



Tarsus

May
2006

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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, 3 May 2006

Speaker: Sue Marte, District Horticulturist, NSW Department of Primary Industries, Young

Title: "*Maroga melanostigma* - Just another boring insect?"

Investigations into the biological control of fruit-tree borer in prune trees"

Fruit-tree borer (*Maroga melanostigma*) is a pest of economic concern for prune growers in Australia. The moth lays eggs in the bark of trees and as the larvae mature, they burrow into the wood of the tree. It is estimated that borer damage can cause up to a 5% decrease in productivity in a prune tree if the pest is present. Considering that up to 50% of trees in a given orchard can be affected by fruit-tree borer this equates not only to a large loss in production across an enterprise, but also to a substantial financial loss.

This three year industry funded project has been looking at biological control options against the pest. The first year focused on the borer life cycle and a literature review of biocontrol options. Also, a survey of the prune trees in the trial was conducted to record base damage levels in the trial blocks (~200 trees/block with 4 blocks each in 3 trial sites = ~2400 prune trees). The most likely candidate for control was in the form of *Trichogramma*, a native egg parasitoid wasp. Releases were undertaken in years 2 and 3. At the end of each year, the same trees were assessed for damage and statistically compared back to the base year data.

The talk will give a brief overview of the prune industry in Australia, how the project came about and some of the findings so far.



Image © South Australian Museum
<http://www.ento.csiro.au/aicn/images/cain2149.jpg>



Photo: courtesy of the South Australian Research and Development Institute
<http://www.usyd.edu.au/macleay/larvae/oeco/mel.html>

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

2006 PRESIDENT'S REPORT

I remember the 53rd year of the Entomological Society of NSW as one in which we maintained our core functions in spite of trying circumstances. Despite an unprecedented lack of participation by the membership in the running of the Society, we have still managed to accomplish quite a lot. In the past year we:

- published a journal,
- put out a monthly circular,
- held monthly meetings with interesting speakers,
- met all our administrative requirements (hall hire, insurances, financial reports etc.), and
- remained solvent.

In addition, we have participated in a wildflower show and organised a weekend excursion. I believe the Council has more than fulfilled its responsibilities to the membership. Thankyou to everyone who contributed through the year.

While we have managed to 'keep the show on the road', getting the Society through another year has been a struggle. It is questionable whether we will survive another year like this one. Personally I confess to a sense of disappointment arising from the indifference members have shown and also from the reactions by some to the changes that have been forced upon us.

Throughout 2005 the Society notched up some significant achievements. Some of those that stand out to me this year included:

- Publication of volume 34 of our Journal *General and Applied Entomology*. Once again Garry Levot did an excellent job cajoling authors and reviewers to see that the Journal not only had content but was of high quality and was published in a timely way.
- Ten issues of the Society's circular *TARSUS* were distributed. The decision to stop sending members printed copies of the Circular met with some criticism but no offers were made to take on this job. To an extent the change was forced on us by the loss of our Circular Editor and the need to save money. However the move to an electronic format is more amenable to enhancement of content, improving design, wider dissemination and posting on the world wide web. At the start of the year I had plans to expand the scope and content of *TARSUS*. Unfortunately the lack of a dedicated editor hindered these plans.
- We held 9 meetings during the year. At all except the AGM we had a guest speaker to talk on an entomological or related topic. Attendances varied but they were significantly better than attendances of a year or 2 ago. I believe improved attendances were a reflection both of the general interest of the topics and of improved efforts by the Society to promote its meetings. This year, 2006 started well. Stephen Doggett's talk on bed bugs was attended by 31 people, with guests outnumbering members. Filling the seminar program remains a challenge for the year ahead. If we cannot find a speaker for a particular month, Council has decided to fill the gap by promoting the meeting of the Society for Insect Studies for that month. SFIS meetings are held at the Australia Museum.
- An electronic database of details of our members was created. Unbelievably, we managed to get by without one until last year. After considerable effort we now have the names and addresses of all 128 or so members in an Excel spreadsheet. To ensure *TARSUS* reaches as many members as possible we have been compiling email addresses of members. We now have 86 of them.

- In November we staged an excursion to Green Gully in the Megalong Valley. Ostensibly an insect collecting trip, the excursion supplied an opportunity for some spotlighting, stargazing, and general relaxation with friends. Typically however attendance by members was poor. Of the 20 or so attendees, only 5 or 6 were members. Given the lack of attendance for this and past outings, it is unlikely anything of this nature will be staged again by the Society.

As I said at the outset, the past year has been a difficult one for the Society. I have reminded the membership of the problems that confront us at every opportunity. Hopefully members will respond to the challenges and make the Society's 54th year a less trying year than the past one has been.

Martin Horwood
 President
 1/3/06

INSECT OF THE MONTH

The Drone Fly – Garry Levot

Here is a case of the ugly duckling turning into the beautiful swan if there ever was one. It is quite likely that you have seen the handsome Drone Fly, *Eristalis tenax* (Diptera: Syrphidae) attending flowers and mistaken it for a honey bee. The resemblance is extraordinary but it does not end there. If approached too closely *Eristalis* will tap its abdomen up and down in a threatening way much like honey bees. Of course the conspicuous difference is that the Drone Fly only has a single pair of wings. On close examination the venation is typical of the Syrphidae (Figure 2).

Whereas the adult fly's life is at least in part a frolic among the flowers life is considerably different and less appealing for the larva. The distinctive 'rat-tailed' maggots of the *Eristalis tenax* (Figure 3) live and feed in liquid manure puddles (Figure 4) that can be found in poorly designed or maintained animal houses or latrines. The 'rat-tail' is a long extensible siphon through which the maggot breathes. Like many dipteran larvae the main respiratory spiracles are located at the back end.

Figure 1. The Drone Fly.
 Photo: Lowan Turton.



Figure 3. The 'rat-tail' maggot of *Eristalis tenax*. Photo: Max Hill.



Figure 2. Typical syrphid wing venation.
 Photo: Max Hill.



Figure 4. Manure puddle caused by leaking waterers on a layer poultry farm.
 Photo: Roger Allanson.

LAST MEETING

SUMMARY OF THE TALK GIVEN IN APRIL 2006

VAPORMATE - She'll be apples

Robert Ryan, BOC Limited: Email: robert.ryan@boc.com

KEY POINTS

- A naturally occurring GRAS food additive (ethyl formate) found in green apples and cabbages is the new weapon in the fight against insects which attack stored products.
- BOC VAPORMATE a non-flammable mixture of 16.7wt% ethyl formate in carbon dioxide has been released on the market by BOC Limited to treat stored grain, fresh produce and packaged food.
- VAPORMATE resulted from CSIRO Research, GRDC funding and BOC product development.
- The APVMA approved efficacious pesticide has a rapid action and requires "No Withholding Period"
- A post harvest fumigant for the control of insects in stored grains, fresh produce & equipment is a niche alternative for methyl bromide.
- Successfully applied as a "fog" to treat processing equipment.
- CSIRO researchers developed a standard concentration for a 50-tonne silo of grain which takes 12 minutes to apply, three hours to fumigate and two hours to air out with no withholding period.
- The VAPORMATE active ingredient, ethyl formate, is very volatile [boiling point 54°C] and so is easily aerated from treated products.

APPLICATIONS

Small Grain Storage:

VAPORMATE is a new fumigant assessed and developed by CSIRO Entomology with the support of the GRDC as a fast treatment for small storages (50-200 tonnes). Five years ago CSIRO Entomology started focusing on using the naturally occurring ethyl formate found in green apples and cabbages as a replacement for methyl bromide and phosphine. For the past three years the GRDC-funded project has worked in collaboration with private enterprise to develop a commercial product for the disinfestation of grain storages which also has post harvest application with fresh produce.

CSIRO reports VAPORMATE forced flow fumigation of stored grain is safe, efficacious and rapid (very high level of mortality of tolerant insects was achieved in 3 hours). Insect tested include a highly phosphine resistant field strain of the grain borer, *Ryzopertha dominica*; laboratory strains of the flour beetle, *Tribolium castaneum* and the rice weevil, *Sitophilus oryzae*. A single dose of 450 g/m³ is sufficient to obtain high level control (> 99%) of all stage of *T. castaneum* and *R. dominica* when the grain is held for 24 hours and moderate control (86%) of *S. oryzae*. In the presence of light infestation of *S. oryzae* the lower rate of application would be sufficient to greatly reduce the insect load in the grain. Contrary to expectations lowering the temperature to 15oC did not affect the efficacy.

After disinfestation of grain storages trials in WA, Queensland, the ACT and Walla Walla, CSIRO researchers have developed a standard concentration for a 50-tonne silo of grain which takes 12 minutes to apply, three hours to fumigate and two hours to air out with no withholding period.

Fresh Produce:

There is an international focus on VAPORMATE treatment of export fresh produce (bananas, pineapples, grapes, citrus etc.). These efforts are increasing because of efforts to eliminate the use of methyl bromide – an ozone depletor. Large projects include export bananas and pineapples from the Philippines, table grapes from Australia and treatment of dried fruits & nuts.

Food Processing Equipment:

The cleaning of the intricate internals of food equipment is not always perfect and pockets of food are frequently left behind. This residual food is an attractive breeding place for stored product insects. Pest control of internal spaces is difficult as treatment with conventional liquid pesticides is not acceptable because of high pesticide residuals levels in any food or on the internal surfaces.

The rediscovery & reformulation of the highly volatile GRAS food additive, ethyl formate, makes possible the disinfestation of enclosed food equipment spaces. ***In addition the formulation of ethyl formate in liquid carbon dioxide also can be used as a Modified Atmosphere Package [MAP] treatment for packaged food.*** The treatment of grain storage will require VAPORMATE to be dispensed via a vaporiser delivering a hot (~60°C) gas mixture to assist the uniform distribution throughout the storage. There is interest in using this vaporised gas to treat packaged rice in 1 tonne bags and consumer “pillow” packs.

CURRENT REGISTERED LABEL:

Situation	Insects	Application rate g/m ³	Critical Comments
Cereal grains and oilseeds in sealed storage	Adult stages of: Rice weevil [<i>Sitophilus oryzae</i>]; Lesser grain borer [<i>Rhyzopertha dominica</i>]; Flour beetle [<i>Tribolium castaneum</i>]; Book lice [Psocids - various species]	420 g/m ³ (24 hours exposure)	Only apply VAPORMATE with BOC LIMITED approved equipment. Only apply VAPORMATE into a gastight closed system for the exposure time period. VAPORMATE is dispensed via fixed high pressure pipe installation into sealed gastight chamber, to allow the volatile ethyl formate active ingredient to penetrate deep into the commodity being treated for the recommended exposure period. The storage volume (m ³) needs to be calculated so correct VAPORMATE dose can be accurately dispensed.
Grain storage premises and equipment	Adult stages of: Rice weevil [<i>Sitophilus oryzae</i>]; Lesser grain borer [<i>Rhyzopertha dominica</i>]; Flour beetle [<i>Tribolium castaneum</i>]; Book lice [Psocids -various species]	420 g/m ³ (6 hours exposure)	
Horticulture produce (post harvest only) – fruit, vegetables, flowers in sealed storage	Pacific spider mite (<i>Tetranychus pacificus</i>); western flower thrips (<i>Frankliniella occidentalis</i>); omnivorous leafroller (<i>Platynota stultana</i>); aphids (eg: <i>Macrosiphum euphorbiae</i>); mealybugs (<i>Pseudococcus longispinus</i>)	420 g/m ³ (4 hours exposure)	The treatment area should be completely shut for the recommended exposure period (a minimum of four hours) to allow the VAPORMATE to act. The storage should be thoroughly ventilated of ethyl formate vapour (less than 100ppm) and CO ₂ (less than 5000 ppm) before out loading or re-entry.

PROPOSED NEW VAPORMATE LABEL RATES:

Complete control of all stages of lesser grain borer [*Ryzopertha dominica*], flour beetle [*Tribolium castaneum*], Psocids - table will include storage moths [*Esphestia spp.*, *Plodia spp.*], *Trogoderma variabile*, *Orysoephilus spp.*, *Collosobruchus spp.*, *Bructus pisorum*: in cereal grain and oilseeds:

Dose: 660g/m³ held for 4hours or 420g/m³ held for 24 hours.

Complete control of all stages of Rice weevil (*Sitophilus oryzae*) in cereal grains and oilseeds:

Dose: 940g/m³ held for 72 hours.

TIMELINE OF ENTOMOLOGY

PRIOR TO 1700

Prehistory

13,000 B.C.

The earliest evidence of man's interest in insects is from rock paintings. The insects depicted are bees.

Egypt, Greek and Roman Empire

Scarab Beetle painted on wall of Rameses IX tomb c. 1000 BC.



A scarab beetle, depicted on the walls of Tomb KV6 in the Valley of the Kings



A carved steatite scarab amulet - circa 550 BC.

Bee-keeping was particularly well developed in Egypt and was discussed by the Roman writers Virgil, Gaius Julius Hyginus, Varro and Columella.

620–560 B.C. Aesop's Fables relate stories of grasshoppers, ants and other insects.

10th–15th Century

1172

Guido of Ravenna does some very early work on insects.

1250

Vincent of Beauvais 'Speculum Naturale' treats insects, especially bees

1250 (circa)

The first documented forensic entomology case is reported by Sung Tz'u in the medico-legal text book Hsi Yuan Lu, The Washing Away of Wrongs. He describes the case of a stabbing near a rice field.



Portrait de Conrad Gessner

16th Century

1505

Albrecht Durer paints a stag-beetle.

1551

Zoologist Conrad Gesner publishes the first volume of *Historia animalium* or *History of Animals*. The work includes some mention of insects.

17th Century

1602

Ulisse Aldrovandi's *Animalibus insectis libri septem, cum singulorum iconibus AD vivum express* is published. This work was devoted to the insects and some other invertebrates.

1634

Insectorum sive Minimorum Animalium Theatrum by Thomas Muffet published posthumously — Contains first image of butterfly from North America, a woodblock print from a painting by John White in 1587.

1654

Birth of a girl, later to be an entomologist, Eleanor Glanville.

1662 — (Between 1662 and 1667)

Jan Goedart publishes *Metamorphosis and historia naturalis* illustrating, by copper plate engravings, the metamorphosis of various insects.

1669

Microscopist Jan Swammerdam publishes *History of Insects* correctly describing the reproductive organs of insects and metamorphosis.

The anatomist Marcello Malpighi publishes a treatise on the structure and development of the silkworm, the first description of the anatomy of an invertebrate.

1685

Jan Goedart Wikisite in French publishes *De Insectis, in methodum redactus, cum notularum additione. Opera M.Lister..item appendicis ad historiam Animalium Angliae*

Anton Leeuwenhoek publishes *Arcana Naturae Detecta*.

1696

The Royal Society of England publishes the studies of the Italian anatomist Marcaello Malpighi the discoverer of the insect excretory organs known as Malpighian tubules.

1696 — (from 1696 to 1700)

Antonio Vallisneri's *Dialoghi sopra la curiosa Origine di molti Insetti*, in English, "Dialogues on the curious origin of several insects", in which he, with Francesco Redi and Malpighi, contradicts the theory of spontaneous generation of maggots.

Reference: http://en.wikipedia.org/wiki/Timeline_of_Entomology_-_Prior_to_1800



Ulisse Aldrovandi

SEMINAR SERIES 2006

Date	Speaker	Title
3 May	Sue Marte District Horticulturist NSW Department of Primary Industries	<i>Maroga melanostigma</i> - Just another boring insect? Investigations into the biological control of fruit-tree borer in prune trees
7 June	Mark Greco Centre for Plant and Food Science UWS	Application and management of Australian Stingless Bees
5 July	To be advised	
2 August	To be advised	
6 September	Greg Holwell Behaviour Ecology Lab Department of Biological Sciences Macquarie University	Mating behaviour in <i>Ciulfina</i> praying mantids: Who needs cannibalism?
4 October	To be advised	
1 November	To be advised	
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)

COUNCIL MEMBER PROFILE

Graeme Smith - Councillor

Graeme studied entomology as part of a science degree at Sydney University, graduating in 1975.



After a short stint working as a lab assistant with the precursor to CERIT (Univ NSW) he joined Bayer Australia Ltd as a Technical Officer developing products for use by the pest control industry, the turf industry as well as for the protection of stored products. In the late 80's he decided to try his hand at marketing (a couple of years in Australia followed by another couple of years at the Bayer parent company in Germany) before deciding he was happiest working in the technical side of the business. He returned to Sydney in 1993 and took on the technical development role for Bayer's pest control business in the Asia/Pacific region.

Graeme moved to Reckitt Benckiser in 2003 and now heads in their global pest control innovation group responsible for new consumer products.

Apart from his professional interest in insects of public health importance, Graeme retains an interest in the taxonomy of silverfish, especially those of the family Nicoletiidae. This interest started back in his university days when he just happened to discover a new species of silverfish living in caves at Bungonia at more or less the same time as the course was covering Thysanura. The late Tony Watson encouraged him to develop this interest, with the enticement to co-author the relevant chapters in the second edition of the "Insects of Australia". Graeme has since published descriptions of about a dozen new species and revised the taxonomy of the Subnicoletiinae.

Graeme is married to Louise and has two sons, Cameron (14) and Robert (11).

2006 COUNCIL MEMBERS

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SOCIETY POSTAL ADDRESS

C/- ENTOMOLOGY DEPARTMENT
THE AUSTRALIAN MUSEUM
6 COLLEGE STREET
SYDNEY NSW 2000

MEMBERSHIP FEES 2007

ORDINARY MEMBERS	\$50 (\$45 if paid by 1/1/07)
COMPANY ASSOCIATES	\$60
STUDENT MEMBERS	\$25 (\$20 if paid by 1/1/07)
CORPORATE MEMBERS	\$30

WEB ADDRESS

<http://www.entsoensw.netfirms.com>