via email.

LIBRARY

The AAS has a large number of reference books, scientific journals and papers available for loan or as photocopies, for those members who do not have access to a scientific library. Professional members are encouraged to send in their arachnological reprints.

Contact our librarian :

Jean-Claude Herremans
PO Box 291
Manly,
New South Wales 1655. Australia.

email: jclh@ihug.com.au

COVER PHOTOGRAPH: *Phoroncidia* sp. ♂ from Western Australia by Melinda Moir

EDITORIAL

As I write, the temperatures are peaking at 38-40°C, (its even 32°C and 60% humidity at 3 a.m.)! This "build-up" season of the monsoonal tropics is just when the males of the local mouse spider *Missulena pruinosa* are keen to leave their burrows to seek a mate. A few brief showers of wonderful rain really get them going, and cause the public to think they are being invaded by funnel webs! One local resident assured me that they were coming out of the gyprock walls! This year some male mouse spiders are volunteering their services for venom research and we hope to see an update on that project in a future issue.

Meanwhile, in this issue we get to read the facts behind the squashed spider story that recently hit the media. We can read about New Zealand lycosids and congratulate Cor Vink on being awarded his PhD. And thanks to Matjaz Kuntner for telling us about his rewarding visit to "down under" and for providing some great photographs.

Congratulations to Robert Raven, Barbara Baehr and Mark Harvey on completing the much awaited CD-Rom on Australian spider families/sub-families. There is clearly no need to agonise over what to get your fellow arachnophiles this Christmas with the latest catalogue of spider books also now available!

I wish all our members a safe and happy Christmas. Until next year...

.....*Tracey*

MEMBERSHIP UPDATES

Welcome to:

Dr Barbara Baehr
Arachnology
Queensland Museum
PO Box 3300
South Brisbane, QLD. 4101

Change of Address

Jeff Cox
29 Elgin Ave
Christies Beach
South Australia 5165

Change of Email address

Graham Wishart
gwishart@tpg.com.au

ARACHNOLOGICAL ACTIVITIES

UNIVERSITY OF MELBOURNE

Therésa Jones joins our laboratory as a post-doctoral research associate to work on sperm competition and mating strategies among orb-web spiders. Therésa has expertise in many terrestrial invertebrate model systems, which means that she will bring several new perspectives to our research.

Prof Douglass Morse (Brown University, USA), who is well known for his research on the ecology and behaviour of crab spiders, is visiting us until May 2003.

Among other things, he is interested in getting comparative perspectives on extreme sexual dimorphism, which is typical of both the genus Nephila and certain thomisids.

Volker Framenau will leave our laboratory at the end of the year, to take up a plumb post-doctoral research position with Mark Harvey at the West Australia Museum. His research will involve a revision of the Australasian lycosids. Volker's contribution to our laboratory was very considerable and we'll miss him.

QUEENSLAND MUSEUM

Another arachnologist comes to Canberra! Sandy Roy is formerly of Scotland and linyphiids and has been in Canberra helping to curate the (orphaned) spider collection in ANIC. Now another one comes to Canberra. Joh Koh is the author of a great pocket book on Singapore spiders. We met him at the Congress here in 1992. He moved from Singapore to Taiwan and now to Canberra to take up a new appointment as the Singapore High Commissioner (Ambassador) to Canberra in November.

Phil Lawless Leaves Museum

Phil Lawless has now left the Queensland Museum and has taken up a job at the Art Gallery as Asst. Registrar. I guess the potential uncertainty of the situation in the Queensland Museum has taken a further toll. Phil's attention to important detail, powerful verbal recall, and ability to tame the most recalcitrant photocopier, amongst others will be missed.

INTERNATIONAL ARACHNOLOGICAL SUBSCRIPTIONS

Subscriptions to international journals and/or societies will be collated by our society's administrator in January. Members have the benefit of paying in Australian dollars and avoiding a bank draft fee. Our fellow societies also appreciate a co-ordinated subscription and payment. When exisiting members receive their notices they can forward these with payment as below. Those wishing to subscribe please send your details and subscription requests with payment.

Fees for 2003 in Australian dollars

(based on the current 0.58 conversion rate):

♦ Acta Sinica	**$86.20**
♦ American Arachnol. Soc.	**$69.30**
(student	$43.10)
♦ Arachnol.Soc. of Japan	**$101.70**
♦ Arthropoda Selecta	**$69.00**
♦ British Arachnol. Soc.	**$62.00**
♦ Internat'l Soc. Arachnol.	**$34.50**
(student / retiree	$25.85)
♦ Revue Arachnologique	tba.

Please make payment for the total amount due as a cheque or postal note made out to the "Australasian Arachnological Society" in Australian dollars. If cash is sent please round up to the nearest dollar.

Send to our administrator, Richard Faulder (see page 1) by Friday **31st January 2003**.

Squashed spiders, Necrotic Ulcers and Digestive Enzymes

by Geoff Isbister

Discipline of Clinical Pharmacology
University of Newcastle

"White-tail spider bite" has become a part of medical dogma and media mythology over the last 20 years in Australia (White 1999). This has caused significant fear around Australia and medical opinion on this topic has taken a sharp turn from the path of good science and evidence based practice. Recently this has been further fuelled by stories of squashed spiders injuring eyes with their digestive enzymes (Isbister &. Balit 2001). What is the meaning of this and is there any evidence to support white-tail spider bites, squashed spiders and digestive spider juices ?

There has been a significant amount of venom research going on in Australia over the last 5 years, particularly in relation to spiders, including the white-tail spider (*Lampona cylindrata* (Koch, 1866) / *L. murina* Koch, 1872). There have been two studies on the venom of the white-tail spider, neither providing convincing evidence that the toxins in the venom cause cytotoxic or necrotic effects (Young & Pincus 2001; Rash, King & Hodgson 2000). One of these studies demonstrated a marked difference between the effects of female and male venoms in pharmacological experimental work (Rash, King & Hodgson 2000). The second study demonstrated quite clearly that the venom of white-tail spiders does not contain the same components as the venom of recluse spiders (*Loxosceles* spp.), which are responsible for the necrotic ulcers associated with these species (Young & Pincus 2001). However, the investigators did demonstrate that these toxins (sphingomyelinases) did occur in the mid-body extracts of white-tail spiders. Unfortunately, the investigators concluded that this was the reason that white-tail spiders caused necrotic ulcers (Young & Pincus 2001). It was suggested in a letter to the journal that rather this was actually evidence that white-tail spiders were unlikely to cause necrotic ulcers which better supported the clinical evidence (Isbister 2001).

The concept that digestive enzymes in the stomach of spiders was responsible for necrotic lesions is not a new concept, and had been suggested 10 years earlier (Atkinson & Wright 1992). These researchers suggested that collagenases in spider mid-body extracts were responsible for necrotic ulcers. Although initially this appears to be a reasonable suggestion, it is actually unlikely to be the case. All spiders have stomachs that contain digestive enzymes, so if this was the explanation, we should see necrotic ulcers occurring with bites from all spider types. Further, this would mean the larger the spider, the greater the stomach contents, and the greater the chance the spider would cause necrotic lesions. However, many large spiders have never been implicated in necrotic arachnidism, including large mygalomorphs and members of the huntsman family (Sparassidae). A recent prospective study of 750 definite spider bites across 18 different spider families, including mygalomorphs and sparassids, failed to

identify any associated necrotic lesions or ulcers (Isbister & Gray 2002). Thus, the digestive enzymes of spiders are unlikely to be the cause of necrotic ulcers.

So, are these digestive enzymes a risk to humans? A recent report of two cases of squashed spiders being wiped in the eyes of humans suggests that under certain circumstances these enzymes may cause harm (Isbister &. Balit 2001). In both cases daddy-long legs spiders (Pholcidae) were squashed then wiped in the patient's eyes. This caused significant pain, redness and swelling of the eye that lasted for 8 to 24 hours. In both cases this resolved without any major problems. The authors suggested that this was a result of digestive enzymes from the squashed spider which caused acute injury and inflammation to the outer part of the eye (Isbister &. Balit 2001). A squashed spider would certainly contain digestive enzymes from the midgut portion of the spider, and when these came in contact with sensitive regions, such as the eyes, it is reasonable to think they would cause an acute chemical conjunctivitis. The reason that this has only been reported for daddy long legs spiders is that if people squash larger spiders, they are more likely to wash their hands, and not wipe their eyes. In addition, these enzymes are unlikely to cause any major problems when they come in contact with normal intact skin.

Should we fear the "great white-tail spider" and its digestive enzymes? I think not. There is now significant evidence from studies of confirmed spider bites that white-tail spiders do not cause necrotic ulcers (Isbister & Gray 2000, 2002). Research on the venom of the spider confirms this (Young & Pincus 2001; Rash, King & Hodgson 2000). Squashing spiders does not appear to be a major health risk, although ocular contact with the digestive enzymes of spiders may cause an acute self-limiting inflammation of the conjunctiva (Isbister &. Balit 2001).

References:

White J. (1999). Necrotising arachnidism. Med. J. Aust. 171:98.

Isbister G.K. & Balit C. (2001). Ocular exposure to squashed spiders. Med. J. Aust. 175:391-2.

Young A.R. & Pincus S.J. (2001). Comparison of enzymatic activity from three species of necrotising arachnids in Australia: *Loxosceles rufescens*, *Badumna insignis* and *Lampona cylindrata*. Toxicon 39:391-400.

Rash L.D., King R.G. & Hodgson W.C. (2000). Sex differences in the pharmacological activity of venom from the white-tailed spider (*Lampona cylindrata*). Toxicon 38(8):1111-27.

Isbister G.K. (2001). Necrotic arachnidism in Australia. Toxicon. 39(12):1941-2.

Atkinson R.K. & Wright L.G. (1992). The involvement of collagenase in the necrosis induced by the bites of some spiders. Comp.Biochem.Physiol.[C] 102:125-128.

Isbister G.K. & Gray M.R. (2000). Prospective study of the clinical effects of bites by the white-tail spider in Australia (*Lampona cylindrata/murina* group). Proceedings of the 13th International Congress on Animal, Plant and Microbial Toxins, Paris.

Isbister G.K. & Gray M.R. (2002). A prospective study of 750 definite spider bites, with expert spider identification. Q.J.Med. 95:723-31

POSTGRADUATE PROJECTS

The taxonomy and systematics of New Zealand Lycosidae (wolf spiders).

Cor J. Vink

Degree: Doctor of Philosophy

Institutions: Ecology and Entomology Group, Lincoln University, and Landcare Research, New Zealand.

Supervisors: Adrian Paterson, Marie-Claude Larivière and Rowan Emberson.

Submission Date: November 2001

Abstract: The 27 species of Lycosidae found in New Zealand were revised of which 11 were new species. All genera and species were described, with information on synonymy, type data, material examined, geographical distribution and subfamilial status. A key to adults was constructed and habitus images of adults, illustrations of important structural features and distribution maps have been provided. A phylogeny for the genus *Anoteropsis* was inferred using parsimony analysis of morphological characters and contained significant phylogenetic structure.

The phylogeny of *Anoteropsis* was further investigated using molecular data to test for congruence with the morphological data and the monophyly of widespread species. Data sets from the mitochondrial gene regions NADH dehydrogenase subunit I (ND1) and cytochrome c oxidase I (COI) of the 20 species in the New Zealand genus *Anoteropsis* were generated. Two species of *Artoria* were also sequenced and used as an outgroup. Species with a large distribution within New Zealand were represented by two or more specimens to test for monophyly or cryptic species. Sequence data were phylogenetically analysed using parsimony and maximum likelihood analyses. Sequence data was combined with a previously generated morphological data set and phylogenetically analysed using parsimony. The ND1 region sequenced included part of $tRNA^{Leu(CUN)}$, which appears to have an unstable amino-acyl arm and no TψC arm in lycosids.

Analyses supported the existence of five main species groups within *Anoteropsis* and the monophyly of the species. Maximum likelihood analyses appears to provide better resolution of the deeper phylogenetic structure within *Anoteropsis*. Phylogenies generated from the COI data set show inconsistencies with the ND1 and morphological trees and caution is advised when using COI to estimate spider phylogenies. A radiation of *Anoteropsis* species within the last five million years is inferred from the ND1 likelihood phylogram, habitat and geological data.

The relationship of New Zealand wolf spiders to Australian, Asian and Holarctic genera was investigated to ensure the correct generic placement of New Zealand species. A data set from the mitochondrial 12S rRNA gene subunit of 11 Australasian lycosid species (six New

Zealand species and five Australian species), three North American lycosid species, one European lycosid species and one New Zealand pisaurid (outgroup) were generated. They were combined with the published sequences of 12 European lycosids, two Asian lycosids and one Asian pisaurid and were phylogenetically analysed using parsimony and maximum likelihood analyses.

Analysis revealed that Australasian species form clades distinct from Palearctic and Holarctic species providing further evidence against the placement of Australasian species in Northern Hemisphere genera. There is evidence that New Zealand wolf spiders are related to a subset of Australian genera whereas the other Australian lycosid genera are related to Asian/Holarctic faunas.

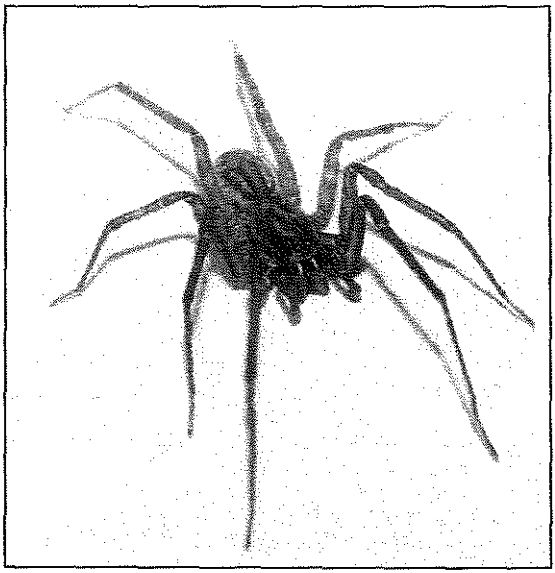
12S gene sequences were useful when examining relationships between closely related genera, but were not as informative for deeper generic relationships.

References:

Vink, C. J. (in press). Lycosidae (Arachnida: Araneae). Fauna of New Zealand, 44. Manaaki Whenua Press, Lincoln. 94pp.

Vink, C. J., Mitchell, A. D. & Paterson, A. M. (in press). A preliminary molecular analysis of phylogenetic relationships of Australasian wolf spider genera (Araneae: Lycosidae). Journal of Arachnology 30.

Allotrochosina schauinslandi
of New Zealand.
The only congener, *A. karri*,
is found in southwest of
Western Australia.



Discoveries Await Araneologists 'Down Under'

Matjaz Kuntner

Systematic Biology-Entomology,
Smithsonian Institution
National Museum of Natural History
Washington, DC, USA.

In April 2002 an international group of araneologists visited Australia for fieldwork and to examine museum collections. The group included Danish, Spanish, Mexican, and Slovenian scientists from the University of Copenhagen and the George Washington University. The main goals were to observe and collect araneoid spiders, and to find a sample of representative Australian spiders to be preserved at the Zoological Museum of the University of Copenhagen, Denmark, and the Smithsonian Institution in Washington, DC, USA.

One of the foci of this expedition was on the systematics of nephiline spiders (Tetragnathidae), which include the golden orb-weavers and the leaf rolling spiders. No less than five genera occur in Australia (*Nephila, Nephilengys, Herennia, Deliochus,* and *Phonognatha*), which makes Australia the premier nephiline hot spot in the world in terms of not only species diversity but also undocumented behaviours. Gathering such data, especially web building behaviour for phylogenetic analyses, was one of the main goals of my fieldwork. Others in the party focused mainly on araneids (Scharff, Larsen), linyphiids (Hormiga), and tetragnathids (Alvarez).

Fernando Alvarez and myself arrived at the Queensland Museum in Brisbane in early April, where Robert Raven kindly made available to us the huge collection of spiders from Australasia, and gave us access to some rare arachnological literature. He and fellow arachnologists, Valerie Davies and Barbara Baehr made our stay in Brisbane memorable. We did some extremely productive fieldwork around the Brisbane area with the young local arachnologist, Michel Rix, who took us to patches of rain forest in Noosa National Park, and Coolum Resort, and to dry eucalypt forests at the Whites Hill Reserve, and Tingalpa, Brisbane. Michael Rix proved to be an expert field worker, who taught us a lot about the local arachnid fauna and the environment. Together, we discovered new species of *Phonognatha* as well as undocumented behaviours of *Deliochus*.

When joined by others in our party, we departed for Lamington National Park in SE Queensland. In addition to regular python encounters, the area provided us with a wealth of spider specimens, with likely new species at least in the families Tetragnathidae, Araneidae, and Linyphiidae. Araneids were diverse and common, including the cryptic *Dolophones* and colourful *Arkys*. The area was also rich with mygalomorphs including the trapdoor spiders *Arbanitis variabilis* and *Misgolas pulchelus*. Tullgren funnels suspended above our beds caught cryptic ground spiders likely to have been missed by eye. Visiting lower elevation dry habitats around Canungra

and the forests of Tamborine National Park I was able to add observations on *Nephila plumipes* and *Phonognatha graeffei* to the growing field data book, including the complete *P. graeffei* egg sac building sequence from the selection of a dry leaf, through egg laying to the leaf folding and suspension.

Next we flew to Cairns for Queensland's wet tropics. First we visited the Atherton Tablelands, working around Lake Tinaroo, the Rose Gums retreat, and Lake Eacham. The area is home to the three Australian *Nephila* species, as well as to *Deliochus* and *Phonognatha*. Unfortunately, drought conditions had already had a noticeable impact on the spider fauna.

We spent the last week of our joint fieldwork in Daintree National Park, in the Cape Tribulation area. Again, the majestic rain forest was extremely dry. Hence, night collecting was much less productive than we had expected. However, the forest was teeming with the largest *Nephila* species, *Nephila pilipes*. Webs of more than a meter in diameter were common. In addition, we found *Nephilengys malabarensis* in the dry coastal forests.

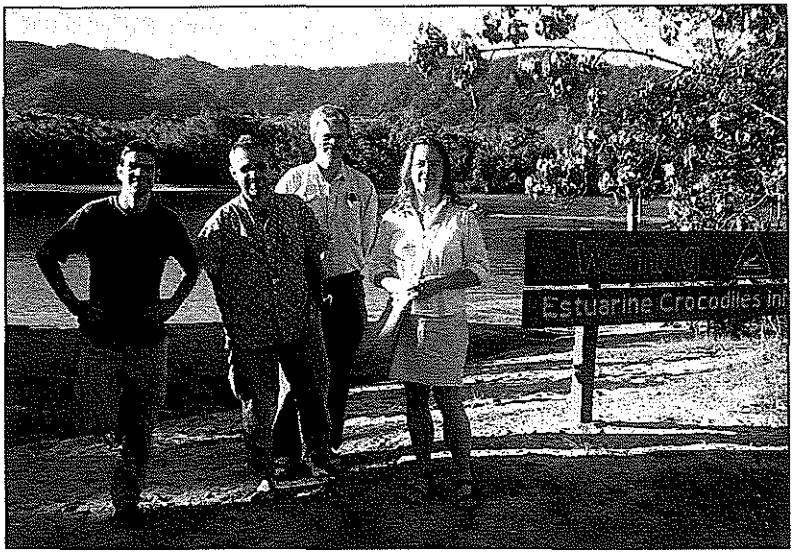
Finally, Fernando and I visited the collections of the Australian Museum in Sydney, which proved to be another Australian treasure of preserved biodiversity. The friendly arachnologists there, Mike Gray, Graham Milledge and Helen Smith provided access to the types, to sorted and unsorted material, and kept us in good company.

Australian spider diversity remains undersampled and insufficiently described. It is imperative that scientists continue to discover, describe and classify this biological resource and preserve it for future generations. Our work on Australian spiders is a small contribution towards this goal, but nevertheless a determined one. We invite taxonomists to contribute by borrowing and describing spiders collected during this trip and deposited at our two institutions.

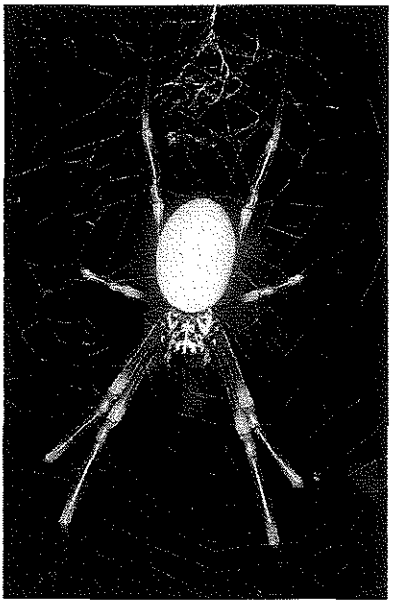
Acknowledgements:

I thank the following biologists for their help or advice during this trip: R. Raven, M. Gray, T. Churchill, M. Harvey, M. Rix, V. Davies, B. Baehr, G. Milledge. The funding for Hormiga, Alvarez and Kuntner came from an NSF-PEET grant to G. Hormiga and J. Coddington. J. Miller kindly edited the text.

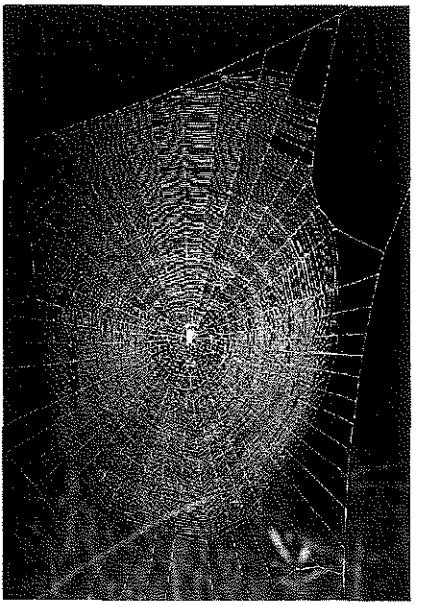
The author Matjaz Kuntner.
Photograph by Tracey Churchill.



The field team (from left to right): Fernando Alvarez Padilla, Gustavo Hormiga, Nikolaj Scharff and Sidsel Larsen (excluding photographer Matjaz

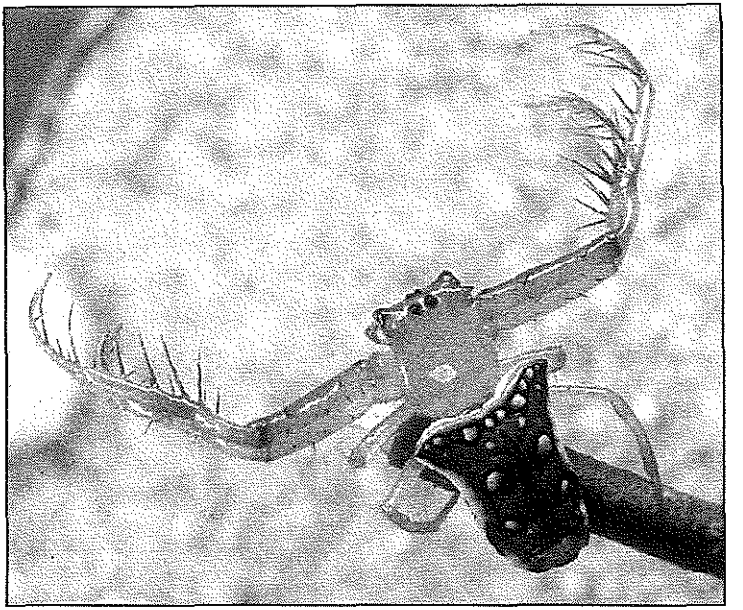


Photographs by Matjaz Kuntner

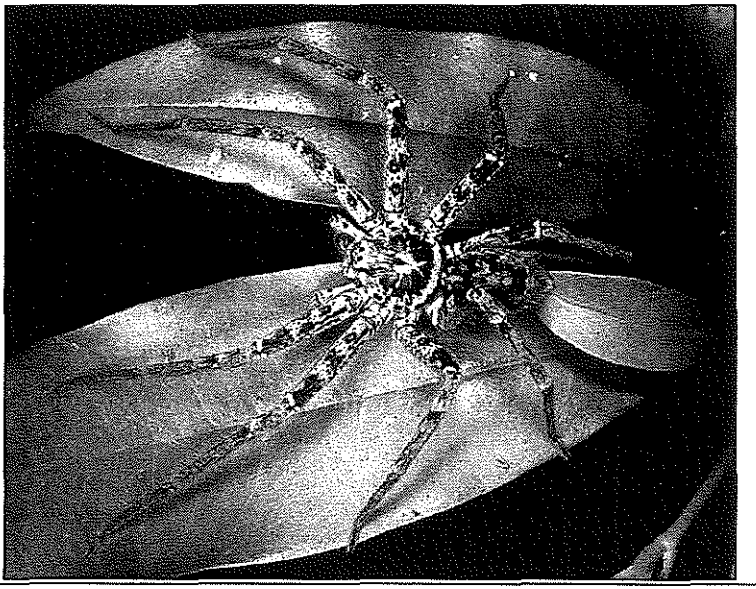


Nephila plumipes ♀ from Canungra.

Deliochus web, Tingalpa, Brisbane.



Arkys sp., Lamington National Park, SEQld.



Heteropoda sp. ♀Cape Tribulation, Daintree National Park, Nth Qld.

Photographs by Matiaz Kuntner

UPCOMING EVENTS

ECOLOGICAL SOCIETY OF AUSTRALIA

Annual Conference 2002

2-6 December
Cairns, North Queensland.

The second joint meeting of the ESA (27th annual meeting) and the New Zealand Ecological Soceity (their 51st annual meeting).

The scientific program for Ecology 2002 includes a one-day course for postgraduate students on Sunday 1st December and four days of scientific sessions on Monday 2nd, Tuesday 3rd, Thursday 5th and Friday 6th December. The program includes special events organised by the Society for Conservation Biology and Earthwatch.

The Symposia include:

- Frugivory and seed dispersal in Australasia
- Exotic ant invasions
- Healthy savanna and grassland landscapes
- Australasian amphibian declines
- Weed risk assessment and incursions
- Forest restoration in theory and practice
- Problems with linear infrastructure corridors
- Ecological applications of GIS
- Climate change and Ecosystems: Can we adapt?
- Global plant conservation strategy - What can Australia and New Zealand achieve by 2010?
- UNESCO Biosphere reserves
- Human Ecology: Integrating social and natural sciences
- Ecotourism management and sea mammals
- Making the connections: applying ecological research to management of threatened species/ecosystems
- Theory and Practice in the Study of Ecosystem Services
- Macroecology of the Wet Tropics rainforests

For more information check out the ESA 2002 website:

ttp://www.tesag.jcu.edu.au/ecology2002