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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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Format: i) typed or legibly printed on A4 paper or ii) as text or MS Word file on CD, 3½ 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:

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COVER ILLUSTRATION:
Protogarypinus giganteus from Two Peoples Bay, Western Australia.
Photo by Melinda Moir (det. Mark Harvey)

EDITORIAL

My apologies again for a belated issue 76 (January instead of December), but I was visiting the Queensland Museum during most of last month making editing this issue somewhat difficult.

Australasian Arachnology 76 features a comprehensive update on the taxonomy and systematics of jumping spiders of Australia by Marek Zabka. Thanks a lot for this interesting contribution!

It is great to see some arachnological student activities in Australasia. This issue contains two theses abstracts: one by Sara Ceccarelli (on ants and jumping spiders) and one by Adam Peck (on tree trunk spider assemblages). Congratulations for your great achievements and I hope you will stick to arachnids in your future professional careers.

From this year, *Australasian Arachnology* will only be available as PDF-version for new individual members. This is to reduce printing and postal costs, and to avoid excessive use of paper. We will continue to provide printed issues for long-standing members, some of which received *Australasian Arachnology* from the first issue. But beware, don't lapse your membership, otherwise you will be treated as a new member with PDF access only! Of course, libraries and societies will still receive the printed version, most of which receive the newsletter in exchange for their printed products.

Cheers and all the best for 2007,

Volker

MEMBERSHIP UPDATES

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LIBRARY UPDATE

Our librarian Jean-Claude Herremans received reprints of publications from Helen Smith. Thanks Helen!

All our members should consider donating reprints of their publications to our library, which is an important source of information for our members without access to a professional library!

I will include an updated list of our library holdings in the next newsletter!

17th International Congress of Arachnology

São Pedro, São Paulo (Brazil)

5-10 August 2007

http://www.ib.usp.br/~ricrocha/ISA17/ISA.htm

Jumping spider (Araneae, Salticidae) taxonomy and biogeography in Australia: current state and future prospects

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The history of Australian jumping spider (Salticidae) research started in the mid 19th century and resulted in a number of papers, most of them by Karsch, C.L. Koch, L. Koch, Keyserling, Simon and Thorell. Of the early works (for a complete listing see Roewer (1955) and Bonnet (1955-1959)), the monumental *Die Arachniden Australiens* by L. Koch (1871-1881) and Keyserling (1881-1890) deserves special mention. Most of the 168 species described in this work are well documented and recognisable with the original illustrations.

Modern taxonomic studies of Australian Salticidae emerged 35 years ago. Proszynski (1971) catalogued salticid type material from major collections worldwide and verified the generic status of some of the species. The same author produced a two-volume atlas of diagnostic drawings (Proszynski 1984, 1987) and a catalogue (Proszynski 1990), all three of them eventually amalgamated into an online world catalogue of the Salticidae (Proszynski 2003). Davies and Zabka (1989) published a key to the 50 Australian genera of Salticidae with diagnoses and remarks on some species of uncertain taxonomic status. The interactive CD-Rom *Spiders of Australia* by Raven *et al.* (2002) was one of the latest contributions to include jumping spiders.

In the last 20 years nearly 140 new species and 14 genera were described (see Richardson and Zabka 2003; bibliography below), most of them by myself (9 genera and 109 species) and by F.R. Wanless (4 genera and 25 species). Thus, the current list of Australian jumping spiders comprises 355 species in 76 genera (8 of which are doubtful) (Richardson & Zabka 2003; Zabka, unpublished data). These numbers, however, are far from complete. Recent field research and a review of major Australian collections suggest an estimate of close to a thousand species (Zabka, unpublished data). This estimate is based on pre-and post-revision species numbers of some better-studied genera, for example *Holoplatys* (7 and 37 species respectively) (Zabka 1991). Similar numbers were confirmed for the Astieae (Wanless 1988), *Lycidas* (Zabka 1987),

Simaetha (Zabka 1994), *Ocrisiona* (Zabka 1990) and *Afraflacilla* (Zabka 1993b).

Recent major advances in salticid taxonomy in Australia were made possible by comprehensive biodiversity surveys conducted in particular by the Australian Museum (Sydney), the Queensland Museum (Brisbane) and the Western Australian Museum (Perth). These surveys resulted in copious and diverse material, mostly collected by pitfall trapping (a method not applied by early collectors). Some previously unknown or rare genera such as *Tauala*, *Sondra*, *Pseudosynagelides*, *Zebraplatys* and *Paraplatoides* proved quite common. Not surprisingly, the richest taxonomic data are available for areas near major centres of arachnological research and those areas subject to their research activities (Richardson *et al.* 2006). In contrast, some inland areas and most parts of topical Western Australia and the Northern Territory are still extremely poorly studied.

Few scientific institutions currently conduct taxonomic projects on Australian Salticidae. Barbara Patoleta, J. Gardzinska and myself work on the genera *Opisthoncus* (some 30 species), *Cosmophasis* (more than 20 new species from Australia alone), *Cytaea* and on the subfamily Dioleninae at the Academy of Podlasie (Siedlce, Poland). Our research also includes New Guinea, Fiji and New Caledonia. Dmitri Logunov (University of Manchester) is working on the "*Neon*" group, which actually comprises a number of genera. The relationships between representatives of *Neon* from the Southern and Northern Hemispheres may be crucial for understanding the origin of salticid faunas worldwide. Julianne Waldock (Western Australian Museum, Perth) is revising *Maratus* (over 20 species) and the *Lycidas chrysomelas*-group (currently 17 species), while B. Richardson's (CSIRO, Canberra) taxonomic studies focus on revisions of *Prostheclina* (in collaboration with myself) and *Servaea*. Michael Rix (Western Australian Museum, Perth) described the monotypic genus *Judalana* and some follow-up projects in collaboration with myself are currently being undertaken [Editors comment: Sara Ceccarelli revised some species of the ant-mimicing genus *Myrmarachne* as part of her Ph.D. studies, see abstract on page 11].

Taxonomic research on Salticidae suffers from difficulties in relation to the uniformity and simplicity of the genitalia and large intraspecific variation in morphological characters. Wayne Maddison (University of British Columbia, Vancouver) and co-workers showed that some systematic problems, mostly at the family and genus level, could be solved employing molecular techniques (Maddison 1996, Hedin and Maddison 2001, Maddison and Hedin 2003).

Modern biogeographical research that included Australian salticids was initiated by Main (1981a, 1981b, 1982). Subsequent analyses based on more complete data sets (including adjacent areas such as New Guinea, Fiji, New Caledonia, and New Zealand) were presented by Zabka (1990, 1991, 1993a), Zabka *et al.* (2002), Zabka and Patoleta (2004), Patoleta (2002) and Proszynski (1996). Some aspects of island biogeography were studied by Patoleta and Zabka (1999).

Patterns of salticid distribution based on biotic and climatic parameters were discussed by Richardson *et al.* (2006), while Harvey *et al.* (2000) and Churchill (1996, 1999) presented interesting contributions to the ecology and regional

biogeography of spiders (including Salticidae) in Australia.

Due to its long-term isolation and evolution of unique climates and biota, the Australian salticid fauna is highly diverse and many taxa represent endemic "prisoners" of the continent with only limited abilities to colonise more or less distant areas such as New Guinea, New Caledonia, Fiji or New Zealand (Zabka 1993a, Zabka *et al.* 2002, Patoleta 2002). No significant links to other southern (post-Gondwanan) faunas have so far been established, although very little research has been conducted on the fauna of *Nothofagus* and other wet temperate forest, especially in southern parts of the continent and Tasmania.

Suggested future research directions

1. Many areas of central, northern and western Australia are still blank spots from taxonomic, ecological and biogeographical perspectives.
2. The study of *Nothofagus* forests and other temperate rainforests may shed a new light on the origins of the Australian salticid fauna.
3. The analysis of (micro) habitats, biotic and climatic parameters may contribute to the knowledge on the evolution of the fauna in the last 45 million years.
4. Some large and difficult genera such as "*Neon*", *Servaea*, "*Lycidas*" or *Clynotis* require revision, as their affinities may be important for understanding the history of the Australian fauna.

Photo: *Megalastia mainae* Zabka, 1995 from the Mitchell Plateau, Kimberleys (Western Australia). These salticids are large; the male holotype has legs ranging from 29.5 – 45mm!
Photo: Jiri Lochman (via J.M. Waldock)

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PH.D. THESIS ABSTRACT

Dynamics of Salticid-Ant Mimicry Systems

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Mimicry in arthropods is seen as an example of evolution by natural selection through predation pressure. The aggressive nature of ants, and their possession of noxious chemicals, stings and strong mandibles make them unfavourable prey for many animals. The resemblance of a similar-sized arthropod to an ant can therefore also protect the mimic from predation. *Myrmarachne* is an ant-mimicking salticid spider genus, whose species associate closely with their model ant species. The behavioural reactions of *Myrmarachne* to ants were analysed, including instances when there was contact between the spider and the ant. In Townsville the salticid *Cosmophasis bitaeniata* and one *Myrmarachne* species associate with *Oecophylla smaragdina* workers. The *Myrmarachne* mimics the ant visually, and *Cosmophasis bitaeniata* mimics the cuticular hydrocarbons of the *O. smaragdina* worker ants. *Cosmophasis* and *Myrmarachne* also mimic ants through certain types of behaviour, such as the "antennal illusion" and bobbing the opisthosoma up and down. The behaviour of both salticids to *O. smaragdina* was compared. This *Myrmarachne* was also studied with a hemipteran mimic of *O. smaragdina*, *Riptortus serripes*, to see whether the salticid could discriminate between the potentially dangerous ant and its hemipteran mimic. The history of the evolutionary dynamics between *Myrmarachne* and the model ant species were studied by analysing molecular phylogenies of the two animal taxa.

Myrmarachne sp.
Photo: Sara Ceccarelli

In a confined space, *Myrmarachne* species displayed versatile reactions to sympatric ants that were dependent on factors such as the position of the ant and the distance between the *Myrmarachne* and the ant. *Myrmarachne* also showed interspecific differences in their reactions to ants. All *Myrmarachne* species avoided contact with the ants whenever possible. Even when there was contact between the two, *Myrmarachne* managed to avoid being attacked by the ant. *Cosmophasis bitaeniata* also avoided contact with ants. *C. bitaeniata* and *Myrmarachne* had the same reaction types to ants, but actions occurred at different frequencies. Overall, there were more similarities than differences between the ways these two salticids interacted with *O. smaragdina* worker ants, even though *Myrmarachne* and *C. bitaeniata* have different methods of mimicking the ants. As for the types of behavioural mimicry, there was a significant difference between *Myrmarachne* species, as well as between the two salticid genera. When *Myrmarachne* was presented with another morphological ant mimic (the alydiid bug *Riptortus serripes*), the spiders' reactions differed from those displayed towards the ants. These differences indicate that *Myrmarachne* can distinguish the ant and the bug using visual cues (perhaps through the structure of the mouthparts, or the way the two insects move around).

So behaviourally, *Myrmarachne* is a versatile genus apparently under strong selection pressure and showing a high rate of differentiation and speciation. The phylogenetic study also reflects strong selection pressure, resulting in highly polymorphic species. *Myrmarachne* species have undergone adaptive radiation and speciation as they evolved towards resembling their different model ant species. Therefore the behavioural and evolutionary dynamics of these salticids and their model ants represents a case of plasticity and versatility by the salticids.

HONOURS THESIS ABSTRACT

Spiders in Restored Habitat: How Important are Dead Standing Trees?

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There is relatively little known about any potential benefits to invertebrates of the provision of standing dead trees in areas rehabilitated following major disturbances. This study describes the effects on spiders of a tree thinning experiment at Huntly Bauxite mine, 110 km south-east of Perth, Western Australia, that created a large number of dead stags in a rehabilitated mine pit by notching and herbicide injection. Spiders were sampled over a six-month period on 159 jarrah (*Eucalyptus marginata*) trees using bark traps, which catch spiders as they walk up the tree trunk (Figs 1). Small dead and live trees were sampled in a restored mine pit and surrounding forest in order to assess the benefit of dead stags to spiders and to compare spider distribution in the forest and mine pit. In the forest, three tree size categories were sampled to study the effect of tree size on spiders.

The habitat available to spiders on individual trees was measured and included bark characteristics and crack dimensions. In total, 1,537 adult spiders were caught, representing 115 species and 24 families. Most spiders were active hunters, the remainder being web spinners. In general, dead trees supported fewer spiders and less species.

Figure 1: A bark trap as employed during the study on the importance of dead standing trees. Photo: Adam Peck

The distribution of species was more even on dead forest trees. While the mine pit had fewer spiders, richness and diversity were similar. There were no effects of tree size on spiders. It is suggested that higher spider abundance and richness on live trees than on dead trees was due to the higher bark cover and decortication of live trees, which increase the amount of microhabitat available to spiders and may also increase prey abundance. The creation of dead stags is of little or no benefit to spiders.

Recent Australasian Arachnological Publications

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

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

I am particularly interested in listing entries of publications that are not easily traceable through the common library search engines, including theses and abstracts of theses. Please provide me with information on your latest publications for the next issue.

Arango, C.P. & **Maxmen, A. 2006.** Porboscis ornamentation as a diagnostic character for the *Anoplodactylus californicus-digitatus* complex (Arthropoda: Pycnogonida) with an example from the *Anoplodactylus eroticus* female. *Zootaxa* **1311**, 51-64.

Beavis, A.S. & **Rowell, D.M. 2006.** Phylogeography of two species of funnelweb spider (*Hadronyche* sp. 1 and *Atrax* sp. 1) in Tallaganda State Forest (NSW). *In:* Insect Biodiversity and Dead Wood: Proceedings of a Symposium for the 22 International Congress of Entomology. General Technical Report (Grove, S.J. & Hanula, J.L., eds), US Department of Agriculture Forest Service, Southern Research Station, Asheville, North Carolina, pp. 23-29.

Brennan K.E.C., Ashby L., Majer J.D., Moir M.L. & **Koch J.M. 2006**. Simplifying assessment of forest management practices for invertebrates: How effective are higher taxon and habitat surrogates for spiders following prescribed burning? *Forest Ecology & Management* **231**: 138-154.

Dashdamirov, S. 2006. A new species of the false-scorpion family Cheliferidae from Thailand, with remarks on *Ancistrochelifer* and *Metachelifer* (Arachnida: Pseudoscorpiones). *Zootaxa* **1325**, 347-362.

Elgar, M.A. & **Allan, R.A. 2006**. Colony specific mimicry of the weaver ant *Oecophylla smaragdina* by the myrmecophilous salticid spider *Cosmophasis bitaeniata*. *Journal of Ethology* **24**, 239-246.

Gardzinska, J. & **Zabka, M. 2006**. A revision of the spider genus *Diolenius* Thorell, 1870 (Araneae: Salticidae. *Annales Zoologici* **56**, 387-433.

Hosseini, R., Keller, M.A., Schmidt, O. & **Framenau, V.W. 2007**. Molecular identification of wolf spiders (Lycosidae) by Multiplex Polymerase Chain Reaction. *Biological Control* **40**, 128-135.

King, D.F. 2006 A male 'funnel-web spider, *Selenocosmia sterlingi,* Theraphosidae, *Geelong Naturalist,* **42 *(*1)**, (Geelong Field Naturalist Club).

King, D.F. 2006. Tarsal brush and scopula, *Selenocosmia sterlingi,* Theraphosidae, *Geelong Naturalist* **42 (2)** (Geelong Field Naturalist Club).

Kozlowski M. & **Zabka M. 2006**. Nuptial Feeding in *Sitticus terebratus* (Clerck, 1757) (Araneae: Salticidae)? *Newsletter of the British Arachnological Society* **105**, 6-7.

Lim, M.L.M. & **Li, D. 2006**. Extreme ultraviolet sexual dimorphism in jumping spiders (Araneae: Salticidae). *Biological Journal of the Linnean Society* **89**, 397-406.

Mansfield S., Dillon M.L. & **Whitehouse M.E.A. 2006**. The impact of season-long insecticide regimes on beneficial arthropod communities in Australian cotton fields. *Agriculture, Ecosystems and Environment* **113**, 326-335.

Moir, M.L. & **Fletcher, M.J. 2006**. Two new species of *Anabunda* Emaljanov (Hemiptera: Flgoromorpha: Achilidae) from Australia. *Zootaxa* **1328**, 39-50.

Schwendinger, P. 2006. A taxonomic revision of the family Oncopodidae VI. *Martensiellus*, a new genus from Borneo, and the discovery of a tarsal pore organ in Oncopodidae (Opiliones: Laniatores). *Zootaxa* **1325**, 255-266.

Woodman, J.D., Ash J.E. & **Rowell, D.M. 2006**. Climatic modelling for Tallaganda State Forest, NSW, relative to population structuring among saproxylic invertebrates. *Journal of Zoology, London* **268**, 325-333.

Yoo, J.-S. & **Framenau, V.W. 2006**. Systematics and biogeo-graphy of the wolf spider genus *Venonia* (Araneae, Lycosidae). *Invertebrate Systematics* 20, 675-712.

Zabka M. 2006. Salticidae (Arachnida, Araneae) from Oriental, Australian and Pacific Regions, XIX. Genus *Pellenes* Simon, 1876 in Australia. *Annales Zoologici* **56**, 567-573.

Conferences:

EVOLUTION 2007

Joint annual meeting of the Society for the Study of Evolution (SSE), the Society of Systematic Biologists (SSB), and the American Society of Naturalists (ASN)

Christchurch, New Zealand, 16-20 June 2007

http://www.evolution2007.com/index.htm

Australasian Evolution Society 5th Conference

The University of New South Wales, Sydney, 12-15 June 2007

http://aes.eriophora.com.au/events/AES07.htm

Invertebrate Biodiversity and Conservation Conference 2007

Pacific Priorities

Brisbane, Australia, 3-7 December 2007

http://www.ibcc2007.org

The Entomological Society of Southern Africa hosts the

XXII International Congress of Entomology at the International Convention Centre in Durban, South Africa from 6-11 July 2008.

http://www.ice2008.org.za

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