Australasian Arachnology

Price $3
ISSN 0811-3696

Number 77
April 2007

Newsletter of the Australasian Arachnological Society

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 : rfaulder@iinet.net.au

Membership fees in Australian dollars (per 4 issues):

	*discount	personal	institutional
Australia	$8	$10	$12
NZ / Asia	$10	$12	$14
elsewhere	$12	$14	$16

There is no agency discount.
All postage is by airmail.
*Discount rates apply to unemployed, pensioners and students (please provide proof of status).

Cheques are payable in Australian dollars to "Australasian Arachnological Society". Any number of issues can be paid for in advance. Receipts issued on request.

Members will receive a PDF-version of *Australasian Arachnology*. (hardcopies for long-standing individual members, libraries and societies in exchange). Members will be notified by mail and email when their subscription has expired.

Previous issues of the newsletter are available at www.australasian-arachnology.org/newsletter/issues.

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:

Volker Framenau
Department of Terrestrial Invertebrates
Western Australian Museum
Locked Bag 49
Welshpool, W.A. 6986, Australia.

volker.framenau@museum.wa.gov.au

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:

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

email: jclh@ihug.com.au

COVER ILLUSTRATION:
Male *Dolomedes* sp. from Victoria.
By Peter Flagstaff

EDITORIAL

You could easily call this new issue of *Australasian Arachnology* a special 'mite edition. Putting this newsletter together, I learned a lot about mites, and this is what Bruce Halliday, the authors of our feature article apparently had in mind. Thanks Bruce, for this great introduction to mite systematics and biology! I will upload this article onto our website soon to make it available for a wider audience (www.australasian-arachnology.org).

I have not received any articles for the next issue, so please sharpen your pencils and send some articles for *Australasian Arachnology* 78 which is scheduled for release in September.

I have not quite packed my bags yet for Brazil, but I am looking forward to catching up with many of our readers at this year's 17th International Congress of Arachnology in São Pedro (http://www.ib.usp.br/~ricrocha/ISA17/ISA17.htm).

Cheers, *Volker*

MEMBERSHIP UPDATES

New Members

Tenille Nielson
39 Gregory Terrace
Kuranda, Qld 4881
Australia
s4129469@student.uq.edu.au

Lynne Forster
17 King St
Sandy Bay, Tas 7005
Australia
lforster@utas.edu.au

Change of Address

Karen Edward
School of Animal Biology
University of Western Australia
Crawley, WA 6009
Australia
edwark02@student.uwa.edu.au

Sydney Jordan
21 Undara Ave
Buddina, Qld 4575
Australia
sljarach@hotmail.com

LIBRARY UPDATE

Our librarian Jean-Claude Herremans received reprints of publications from Helen Smith, Wilson Lourenco, and Herb Levi (via Laura Leipensperger). Thanks a lot to Helen, Wilson and Herb!

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 one of the next newsletters and will hopefully be able to upload this list onto our website at some stage as well.

Mites are arachnids too

Bruce Halliday, CSIRO Entomology, GPO Box 1700, Canberra ACT 2601, Bruce.Halliday@csiro.au

Introduction

Almost all arachnids are predators. The only group of arachnids that has managed to break out of the predatory habit on a large scale is the mites, which have diversified into an extraordinary range of niches. Many are still predatory, but there are also thousands of species of plant feeders, fungivores, saprophytes, pollen and nectar feeders, microbial filter feeders, and internal and external parasites on a wide range of vertebrates and invertebrates. Others have a complex life cycle, in which parasitism and predation occur at different life stages within a species, and others are omnivorous. Mites occur in soil and decomposing organic matter, in fresh water and sea water, high in the air, deep in the oceans, on and in the bodies of other animals, and on plants of all kinds. This ecological diversity has been accompanied by a bewildering degree of morphological diversity. Their diversification has in turn been reinforced by their small body size, which allows them to occupy minute spaces, and makes it necessary to use specialised techniques for their observation and taxonomic study. All of these factors conspire to create an artificial division between acarologists and other arachnologists, to the extent that mites have their own literature, their own anatomical terminology, and their own national and international conferences. One of the outcomes of this division is that research papers on mites are more likely to be found in entomology journals than those devoted to arachnology. This is a reflection of the fact that mites have much in common with insects, especially as pests of cultivated plants and crops. The purpose of this general article is to make mites more accessible to arachnologists who do not have specialist knowledge of acarology.

Classification of the Acari

Mites are the smallest arachnids in terms of body size (although the biggest mites are bigger than the smallest spiders). Adults of most species of mites are in the range 300–800 micrometres in body length. Mites are also distinguished from other arachnids by the complete absence of body segmentation, and by the fundamental organisation of the body. There is no division of the body into cephalothorax and abdomen. Instead, the mouthparts and associated sensory structures form a discrete anterior structure known as the gnathosoma. All the rest of the animal's anatomical structures, including leg bases, central nervous system, ocelli when present, and reproductive and digestive systems, are all fused into a single unsegmented body called the opisthosoma.

Many **systems of higher classification** have been used for the mites, and many different names have been used for the higher taxa of mites at all levels. In the most modern classification, the mites are placed in the class Acari, within which there are two superorders. The superorder Parasitiformes includes order Opilioacarida, order Holothyrida, order Ixodida, and order Mesostigmata. The superorder Acariformes includes order Trombidiformes and order Sarcoptiformes (Walter 2006; Krantz and Walter 2007).

The **order Opilioacarida** includes a single family of large mites (≥ 1 mm) that have many character states that are considered to be ancestral (Krantz 1978). They are widespread but rare in semi-arid climates, where they are found under stones. An unidentified species has been collected in Kakadu National Park, where it feeds on mites and insects, as well as fungal hyphae and pollen (Walter and Proctor 1998).

Fig. 1: Species of *Asca* (Mesostigmata: Ascidae) are recognised by the pair of prominent horns or protuberances on the posterior margin of the body. About 80 species occur in leaf litter and moss world-wide, where they prey on mites, insect eggs and larvae, and nematodes

Photograph: D.E. Walter

The **order Holothyrida** includes large mites (≥ 2 mm) with a heavily sclerotised and highly-arched body, which feed readily on dead arthropods (Walter and Proctor 1998). The order includes about 25 species in three familes, and has a Gondwanan distribution. Only three species have been described from Australia, all in the family Allothyridae (van der Hammen 1983), but many other undescribed species have been collected and await study.

There are about 80 known species of ticks, **order Ixodida**, in Australia (Roberts 1970; Keirans *et al*. 1994, 1996). They are all blood-feeding parasites of mammals, reptiles and birds, and are characterised by mouthparts with a large number of backward-directed hooks that are inserted into the host for feeding. The best known Australian species is the paralysis tick *Ixodes holocyclus*, which can be dangerous to the health of humans and dogs (Anonymous 2003).

The **order Mesostigmata** (e.g. Fig. 1) includes about 80 families of relatively large mites with adult body lengths in the range 300–3000 μm. They are characterised by a series of leathery sclerotised plates that cover the body, and by a pair of laterally-placed stigmata, which are the external openings of the tracheal system. Most are predatory, while a few also feed on pollen and nectar. They occur in a wide range of habitats, including soil and litter, but are also abundant in dung, carrion, compost, and in the nests of vertebrates. Many are beneficial, contributing to the control of insect and mite pests. Notable among these is the arboreal family Phytoseiidae, which are widely used in the control of spider mites that damage crop plants (Gerson *et al*. 2003). Many families are parasites of vertebrates, including families such as the Dermanyssidae and Macronyssidae, which parasitise domesticated animals and can attack humans (Southcott 1976). Many families have associations with insects. These relationships vary from simple phoresy for the purpose of dispersal, to much closer relationships in which the mite has specialised morphological and be-

havioural adaptations at different stages of the life cycle that are involved in its interaction with its insect carrier. Sexual dimorphism is common, in the general arrangement of body sclerites, in modification of the legs of the male which are used in fighting, and in structures on the male chelicerae that are used in sperm transfer.

Fig. 2: *Stereotydeus* (Prostigmata: Penthalodidae) is a genus of brightly coloured and ornamented mites found in moss and leaf litter in the Southern Hemisphere, including Antarctica. Little is known of their biology, but they are believed to be predatory.
Photograph: D.E. Walter

The **order Trombidiformes**, also known as **Prostigmata** (e.g. Fig. 2), is the most diverse of the major mite groups, in terms of the number of species it contains, and in the range of morphological and behavioural variation they display. They are called Prostigmata because the stigmata are usually located at the base of the mouthparts, or on the anterior margin of the opisthosoma. The cohort Eupodina includes the family Penthalaeidae, in which the redlegged earth mite *Halotydeus destructor* and blue oat mite *Penthleus major* are serious pests of crops and pastures in southern Australia. The same cohort also includes the predatory families Bdellidae and Cunaxidae, whose members have been used as biological control agents of mite pests in pastures and horticulture (Gerson *et al*. 2003). The superfamily Eriophyoidea includes thousands of species of plant parasites, many of which are important crop pests, either through the damage they cause directly, or through their role as vectors of plant viruses. The cohort Anystina includes beneficial predatory species among its 6 families. The cohort Parasitengona includes hundreds of species, most of which have a complex life cycle in which the larval stage is a parasite and later stages are free-living predators. Larval Trombiculidae are parasites of vertebrates, commonly known as chiggers, the Australian fauna of which has been catalogued by Domrow and Lester (1985). Several families including Erythraeidae and Trombidiidae have larvae that are parasitic on insects, and terrestrial adults that are often called red velvet mites. Only a handful of species have been reared in captivity to allow the adults and larvae to be correlated. A further group of families is collectively known as “water mites” or Hydracarina. The larvae of these groups are mostly parasites of aquatic insects, and the adults are often large brightly coloured mites that can be found swimming in fresh water. Harvey (1998) reviewed the Australian fauna, which includes over 400 known species spread over 24 families. A further important group of Prostigmata includes the spider mites of the family Tetranychidae. These are damaging pests of crop plants, especially in horticulture, but the Australian fauna has never been systematically studied. The cohort Heterostigmata includes about 12 families of small to minute mites, many of which have close associations with insects. The existence of intra-species polymorphism

and often bizarre morphologies has meant that the taxonomy of these groups is very unstable, even at the family level. A diverse range of families of Prostigmata that are parasites of vertebrates have been catalogued by Domrow (1991).

The **order Sarcoptiformes** includes over 130 families of soil mites in the suborder Oribatida, commonly known as oribatids. These are mostly slow-moving, heavily sclerotised mites that are most abundant and diverse in the upper layers of the soil and the associated organic litter. They feed on dead plant material and the associated microfungi, and most have very robust heavily sclerotised chelicerae, adapted for crushing fungal mycelium. Their role in feeding on decaying plant material means that they are very important in maintaining and enhancing soil fertility, and they have been the subject of a substantial ecological literature for that reason. A few species are beneficial in more direct ways, contributing to the control of pest mites, nematodes, and weeds. Others are themselves pests that damage crop plants (Colloff and Halliday 1998). Some act as intermediate vectors of tapeworm parasites of livestock (Denegri 1993). The Australian fauna was catalogued by Colloff and Halliday (1998), who listed 340 described species.

The order Sarcoptiformes also includes the cohort Astigmata, which until recently has been given equal rank with the Oribatida. The Astigmata includes the common flour mites and cheese mites that infest stored food and which damage stored grain on an industrial scale, the house dust mites that cause allergy and asthma in humans, and a wide range of fungivorous and saprophytic species in soil. Many of these species have a specialised immature form known as the hypopus, which attaches itself to insects for dispersal. The Astigmata also includes hundreds of species of feather mites that occur on birds, but the Australian fauna of these groups has never been studied in any depth. Domrow (1992) catalogued 204 species of Astigmata in 24 families that parasitise Australian vertebrates or occur on their bodies. These include the mites that cause such diseases as scabies (*Sarcoptes scabiei*), scaly leg of chickens (*Knemidokoptes mutans*) and several types of mange in domestic animals (e. g. the ear mite of dogs and cats, *Otodectes cynotis*).

The Australian mite fauna

A recent review estimated that there are 48,000 named and described species of mites world-wide (Halliday *et al*. 2000), and extrapolated that number to speculate that over half a million species of mites exist in total. In Australia, 2,871 described species in 304 families had been documented to April 2000 (Halliday 2001a), and the total number of species that exist is likely to exceed 20,000 (Halliday 2001b). Significant habitats such as the rainforest canopy remain largely unexplored, and diverse faunas await discovery there (Walter *et al*. 1998). Major groups have never been studied in a systematic way, and are likely to contain large numbers of undescribed species. Conspicuous among these are the feather mites, with possibly 2,000 unknown Australian species, the plant parasites of the family Eriophyidae, with posssibly 5,000 unknown species, and the Halacaridae (Prostigmata) and Uropodina (Mesostigmata), each of which is likely to yield hundreds of species (Halliday 2001b). A single expedition by a single acarologist revealed 200 new species of aquatic mites (Cook 1986), and similar results are likely when serious attention is

paid to other groups that have previously been neglected.

There are no general estimates of the level of endemism in the Australian mite fauna. Colloff and Halliday (1998) documented 340 species of Australian Oribatida, including 256 that were described from Australian type localities and had not been recorded elsewhere. Many distinctive elements of the Australian mite fauna are found in those mite groups that have intimate associations with other components of our flora and fauna. The mites parasitic on vertebrates have been catalogued in detail (Domrow 1988, 1991, 1992; Domrow and Lester 1985), and all these parasitic groups include species and genera that are found only on Australian native vertebrate hosts. The ticks were the subject of a monograph by Roberts (1970), but new species are still being found on native vertebrates (e.g. Keirans *et al*. 1994, 1996). The same is likely to apply to the Australian feather mites, which are almost completely unstudied. Plant-parasitic groups that have some degree of host specificity are also likely to include many endemic species and genera, especially the Eriophyidae and Tetranychidae. Among the free-living groups in forest litter, Australia has a rich and distinctive fauna of Holothyrina and predatory Mesostigmata that have not been adequately studied. The Uropodina are now being examined closely for the first time, and are yielding many surprises (*e.g*. Błoszyk *et al*. 2005; Dylewska *et al*. 2006).

The rapid rate of change in the classification of Australian mites is clearly demonstrated by the fact that new families are still being described. Recent examples are Eriorhynchidae (Qin and Halliday 1997), Heatherellidae (Walter 1997), Dasythyreidae (Walter and Gerson 1998), Nothogynidae (Walter and Krantz 1999), Saltiseiidae (Walter 2000), and Uronyssidae and Teranyssidae (Halliday 2006).

Acarology in Australia

The history of the science of acarology in Australia has been reviewed in some depth (Southcott 1982; Halliday 2001b). The main trends have been research on agricultural pest mites and their natural enemies, on mite parasites of vertebrates, including humans and domesticated animals, on mites that have various types of association with Australian insects, and on the native mite fauna in agricultural and forest soils.

There is no single comprehensive mite collection in Australia. Instead, there are collections in a number of institutions where the research effort has historically been concentrated. The **South Australian Museum** in Adelaide has had the longest history of research in truly Australian mite taxonomy. Research there began with the work of Stanley Hirst, who was publishing from about 1912 to 1930, on a very wide range of mite groups. Herbert Womersley worked in the South Australian Museum from 1933 to 1962 (Southcott 1964). His work includes important publications on chiggers (Trombiculidae), including the vector of scrub typhus; on other parasites of vertebrates; on beneficial predatory groups; on pasture pest mites and their natural enemies; and on the families of Mesostigmata that dominate the fauna of soil and forest litter in this country. No modern study of Australian taxonomic acarology is complete without constant reference to Womersley's publications and collections. Acarology at the South Australian Museum continued with Ron Southcott, who published hundreds of papers from about 1945 to 1999 on a

wide range of subjects. He is best known for his major works on trombidiform mites, especially the Erythraeidae (Southcott 1961), Trombidiidae (Southcott 1986) and Microtrombidiidae (Southcott 1994). The Adelaide tradition was continued by David Lee, who published important revisionary work on Mesostigmata (e.g. Lee 1970) and Oribatida (e.g. Lee 1992, 1993).

The **Agricultural Scientific Collections Unit at the New South Wales Department of Primary Industries**, **Orange Agricultural Institute**, Orange NSW, has an important collection of predatory Phytoseiidae created by Eberhard Schicha (Schicha 1987; Schicha and Corpuz-Raros 1992), which includes many type specimens. There are also collections of other groups of plant mites including Tenuipalpidae, Tetranychidae and Pygmephoridae. These are now being supplemented by a growing collection of plant parasites of the family Eriophyidae (Knihinicki and Boczek 2002, 2003).

The mite collection in the **Australian National Insect Collection** in Canberra, has grown as a result of a series of research projects on mite and insect pests and their natural enemies. A long term program of research on red-legged earth mites has included taxonomic studies of the pest and its relatives (Qin and Halliday 1996a, 1996b, 1997), and families of predatory mites that occur in the same habitats, especially Anystidae and Bdellidae (Wallace and Mahon 1973, 1976; Otto 1999a, 1999b, 1999c; Halliday 2005). The result was the formation of large collections of plant-feeding and predatory mites from pastures, both from Australia and overseas. The ANIC also includes large collections of mites associated with dung and dung beetles (e.g. Wallace 1986; Halliday 2000) and with many other groups of insects, but only a minority of these have been documented. There is a representative collection of marine mites of the family Halacaridae (e.g. Otto 1994, 1999d), and some families of oribatids are represented (Niedbala 1987; Niedbala and Colloff 1997). There is a large collection of ticks, most importantly those documented by Roberts (1970). The mite fauna of forest litter is huge and diverse, and a few preliminary studies of ANIC collections of these groups have appeared (Halliday 1997; Halliday *et al*. 1998). The collection also houses hundreds of unsorted samples of fauna from forest litter and other habitats, and these contain very rich collections of mites that await study.

The **Queensland Museum** in Brisbane houses a collection of approximately 16,000 slides and 2,500 vials of mites. By far the most significant portion of this collection is Bob Domrow's collection of about 13,000 slides and 1,000 tubes of mites from mammals, birds and reptiles, which was originally housed at the Queensland Institute of Medical Research. Only a small portion of these slides have been registered, and even fewer databased. The remainder of the collection comprises about 1,000 vials of mixed mites (mostly from pitfall trap samples), 500 vials of ticks, and another 3,000 slides that have a strong focus on the Trigynaspida, Podapolipidae and Tetranychidae (e.g. Seeman and Nahrung 2005). The Entomology section also holds a collection of 1,270 Berleseates, mostly from the wet forests of coastal Queensland, which are a rich source of unstudied mites.

The **University of Queensland Insect Collection** houses a very substantial collection of mites, which was largely built up through the efforts of Dave Walter. Most of the major families are

represented, with strength in soil and litter Mesostigmata, predatory Phytoseiidae (Beard 2001), plant-feeding spider mites (Tetranychidae) and false spider mites (Tenuipalpidae), and some of the lesser known families of Prostigmata, including aquatic families. There is also a good range of Oribatid families, and both free-living and parasitic Astigmata. About 25% of the collection has been catalogued in the UQIC database. An outline of this catalogue is available at http://www.sib.uq.edu.au/acarina-catalogue, and contains links to a number of spectacular mite images.

The **Museum of Victoria** mite collection in Melbourne includes a substantial collection of water mites from Victoria. It includes types and identified material (Harvey 1990a; Harvey and Cook 1988), as well as unidentified water mites from multidisciplinary surveys of river faunas. There are also significant holdings of unidentified and sorted and unsorted mites from soils in a range of Victorian forests and woodlands, collected in pitfall traps during biodiversity and environmental management surveys.

Acarology at the **Australian Museum** (Sydney) began with Rainbow (1906), the first attempt to produce an overview of the Australian mite fauna, and some of Rainbow's types are still in the collection. The tick collection there includes types of some species described by Roberts, among others (e.g. Roberts 1960). There is also a collection of water mites, including some described by Harvey (1987, 1990a, b), but the collection is dominated by oribatids described by Glenn Hunt (Hunt 1996a, b; Hunt and Lee 1995). The slide collection is supported by substantial holdings of non-type and unidentified mite accessional material. including bulk samples from pitfall and litter collecting.

The **Western Australian Museum** in Perth has strong collections of mites in a range of families. There is an important collection of types of mites parasitic on vertebrates, mostly described in a series of papers that appeared in *Records of the Western Australian Museum* in 1978–1981, under the general title Parasites of Western Australia (e.g. Fain and Lukoschus 1979, 1981). There is also a large collection of marine mites of the family Halacaridae, especially the species from Rottnest Island (e.g. Bartsch 1993, 1994), a collection of water mites from Western Australia (Harvey 1988, 1996), a good collection of ticks, and a large quantity of unsorted mite material.

Further reading

There are several excellent modern textbooks of acarology. Evans (1992) is a comprehensive review of mite anatomy, morphology, and behaviour, with detailed coverage of the structure and function of the integument, musculature, circulatory, respiratory and sensory systems, feeding, digestion, physiology, reproduction and mating, and development and dispersal. There is also a summary of classification, with keys to higher taxa down to the superfamily level. Walter and Proctor (1999) thoroughly explores the evolutionary origin of mites, the morphology and systematics of the major mite groups, and the life cycles, development, behaviour, reproduction, habitat and ecological relationships of mites, and uses mites as models to demonstrate a wide range of phenomena in evolutionary biology. The most detailed textbook of mite taxonomy is Krantz (1978), which provides keys down to the family level for all groups. Each family study includes information on biology and behaviour, evolutionary relationships and economic importance, and a taxonomic

overview of the family. The current 1978 edition will soon be replaced by Krantz and Walter (2007), which presents the latest concepts in mite classification.

Many research publications in acarology appear in *Acarologia*, *International Journal of Acarology*, *Systematic and Applied Acarology*, *Experimental and Applied Acarology*, and a range of other acarology and entomology journals. Much important information also appears in the *Proceedings of the International Congress of Acarology*. The latest of these to be published was from the 1998 Canberra Congress (Halliday *et al*. 2001). The *Proceedings* of the 2002 Mexico Congress is in press, and that of the 2006 Amsterdam Congress is in preparation. Other important recent compilations of papers presented at acarological conferences include Schuster and Murphy (1991), Wrensch and Ebbert (1993), Kropczyńska *et al*. (1995), and Bernini *et al*. (2002).

A variety of valuable information about acarology is available on the internet through the Acarology Home Page, at http://www.nhm.ac.uk/hosted_sites/acarology/ . This site provides contact details for acarologists and their institutions, details of acarological societies and publications, and an e-mail discussion list.

Conclusions

One of the subjects that is discussed among acarologists on the e-mail discussion list and elsewhere is the steady decline in the level of basic skills in our science. In 1998 the acarologists of Australia felt confident enough in the strength of their science to host the 10th International Congress of Acarology. In 2007, despite the enormous economic importance of mites, the demonstrated presence of many very distinctive components of our fauna, and the existence of thousands of undescribed species and higher taxa, there is not one full-time professional mite taxonomist in Australia. The research effort is being sustained by people working opportunistically part-time, or voluntarily in retirement, or by overseas acarologists who are working on the Australian fauna. There is no regular training in acarology at undergraduate or postgraduate level in Australian universities. Many challenges lie ahead in Australian acarology, and many important questions in mite systematics remain unanswered. An increase in the level of basic skills in mite taxonomy will be needed if Australia is to avoid mistakes in biosecurity and pest management, to realise the potential of mites as a source of information in biodiversity conservation, and to make an adequate contribution to international efforts to document this fascinating group of animals.

Acknowledgements

I am very grateful to Dave Walter for permission to reproduce the illustrations, and to Owen Seeman, Greg Daniels, Graham Milledge, and Peter Lillywhite, who provided valuable information about the mite collections in their care.

References

Anonymous 2003. Ticks. (http://medent.usyd.edu.au/fact/ticks.htm) (date of access 10 January 2007).

Bartsch, I. 1993. Rhombognathine mites (Halacaridae, Acari) from Rottnest Island, Western Australia. *In* **Wells, F.E., Walker, D.I., Kirkman, H. & Lethbridge, R. 1993**, *The Marine Flora and Fauna of Rottnest Island*,

Western Australia. (Western Australian Museum, Perth). pp. 19–43.

Bartsch, I. 1994. *Copidognathus* (Halacaridae: Acari) from Western Australia. Description of twelve species of the *gibbus* group. *Records of the Western Australian Museum* **16**, 535–566.

Beard J.J. 2001. A review of Australian *Neoseiulus* Hughes and *Typhlodromips* de Leon (Acari: Phytoseiidae: Amblyseiinae). *Invertebrate Taxonomy* **15**, 73-158.

Bernini F., Nannelli R., Nuzzaci G. & **de Lillo E. (Eds.). 2002**. *Acarid Phylogeny and Evolution*: *Adaptation in Mites and Ticks*. Kluwer, Dordrecht. 451 pp.

Błoszyk J., Halliday R.B. & Dylewska M. 2005. *Acroseius womersleyi* gen. nov., sp. nov., a new genus and species of Uropodina from Australia (Acari: Trachytidae). *Systematic and Applied Acarology* **10**, 41-60.

Colloff M.J. & Halliday R.B. 1998. *Oribatid Mites. A Catalogue of the Australian Genera and Species*. CSIRO Publishing, Melbourne. 223 pp.

Cook D.R. 1986. Water mites from Australia. *Memoirs of the American Entomological Institute* **40**, 1-568.

Denegri G.M. 1993. Review of oribatid mites as intermediate hosts of tapeworms of the Anoplocephalidae. *Experimental and Applied Acarology* **17,** 567-580.

Domrow R. 1988. Acari Mesostigmata parasitic on Australian vertebrates: an annotated checklist, keys and bibliography. *Invertebrate Taxonomy* **1**, 817-948.

Domrow R. 1991. Acari Prostigmata (excluding Trombiculidae) parasitic on Australian vertebrates: an annotated checklist, keys and bibliography. *Invertebrate Taxonomy* **4**, 1238-1376.

Domrow R. 1992. Acari Astigmata (excluding feather mites) parasitic on Australian vertebrates: an annotated checklist, keys and bibliography. *Invertebrate Taxonomy* **6**, 1459-1606.

Domrow R. & **Lester L.N. 1985**. Chiggers of Australia (Acari: Trombiculidae): an annotated checklist, keys and bibliography. *Australian Journal of Zoology Supplementary Series* **114**, 1-111.

Dylewska M., Błoszyk J. & Halliday R.B. 2006. *Platysetosus occultus* gen. nov., sp. nov., a new genus and species of mite from Tasmania (Acari: Uropodina). *Zootaxa* **1223**, 55-64.

Evans G.O. 1992. *Principles of Acarology*. CAB International, Wallingford UK. 563 pp.

Fain, A. & Lukoschus F.S. 1979. Parasites of Western Australia. VI. Myobiidae parasitic on bats (Acarina : Prostigmata). *Records of the Western Australian Museum* **7**, 61-107.

Fain, A. & Lukoschus F.S. 1981. Parasites of Western Australia. XII. Atopomelidae parasitic on rodents (Acari : Listrophoroidea). *Records of the Western Australian Museum* **8**, 563-584.

Gerson U., Smiley R.L. & Ochoa R. 2003. *Mites* (*Acari*) *for Pest Control*. Blackwell, Oxford, 539 pp.

Halliday R.B. 1997. Revision of the Australian Ameroseiidae (Acarina:

Mesostigmata). *Invertebrate Taxonomy* **10**, 179-201.

Halliday R.B. 2000. The Australian species of *Macrocheles* (Acarina: Macrochelidae). *Invertebrate Taxonomy* **14**, 273-326.

Halliday R.B. 2001a. Arachnida: Acarina. In *Australian Faunal Directory*. Web site address http://www.deh.gov.au/cgi-bin/abrs/abif-fauna/details.pl?pstrVol=ACARINA;pstrTaxa=1;pstrChecklistMode=1 (Australian Biological Resources Study, Canberra).

Halliday R.B. 2001b. 250 years of Australian acarology. In: *Acarology*: *Proceedings of the 10th International Congress* (**Halliday R.B., Walter D.E., Proctor, H.C., Norton, R.A. and Colloff, M.J., eds.**). CSIRO Publishing, Melbourne, pp. 3-16.

Halliday R.B. 2005. Predatory mites from crops and pastures in South Africa: Potential natural enemies of redlegged earth mite *Halotydeus destructor* (Acari: Penthaleidae). *Zootaxa* **1079**, 11-64.

Halliday R.B. 2006. New taxa of mites associated with Australian termites (Acari: Mesostigmata). *International Journal of Acarology* **32**, 27-38.

Halliday R.B., Walter D.E. & Lindquist E.E. 1998. Revision of the Australian Ascidae (Acarina: Mesostigmata). *Invertebrate Taxonomy* **12**, 1-54.

Halliday R.B., OConnor B.M. & Baker A.S. 2000. Global diversity of mites. *In* Raven, P. and Williams, T. (eds). *Nature and Human Society*: *The Quest for a Sustainable World*. *Proceedings of a Conference*, *27-30 October 1997*. (National Academy Press, Washington DC). pp. 192-203.

Halliday R.B., Walter D.E., Proctor H.C., Norton R.A. & Colloff M.J. (Eds.). 2001. *Acarology*. *Proceedings of the 10th International Congress*. CSIRO Publishing, Melbourne. 657 pp.

Hammen L. van der 1983. New notes on Holothyrida (Anactinotrichid mites). *Zoologische Verhandelingen* **207**, 1-48.

Harvey M.S. 1987. New and little-known species of the water mite genera *Tartarothyas*, *Pseudohydryphantes* and *Cyclohydryphantes* from Australia (Chelicerata: Actinedida: Hydryphantidae). *Memoirs of the Museum of Victoria* **48**, 107-122.

Harvey, M.S. 1988. Two new species of the water mite genus *Aspidiobates* Lundblad from Western Australia (Acarina: Hygrobatidae). *Records of the Western Australian Museum* **14**, 199-209.

Harvey M.S. 1990a. Two new species of *Partidomomonia* Cook from south-eastern Australia (Acarina: Momoniidae). *Memoirs of the Museum of Victoria* **50**, 337-340.

Harvey M.S. 1990b. Pezidae, a new freshwater mite family from Australia (Acarina : Halacaroidea). *Invertebrate Taxonomy* **3**, 771-781.

Harvey, M.S. 1996. A review of the water mite family Pionidae in Australia (Acarina: Hygrobatoidea). *Records of the Western Australian Museum* **17**, 361-393.

Harvey M.S. 1998. *The Australian Water Mites*. CSIRO Publishing, Melbourne. 150 pp.

Harvey M.S. & Cook D.R. 1988. Water mites of the genus *Aspidiobates* from Victoria, with the description of two new species (Chelicerata : Acarina : Hygrobatidae). *Memoirs of the Museum of Victoria* **49**, 51-57.

Hunt G.S. 1996a. A review of the genus *Pedrocortesella* Hammer in Australia (Acarina: Cryptostigmata: Pedrocortesellidae). *Records of the Australian Museum* **48**, 223-286.

Hunt G.S. 1996b. A review of the family Pheroliodidae Paschoal in Australia (Acarina: Cryptostigmata: Plateremaeoidea). *Records of the Australian Musuem* **48**, 325-358.

Hunt G.S. & Lee D.C. 1995. Plateremaeoid mites (Arachnida: Acarina: Cryptostigmata) from South Australian soils. In *Australasian Spiders and Their Relatives*: *Papers Honouring Barbara York Main*. *Records of the Western Australian Museum*, *Supplement* **52**, 225-241.

Keirans J.E., King D.R. & Sharrad R.D. 1994. *Aponomma* (*Bothriocroton*) *glebopalma*, n. subgen., n. sp., and *Amblyomma glauerti* n. sp. (Acari: Ixodida: Ixodidae), parasites of monitor lizards (Varanidae) in Australia. *Journal of Medical Entomology* **31**, 132-147.

Keirans J.E., Bull, C.M. & Duffield G.A. 1996. *Amblyomma vikirri* n. sp. (Acari: Ixodida: Ixodidae), a parasite of the gidgee skink *Egernia stokesii* (Reptilia: Scincidae) from South Australia. *Systematic Parasitology* **34**, 1-9.

Knihinicki D.K. & Boczek J. 2002. New eriophyoid mites (Acari: Eriophyoidea) from Australia. *International Journal of Acarology* **28**, 241-249.

Knihinicki D.K. & Boczek J. 2003. Studies of eriophyoid mites (Acari: Eriophyoidea) of Australia: A new genus and seven new species associated with tea trees, *Melaleuca* spp. (Myrtaceae). *Australian Journal of Entomology* **42**, 215-232.

Krantz G.W. 1978. *A Manual of Acarology*. Second Edition. Oregon State University Bookstore, Corvallis, Oregon. 509 pp.

Krantz G.W. & Walter D.E. (eds.) 2007. *A Manual of Acarology*. Third Edition. Texas Tech University Press (in press)

Kropczyńska D., Boczek J. & Tomczyk A. (Eds.). 1995. *The Acari. Physiological and Ecological Aspects of Acari-Host Relationships*. Oficyna Dabor, Warszawa. 698 pp.

Lee D.C. 1970. The Rhodacaridae (Acari : Mesostigmata); classification, external morphology and distribution of genera. *Records of the South Australian Museum* **16**, 1-219.

Lee D.C. 1992. New species of Oribatulidae (Acarida: Cryptostigmata: Planofissurae) from South Australian soils, with a review of subfamilies and Australian records. *Records of the South Australian Museum* **26**, 37-49.

Lee D.C. 1993. *Incabates* Hammer and *Setincabates* gen. nov. (Acarida: Cryptostigmata: Haplozetidae) from South Australian soils. *Proceedings of the Royal Society of South Australia* **117**, 77-85.

Niedbala W. 1987. Phthiracaroidea (Acari, Oribatida) noveaux d'Australie. *Redia* **70**, 301-375.

Niedbala W. & Colloff M.J. 1997. Euptyctime oribatid mites from

Tasmanian rainforest (Acari: Oribatida). *Journal of Natural History* **31**, 489-538.

Otto J.C. 1994. New species of Halacaridae from Australia (Acarina : Prostigmata). *Acarologia* **35**, 31-48.

Otto J.C. 1999a. Revision of the genus *Erythracarus* Berlese (Acarina: Anystidae: Erythracarinae). *Journal of Natural History* **33**, 825-909.

Otto J.C. 1999b. Systematics and natural history of the genus *Chaussieria* Oudemans (Acarina: Prostigmata: Anystidae). *Zoological Journal of the Linnean Society* **126**, 251-306.

Otto J.C. 1999c. The taxonomy of *Tarsotomus* Berlese and *Paratarsotomus* Kuzntezov (Acarina: Anystidae: Erythracarinae) with observations on the natural history of *Tarsotomus*. *Invertebrate Taxonomy* **13**, 749-803.

Otto J.C. 1999d. Halacarid fauna of the Great Barrier Reef and Coral Sea: The genera *Agauopsis* and *Halacaropsis* (Acarina: Halacaridae). *Memoirs of the Queensland Musuem* **43**, 797-817.

Qin T.K. & Halliday R.B. 1996a. Revision of the Australian and South African species of *Halotydeus* (Acarina: Penthaleidae). *Bulletin of Entomological Research* **86**, 441-450.

Qin T.K. & Halliday R.B. 1996b. The Australian species of *Chromotydaeus* Berlese and *Penthaleus* C.L. Koch (Acarina: Penthaleidae). *Journal of Natural History* **30**, 1833-1848.

Qin T.K. & Halliday R.B. 1997. Eriorhynchidae, a new family of Prostigmata (Acarina), with a cladistic analysis of eupodoid species from Australia and New Zealand. *Systematic Entomology* **22**, 151-171.

Rainbow W.J. 1906. A synopsis of Australian Acarina. *Records of the Australian Museum* **6**, 145-193.

Roberts F.H.S. 1960. A systematic study of the Australian species of the genus *Ixodes* (Acarina: Ixodidae). *Australian Journal of Zoology* **8**, 392-485.

Roberts F.H.S. 1970. *Australian Ticks*. CSIRO, Melbourne. 267 pp.

Schicha E. 1987. *Phytoseiidae of Australia and Neighbouring Areas*. Indira Publishing House, Oak Park, Michigan, USA. 187 pp.

Schicha E. & Corpuz-Raros L.A. 1992. *Phytoseiidae of the Philippines*. Indira Publishing House, West Bloomfield, Michigan, USA, 190 pp.

Schuster R. & Murphy P.W. (Eds.). 1991. *The Acari*. *Reproduction*, *Development and Life-History Strategies*. Chapman and Hall, London. 554 pp.

Seeman O.D. & Nahrung H.F. 2005. New *Parobia* (Acari: Podapolipidae) parasitic on pestiferous paropsine beetles (Coleoptera: Chrysomelidae) in eucalypt plantations. *Systematic and Applied Acarology* **10**, 111-135.

Southcott R.V. 1961. Studies on the systematics and biology of the Erythraeoidea (Acarina), with a critical revision of the genera and subfamilies. *Australian Journal of Zoology* **9**, 367-610.

Southcott R.V. 1964. Obituary and bibliography of Herbert Womersley. *Records of the South Australian Museum* **14**, 603-632.

Southcott R.V. 1976. Arachnidism and allied syndromes in the Australian region. *Records of the Adelaide Children's Hospital* **1**, 97-186.

Southcott R.V. 1982. Australia. In *History of Acarology*. (**Prasad V.,** ed.). Indira Publishing, Oak Park, Michigan, pp. 1-51.

Southcott R.V. 1986. Studies on the taxonomy and biology of the subfamily Trombidiinae (Acarina : Trombidiidae) with a critical revision of the genera. *Australian Journal of Zoology Supplementary Series* **123**, 1-116.

Southcott R.V. 1994. Revision of the larvae of the Microtrombidiinae (Acarina: Microtrombidiidae), with notes on life histories. *Zoologica* **48** (2), 1-155.

Wallace M.M.H. 1986. Some macrochelid mites (Acari: Macrochelidae) associated with Australian dung beetles (Coleoptera: Scarabaeidae). *Acarologia* **27**, 3-15.

Wallace M.M.H. & Mahon J.A. 1973. The taxonomy and biology of Australian Bdellidae (Acari). I. Subfamilies Bdellinae, Spinibdellinae and Cytinae. *Acarologia* **14**, 544-580.

Wallace M.M.H. & Mahon J.A. 1976. The taxonomy and biology of Australian Bdellidae (Acari). II. Subfamily Odontoscrinae. *Acarologia* **18**, 65-123.

Walter D.E. 1997. Heatherellidae - a new family of Mesostigmata (Acari: Parasitiformes) based on two new species from rainforest litter in Australia. *International Journal of Acarology* **23**, 167-175.

Walter D.E. 2000. A jumping mesostigmatan mite, *Saltiseius hunteri* n. g., n. sp. (Acari: Mesostigmata: Trigynaspida: Saltiseiidae, n. fam.) from Australia. *International Journal of Acarology* **26**, 25-31.

Walter D.E. 2006. Invasive Mite Identification: Tools for Quarantine and Plant Protection. Worldwide web document at http://www.lucidcentral.org/keys/v3/mites/Invasive_Mite_Identification/key/Whole_site/Home_whole_key.html (date of access 13 January 2007).

Walter D.E. & Gerson U. 1998. Dasythyreidae, new family, and *Xanthodasythyreus* n. g. (Acari: Prostigmata: Raphignathoidea) from Australia. *International Journal of Acarology* **24**, 189-197.

Walter D.E. & Krantz G.W. 1999. New early derivative mesostigmatans from Australia: *Nothogynus* n. g., Nothogynidae n. fam. (Mesostigmata: Microgyniina). *International Journal of Acarology* 25, 67-76.

Walter D.E. & Proctor H.C. 1998. Feeding behaviour and phylogeny: observations on early derivative Acari. *Experimental and Applied Acarology* **22**, 39-50.

Walter D.E. & Proctor H.C. 1999. *Mites. Ecology, Evolution and Behaviour*. University of New South Wales Press, Sydney. 322 pp.

Walter D.E., Seeman O., Rodgers D. & Kitching R.L. 1998. Mites in the mist: how unique is a rainforest canopy-knockdown fauna? *Australian Journal of Ecology* **23**, 501-508.

Wrensch D.L. & Ebbert M.A. (Eds.). 1993. *Evolution and Diversity of Sex Ratio in Insects and Mites*. Chapman

and Hall, New York and London. 630 pp.

HONOURS THESIS ABSTRACT

Willow (*Salix* x *rubens*) invasions: impacts on riparian spiders

Patrick McCormick
Department of Biological Sciences
Monash University, Clayton, Victoria.
Patrick.McCormick@melbournewater.com.au

Supervisors: Dennis O'Dowd, Sam Lake

Fig. 1: Pat checking a pitfall trap.

Biological invasions are increasingly seen as a major factor in human-induced global change, affecting biodiversity and ecosystem function. Riparian zones are critical for the health of waterways and adjacent ecosystems; woody weed invasions in this zone may affect both habitat structure and plant species composition. In turn, these changes may affect prey and habitat availability for important groups of higher-order consumers, like spiders and birds, resulting in changes in abundance and species richness. Spiders are increasingly being utilised in ecological impact studies; they are useful due to their specialisation, group complexity and ease of sampling.

In this study, I (Fig. 1) examined the impact of willow invasion (Basket willow, *Salix* x *rubens*) on spider assemblages along the Tarago River in West Gippsland, Victoria. Willow-invaded sites (Fig. 2) were compared to sites with intact native vegetation (Fig. 3). Plant species composition, habitat structure, and resource availability were determined. Spiders, and their potential prey, were sampled using pitfall traps ("terricolous"), branchlet samples of woody vegetation ("arboreal"), and sticky traps suspended in vegetation ("aerial invertebrates"). Visual surveys were used to census web-weaving spiders and their web forms.

Fig. 2: Willow infested site at the Tarago River, West Gippsland, Victoria.

Not surprisingly, plant species composition was distinctively different between willow-invaded and native sites. Willow-invaded sites appeared structurally simpler, with less leaf litter, less large woody debris (logs and stumps) and a lower canopy height than native sites. Prey resources had differing trends: no significant impact on aerial invertebrates, while willow-invasion negatively impacted arboreal invertebrates – decreasing abundance and altering ordinal composition.

Fig. 3: Native vegetation at the Tarago River, West Gippsland, Victoria.

Arboreal spiders were only present in native sites, while terricolous spider and web abundance increased significantly between months. Willow invasion affected the spider assemblage through habitat simplification and alteration of prey resources. While native sites favoured arboreal hunting spiders, willow-invaded sites favoured an increase in vertical orb-weavers. Willow invasion significantly alters overall spider composition.

17th International Congress of Arachnology

São Pedro, São Paulo (Brazil)

5-10 August 2007

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

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 send me information on your latest publications for the next issue.

Allen, G.R., Seeman, O.D., Schmid-Hempel, P. & Buttermore, R.E. 2007. Low parasite loads accompany the invading population of the bumblebee, *Bombus terrestris* in Tasmania. *Insectes Sociaux* **54**, 56-63.

Bartsch, I. 2007. Halacarid mites (Acari: Halacaridae) from Esperance (Western Australia), description of two new *Copidognathus* species. *Zootaxa* **1435**, 41-49.

Beavis A.S., Rowell D.M. & Evans T. 2006. Tolerance and kin recognition in *Delena cancerides*, a social huntsman spider. *Journal of Zoology, London* **271**, 233-237.

Blamires, S.J., Hochuli, D.F. & Thompson, M.B. 2007. Does decoration building influence antipredator responses in an orb-web spider (*Argiope keyserlingi*) in its natural habitat? *Australian Journal of Zoology* **55**, 1-7.

Chami-Kranon, T. & Ono, H. 2007. On Vietnamese representatives of the ant spider genus *Heradion* (Araneae: Zodariidae). *Zootaxa* **1395**, 59-68.

Chami-Kranon, T., Likhitrakarn, N. & Dankittipakul, P. 2007. *Allagelena monticola* sp. n. (Araneae: Agelenidae), a new species of funnel-web spiders from northern Thailand. *Zootaxa* **1397**, 47-53.

Chami-Kranon, T., Likhitrakarn, N. & Wongsawad, C. 2007. *Utivarachna rama* sp. n., a new species of tracheline spiders (Araneae: Corinnidae) from Thailand. *Zootaxa* **1446**, 59-68.

Chen, S.H. 2007. Spiders of the genus *Hersilia* from Taiwan (Araneidae: Hersiliidae). *Zoological Studies* **46**, 12-25.

Cheng, L., Yang, C.M., Li, D. & Liu, H.M. 2006. Aquatic Heteroptera (Insecta: Gerromorpha and Nepomorpha) from Xishuangbanna, Yunnan, China. *Raffles Bulletin of Zoology* **54**, 203-214.

Clements, R., Koh, L.P., Lee, T.M., Meier, R. & Li, D. 2006. Importance of reservoirs for the conservation of freshwater molluscs in a tropical urban landscape. *Biological Conservation* **128**, 136-146.

Cokendolpher, J.C., & Taylor, C.K. 2007. Monoscutidae Forster, 1948. *In* Harvestmen: The Biology of Opiliones. (**Pinto-da-Rocha, R., Machado, G. & Giribet, G., eds.**). Harvard University

Press: Cambridge, London, pp. 118-121

Du, N., Liu, X.Y., Narayanan, J., Li, L., Lim, M.L.M. & Li, D. 2006. Design of superior spider silk: from nanostructure to mechanical properties. *Biophysical Journal* **91**, 4528-4535.

Framenau, V.V. 2007. Revision of the new Australian genus *Artoriopsis* in a new subfamily of wolf spiders, Artoriinae (Araneae: Lycosidae). *Zootaxa* **1391**, 1-34.

Gaskett, A. C. 2007. Spider sex pheromones: emission, reception, structures, and functions. *Biological Reviews* **82,** 27-48.

Huang, W.D., Lin, Z., Sin, Y.M., Li, D., Gong, Z.Y. & Yang, D.W. 2006. Identification and characterization of a novel spider cDNA, TuSp1, encoding a silk protein involved in spider egg sac formation. *Biochimie* **88**, 849-858.

Kasumovic, M. M., Bruce, M.J., Herberstein, M.E. & Andrade, M.C.B. 2007. Risky mate search and mate preference in the golden orb-web spider (*Nephila plumipes*). *Behavioral Ecology* **18**, 189-195.

Klompen, H. & Austin, C.C. 2007. A new species of *Ophiomegistus* Banks (Acari: Paramegistidae) from Papua New Guinea *Zootaxa* **1387**, 47-57.

Li, D. & Kuan, J.Y.X. 2006. Natal dispersal and breeding dispersal in a spitting spider, *Scytodes pallida* (Araneae: Scytodidae), from Singapore. *Journal of Zoology, London* **268**, 121-126.

Lim, M.L.M. & Li, D. 2006. Behavioural evidence of UV sensitivity in jumping spiders (Araneae: Salticidae). *Journal of Comparative Physiology A* **192**, 871-878.

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.

Lim, M.L.M. & Li, D. 2007. Effects of age and feeding history on structure-based ornaments of a jumping spider. *Proceedings of the Royal Society of London B* **274**, 569-575.

Lim, M.L.M., Land, M.F. & Li, D. 2007. Sex-specific UV and fluorescence signals in jumping spiders. *Science* **315**, 481.

Mansfield S., Dillon M.L. & Whitehouse M.E.A. 2006. Are arthropod communities in cotton really disrupted? An assessment of insecticide regimes and evaluation of the beneficial disruption index. *Agriculture, Ecosystems and Environment* **113**, 326-335.

Nelson, X.J., Jackson, R.R. & Li, D. 2006. Conditional use of honest signaling by a Batesian mimic. *Behavoral Ecology* **17**, 575-580.

Nelson, X.J., Jackson, R.R., Li, D., Barrion, A.T. & Edwards, G.B. 2006. Innate aversion to ants (Hymenoptera: Formicidae) and ant mimics: experimental findings from mantises (Mantodea). *Biological Journal of Linnean Society* **88**, 23-32.

Nelson, X.J., Li, D. & Jackson, R.R. 2006. Out of the frying pan and into the fire: a novel trade-off for Batesian mimics. *Ethology* **112**, 270-277.

Opell, B.D., Berger, A.M., Bous, S.M. & Manning, M.L. 2007. Genetic relationships of *Amaurobioides* (Anyphaenidae) spiders from the southeastern coast of New Zealand. *Zootaxa* **1425**, 1-10.

Pesic, V. & Smit, H. 2007. Water mite species of the genus *Hydrodroma* Koch (Acari: Hydrachnidia, Hydrodromidae) from Australasia. Part I. *Zootaxa* **1389**, 31-44

Rao, D., Cheng, K. & Herberstein, M.E. 2007. A natural history of web decorations in the St Andrew's Cross spider (*Argiope keyserlingi*). *Australian Journal of Zoology* **55**, 9-14.

Roberts, J.A., Galbraith, E., Milliser, J., Taylor, P.W. & Uetz, G.W. 2006. Absence of social facilitation of courtship in the wolf spider, *Schizocosa ocreata* (Hentz) (Araneae: Lycosidae). *Acta Ethologica* **9**, 71-77

Roberts, J.A., Taylor, P.W. & Uetz, G.W. 2007. Consequences of complex courtship display: Predator detection of multi-modal signaling. *Behavioral Ecology* 18: 236-240.

Seeman, O.D. 2007. A new species of *Paradiplogynium* (Acari: Diplogyniidae) from *Titanolabis colossea* (Dohrn) (Dermaptera: Anisolabididae), Australia's largest earwig. *Zootaxa* **1386**, 31-38.

Su, K.F.L. & Li, D. 2006. Female-biased predation risk and its differential effect on the male and female courtship behaviour of jumping spiders. *Animal Behaviour* **71**, 531-537.

Symkowiak, P. 2007. Redescription of Australian crab spider *Diaea pulleinei* Rainbow, 1915 (Araneae: Thomisidae). *Zootaxa* **1425**, 11-20.

Taylor, P.W., **Roberts, J.A. & Uetz, G.W. 2006.** Compensation for injury? Multimodal courtship of wolf spiders following loss of signaling appendages. *Ethology Ecology and Evolution* **18**, 79-89.

Whitehouse M.E.A., Wilson L.J & Constable G. 2007. Target and non-target effects on the invertebrate community of Vip cotton, a new insecticidal transgenic. *Australian Journal of Agricultural Research* **58,** 273-285.

Zhang, J.X., Woon, J.R.W. & Li, D. 2006. A new genus and species of jumping spiders (Araneae: Salticidae: Spartaeinae) from Malaysia. *Raffles Bulletin of Zoology* **54**, 241-244.

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

Australasian Arachnology
Issue 77
April 2007

Contents