Tarsus

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Next Meeting of the Entomological Society of NSW Inc

Where: Meeting Room 2, Ermington Community Centre, River Road, Ermington
When: 7.30 pm on Wednesday, 2 August 2006
Speaker: Graeme Smith M.Sc (agric)
Title: Silverfish and Jumping Bristletails (Thysanura) - morphology, biology and other trivia

Most Australians only know silverfish from the occasional encounter with *Ctenolepisma longicaudata* in their cupboards or bathrooms. This talk will take a broader look at the two orders of primitively ectognathous hexapods.

The jumping bristletails (Archaeognatha) are generally collected under rocks or on coastal cliffs. The true silverfish (Zygentoma) have much broader adaptations and can be found in deserts, caves and as inquilines with ants or termites.

Silverfish
www.myers-services.com/learn_more/household_pests.php

The talk will be illustrated with photos, drawings from the literature and scanning electromicrographs to illustrate some of the more unusual adaptations that can be found in these often overlooked orders of insects.

Jumping Bristletail (Archaeognatha: Machilidae)
photograph © Alex Wild 2003

Subtrinemura anemone Smith from caves in the NSW Southern Highlands

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TARSUS is prepared for ESNSW by Simone McMonigal Email: smcmonigal@hotmail.com

LAST MEETING

SUMMARY OF THE TALK GIVEN IN JULY 2006

INSECTICIDAL CONTROL OF SMALL HIVE BEETLE -
PROGRESS TOWARDS PRACTICAL OPTIONS FOR BEE-KEEPERS

Dr. Garry Levot, Principal Research Scientist
Elizabeth Macarthur Agricultural Institute
NSW Department of Primary Industries, Woodbridge Road, Menangle, NSW 2568

In the long term, control of Small Hive Beetle will rely on changes to management of hives and stored comb and on a combination of physical and, for some bee keepers, chemical intervention to reduce beetle numbers. Work supported by the Rural Industries Research and Development Corporation (RIRDC) and NSW Department of Primary Industries has made significant progress in several areas including:

- the use of cold room and freezer temperatures to kill all life-stages of the beetle
- demonstration that phosphine fumigation mimicking treatment for wax moth is effective in disinfesting stored comb of all life-stages of the beetle
- laboratory experiments that measured the effectiveness of several insecticides, including permethrin, against Small Hive Beetle larvae
- successful development of an efficient method of rearing the beetle under laboratory conditions without the use of brood or stored comb

A Pesticide Order allowing bee keepers to use permethrin soil drenches is in place in NSW and data generated during our project was submitted by AHBIC to the Australian Pesticides and Veterinary Medicines Authority (APVMA) to support an application to extend the use of aluminium phosphide tablets for Small Hive Beetle disinfestation of stored comb.

Most interest has focussed on our ambitious project to develop an insecticidal refuge trap for use in bee hives. We started with almost nothing. Regulatory authorities in the United States of America had legitimised the use of Checkmite™ coumaphos strips, routinely used for varroa control, for use against Small Hive Beetle. There were problems with coumaphos residues in honey but apparently, the situation was no worse than that caused when the strips were used against varroa. I thought we could do better and I believe the approach we are taking has significant advantages over that used in the USA, particularly with respect to reduced risk of insecticide contamination of honey and other bee products.

The research strategy is based on three cornerstones:

- the need to identify an insecticide with suitable characteristics and efficacy against Small Hive Beetle adults
- the need to develop a delivery system that exploits vulnerabilities in the behaviour of the adult beetles
- an absolute commitment to protect bees and bee products from the risk of insecticide poisoning

The Steps so far:
We have undertaken research in areas built on each of these three cornerstones.

1. ***A suitable insecticide:*** Laboratory tests of seven insecticides with potential for the control of adult beetles were completed as part of RIRDC funded project **DAN216** ***Insecticidal Control of Small Hive Beetle***. One insecticide, fipronil, was much more effective against adult beetles and was also less likely to cause unacceptable residues in honey or wax. The other compounds were rejected on the grounds of poor efficacy, unfavourable residue risk, or both.

2. ***A clever delivery system:*** An innovative way of delivering the insecticide that took advantage of the shy habits of the beetle and its preference to rest in cracks and crevices away from the bees was also extensively tested. We used pieces of insecticide-treated corrugated cardboard covered with a layer of adhesive-backed aluminium foil. Results of laboratory tests with these artificial harbourages indicated that 98% of beetles contained within sealed boxes of stored comb were killed because they chose to hide inside the cardboard. Further work went into determining an appropriate concentration of insecticide that would be effective, provide adequate persistent activity against beetles and have a useful shelf-life prior to use.

Photos by: Maryann Frazier

3: ***Management of risk to bees:*** Insecticide residue trials with the prototype harbourages were conducted in research hives owned by NSW DPI. These trials aimed to measure the risk to hives and the potential contamination of honey as a result of the use of the lethal harbourages. Results of trials in which honey collected from hives containing the prototype lethal harbourages was analysed for contamination indicated that minimal residues could be expected unless bees damaged the harbourage. If damage occurred residues in honey were still low, but unacceptable. Perhaps even more importantly, hive death could result.

During 2005 trials of the prototype insecticide treated harbourage were conducted in strict accordance with the conditions of APVMA Research Permit **PER-8167**. Permission was granted to treat only 20 infested commercial hives located in western Sydney. Results of these limited trials demonstrated that 87-93% reduction in the number of beetles inside hives was achieved. At one location the treated harbourages were stuck to the uneven surface of the bottom board to prevent beetles avoiding treatment by hiding between the corrugated bottom board and the harbourage. In these hives very few dead beetles were found probably

because they had been removed by the bees. At other locations large numbers of dead beetles were usually found under the harbourage. Damage caused by bees to the harbourage in one of the hives led to the death of that hive. Clearly, a more robust 'bee-proof' housing for the insecticide treated cardboard was required. After careful consideration a list of features needed in the new housing was made. The features were:

- Two-piece rigid plastic design
- Tamperproof after assembly (locking pins)
- Precise size openings that allow beetles in but exclude bees
- Protective of C flute cardboard insert (no user access)
- Cardboard insert positioned 8 mm in from openings
- Black
- Compatible with silicone adhesives
- Inexpensive
- Disposable in household garbage

A second prototype housing was made in consultation with a specialist plastics company. This was modified before the final design was accepted. Dies for injection moulding of the two piece design were made during April 2006 and a production run of 1000 units was ordered at that time. Simultaneously an order was placed for knife-cut cardboard inserts, and fresh insecticide was obtained.

To obtain product registration trials must be conducted using the final end-use-product. We are currently at the stage of repeating the insecticide residue trial with the finalised end-use-product. This involves placement of a harbourage inside each of five NSW DPI research hives and collecting 'before' and 'after' honey samples. It is hoped that this trial can be completed before winter as the onset of cold conditions will preclude work with bees. Results of residue analysis of the honey, together with the results of the field trials conducted with the earlier prototype harbourage will form the basis for an application to the APVMA for a Pesticide Permit to conduct field tests with the product in commercial apiaries next spring.

What's next?

To successfully bring the product to commercial reality requires that the residue results are favourable, that bees are not harmed and of course, that the device is effective in reducing beetle numbers in infested hives. The company with exclusive rights to fipronil, must be convinced to allow a manufacturer to register the product or register it themselves. None of these things is guaranteed at this time but results to date have been extremely promising and it is hoped that with most of the Research and Development investment already committed by RIRDC and NSW DPI, that the product will attract a commercial partner.

Acknowledgment:

The research reported in this paper was jointly funded by the Rural Industries Research and Development Corporation (RIRDC) and the NSW Department of Primary Industries.

Australian Government

Rural Industries Research and Development Corporation

NSW DEPARTMENT OF PRIMARY INDUSTRIES

INSECT OF THE MONTH

Bogong moth - *Agrotis infusa* (Boschinval) - Garry Levot

The Bogong moth is one of the better known Australian insects because of the exceptional moth invasions that frequently occur in south eastern Australia. We are indebted to nineteenth century explorers, anthropologists, naturalist and others, (eg. Bennett 1834, Macarthur and de Strezilecki 1840, Eyre 1859, Scott 1873 and Helms 1890, 1895), for recorded information about the collection and consumption of the moths, – variously called "bugongs", "bogongs", "bougongs", "boogans", "bougans" and "boganks" – by the Aboriginal tribes between October and February each year. Places where Aborigines camped and which were familiar to them were often named after events that happened there, from supplies that were plentiful in the vicinity or from the physical features of the locality. Hence, the extant place names – Bogong Mountains, Bogong High Plains, Mount Bogong and Bogong (township) in south eastern Australia – are derived from the other Aboriginal name.

By 1850 it had been established that the moths resided in large numbers in mountainous areas of south eastern Australia from about October to February each year, and were hunted and eaten by Aboriginal tribes in the vicinity. In September – October 1867 the first recorded moth invasions of Sydney occurred. In October 1889 another moth invasion took place and the first reports of prior caterpillar (cutworm) activity in inland NSW were noted (Oliff 1889). In 1898 another moth invasion occurred. This was followed by a widespread caterpillar outbreak in inland NSW in late winter-early spring 1899. A map of the outbreak was published in the Agricultural Gazette of NSW (Froggatt 1899). Additional caterpillar outbreaks occurred in 1900 and 1906 and these were either followed by, or preceded by, moth invasions in 1900 and 1905, respectively (Froggatt 1990, Gurnery 1906). By 1906 it was known that a generation of caterpillars completed development and pupated in about September – October and that the resultant moths migrated several hundred kilometres to the mountainous areas of south eastern Australia. In autumn they must make the return journey from the mountains to the slopes and plains. If the winds blow the wrong way many don't make the distance or drown in the Tasman Sea.

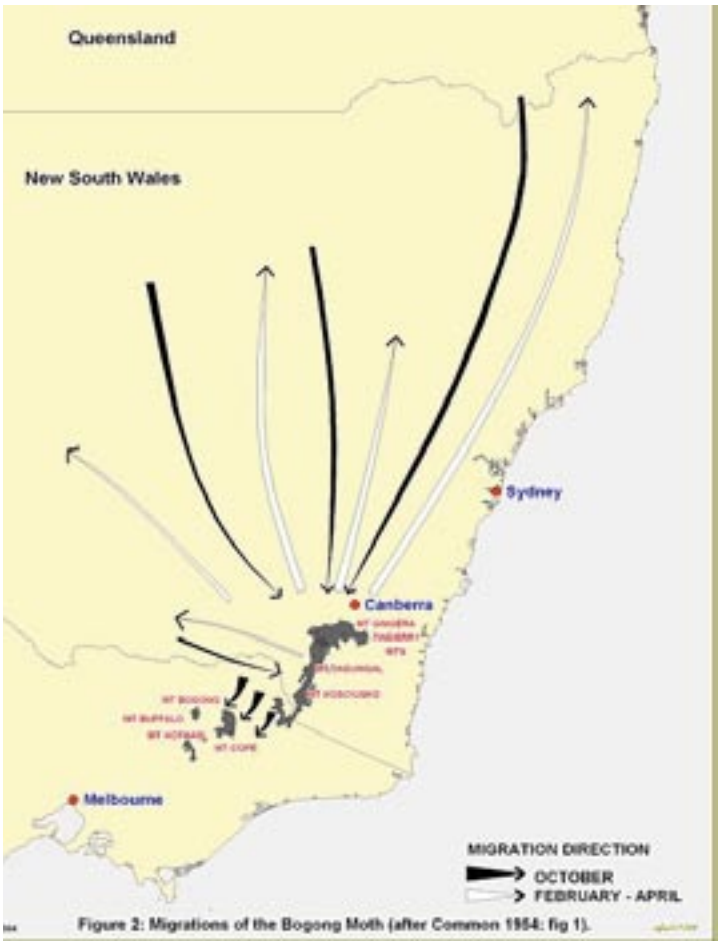

Figure 2: Migrations of the Bogong Moth (after Common 1954: fig 1).

UPCOMING EVENTS

Ku-ring-gai Festival of Wildflowers
Saturday & Sunday 26-27 August
Ku-ring-gai Wildflower Garden, 420 Mona Vale Road, St Ives

The focus of the annual Festival is on nature education for the whole community, with the ultimate aim of protecting Australian native flora and fauna. There will be beautiful displays of native flower arrangements, and many exhibits with live animals, all arranged by Societies focussed on nature conservation. Many native plants and environmental books will be for sale. Guided bushwalks, face painting and other activities are arranged by the local Council.

The Entomological Society of NSW, greatly assisted by the Society for Insect Studies, will again participate by presenting displays of both preserved and live insects to spread knowledge and enthusiasm, and to advertise our existence and activities. We also offer Spiny Stick Insects for sale, a family quiz with book prizes, and a guided bush walk.

Any members who wish to take part (ie. 'man' our stall and talk to the public) are most welcome. There is a minimal entry fee to the Festival, but volunteers enter free of charge. If you would like to contribute with a display or assist at our stall, please contact:

Gith Strid-Nwulaekwe
Tel (02) 9888 9011,
or 0418 206622

Partial stall team at the 2004 Festival

SEMINAR SERIES 2006

Date	Speaker	Title
2 August	Graeme Smith	Silverfish and jumping bristletails (Thysanura) - morphology, biology and other trivia
6 September	Greg Holwell Behaviour Ecology Lab Department of Biological Sciences Macquarie University	Mating behaviour in *Ciulfina* praying mantids: Who needs cannibalism?
4 October	To be advised	
1 November	Dr Cameron Webb Medical Entomology Department Westmead Hospital	Mosquito Surveillance Techniques
6 December	To be advised	

Venue:
Meeting Room 2
Ermington Community Centre
10 River Road, Ermington

Meetings start at 7.30pm
Talks run for around 45 minutes, with 10 minutes for questions.
Afterwards a supper is provided.
Guests are most welcome.

Getting there:

By Car: From Victoria Rd turn into Spurway St (head towards Parramatta River). Turn right into Jackson St then left into River Rd. If heading north on Silverwater Rd, turn right into Victoria Rd then proceed as above. If heading south on Silverwater Rd take the Parramatta off ramp, cross Victoria Rd and proceed into River Rd. If you miss the off ramp, turn left into South St, then left into River Rd.

By Bus: Routes 525, 523 and L20 depart from Argyle St near Westfield shopping centre near Parramatta station. Routes 523 and L20 depart from West Ryde station. Get off at the Ermington shops. River Rd passes between the supermarket and the hotel.

(Information: Martin Horwood martinh@sf.nsw.gov.au phone 02 9872 0111)

Photo credits:
Front page Bogong Caterpillar title photo: http://agspsrv34.agric.wa.gov.au/agency/pubns/farmnote/1994/F05994.htm
Bogong Moth Photo: http://www.ento.csiro.au/Ecowatch/Primary/butterflies/pages/agrotis_infusa.htm
Bogong Moth Caterpillar Photo: Merlin Crossley
Bogong Migration Map from: http://www.aph.gov.au/library/pubs/RB/2005-06/06rb05.htm
Campfire Photo: http://www.flindersoutback.com/understars.htm

BOGONG MOTH DAMPER

Before arsenic found its way into the moths, they made a fine dinner. Here's a modern adaptation of an ancient recipe.

- A generous handful of moths
- 1 cup plain flour
- 1 cup self-raising flour
- 1 cup powdered milk
- 1/4 teaspoon raising agent
- water

Using a mortar and pestle (or near equivalent) pound up the moths with the powdered milk. Mix in the remaining dry ingredients. Add sufficient water to make a stiff dough and shape into a ball. Flatten the ball to a height of 2.5 centimetres, lightly flour the surface and cook in ash, camp oven, or domestic oven until cooked through. Serve hot.

Recipe courtesy of Vic Cherikoff
http://www.abc.net.au/science/scribblygum/november2002/default.htm

ARE YOUR DETAILS UP TO DATE?

Volume 35 of **General and Applied Entomology**, the Journal of the Entomological Society of New South Wales Inc. was published and posted out to all members in June.

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