Invertebrata

Tasmania's Invertebrate Newsletter

Inside...

Features:

Articles and notes:

November 1998
No. 12

Invertebrata is produced by the Queen Victoria Museum and Art Gallery, Launceston, Tasmania.

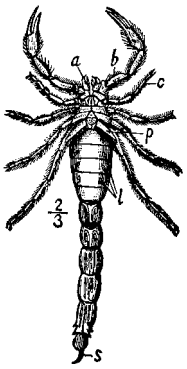
We publish articles and short notes on all aspects of invertebrate biology and conservation in Tasmania.

All correspondence (including changes of address) to the editor,
Bob Mesibov
PO Box 700, Burnie TAS 7320
(03) 6431 3428
mesibov@southcom.com.au

Wanted

Scor'pi-on (skôr'pĭ-ŭn), *n.* [F., fr. L. *scorpio, scorpius*, Gr. σκορπίος, perhaps akin to E. *sharp.*] **1.** (*Zoöl.*) Any one of numerous species of pulmonate arachnids of the order Scorpiones, having a suctorial mouth, large claw-bearing palpi, and a caudal sting.

☞ Scorpions have a flattened body, and a long, slender post-abdomen formed of six movable segments, the last of which terminates in a curved venomous sting. The venom causes great pain, but is unattended either with redness or swelling, except in the axillary or inguinal glands, when an extremity is affected. It is seldom if ever destructive of life. Scorpions are found widely dispersed in the warm climates of both the Old and New Worlds.



During May, Roy Swain and Alastair Richardson were visited by Professor Michael Warburg and his wife Hava. Michael is a comparative physiologist and ecologist at the Institute of Technology, Haifa, in Israel. Many of his publications have been on terrestrial isopods but he has also worked extensively on crabs and scorpions. His visit here was very brief but there was time to do a little exploring and some collecting. Unfortunately he didn't have time to catch up with isopod friends.

Michael was particularly excited by our scorpions, which apparently have an undescribed reproductive anatomy and some very interesting possibilities for maternal support of the developing young. He would like to return sometime within the next few years to do some research on these animals. If this proves impossible we are hoping to collaborate by doing some of the work ourselves and shipping material to him.

In any event we would like to build up a collection of scorpions collected at all times of the year, so if anyone can help we would be very grateful. All we require is formalin-fixed material with basic information about location, date and collector. Specimens, live or fixed, can be dropped off at the University of Tasmania in Hobart, or held at one of the Museums for us to collect.

Roy Swain
School of Zoology
University of Tasmania
GPO Box 252-05
Hobart TAS 7001
ph (03) 6226 2610
fax (03) 6226 2745
Roy Swain@utas.edu.au

Editorial

This issue of *Invertebrata* includes a few changes in layout.

We now use Arial font for headers and Calisto MT for body text, which should make *Invertebrata* a little easier on the eyes. We've also dropped two features, 'Invertebrate Calendar' and 'What Is It?', which weren't being supported by readers. Believe it or not, the *only* suggested identification for Henry Hellyer's insect (*Invertebrata* 11) came from Dr Noel Hynes, who lives in Canada. It's almost certainly a cicada, but hey, you local entomologists, which of our species?

Liz Turner of the Tasmanian Museum and Art Gallery has suggested that *Invertebrata* could be a forum for discussing the deplorable state of employment in zoology. We could broaden that to *funding for zoology*. Every reader knows how support for research has steadily contracted in recent years. Horror stories abound. I've just had an email from a zoological colleague who says that a research post in Germany has had 400 applications, mainly from out-of-work Ph. D.'s.

Your editor is another victim of the decline in support for zoological research. After a career in contract work (mainly invertebrate surveys), I now make my living outside zoology and study millipedes as a hobby.

There's been an equally disappointing shrinkage in zoology education at all levels. More than one Australian university administration now believes that 'biodiversity' can be understood without serious reference, anywhere in the life sciences curriculum, to diversity of form and life history among the invertebrates.

OK, what next? We aren't going to see increases in funding for invertebrate research in Tasmania over the next few years. Lab and office budgets will shrink. We'll be very lucky to see more than a few grants for work on economically important and severely threatened species. Environmental monitoring programs will support the collection of 'indicator' invertebrate specimens but not their proper curation and certainly not their further study by taxonomists. Already familiar? It's going to get worse.

So how do we keep invertebrate zoology alive through this Dark Age?

Sees bees overseas...

(As promised in Invertebrata *11, here's a travel report from Roger Buttermore)*

The Gallaugher Bequest Churchill Fellowship allowed me to study overseas bumblebee research facilities during April-July 1998 at the invitation of the following people and institutions: Dr Rod Macfarlane, Buzz Universal, Christchurch, NZ; Dr Barry Donovan, Canterbury Agriculture & Science Centre, Lincoln, NZ; Dr Peter Kevan, University of Guelph, Ontario, Canada; Prof. Ingrid Williams, IACR-Rothamsted, Harpenden, Herts, UK; Dr Bernard Vaissière, Laboratoire de Pollinisation Entomophile, INRA, Avignon, France; Dr Jean-Noël Tasei, Laboratoire de Zoologie, INRA, Lusignan, France; Dr Vladimir Ptácek, Masaryk University, Brno, Czech Republic; Dr M.J. Duchateau, University of Utrecht, Utrecht, The Netherlands; Dr Aad de Ruiter, Research Centre Insect Pollination & Beekeeping, Hilvarenbeek, The Netherlands.

In New Zealand I studied successful trap nest design, construction, orientation and placement in both suburban and bush locations.

In Canada I observed the pollination of tomatoes and cucumbers by bumblebees in glasshouses up to 40 acres in size; research including the effect of interior UV light on bee behaviour; and outdoor tracking of various insect pollinators in apple orchards.

In the UK I networked with bumblebee experts in Cambridge, Oxford, London and Cardiff, and while at Rothamsted helped to tag bumblebees used in research.

In the Avignon region of France I accompanied technical representatives of commercial bumblebee suppliers (as part of an integrated pest management package) on their rounds of glasshouses and plastic tunnels. In Lusignan I participated in bumblebee rearing routine at the INRA laboratory and observed pesticide research using those bumblebees.

In the Czech Republic, research is conducted on modest budgets and I observed rearing techniques which used simple equipment but were still very effective.

In Holland I spent three weeks gaining experience in colony behaviour, genetics, disease and parasite recognition.

I presented a 50-minute seminar on Tasmanian bumblebees at Rothamsted Experimental Station; Avignon, Lusignan, and Magneraud INRA Laboratories; Cambridge, Masaryk and Utrecht Universities.

My previous research on Tasmanian bumblebees found that the population is highly inbred, a unique situation that has aroused much scientific interest. Encouraged by my hosts, I now have the expertise to maintain a continuous rearing experiment (with modifications and refinements learned in my travels) to ascertain if the Tasmanian bumblebee population is still inbred and what kind of parasites/diseases are present. I will also trap nest feral queens to assess field survival of diploid male producing colonies, and begin an extensive flower preference study.

Finance for this experimental work will need to be sought and I hope to be involved as Chief Investigator in a forthcoming Tasmanian bumblebee environmental impact study. The findings of this research will be of interest to the Tasmanian horticultural industry.

Roger Buttermore
Senior Curator, Invertebrate Zoology
Tasmanian Museum & Art Gallery
GPO Box 1164M
Hobart TAS 7001
ph (03) 6235 0722
fax (03) 6234 7139
roger.buttermore@postoffice.tased.edu.au

Crustacean conferences

Several Tasmanians were among a substantial Australian contingent at the Fourth International Crustacean Conference at the University of Amsterdam in July.

Brita Hansen pointed out the conservation implications of her soon-to-be-published review of the crayfish genus *Parastacoides*, Roy Swain presented work on the life history of the sedgeland syncarid *Allanaspides helonomus*, and I tried to persuade an uncaring world that talitrid amphipods are a wonderful model for studies of the evolution of life onto land.

Amongst the 500+ other contributors, John Bradbury (Adelaide) presented an interim report of his taxonomic work on crangonyctoid amphipods, including much Tasmanian material. Seven concurrent sessions made it difficult to get any sort of overview of the conference, but highlights for me included the discussions on higher-level phylogeny, particularly the status of the Peracarida, Peter Greenaway's review of the physiology of land colonisation and the realisation that it is now perfectly feasible for a crustacean (or anything else) to swim via rivers and canals right across Europe from the Black Sea to the North Sea.

The next conference, *ICC-5*, will be held in Melbourne in 2001, organised by Gary Poore. A crustacean tour of Tasmania will be organised before or after this meeting.

Brita and I moved on, a week later, to Augsburg in Germany for the 12th Symposium of the International Association for Astacology. Here a couple of hundred crayfish freaks discussed all aspects of the biology of the group, from how to grow them faster and make cooked ones pinker, to their physiology, ecology and conservation. Brita presented preliminary results of her biogeographical studies on *Parastacoides*, while I reviewed the conservation status of Tasmanian crayfish. Information on *Astacopsis gouldi* is always eagerly sought by northern hemisphere astacologists, so it was good to be able to report the ban on fishing for this species. A paper entitled *European crayfish - do they have a future?* highlighted the devastating effects of crayfish plague and introduced species on the European fauna, and serves as a reminder (if one was needed) that Australia should continue to prevent the introduction of any alien crayfish.

IAA 13 will also be held in Australia, in Perth in 2000, and there will be another tour of Tasmania!

Alastair Richardson
School of Zoology
University of Tasmania
GPO Box 252-05
Hobart TAS 7001
ph (03) 6226 2593
fax (03) 6226 2745
Alastair.Richardson@utas.edu.au

Wow! It's Prof. Bugman!

He's adorable, he's colorful, he's cuddly. Prof. Bugman could just be the sweetest item ever offered in a zoological newsletter.

He's a 40-cm-high stuffed doll knitted by Mrs Lexie Paul of Burnie. Prof. Bugman has a professorial moustache, a jaunty cap and an assortment of eight crocheted invertebrates, including a bee, worms and a spider dangling from his cap. His cap's baby blue, he has yellow hair and he wears a green pullover, a multi-coloured winter scarf, purple-and-tan striped trousers, black-and-tan shoes and a blue belt with a yellow buckle.

For a chance to win this lovable character, send a $5 donation (or more) to the Queen Victoria Museum and Art Gallery, Wellington Street, Launceston TAS 7250, and mark your donation '*Invertebrata* Doll'. Proceeds will be shared between the *Invertebrata* expenses fund and Mrs Paul's penguin-fence project at Camdale beach, just west of Burnie. (The fence will prevent Little Penguins from wandering from their nesting sites onto the busy Bass Highway.) A winning entry will be drawn in February in time for an announcement in the March *Invertebrata.*

Beetle-mites that take to the water

The Oribatei ('beetle-mites') comprise a diverse group of mites, containing about 145 families, that are commonly part of the soil fauna. They are also widespread amongst lichens and mosses. So, we are talking about an exclusively terrestrial group of animals – or are we?

During the Winter of 1977, I sampled some very shallow (depth 2.5-3.5 cm) pools on the summit of Mt Chudalup (altitude 186 m) - a granite inselberg that rises well above the coastal plain between Northcliffe and Windy Harbour in Western Australia. My collections from these pools were dominated by beetle-mites; I had literally tens of thousands of them - aquatic 'terrestrial mites! I took these collections overseas with me when I went on study leave during the latter part of 1977 and early 1978.

I spent most of this leave in the Zoology Department, Westfield College (then part of the University of London, now 'rationalized' out of existence!). As luck would have it, the staff of this Department included a noted acarologist, Dr Tony Wallwork. Tony got very excited when I presented him with a 125 ml jar, half the volume of which was occupied by the bodies of an unknown beetle-mite! He set to work and described the animal, first in a preliminary fashion (Wallwork 1979), and then definitively (Wallwork 1981). So, fom the summit of Mt Chudalup came *Chudalupia meridionalis.* Aspects of the ecology of the Mt Chudalup pools were described by Bayly (1982).

It turned out that the closest relative to *C. meridionalis* was *Aquanothrus montanus*, described by Engelbrecht (1975) from pools located at 1700-2000 m in the sandstone mountains of Orange Free State in South Africa. *Aquanothrus* and *Chudalupia* both belong to the family Ameronothridae. [As an interesting parallel, it may be noted that the most primitive of extant chironomid (Diptera) genera, *Archaeochlus*, occurs in freshwater seepages on granites in Western Australia and in similar habitats in southern Africa. These elevated rocky habitats have not been invaded by the sea since before the Triassic; allowing for seasonal and secular interruptions, they have had a continuous existence for at least 240 million years. It is believed that the genus *Archaeochlus* dates back at least to the Upper Jurassic and that the Australian portion of the genus has been isolated from that in Africa for a minimum of 120 million years (time of separation of Africa from the rest of Gondwana).]

The story now moves to the 1990s when a new oribatid mite, closely related to *Aquanothrus* (and possibly a congener), was found in shallow (2-5 cm deep) pools lying in sandstone on the Colorado Plateau, USA, at an elevation of 1125-2100 m (Norton *et al.* 1996). Most oribatids are fungivorous but this new one from Colorado emphasises its adaptation to the aquatic environment by eating bdelloid rotifers! If sediment is taken from a pool that has been dry for a few days, the mites immediately become active when immersed in water. If the dry period has been longer, revival in water takes 10-20 seconds. In two instances, a few adult mites have been revived from samples kept dry for one year (Norton *et al.* 1996)!

For the latest development we move to Tasmania. On 23 June 1997, I sampled a flooded granite gnamma (see *Invertebrata* 9) at Killiecrankie, Flinders Island. This ovoid pool measured 3.1 x 1.5 m and had a maximum depth of 7.0 cm. The water could be described as high-conductivity fresh water verging on slightly saline (K25 = 5.06 mS/cm; salinity *ca.* 2.7 g/L). My collection contained *inter alia* reasonably large numbers of an oribatid mite! Dr Matthew Colloff, an acarologist working for the CSIRO Entomology Division, tells me that the Killiecrankie beast belongs to the family Ameronothridae but is not *Chudalupia*. So, in summary, four species of aquatic oribatid mite are now known from shallow, temporary rockpools: *Aquanothrus montanus* (Engelbrecht 1975), *Chudalupia meridionalis* (Wallwork 1981), an undescribed species close to *A. montanus* (Norton *et al.* 1996) and an undescribed ameronothroid species from Flinders Island.

Dr Ian Bayly
Dept. of Biological Sciences
Monash University
Clayton VIC 3168

References:

Bayly, I.A.E. 1982. Invertebrate fauna and ecology of temporary pools on granite outcrops in southern Western Australia. *Aust. J Mar. Freshwater Res.* 33:599-606.

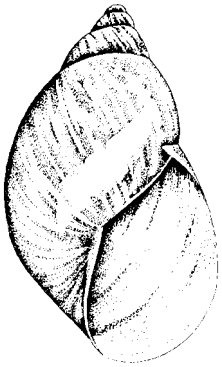
Engelbrecht, C. M. 1975. New ameronothroid (Oribatei, Acari) taxa from the Republic of South Africa and the islands Gough and Marion. *Navors. Nas. Mus. Bloemfontein* 3(5):53-88.

Norton, R.A.,Graham, T.B.and Alberti,G. 1996. A rotifer-eating ameronothroid (Acari: Ameronothridae) mite from ephemeral pools on the Colorado Plateau. *In* R. Mitchell, D.J. Horn, G.R. Needham and W.C. Welbourn (eds) *Acarology* IX: Vol 1, Proceedings. Ohio Biological Survey, Ohio.

Wallwork, J A. 1979. Relict distributions of oribatid mites. *Adv. Acarology* 2:515-521.

Wallwork, J.A. 1981. A new oribatid mite from Western Australia. *Acarologia* 22:333-339.

Brian Smith's Website



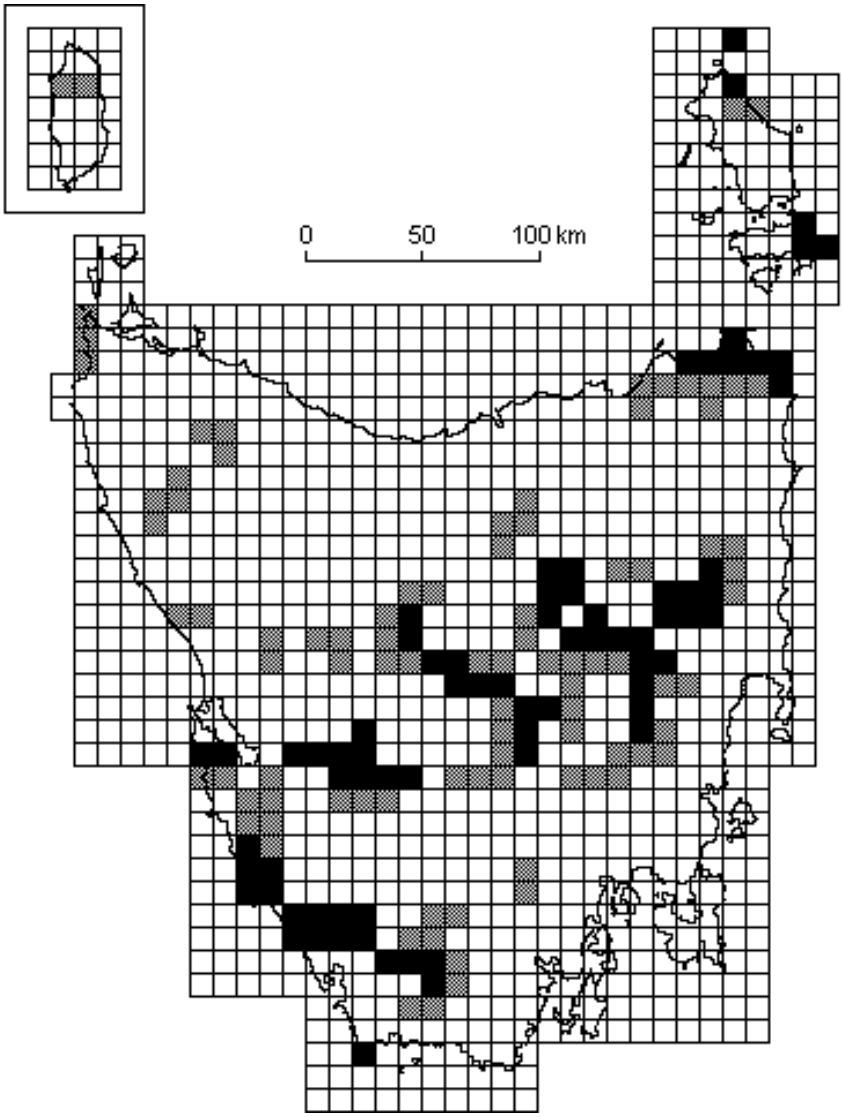
Point your browser, as they say, at

www.tassie.net.au/tassnail/

for a look at a very nicely designed personal website. It was put together by Sally Jones and Jason Davis for Dr Brian Smith, QVMAG Research Associate and editor of *Molluscan Research*. The linked pages cover Brian's biography, publications and current research, as well as information on *Molluscan Research* for intending authors and subscribers. A regularly updated 'Special Items of Interest' page currently (28 October) refers to *Anoglypta launcestonensis* and to the guidebook *Tamar Intertidal Invertebrates*. There's also a 'molluscan links' page with some useful Net addresses. The running GIF logo (left) shows Rhyllis Plant's drawing of *Bothriembryon tasmanicus*.

– Ed.

Atlasing Tasmanian snails



Tasmanian snail biogeography is unusual in an Australasian context. Australasian snails are often very sensitive to differences in habitat or landscape history. As a result, some areas have very significant clusters of locally endemic species, and certain habitat types (e.g. limestone areas) can produce vastly higher species counts than other, equally wet habitats.

In Tasmania, in contrast, there are no significant 'hot spots'. Although many species are endemic to parts of the State, each species appears to have its own distinct range, with little 'congruence' in distributions. As a result, most Tasmanian forests support a reasonable diversity of snails.

Over the next three years, I'm hoping to explore why Tasmania is so different.

A starting point is the production of a comprehensive atlas of Tasmanian snail distributions. Most parts of the State have been reasonably well-searched and some species have had their ranges finely documented, but large gaps in our knowledge remain. The accompanying map shows the 10 km grid squares which are presently classed as 'undersurveyed'. Any native snail records from these grid squares, even of very common species, would be especially welcome. Black squares represent 'undersurveyed squares in undersurveyed areas' (typically, fewer than 10 recorded sites in a 30x30 km area), while gray squares represent orthogonal sets of completely unsurveyed squares.

With the help of Roy Crookshanks in particular, I'm progressively surveying these squares and eliminating them from the map. However, areas which are well-searched can often yield biogeographical surprises, and intensive surveying is needed to find all species in a given square. Tasmania's 66th and newest native land snail, a *Pernagera*, was first found in the very well-surveyed Orford grid square. The 'recorder effect' is still very strong, with squares close to our major cities having the largest numbers of recorded species: Hobart has 27 and Launceston 22.

Some major features of Tasmanian snail biogeography that are emerging are:

East/West divides. The so-called 'Tyler's Line' now appears significant in explaining boundaries (in part) of at least 12 species.

Victoria-Tasmania links. Much of Tasmania's snail fauna appears to have reached the State by crossing the Bassian Plain from southeast Victoria to northwest Tasmania. This is curious as paleoclimatic reconstructions don't suggest that the Bassian Plain would have been hospitable for snails.

Gap clusters. Many common and widespread species appear to avoid one or more of three recognised non-alpine gap clusters: the southern half of the East Coast, the northeast forests and coast, and the far Northwest.

Endemic ranges. Species endemic to the southern half of the Tasmanian mainland generally have much smaller ranges than those restricted to the northern half.

This work has also produced two massive and mysterious extensions to supposedly well-defined ranges. The 'northwest endemic' *Oreomava johnstoni* was found at Clear Hill Road near Lake Gordon in the Southwest, while the 'eastern half endemic' *Planilaoma luckmanii* was found at The Nut, Stanley.

Kevin J. Bonham
Centre for Environmental Studies
University of Tasmania
k_bonham@postoffice.utas.edu.au
Home: 3/54 Duke St
Sandy Bay TAS 7005
(03) 6224 8487

Windy old weather

by Lionel Hill

Remember that storm on the north coast back in late September when about 50 mm of rain fell in one night? It was a Tuesday night, September 22. I was in Adelaide attending a workshop on management of cabbage moth in brassica crops. Actually I was having dinner with the research group at the Edinburgh Hotel. A thunderstorm was in progress and rain fell in squalls. I noticed particular noctuid moths resting on the windows: species like green looper (*Chrysodeixis argentifera*), brown cutworm (*Agrotis munda*) and native budworm (*Helicoverpa punctigera*), as well as green lacewings (*Mallada* sp., I think). I pointed them out to a colleague, remarking that they are migratory species, and wondered if cabbage moth (*Plutella xylostella*) undertook large migrations in Australia. I had been unsuccessful in getting the research group to invest funds in resolving this question.

On Wednesday I returned to Devonport to hear about the big storm and heavy rain. Next morning I found my light trap at Stony Rise government offices full of green looper, brown cutworm and native budworm moths. There were other known migrant noctuid moths in the catch, namely southern armyworm (*Persectania ewingii*), a couple of lesser budworm (*Heliothis punctifera*), one common cutworm (*Agrotis infusa*) and many *Hypoperigea tonsa*, which is not a pest and lacks a common name. There were one or two specimens each of several other noctuids which may or may not be migrants as well as cabbage centre grub (*Hellula hydralis*) and quite a few cabbage moth. The latter two species belong to moth families other than Noctuidae. Also of interest were a large number of the black and yellow hoverfly *Melangyna*.

Since that night catches of brown cutworm have been very high and I have issued a warning to farmers. However, heavy rainfalls in October are likely to kill many eggs and young caterpillars in the soil before they grow large enough to damage young vegetable crops along the Northwest Coast of Tasmania.

Five Painted Lady butterflies turned up in the light trap in mid-October with a batch of known migrant moths. One of these butterflies was also trapped back in early September, coincident with their first appearance in the landscape.

Native budworm and cabbage moth catches are also above average but most curious this season is the very large catch of *Hellula* moths, i.e. cabbage centre grub. It usually turns up in small numbers in the light trap catch and has never been regarded as a pest in Tasmania, although it is certainly a pest of brassica crops on the mainland, particularly in warmer districts. The fawn-coloured, 1 cm-long *Hellula* moths were so common in October that I kept seeing them around my garden during the daytime and farmers were asking what they were. We are yet to see whether they can breed successfully in Tasmanian brassica crops.

Life on the Northwest Coast has inspired in me a growing fascination with migration of insects across Bass Strait. I am becoming perhaps a little paranoid about the number of insects that spend winter elsewhere, returning here on the equinoctial gales for summer. My cabbage moth research colleagues on the mainland regard it as a harmless obsession. I am still uncertain whether cabbage moth relies substantially on immigration or local over-wintering to keep the population at high levels. Certainly the cabbage white butterfly (*Pieris rapae*) over-winters here and emerges surprisingly early in spring from pupae on north-facing brick walls.

Various methods have been used to establish that insects migrate across Bass Strait. The heat-unit requirements of larval and pupal southern armyworm have been used to show that locally over-wintering individuals will not emerge from their pupae until November whilst many adults appear in September. CSIRO personnel brought their insect radar to Table Cape (?or the Nut) in the early 1980s, and they detected large flights of insects blowing in from the sea at night in coincidence with large catches of budworm and cutworm moths in a light trap at Elliott research farm. More recently I showed that budworm moths emerge pale-coloured if the subterranean pupae experience temperatures above 25 °C, but dark-coloured if they develop at lower temperatures. All the moths that are caught in spring are a pale straw colour showing that they are immigrants. Dark individuals are not seen until mid-summer when the next generation of moths emerge locally.

Sudden appearance of large numbers of adults and the appearance of species not known to breed here also imply immigration. Some of these species have been detected elsewhere in the world undertaking substantial migrations. *Melangyna* hoverflies have previously been noted in sudden great abundance in Tasmania and on the Bass Strait islands. The heliotrope moth (*Utethesia pulchelloides*) appeared one spring in enormous numbers. It is known to travel far distances across seas to islands. *Calliphora* blowflies have appeared suddenly here after winter in the same week as in Melbourne. Extensive research by CSIRO has shown that bush flies (*Musca vetustissima*) migrate to the cool temperate parts of Australia each summer. Spur-throated locust (*Nomadacris guttulosa*) and wanderer butterflies (*Danaus plexippus*) turn up sporadically. When cabbage white butterfly first appeared in Tasmania in 1940 it was observed flying in from the sea over the Nut at Stanley, having established in Victoria the preceding season. Similar reports came from Scottsdale. These flights were in summer.

American entomologists have studied pollen on the mouthparts of moths to show that some species migrate from Mexico to northern USA. Many of these species are closely related to our migrants. Polewards migration in spring or summer seems a worldwide phenomenon with moths heading from southern China to Japan and North Africa to Europe. Birds aren't the only globetrotters!

Noctuid moths that appear in Tasmania sporadically and usually in small numbers are called 'vagrants'. They include black cutworm (*Agrotis ipsilon*), *Crioa hades, Eudesmeola lawsoni, Hypoperigea tonsa,* nightfeeding sugarcane armyworm (*Leucania loreyi*), sugarcane armyworm (*Leucania stenographa*), *Omphaletis florescens,* inland armyworm (*Persectania dyscrita*), lesser armyworm (*Spodoptera exigua*) and soybean looper (*Thysanoplusia orichalcea*). All those with common names are pests in other places.

Many migrants arrive in spring but some arrive later. Some appear to move south across the mainland in a series of generations, e.g. bush fly and corn earworm (*Helicoverpa armigera*). These species do not cross Bass Strait until summer. Others seem to come direct from their winter breeding areas in a series of two or three consecutive night-time flights during spring. Native budworm breeds in enormous numbers on native daisies and peas in outback Australia when

(Continued on page 8)

What's on in the Tasmanian Wilderness World Heritage Area Fauna Program for 1998/99

Trichopterans

Surveys will be undertaken for WHA trichopterans listed in the *Threatened Species Protection Act 1995*. Two species, *Taskiropsyche lacustris* (Lake Pedder caddisfly) and *Taskiria mccubbini* (McCubbins caddisfly) are listed as endangered and neither has been recorded since the flooding of Lake Pedder. Sites around Lake Pedder will be surveyed, together with other lakes in the area with similar habitat. Another two species, *Oxyethira mienica* (Miena microcaddisfly) and *Orphninotrichia maculata* (spotted microcaddisfly) are listed as rare as they have only been collected from a few locations. However, as these locations are widely separated we are hopeful that enough additional locations will be found to let us de-list the species. *O. maculata*, in particular, is relatively common on the Australian mainland. This work will be a collaborative project with Jean Jackson, Inland Fisheries Commission.

Cave species

Last year Stefan Eberhard undertook a survey of sensitive habitats and species in the Ida Bay karst system. This resulted in the creation of fauna sanctuaries and stringlines along paths to protect sensitive areas. The blind cave beetle, *Goedetrechus mendumae*, which was previously only known from one location in Exit Cave, has now been recorded in two locations in Mystery Creek Cave, as well as other locations in Exit Cave. A management plan for the fauna of the Ida Bay karst system has been written by Stefan.

As a result of this work a monitoring program of cave fauna (glowworms, spiders, crickets and beetles) at Ida Bay has been established to gather baseline data on cave fauna numbers prior to reopening Exit Cave to recreational cave users under controlled conditions.

This year a fauna survey of the Mole Creek caves will be undertaken.

Fire and invertebrates

Studies on the effect of fire on invertebrate biodiversity in buttongrass moorlands will continue this year. Long-term monitoring plots have been established. These will be sampled before and after planned fuel-reduction burns in the Southwest and Central Highlands.

Exotic invertebrates: can you help?

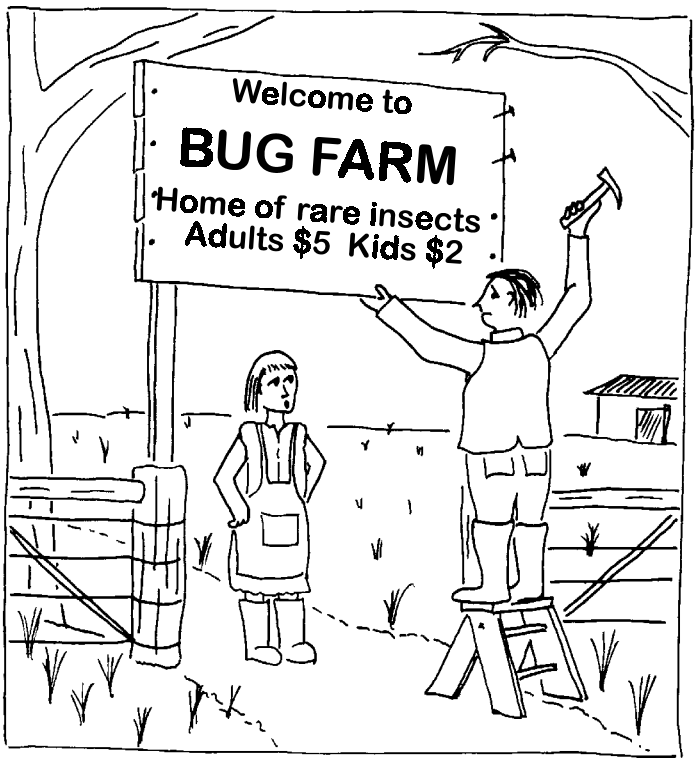
I am collecting records of introduced fauna and their locations in the WHA. If you have any records I would be glad to hear from you. I would need the usual information, i.e. species, location, observer and date (an estimate of date will do). You can provide the records by email, fax or phone (see below).

Mike Driessen
Parks and Wildlife Service
GPO Box 44A
Hobart TAS 7001
ph (03) 6233 3751
fax (03) 6233 3477
miked@dpiwe.tas.gov.au

Wanted!

Regular reports of 'people news' and invertebrate goings-on from the Parks and Wildlife Service, Inland Fisheries Commission, CSIRO Marine Labs, University of Tasmania departments and any other agencies, institutions or individuals studying invertebrates in Tasmania. We and our readers are especially keen to hear from non-professional zoologists with tales and tidbits about this State's wonderful invertebrate fauna. Items for the March *Invertebrata* should be posted or e-mailed to the editor before the end of February. Pictures are welcome but should be black-and-white, not colour and not in a range of grays; send these as hard copy, bitmaps on diskette, or JPEG files by e-mail.

Spring, 1998, and Mr & Mrs Athol Nesbitt of Woolville face up to the practicalities of environmentally sound tourism in a clean, green Tasmania.



'You mean I can't use Mortein to kill the blowflies in the kitchen when I'm baking the scones?'

(Continued from page 6)

winter rains occur. When the outback is dry its population is small. Strong low-level jet streams of air can occur when a strong high pressure system is pushed eastwards by a strong cold front. Moths of certain species deliberately fly aloft at dusk to get caught by these fast airflows. Sometimes they are dumped in Tasmania with driving rain on a windy spring night as the front catches them during their flight.

To what extent these species return northwards in autumn is poorly understood. One species is exceptional in this regard. It is the common cutworm (also known as bogong moth) which was shown by Ian Common of CSIRO to migrate from the black soil plains of NSW to the high country of NSW and Victoria. He found the moths sheltering in caves through summer to fly northwesterly in autumn as the autumn rains promoted new broad leafed growth on the black soil plains. Other species return as a subsequent generation if they return at all. I have trapped huge numbers of common cutworm on the scree slopes of Mt Barrow in summer and suspect that it treats the crevices of Tasmanian mountain screes as just an extension of the caves of the mainland high country. After all, it's just a short flight.

The spectrum of known or suspected immigrants in my light trap is different every year depending on conditions in various mainland breeding areas and the vagaries of the wind. The empty winter landscape suddenly fills with insects. Between the spring squalls, hoverflies hover on the daisies and *Diosma* while Painted Ladies and the occasional Admiral flit by. For me, every spring is a lucky dip.

Lionel Hill
Department of Primary Industry, Water and Environment
PO Box 303
Devonport TAS 7310
Lionel.Hill@dpiwe.tas.gov.au

Honours and post-graduate projects at the University of Tasmania

This list was kindly provided by Jane Elek (Forestry Tasmania) on behalf of the Australian Entomological Society.

School of Agricultural Science/ CRC for Sustainable Production Forestry

BEVERIDGE, Natasha (PhD) The biology, ecology and biocontrol of eucalypt beetles associated with *Eucalyptus nitens.*

CANDY, Steve (PhD) Mathematical models and sampling procedures to support integrated pest management of leaf beetles.

HOWLETT, Bradley (PhD) Factors affecting the egg batch distribution of *Chrysophtharta bimaculata* (Coleoptera: Chrysomelidae) on eucalypts and their implications for larval survival.

LUKACS, Zoltan (PhD) Factors affecting the seasonal development of Autumn gum moth *Mnesampela privata* (Lepidoptera: Geometridae).

RAPLEY, Luke (Hons) Pupal diapause and larval feeding performance in Autumn Gum Moth (*Mnesampela privata*).

SIMMUL, Tara (PhD) Biology of the fireblight beetle, *Acacicola orphana* (Erichson) (Coleoptera: Chrysomelidae), a defoliator of wattle.

School of Plant Science

HINGSTON, Andrew (PhD) Pollination ecology and gene flow in *Eucalyptus globulus*.

LAWRENCE, Rachel (Hons) The response of dependant insect communities to plant ontogeny in eucalypts.

School of Geography and Enviromental Studies

ARCHER, Louise (Hons) Effects of forest management on bryophyte-dwelling beetles.

DUNN, Helen (PhD) Conservation values of fresh water insect fauna.

KEBLE-WILLIAMS, Jane (Hons) Effect Of insect herbivory on rain forest canopy in Tasmania.

MELLICK, Stephen (PhD) Impact of honey bees on pollination ecology of leatherwood.

MICHAELS, Karyl (PhD) Carabidae as environmental indicators.

SMITH, Kindi (Hons P/T) Effects of spatial distribution of vegetation on populations of the *Eucalyptus* leaf beetle, *Chrysophtharta bimaculata.*

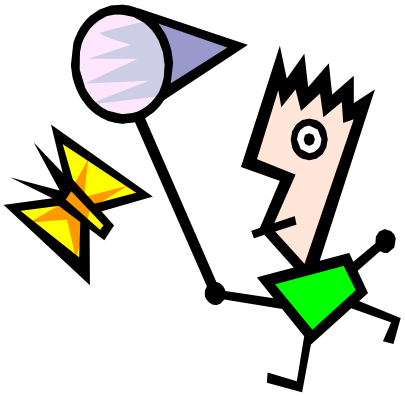
School of Zoology

YOUNG, Cathy (Hons) Biosystematics of the genus *Paralaea* Guest (Geometridae).

HANSEN, Brita (PhD) Biology of the Tasmanian giant fresh-water crayfish, *Astacopsis.*

Coming to Tasmania for a quick sweep?

A notice of your planned collecting trip in *Invertebrata* could put you in touch with local experts, enthusiasts and volunteer helpers. Local zoologists would also be interested to hear where you went and what you found!



Heads or tails?

If cut in two, many species of earthworm will regrow the missing part. Regeneration of the hinder end takes place much more readily than that of the anterior, the regrown tail often being paler and narrower than the rest of the body. Head regeneration is less commonly encountered as the worm is unable to feed, and lies sad and dormant in the soil until the mouth re-forms.

The injury which initiates regeneration is often caused by predators (birds, mammals, snakes, amphibians and a range of invertebrates, including other worms), by mechanical damage (e.g. a garden spade), or by autotomy (the self-amputation and shedding of the tail in response to abuse). Stephenson (1930) devotes an entire chapter of his great monograph to this subject, while Gates (1972) gives specific details for a range of exotic species. Included in this latter work are examples of regeneration in *Eisenia fetida* (tiger worm) and *Perionyx excavatus* (Indian blue worm).

Gates also gives instances of 'heteromorphic' regeneration, when a head grows where a tail should be and *vice versa*, but survival of such freaks is unlikely. Depending of the level and severity of the damage, it is theoretically possible to get two worms when an individual is cut in half — although we cannot really call it an individual if it can be divided! Head regeneration in an Australian native earthworm has recently been discovered in one of the 200 or so Tasmanian species currently in the process of being described (Blakemore, in prep.).

Surprisingly, the following conversation overheard on a Glasgow bus is therefore correct:

'Jimmy, see if ye cut a wurrm in half, ye get two wurrms.'

'No' if ye cut it lengthways, Hamish!'

Rob Blakemore
Queen Victoria Museum & Art Gallery
Wellington Street
Launceston TAS 7250
rob@qvmag.tased.edu.au

References:

Blakemore, R.J. (In prep.) Tasmanian earthworm grows second head.

Gates, G.E. 1972. Burmese Earthworms. *Trans. Am. Philosoph. Soc.* N.S., 62(7): 1-326.

Stephenson, J. 1930. *The Oligochaeta.* Oxford, Clarendon Press.

New flowers visited by Bumble Bees

The plants listed below should be added to my 1996 catalog of species visited by Bumble Bees in Tasmania ('Flower visitation by the Bumble Bee *Bombus terrestris* (L.) (Hymenoptera: Apidae) in Tasmania.' *Australian Entomologist* 23: 33-35). The aggregate list now stands at 216 plants: 20 natives and 196 introduced species (formerly 14 and 156, respectively). No doubt there are more. If any reader knows of plants visited which don't appear on the lists, I would be happy to get that information.

Trevor Semmens
Department of Primary Industries, Water and Environment
GPO Box 192B
Hobart TAS 7001
Trevor.Semmens@dpiwe.tas.gov.au

Native Species

Eucalyptus globulus (Bluegum)
Grevillea spp. (Grevillea)
Leptospermum petersonii (Lemon Scented Tea Tree)
Leptospermum scoparium (Tea Tree)
Melaleuca diosmifolia (Green Bottlebrush)
Melaleuca nesophila (Western Tea Myrtle)
Sollya heterophylla (Western Australian Bluebell)

Introduced Species

Abelia x *grandiflora* (Abelia)
Bougainvillea spectabilis (Bougainvillea)
Brugmansia suaveolens (Angels Trumpet)
Campanula medium (Canterbury Bell)
Cheiranthus sp. (Wallflower)
Coriandrum sativum (Coriander)
Cucurbita pepo (Zucchini)
Cyclamen hederifolium (Cyclamen)
Echeveria sp. (Echeveria)
Echinops bannaticus (Globe Thistle)
Endymion hispanicus (Spanish Bluebell)
Fragaria x *ananassa* (Strawberry)
Fuchsia spp. (Fuchsia)
Genista monspessulana (Canary Broom)
Hebe buxifolia (Veronica)
Hebe speciosa (Hebe)
Heliotropium anborescens (Cherry Pie)
Hypochoeris radicata (Catsear)
Hyssopus officinalis (Hyssop)
Ilex aquifolium (Holly)
Lithodora diffusa (Heavenly Blue)
Lychnis sp. (Campion)
Mentha piperata (Peppermint)
Metrosideros excelsa (Pohutukawa)
Ocimum basilicum (Basil)
Pandorea jasminoides (Tecoma)
Petroselinum crispum (Parsley)
Phacelia campanularia (Californian Bluebell)
Pilea sp. (Aluminium plant)
Primula x *polyantha* (Polyanthus)
Prunus armeniaca (Apricot)
Prunus cerasifera (Cherry Plum)
Prunus x *yedoensis* (Flowering Cherry)
Ribes rubrum (Redcurrant)
Rubus loganobaccus (Loganberry)
Rubus x sp. (Thornless Youngberry)
Scabiosa caucasica (Perennial Pincushion)
Senecio jacobaea (Ragwort)
Serbus sp.
Spiraea sp. (Spirea)
Vaccinium corymbosum (Blueberry)
Veronica lalifolia (Speedwell)

Conservation management of *Hoplogonus simsoni*

Tasmania has a rich endemic stag beetle fauna with over 30 species described. Simsons stag beetle, *Hoplogonus simsoni*, is considered one of the finest. When *H. simsoni* was listed as a vulnerable taxon under the Tasmanian *Threatened Species Protection Act 1995* it was known from only five localities in the Blue Tier region of northeast Tasmania and little was known of its habitat requirements. However, we have recently completed a study (involving lots of scrabbling through leaf litter and dirt on over 4000 one-square-metre plots) which has increased the number of known localities to over 100. The study also revealed some other beetle secrets including the characteristics of its preferred habitat, and this has enabled us to develop a detailed conservation management strategy for the species and its habitat, one of the few such strategies in Australia for an invertebrate.

H. simsoni is a large, flightless, black beetle with a body length sometimes reaching 25 mm. The males have greatly enlarged, elongate mandibles. *H. simsoni* is easily distinguished from other stag beetles by the humeral spines or spurs on its elytra. It is a relatively long-lived beetle, its larval stage lasting up to three years and the adult living one to two years. The larvae are soil-dwelling and are believed to feed on organic matter in the upper soil horizon. The adults are free-living but non-feeding, wandering through leaf litter during spring and summer nights (presumably looking for a mate) and sheltering under rocks, logs and leaf litter during the day.

H. simsoni was first described in the 1850s and was left pretty much to itself for the next 130 years until it caught the eye of stag beetle collectors. The authors became involved when these same beetle collectors advocated the listing of the species under the *Threatened Species Protection Act 1995*. The conservation of *H. simsoni* became a serious issue for land managers in the summer of 1995/96 when roading commenced in an area containing an exceptionally high-density population of the beetle. An agreement was reached between Forestry Tasmania and the Tasmanian Parks and Wildlife Service to defer harvesting of this area until further research was conducted on the beetle.

Having obtained research funds, we began a detailed study of the distribution, population densities, local habitat requirements and impact of logging on the beetle in late 1996. This study found that *H. simsoni* was restricted to an area of 240 square kilometres in the Northeast and that the area of suitable habitat within its range was only 174 square kilometres. The beetle was not evenly distributed throughout its range, with moderate- to high-density populations occurring in a narrow band along the eastern edge, and apparently isolated low-density populations towards the west and north.

Generalised linear modelling of the relationship between beetle abundance and habitat variables enabled us to identify optimal habitat for the beetle. The characteristics of this habitat appear to relate to the beetle's need for a cool, moist, stable microclimate and an absence of wildfire for some time.

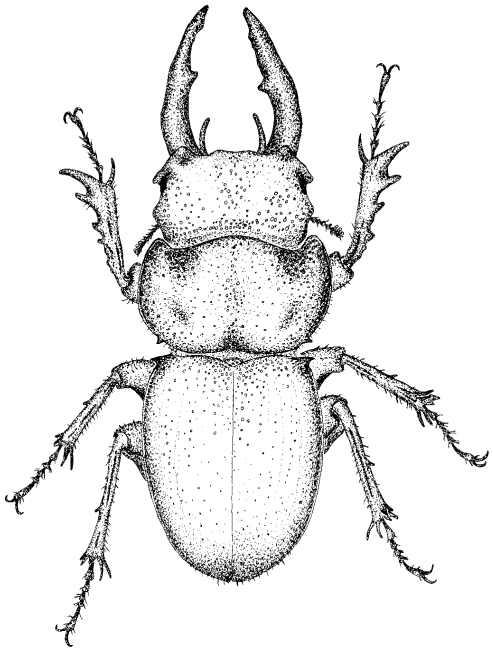
Predictive maps of the distribution of *H. simsoni* were constructed using 100 m grid square units by coupling the habitat models with GIS data held by Forestry Tasmania, something that has rarely been attempted for invertebrates. Subsequent field-testing of these models (an even rarer development) has found them to be remarkably accurate.

The predictive maps and the results from the field testing have formed the basis of a proposed conservation management plan. Most of the beetle's quality habitat is managed as production forest, and unfortunately for the species there is a strong correlation between quality beetle habitat and areas targeted for conversion to pine plantation in northeast Tasmania. Our study clearly showed that conversion of native forest to pine plantations can result in local extinction of the species.

Our recommendations for the conservation of *H. simsoni* are aimed at limiting the impact of plantation establishment. A three-tiered strategy has been proposed which will (1) reserve areas of optimal habitat as Wildlife Priority Areas, (2) maintain links between these and other areas of optimal habitat, and (3) manage forestry activities by prescription over the rest of the beetle's range.

Work on other stag beetles, including two newly described species of *Hoplogonus*, is planned for this summer. These species appear to be at even greater risk of extinction as their current known ranges are in the order of a few tens of square kilometres.

Jeff Meggs & Dr Sarah Munks
Forest Practices Board
PO Box 180
Kings Meadows TAS 7249
sarahm@fpb.tas.gov.au
jeffm@fpb.tas.gov.au



Hoplogonus simsoni male (drawing by Karen Richards)