

# AUSTRALIAN ENTOMOLOGY CO-OPERATIVE TEACHING PROJECT

Progress Report from an Urban and Commercial Pest Management Perspective

by

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## Background

Over the past few years, many people involved in training of Urban and Commercial Pest Managers have become increasingly concerned that many of our trainers are ageing and relatively few younger people are following in their footsteps. Also, expertise in some pest identification, biology and management areas is becoming very limited and existing teaching resources are being lost to the industry and/or becoming outdated. This situation is mirrored in and closely related to an emergent crisis in entomological teaching in Australia.

Dr David Merritt, an Entomology teacher at University of Queensland (UQ) summed up the Australian entomological teaching situation in a recent communication as follows:

*Typically Entomology courses throughout Australia are specialist courses with correspondingly small enrolments. However the graduates go on to meet the needs of Australian industry. A disturbing trend is the steady reduction in the number of courses offered in Entomology while the national interest is likely to see an increase in demand because of emerging issues such as biosecurity, assessing biodiversity, and assessing the impact of GMOs. This trend has come about because funding changes in Australian universities over the last decade have led to elimination of courses with small enrolments, income being generally based on a per capita model. In a harsh economic environment the national interest is easily disregarded: large classes are an imperative if staff workloads are to be kept at a level that allows academics to maintain a balance between teaching, research and postgraduate supervision.*

While irrefutable statistics on reduction of Australian entomological teaching are thin on the ground, the trend is clear: In the 1980s many Australian universities offered several insect-related course units at two levels, and a few (eg. UQ, U Adelaide, etc.) offered such a broad selection of insect-related courses that it was possible to produce graduates with a comprehensive entomology major.

Today that situation has changed dramatically. Many universities have had to abandon insect courses completely. Others offer only one or two units, usually at one level (typically third year Science or Ag Science) and it is extremely difficult to undertake a 'classical' entomology major degree with at least three insect units, all with a full practical component, in Australia. This has happened because specialist class sizes (particularly those with a practical component) with enrolments below about 30 have become unsustainable in the present university funding model. Only UQ offers a broad selection of second and third year insect units, only two of these offer a practical component and now some of these also are under threat.

In response, some universities have chosen to offer some or all of their units in both undergraduate and postgraduate courses and by 'flexible delivery' (distance-ed.) as this can improve productivity. However there are down-sides that need to be

addressed; particularly the difficulty in providing practical classes, really meaningful tutorials and the unquantifiable though clearly critical, benefits of contact with teachers. Increasingly, providers of distance-ed courses are finding that delivering a quality outcome for students is much more difficult and time consuming than they (or more importantly their Deans) had expected. Hence, distance-ed while important, can only ever be one component in the solution of the present entomology teaching problem.

### **Formation of a Co-operative Entomological Teaching Project**

Recently a group of entomology teachers and end-users of entomology teaching was formed, co-ordinated by David Merritt of UQ ([dmerritt@zen.uq.edu.au](mailto:dmerritt@zen.uq.edu.au)), with the aim of initiating a high level of co-operation in entomological teaching and development of curriculum and teaching resources within Australian universities. It held an initial meeting in conjunction with the International Congress of Entomology (ICE) in Brisbane in August 2004 and its first workshop in Brisbane on 5 November 2004.

### **Initial meeting**

At the initial meeting, the framework and topics for the workshop were proposed and a committee established with the following state representatives:

S.A. – Mike Keller (Univ Adelaide)  
W.A. – Helen Spafford-Jacob (UWA)  
Vic – Ary Hoffman (La Trobe Uni)  
NSW – Nigel Andrew (Macq U, soon to be @ UNE)  
Qld – David Merritt (UQ)  
ACT John Trueman

### **Workshop**

Over the past few months since ICE, David Merritt has been in contact with most of the Australian Universities teaching insect-related courses and on 5 November 2004, a one-day workshop was held in Brisbane. The following 20 entomological teachers and end users participated:

Richard Rowe – James Cook Uni, Townsville  
Geoff Gurr – Sydney Uni, Orange (shortly to become part of Charles Sturt Uni),  
[current Secretary, Aust. Entomological Society]  
John Jennings – Uni of Adelaide  
Mike Keller – University of Adelaide  
Bob Newby – Univ Central Qld, Rockhampton  
Ian Naumann – Aust Govt Dept Agriculture, Fisheries & Forestry, Canberra,  
[current President, Aust. Entomological Society]  
Chris Orton – UNSW, Sydney  
Helen Spafford-Jacob, UWA, Perth  
Nigel Andrew – Macquarie Uni, Sydney (shortly to re-locate to UNE, Armidale)  
Ary Hoffmann – LaTrobe Uni, Melbourne  
Gary Fitt - CSIRO Entomology  
John LaSalle – CSIRO Entomology (ANIC)

From UQ Dep Zoology & Entomology, Brisbane:

David Merritt	Margaret Schneider	Bronwen Cribb
Karen Johnson	Sassan Asgari	Susan Hamilton
Gail Walter	Paul Ebert	

The agenda consisted of the following:

1. Overview of existing courses;
1. Industry perspectives (view of two end users);
1. Possible models for cross-institutional courses;
1. Possible courses to be offered and their co-ordination;
1. Possible processes for course development;
1. Resources required;
1. Possible funding sources;
1. Allocation of responsibilities.

### **End-user perspectives**

Two end-user perspectives were provided:

#### **A perspective from Aust Govt Dept Agriculture, Fisheries & Forestry**

Ian Naumann outlined the requirements of this department, which is responsible for providing entomological services for:

- The Office of the Chief Plant Protection Officer
  - Emergency management
  - Infrastructure development
  - Offshore programs;
- Australian Plague Locust Commission
  - Locust forecasting and control;
- Biosecurity Australia and Market Access
  - Quarantine policy and market access;
- Aust Quarantine and Inspection Service (AQIS)
  - Border control and compliance
  - Northern Australia Quarantine strategy (NAQS)
  - Biological control.

Each of these organizations needs staff trained in a range of the following courses:

- Diagnostic principles, classification, biology
- Practical identification, sampling, surveillance,
- Familiarity with impacts and management approaches,
- Awareness of institutions and agencies
- Ecology
- Pest management
- Toxicology
- Biological Impact Assessment
- Pest management, pre- and post-harvest
- Principles of biological control

They also require specific management skills extending well beyond entomology. 'Core' courses would differ depending on the focus of the particular organization.

#### **A perspective from Urban and Commercial Pest Management (UCPM)**

Chris Orton outlined the recent history of UCPM training in Australia and its proposed activities relating to PestCert accreditation and Continuing Professional Development (CPD). His perspective, drawn from experience in providing and appraising CPD events for UCPM and his involvement in the NSW ITAB was that:

- The UCPM industry is moving significantly to increase training requirements;
- Many existing UCPM teachers are ‘ageing’ and have little prospect of succession unless action is initiated to address this;
- There is a realisation in the UCPM industry that more basic biology is needed in training;
- There will be a need for more Australian graduate entomologists to teach UCPM in next 10 years +;
- Over the past ten years, there has been a significant reduction in biological expertise within companies marketing pest management products in Australia;
- There is a real need for UCPM teaching to be a factor in the planning of the co-operative Entomology Teaching Project;
- The present Australian trend is beginning to mirror the USA where universities (mostly the so-called ‘agricultural’ universities) have embraced a significant role in UCPM research & teaching. Possibly there is a new opportunity for Australian Universities here;
- Increasingly UCP managers are the first port of call for the general public when dealing with pest issues;
- There is a need for a culture shift in entomological teaching to accommodate needs of UCPM teaching. It is not well-served by the present ‘classical’ teaching of entomology;
- The highest priorities for UCPM training are courses in basic biology, insect behaviour and pest management techniques;
- We need to be thinking; ‘Part-Time’, ‘Remote-access’, ‘Web-delivered’, ‘Integrated’ and ‘Resource-pooling’ for UCPM training.....as is the case for the Co-operative Entomology Teaching Project;
- Both development of new teaching resources AND new teaching expertise are needed for UCPM training.....as is the case for the Co-operative Entomology Teaching Project.

Further end user perspectives are needed, but already the potential demand for entomological teaching beyond our present ‘square’ has emerged.

### **Points of Consensus**

The agenda of this workshop was very ambitious for a single-day meeting. Not surprisingly, all of the items could not be covered in depth so further workshops will be needed before a clear pathway forward is achieved. Nevertheless the following points of consensus were reached:

- Enhancement of existing options in teaching entomology is a common goal;
- Increased sharing of resources is the best approach;
- Ability to offer courses via remote delivery is desirable;
- There is a need to form cooperative groups for the development of specialized courses and teaching resources;
- Courses should align with national priorities;
- Core courses should be flexible so that they can be offered at multiple levels;
- A practical component is highly desirable in most courses – essential in some;
- There is agreement to explore funding options for course development;
- It is desirable that the Aust Entomological Society become involved in moving the initiative forward.

## **National Priorities**

The following National Priorities served by entomology were identified:

- Bio-security and market access;
- Sustainable pest management & sustainable agriculture;
- Biodiversity, conservation and ecosystem services;
- Human health and welfare and emergent disease pests;
- Animal health and welfare and emergent disease pests;
- Asset protection;
- Insects and global warming.

## **Core courses**

A list of core courses was collated that match the national priorities. The courses do not serve the priorities on a one-to-one basis, rather they are based around mixes of the following:

- Biological Control and Behaviour;
- Biodiversity and Conservation;
- Insect Systematics & Identification;
- Insect Physiology and Toxicology;
- Medical & Veterinary Entomology;
- Insect Behaviour;
- Integrated Pest Management;
- Insect Ecology.

## **Accommodating different target groups**

It was agreed that given the attributes of flexible delivery, each course could provide the base material along with particular aspects tailored toward providing the desired outcomes for specific target groups. For example, different assessment requirements and differing amount of core material. It was agreed that the courses should be developed so that they are flexible and able to be offered to different categories of students, for example:

- 3<sup>rd</sup> level undergraduates enrolled in BSc or BApplSc,;
- research higher degree students or coursework MSc students;
- professional development of pest controllers (urban and rural);
- overseas students.

In addition to the core courses, four specialist course areas were identified as having potential for development:

- Forensic entomology – (strong student interest);
- Insect and plant pathology (fulfils a national priority need);
- Urban and commercial entomology (tailored to needs of urban & commercial pest control training and professional development);
- General Insect Biology (tailored to the needs of students who want a general introduction to [but not necessarily specialisation in] insects. Would include identification to insect orders).

## **The concept and benefits of a National Entomology Curriculum**

It was proposed that significant benefits could be derived by developing a national entomological curriculum, based upon a suite of courses that fulfil Australia's ongoing requirements for entomological expertise. This could ensure the availability of an accessible complete curriculum distributed throughout the nation rather than a few courses offered by each institution, none of which offers a complete set of courses. Courses that currently are threatened by low enrolments or where

cancellation is imminent, should see increased enrolments because they could draw on an expanded national and international pool of students.

All options require an up-front commitment to development of material and mechanisms for flexible delivery. Employment of an artist, IT personnel and educational consultant may be required. However, care would need to be exercised to ensure a balance is achieved between the uniformity imposed by a national curriculum and the diversity which exists in current courses because of the strengths and special expertise of the individuals who present them.

### **Marketing the benefits of the Project to our own university administrators**

The surface was barely scratched on this key requirement but two benefits were forthcoming at the workshop:

1. The potential to increase total insect units taught, as students (including local and overseas undergraduate and postgraduate students) perceive that a complete, co-ordinated entomological teaching pathway exists in Australia;
2. The potential to offer a broadened course offering within home universities by utilising course units offered by other universities. This is significantly enhanced where the units are delivered by distance-ed.

### **Where from here ?**

The next meeting of the group is planned for April 2005. In the meantime, working parties have been set up to progress the following tasks with the designated timelines:

- Summarise the November workshop outcomes and distribute to attendees (end November 2004 – Merritt);
- Distribute progress report to Australian entomologists (end November 2004 – Merritt);
- Develop course profiles and investigate ways of producing tailored, flexible components in each course (end February 2005 – designated course leaders);
- Develop financial models for coursework delivery and circulate to attendees (end February 2005 – Hoffmann, Keller, Cribb);
- Investigate funding models and circulate to attendees (end February 2005 – Naumann, Zaluki, Risdell-Smith);
- Report progress of working parties to April 2005 meeting (April 2005 – Merritt).

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*The views expressed are from my own perspective and do not necessarily represent the collective views of the participants.*