September 2007

Issue No. 577

CIRCULAR OF THE ENTOMOLOGICAL SOCIETY OF NEW SOUTH WALES Inc

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, 5 September 2007

Speaker: Dr Peter Gillespie,
DPI
Orange Agricultural Institute

Australian Whitefly Diversity - a synopsis of the Aleyrodidae in Australia

Whilst most gardeners are familiar with a small number of pest whitefly species, these one or two polyphagous, cosmopolitan species do not typify the family Aleyrodidae particularly in Australia. Almost uniquely amongst the insects, the majority of taxonomic information about whiteflies is gained from the immature stages and these are sessile and usually highly host specific. Australia has a diverse and eclectic whitefly fauna closely allied to the radiation of its flora. An overview of the systematics and diversity will show Australia has representatives of at least three subfamilies (including one undescribed subfamily) and includes an enormous amount of undescribed species with the currently described species representing 40% or less of the estimated fauna. Displays of a variety of described and undescribed whitefly species will amply display the diversity of the Australian whiteflies."

General Information

ZOO VISIT
November Meeting
Wednesday 7th November, 2007

Come and see the Invertebrate Section of
"Backyard to Bush"

Thanks to a kind offer by Warwick Angus and some Taronga Park Zoo staff, the Society will be holding their next meeting in this section of the zoo.

Starting at 7pm, an inspection of the facilities will be followed by a BBQ, catered for by the Society. Details to follow by email but numbers will be limited to 30 people. Cost per person should be around $10.

POSITION STILL VACANT

PRESIDENT

The Entomological Society of NSW still requires a member of the Society with an interest in setting the direction of the Society over the next year. Is this something you think you'd like to try?

If you would be interested just contact any of the Council members.

TARSUS is prepared by for ESNSW by Graeme Smith Ph: 02 9981 3749 Email: le_gbsmith@optusnet.com.au

Paropsis charybdis – a complex story of biological control

A synopsis of the talk presented at the July meeting

Dr Sarah Mansfield
Faculty of Agriculture, Food and Natural Resources, University of Sydney

Background

The tortoise beetle, *Paropsis charybdis* is the most serious defoliator of *Eucalyptus* species in New Zealand (Figure 1) and is a significant risk to growers of susceptible species such as *E. nitens*. Heavy defoliation results in a crown devoid of current foliage with a proliferation of juvenile foliage on the main stem and larger branches. Repeated defoliation may result in crown dieback; complete defoliation over two consecutive years can cause death in young trees (Figure 2).

Figure 1. Adult *Paropsis charybdis.* (Photo: ensis archives).

Paropsis charybdis limited the development of *Eucalyptus* forestry in New Zealand until the introduction of an egg parasitoid, *Enoggera nassaui*, from Australia in 1987 provided population control (Figure 3, Kay 1990). The effectiveness of this control agent is now threatened by the arrival in New Zealand of a hyperparasitoid, *Baeoanusia albufunicle* (Figure 4, Murphy 2002). High levels of hyperparasitism on *E. nassaui* have been recorded in the field (Jones and Withers, 2003, Jones and Mansfield, 2004). A second Australian egg parasitoid, *Neopolycystus insectifurax*, was also recorded in 2001 for the first time in New Zealand (Figure 5). This species has potential for control of *P. charybdis* because it is not attacked by *B. albifunicle* and has been the subject of a mass-rearing and release programme. However little is known about the basic biology and attack behaviour of *E. nassaui* and *N. insectifurax* so it is difficult to predict the effect *N. insectifurax* will have on *P. charybdis*.

Figure 2. Feeding damage from *Paropsis charybdis* on *Eucalyptus nitens* compared with undamaged *Eucalyptus fastigata*. (Photo: ensis archives).

Prior to the introduction of *E. nassaui* in 1987, an Australian ladybird, *Cleobora mellyi*, was introduced for control of *P. charybdis* (Figure 6, Bain *et* al. 1979). *C. mellyi* became established in only one release area in the South Island (Maori Bay, Marlborough Sounds) and the species persists there today (Satchell et al. 2004). Previous studies found *C. mellyi* can be reared from egg to adult on a mixed diet of psyllids and *P. charybdis* eggs. Several artificial diets have been developed that are suitable for rearing larvae from hatch to pupation (Bain et al. 1984). However the rate of larval development when fed exclusively on *P. charybdis* eggs has not been determined. In eucalypt plantations at certain times of year, *P. charybdis* may be the sole food source for larval *C. mellyi*. Therefore it is important to know if larval development is successful on such a diet.

Although *C. mellyi* is a voracious feeder on *P. charybdis* eggs, it does require other prey, particularly psyllids, in order to reproduce successfully (Bain et al. 1984). The absence of such prey at most sites at the time of release is thought to have limited the establishment of this predator. At least five new species of eucalypt psyllids have become established in New Zealand (Withers 2001) since the initial releases of *C. mellyi,* which took place from 1977 to 1980. With a wider variety of

suitable prey present in eucalypt plantations it may be possible to establish *C. mellyi* over a broader geographic range. It is unclear whether the presence of *C. mellyi* would actually improve biological control of *P. charybdis* or interfere with existing control agents (the egg parasitoids) and thereby reduce the degree of control exerted by those agents. Parasitised *P. charybdis* eggs take longer to hatch under natural conditions than unparasitised eggs, so there may be a greater risk of predation on parasitised eggs. The feeding preferences of *C. mellyi* for psyllids, parasitised and unparasitised eggs of *P. charybdis* will have a major influence on the outcome of any future interactions between the various biological control agents of *P. charybdis*.

Figure 3. Adult female *Enoggera nassaui* attacking an egg of *Paropsis charybdis*. (Photo: S. Mansfield).

Two separate research projects were conducted from 2004 to 2006 on the biological control of *P. charybdis*. The first was a comparative analysis of the biology and behaviour of the primary parasitoids, *E. nassaui* and *N. insectifurax*. The second examined the feeding preferences of *C. mellyi*.

Results

The lifespan of adult *E. nassaui* and *N. insectifurax* was similar (approximately 40-50 days on average) when supplied with food. The parasitism rate of *E. nassaui* was consistently higher than *N. insectifurax*, particularly when hosts were available for a short time. Both species defended host eggs from other females and would engage in physical combat if a competitor did not retreat from the hosts. The presence of competitors did not affect the parasitism rate of *E. nassaui*, despite the time spent in defence of host eggs. In contrast, *N. insectifurax* spent substantial amounts of time on defence yet rarely attacked the hosts. The explanation for this difference in behaviour between the two species is not clear.

Figure 4. Adult female *Baeoanusia albufunicle*, a hyperparasitoid of *Enoggera nassaui*. (Photo: S. Mansfield).

Adult and larval *C. mellyi* showed well-developed preferences for psyllids, followed by unparasitised *P. charybdis* eggs. Parasitised *P. charybdis* eggs were not a favoured food choice although some consumption did occur. The foliage types preferred by psyllids and *P. charybdis* will contribute to a physical separation of the predatory and parasitic biological control agents on *E. nitens*, the eucalypt species most affected by *P. charybdis* in New Zealand.

Psyllids are an essential food for breeding by *C. mellyi* and act as a trigger for oviposition. The bluegum psyllid (*Ctenarytaina eucalypti*) is a free living psyllid that occurs widely on the juvenile foliage of *E. nitens* but not on the mature foliage (Farrow, 1996). In contrast *P. charybdis* oviposits and feeds on the mature foliage, not the juvenile (Edwards 1982). Therefore it is unlikely that *C. mellyi* will actively disrupt biological control of *P. charybdis* by the egg parasitoids *E. nassaui* and *N. insectifurax.*

Figure 5. Adult female *Neopolycystus insectifurax* on eggs of *Paropsis charybdis*. (Photo: S. Mansfield).

Conclusions

Behavioural observations of the two egg parasitoids suggest *N. insectifurax* is unlikely to replace *E. nassaui* as an effective parasitoid of *P. charybdis*. The host range and host preference of these two parasitoids is being investigated further to try to explain the differences in their attack behaviour and parasitism rates. *Cleobora mellyi* is not expected to have a negative effect on biological control of *P. charybdis* and may improve control of this pest, if *C. mellyi* can be established more widely in New Zealand.

References

Bain, J., Faulds, W. and Alma, P. J. (1979) Biological control for eucalypt defoliator? *What's New in Forest Research,* **75,** 1-4.

Bain, J., Singh, P., Ashby, M. D. and Van Boven, R. J. (1984) Laboratory rearing of the predatory coccinellid *Cleobora mellyi* [Col.: Coccinellidae] for biological control of *Paropsis charybdis* [Col.: Chrysomelidae], *Entomophaga,* **29,** 237-244.

Edwards, P. B. (1982) Do waxes on juvenile *Eucalyptus* leaves provide protection from grazing insects? *Australian Journal of Ecology,* **7,** 347-352.

Farrow, R. (1996) *Insect pests of eucalypts on farmland and in plantations in southeastern Australia,* CSIRO Publishing, Collingwood, VIC.

Jones, D. C. and Withers, T. M. (2003) The seasonal abundance of the newly established parasitoid complex of the eucalyptus tortoise beetle (*Paropsis charybdis*), *New Zealand Plant Protection,* **56,** 51-55.

Jones, D. C. and Mansfield, S. (2004) *Paropsis* update, *Forest Health News,* **141,** 1.

Kay, M. K. (1990) Success with biological control of the eucalyptus tortoise beetle, *Paropsis charybdis*, *What's New in Forest Research,* **184,** 1-4.

Murphy, B. D. (2002) New insect threatens control of eucalyptus tortoise beetle, *Forest Health News,* **117,** 2.

Satchell, D., Hood, I. and Bain, J. (2004) *Cleobora* alive and well in the South Island, *Forest Health News,* **140,** 1.

Withers, T. M. (2001) Colonization of eucalypts in New Zealand by Australian insects, *Austral Ecology,* **26,** 467-476.

Figure 6. Adult *Cleobora mellyi* feeding on eggs of *Paropsis charybdis*. (Photo: ensis archives).

Circular Editor's comments

It's great to see the photos being submitted with articles and presentations. With standard computer programmes it is quite easy to put these into the document without making the file size too big. And it definitely makes the Circular more interesting.

I would very much appreciate any offers of content you may have so that we can present a variety of articles. Dinah's contribution on the Citrus Fruit Borer is a much appreciated example.

It doesn't take much effort to put together an "Insect of the Month" article and you can often find a picture on the internet that is not copyright protected if you don't have one you've taken yourself. The cave cricket article in this issue only took an hour or two to put together and I learned a few new interesting things during the exercise.

The Councillors put a lot of time into the Society to keep things running and it would be great if a few of the members who are unable to be active participants at meetings could increase their involvement by contributing an article or item of interest every so often. I don't mind helping to put the final article together if you can provide the basic information. The most important thing is to hear about different areas of entomology outside those that we hear about at meetings.

As mentioned in previous issues, Tarsus will be sent by email only in the week before each bi-monthly meeting. Please make sure that we have your latest email address or else speak to one of the members to arrange to receive your copy by some other means. Change of address details should be sent to me by email or to the Society by post.

Graeme Smith
Circular Editor

July meeting- Show & Tell

Illustration courtesy of http://www.padil.gov.au use with permission

Ted Taylor reported on the recent identification of the Sycamore Lace Bug *Corythucha ciliata* (Say) (Hemiptera: Tingidae: Tinginae) and bought along a few samples for our interest. This insect was recently identified by a visiting entomologist from Wales. It has probably been here for at least 10 years and is quite widespread. The insect can have multiple generations each year and over-winters under the bark. Although the lace bug is reported as being capable of causing severe defoliation, they don't appear to be causing a lot of damage to local trees so far.

Fred Swindley bought along an orange to the meeting in which he suspected the presence of a lepidopteran larva. Attempts to find the culprit unfortunately proved unsuccessful.

Graeme Smith reported on his recent visit to the Centro de Zoologia, within the Instituto de Investigação Científica Tropical where he met with Dr Luis Mendes to learn more about silverfish. This institute has a long history of work on African fauna and Dr Mendes has revised all of the silverfish families. He has a very comprehensive collection of specimens and literature and was very supportive.

The Centro de Zoologia building, Lisbon, Portugal

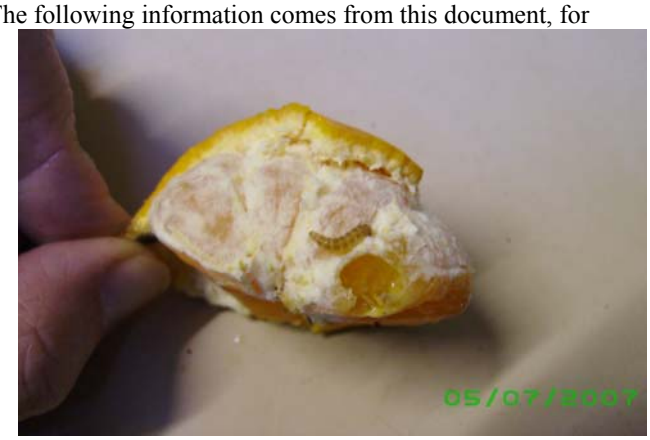
Dr Mendes and his lepidopterist colleague Dr Biva Sousa

More on citrus pests

Caterpillar damaging citrus– *Dinah Hales*

Fruit with rot

At the July meeting of the Society, Fred Swindley brought some oranges affected by a caterpillar boring through the peel and into the flesh of the segments. I had intended to bring mandarins from my garden with the same problem, but in my usual hasty departure I forgot to bring them. Other members reported similar observations. Our mandarins had been dropping from the tree before ripening fully and nearly all the fallen ones had one or two of these caterpillars present. Whilst not much of the flesh was damaged, rots often developed around the site of access of the caterpillar so that the fruit became unusable. I'd been sufficiently concerned – and curious – to try the internet for possible identification of the problem, but had come up with very little helpful information in response to terms like "citrus-boring caterpillar". What I did find was on the AQIS site and referred to the citrus fruit borer , *Citripestis sagittiferella*, an insect common in SE Asia and posing a threat to the northern Australian citrus industry if accidentally imported. (See http://www.daff.gov.au/aqis/quarantine/pests-diseases/naqs-fact-sheets/pests_of_plants_citrus_fruit_borer). Although Sydney is scarcely "Northern Australia" it was worth sending off an email to describe the local problem. NSWDPI reacted quickly, sending an officer to collect specimens, and it was not long before I got a response from Merydyn Davison in Orange identifying the caterpillar as probably the larva of the guava moth, *Coscinoptycha improbana* Meyrick (Lepidoptera: Carpopsinidae), a native of Eastern Australia. In Australia the species is known from Eungella in Queensland right down to Tasmania and also on Norfolk Island (Common 1990). Common gives a black and white photograph of a pinned adult specimen. Merydyn suggested the following website, which provides information by NZ MAFF scientists following the natural (wind-blown) or accidental introduction of the species to NZ in the 1990s: http://www.hortnet.co.nz/publications/pdf/guavamoth.pdf . The following information comes from this document, for those without easy net access.



Caterpillar

Besides guava, it attacks feijoa, macadamia, loquat, pear, plum, peach and citrus. In the laboratory moths laid eggs in cracks in the shell of macadamias but eggs have not been found in the field. The mature larvae leave the fruit after it has fallen and presumably pupate in the soil, perhaps in a loosely-attached covering of particles. It is difficult to rear the adults through but this was achieved on an artificial diet. NZ scientists have developed a pheromone for male attraction.

Merydyn advised further: "It seems that this moth can maintain populations throughout the year so long as there is fruit available for larval development. No recommended treatment but treating fruit around the time of adult emergence might work. The adult is nocturnal so would be difficult to locate. It means that home owner would have to work out when moths are around by checking size of larvae." My observation was that the worst fruit-drop was in the unusually warm May we had this year and decreased when it got colder in June and July. A couple of days ago I found a well-developed caterpillar in a grapefruit, so perhaps they are getting going again. I haven't tried very hard to rear them through and I don't know whether Merydyn had any success. It would be good to have adults in order to confirm the ID. The lack of information on biology of the species in Australia suggests an MSc project waiting to happen.

Reference

Common IFB 1990 *Moths of Australia.* Melbourne University Press, p. 318, and Fig. 30.1, p. 99.

Insect of the Month

CAVE CRICKETS– *Graeme Smith*

(Orthoptera: Rhaphidophoridae)

Cavernotettix sp. Bungonia Caves *Photo: G. Smith*

Cave Crickets or Wetas belong in the orthopteran family Rhaphidophoridae. They are also known as camel crickets because of their hump-backed appearance. In Australia they are usually associated with caves and tend to congregate around the entrance zone of caves in various sheltered corners where it is very dark; it is certainly too dark for human cavers to see anything at all without using a torch. These insects have very long antennae and long, thin legs and rely on their tactile senses to negotiate in the darkness. They are generally quite passive and move very slowly about the walls and ceilings of the cave passages.

Non-cave species live in similar cool, damp situations such as within rotting logs and hollow trees and under stones. They have also been found in the basement of homes. Biospeleologists place the cave dwelling species within the ecological classification of trogloxenes because they do move outside the cave entrances when conditions are suitable and are therefore not restricted to caves.

They are omnivorous scavengers, browsing on organic debris, mosses, fungi or dead insects. The female cave cricket has a very long ovipositor which is used to make a hole in soft earth or mud in which a single egg is deposited.

Studies in New Zealand (Richards, 1965) showed that weta movement is more or less continuous over the 24 hour day without well-defined ranges and there was no evidence of territorial behaviour. Some 28 species in 13 genera and two subfamilies are described from Australia.

Sources:

Anon. Cave crickets. http://www.parks.tas.gov.au/factsheets/wildlife/CaveCreature.pdf

Richards, A.M. (1965). Movements of Rhaphidophoridae (Orthoptera) in caves at Waitomo, New Zealand. *Helictite* **3(4),** 65-78

Request from a student

I have recently started my PhD at Macquarie University with Professor Lesley Hughes. I am planning to investigate whether Australian Lepidoptera are responding to climate change by shifting their ranges southwards.

I am trying to collect data points for east coast butterfly species and I am wondering if you or any or your members may be able to help. I have already got the data from the Dunn and Dunn 1991 data base for butterflies and have been in touch with Murdoch De Barr and Andrew Atkins, but I am hoping that there are still more records out there. I am writing to ask if you could help me send a message to your members and readers. I would be very interested in hearing from anyone who has a voucher specimen or just sighted any of my target species, especially in the last ten years. If anyone is inclined to share their data with me I would need a location (with a GPS coordinate if possible), date and whether the data point is from a sighting or voucher specimen.

I have attached a list of my target species below.

Thank you, in advance, for your help.

Sincerely,

Kath McClellan

Butterflies: Order: Lepidoptera

Suborder: Glossata

Superfamily: Papilionoidea

Family	Subfamily	Species name
Hesperiidae	Coeliadinae	*Hasora khoda*
Hesperiidae	Trapezitinae	*Trapazites phigalioides*
Hesperiidae	Trapezitinae	*Trapazites iacchoides*
Hesperiidae	Trapezitinae	*Anisynta tillyardi*
Pieridae	Pierinae	*Elodina angulipennis*
Pieridae	Pierinae	*Elodina perdita*
Nymphalidae	Satyrinae	*Hypocysta euphemia*
Nymphalidae	Satyrinae	*Heteronympha mirfica*
Nymphalidae	Nymphalinae	*Doleschallia bisaltide*
Nymphalidae	Danainae	*Euploea tulliolus*
Lycaenidae	Theclinae	*Paralucio spinifera*
Lycaenidae	Theclinae	*Hypochrysops epicurus*
Lycaenidae	Theclinae	*Ogyris barnardi*
Lycaenidae	Theclinae	*Deudorix diovis*
Lycaenidae	Polyommatinae	*Prosotas felderi*

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Bi-monthly Meetings

The Council will continue the operation of the Society while we try to fill the position of President. However, the Society will meet only **BI-MONTHLY** until further notice. General meetings with a speaker will be held only on the "odd numbered" months (March, May, July, September, November) while the Council will meet more frequently. Speakers tentatively scheduled for the coming general meetings are shown below.

This timing allows us to alternate meetings with the Society For Insect Studies (SFIS) which meets at the Australian Museum at 7.30 on the second Tuesday of the "even numbered" months.

The next meetings of the general meeting Entomological Society of NSW will be held at 7.30 pm on July 4 at the usual venue.

Seminar series 2007

Date	Speaker	Title
5 September	Peter Gillespie (DPI- Orange Agricultural Institute)	"Australian Whitefly diversity"
7 November	Warwick Angus	Zoo visit- "Backyard to Bush"
2008 TBD	Cameron Webb (Westmead Hospital)	Mosquitoes - Title TBD
2008	Graeme Smith (Reckitt Benckiser)	Testing consumer pest control products

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

Meetings start at 7:30 p.m.
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.

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MEMBERSHIP FEES 2007

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