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## IPM workshops for growers and consultants – lessons for R, D and E

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### Introduction

Facilitating change in pest management practices, and ultimately the implementation of IPM (integrated pest management) is a significant challenge for research and extension practitioners. The field crops entomology group within the Queensland Department of Employment and Economic Development (DEEDI, formerly Department of Primary Industries) has a long history of researchers and extension officers working together, with industry, to promote the adoption of IPM (Brier et al. 2008) However, there has been limited formal evaluation of the extent to which these activities have resulted in sustained and/or progressive practice change in the grains industry. Over the past 10 years, there has been a concerted effort to promote IPM for pulses in the northern region. Over this period, 14 soybean and mungbean IPM workshops have been held in Queensland and northern NSW for around 400 growers and their advisors. In addition, pest management modules have been delivered to over 350 participants as part of 19 accredited mungbean, ten chickpea and four sunflower workshops. With this recent experience, it is a good time to reflect on what we are doing, how it is being done, the impact that it is having and how we may improve the adoption of IPM.

### Workshops as a way of communicating about IPM

At the outset in 2002, accredited agronomist training courses were developed in consultation with the mungbean industry to meet industry demand for improved capability to implement IPM amongst agronomists and growers. Initially, the focus, was on consultants, with the expectation that they would expose growers to IPM best- practice in mungbeans in their role as advisers. In 2006, IPM courses were developed for cane growers wanting to grow soybeans (and other pulses) as 'grain for harvest' rotation crops in cane-farming systems in coastal Queensland. The structure and content of these courses was modelled on that of previous courses.

From our perspective, the benefits of the workshop format are that they:

- Allow for face-to-face contact between DEEDI staff and participants; important in establishing credibility and trust, a point also emphasised by course participants.
- Bring participants together, providing opportunities to learn together and benefit from discussion and sharing of personal experiences.
- Provide invaluable opportunity for the researchers and extension staff to get feedback on the material they are presenting to industry, and the practicalities of implementing it on-farm.
- Are a cost-effective way to make contact with a large group of growers and/or advisers.
- Sow the seeds for the emergence of local IPM champions.
- Establish IPM networks throughout NE Australia grain/pulse growing regions.

However, experience in delivering the workshops demonstrated that some aspects of the workshop model are less than ideal. These include:

- A tendency to overload participants with information. The focus on the delivery of research outcomes (thresholds, monitoring, identification, biology, ecology) results in a very top-down, transfer of technology model of engagement with the participants.
- A need for post-workshop follow-up to provide ongoing support for participants as they attempt to change their pest management practices.
- Limited assessment of the needs and expectations of the participants prior to the workshop; resulting in the same workshop being delivered irrespective of participant experience, skills or knowledge.
- Limited evaluation of short and long-term impact of participation on growers and agronomists.

### Workshop content and processes

The content of the IPM module of the Accredited Mungbean Agronomist Course was developed following discussions (early 2000s) with the Australian Mungbean Association (AMA) and Pulse

Australia. These stakeholders noted concerns that most consultants were poorly skilled in mungbean pest management. As a result of these discussions, and subsequent experience with early workshops, the courses now cover crop stages at greatest risk, insect identification (pests and beneficials), monitoring, thresholds, control options, IPM principles, and insect biology. The soybean/summer pulse IPM courses follow a similar format, but with an emphasis on pest management in soybeans.

Key tactics promoted during the workshops include: (a) the “Go Soft Early” IPM approach to delay broad-spectrum pesticide sprays for as long as possible to foster beneficial insects, (b) thorough scouting at critical crop stages, (c) the adherence to pest thresholds, and (d) the use of the most selective pesticide options wherever possible. Since their inception, workshop content has been added to or modified as research has progressed and new pest issues have arisen.

The workshops are comprised of two components, a sit-down lecture and a field-based practical component. The pest management component of the Accredited Mungbean Agronomist Course consists of a 3.5 hour lecture and is normally held in winter/spring with a follow up field component in the following summer when crops are available. The soybean IPM workshop lectures are normally held in summer, and consist of a 4-5 hour lecture followed by a field component on the same day or the following morning.

Participants are encouraged to put the information they have covered in the lectures to the test in the field sessions. The practical sessions include active learning and focus on sampling and monitoring, insect identification and decision making for the crop in question – similar to what would occur on their own farms. Adult learning principles are central to the structure of the workshops which incorporate opportunities for interaction and discussion, with a focus on learning from peers, and building on experience (Lawrence et al. 2000).

### **Workshop tools**

Since 2008 a TurningPoint® Audience Response System (Keepad Interactive, Sydney) has been employed to assist in quantifying audience knowledge and feedback. TurningPoint® software allows presenters to ask questions of the audience, and the audience to respond anonymously (or otherwise) to a choice of options using keypads. The responses are captured, summarised and immediately presented back on-screen to the audience for debate and discussion. TurningPoint® allows data to be analysed in terms of a range of demographic criteria, e.g. region, industry, experience, profession, previous workshop participation.

This technology provides information to researchers and extension officers delivering the workshops on the participants in terms of:

- Levels of knowledge and confidence in specific areas e.g. pest identification (pre and post workshop)
- Current pest management practices
- Expectations of the workshop
- Issues of particular importance to individuals, or regions, and
- Documenting the incidence of regional pests across seasons

Participants using the technology have shown interest in seeing this data displayed and visualising their position in the spread of responses.

### **Review of IPM courses – analysis of participant data**

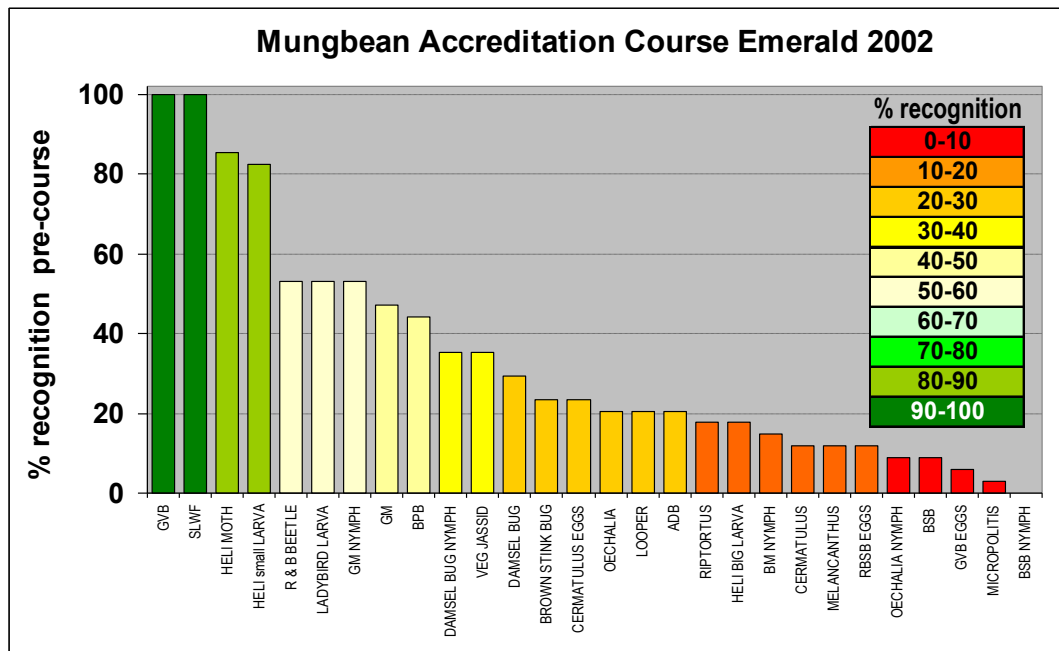
Analysis of data captured via TurningPoint® provides researchers and extension staff with information on participants’ knowledge of pests and natural enemies, local issues, problems and practices as well as information gaps. This data can then be used to improve course content and address those issues identified in specific regions.

### **Recognition of pest and beneficial species**

Survey data from the IPM courses clearly shows that the majority of course participants have difficulty in identifying many of the insects commonly found in summer pulses, both pests and natural enemies. Surveys in the initial courses showed that 75% of consultants couldn’t recognize 50% of key insects commonly found in mungbean crops (Figure 1).

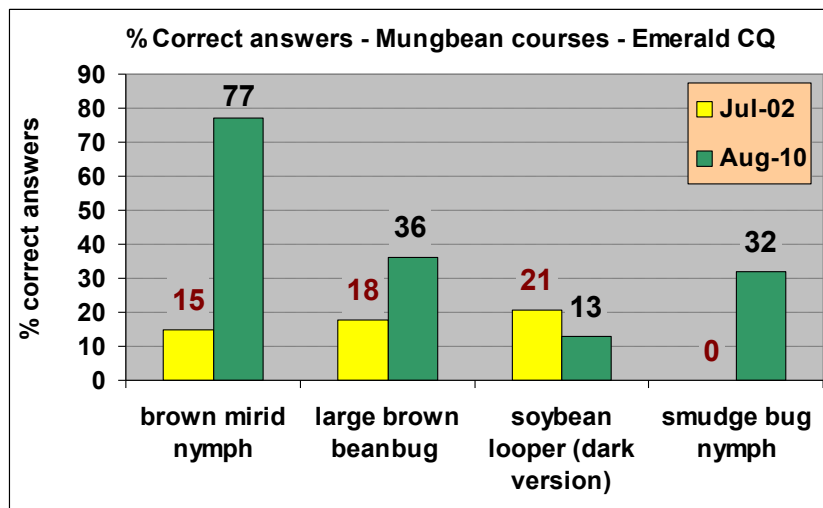
Clearly an inability to correctly identify insects in crop is a major impediment to making appropriate management decisions. For example, many course participants find it difficult to distinguish caterpillars. This has implications for the correct use of heliothis NPV if loopers and *helicoverpa* cannot be distinguished, as NPV is ineffective against loopers. There is also evidence that minor pests and natural enemies are generally poorly recognised by course participants.

**Figure 1. Percent recognition (% correct answers) of 28 insects commonly found in mungbeans, from participants of an Accredited Mungbean Agronomist Course at Emerald, July 2002 (17 participants)**



Surveys in subsequent workshops over a period of 3 years show that consultant/grower ability to identify key pests has improved but remains varied, dependent upon species. For example ability to identify mirids improved, but for other key pests such as the bean bugs and young soybean loopers identification is still problematic (Figure 2).

**Figure 2. Changes in insect recognition skills (from 2002-2010) in consultants for selected major pest, minor pest and beneficial species commonly found in summer pulses**

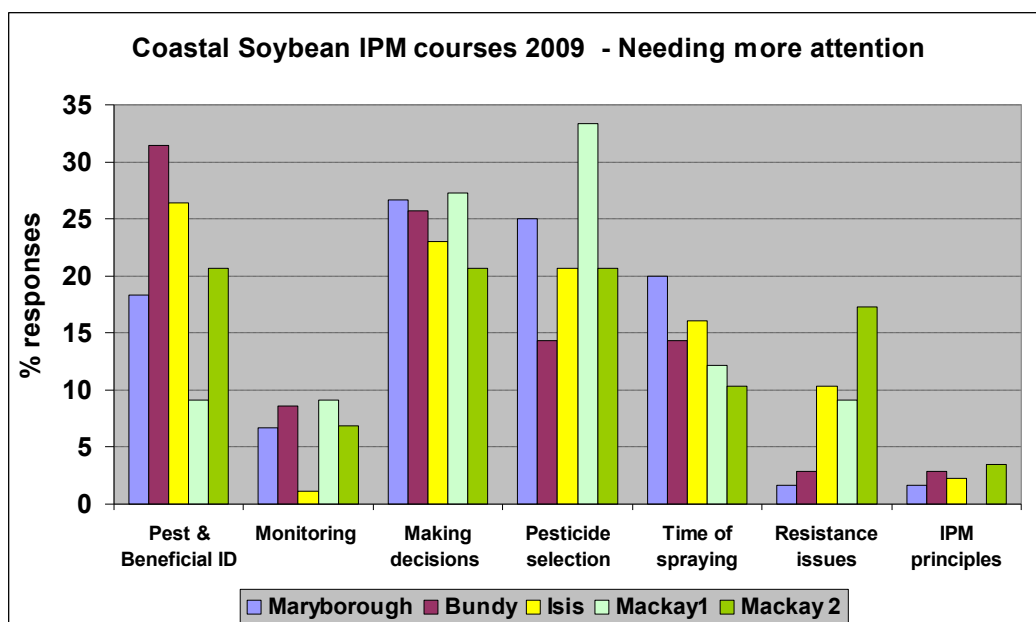


**Participant feedback on course impact and content**

Significant change in the confidence of course participants in managing pests has been reported, despite challenges with insect recognition skills. Prior to undertaking an IPM course participants are asked how confident they feel (in managing pests), and again at the end of the theory session. In all cases participants report an increase in their level of confidence in managing insect pests after completing an IPM course.

Course participants are also asked to identify those areas in which they feel they need more instruction. Participants consistently identified insect identification and decision making as the areas needing most attention (Figure 3).

**Figure 3. Key areas of knowledge where grower and agronomist participants in IPM courses identified they needed more capability**



Percent (%) frequency values are based on the number of responses within each location

Feedback from participants (Figure 4) suggests that the content of the courses is not focusing on areas in which they are particularly interested. Practical tools for decision making (identification and economic thresholds) are identified as important, but less so other components. This feedback highlights the deficiency of a transfer of technology approach, where presenters focus on telling the participants how to do things, and impart scientific information, but the participants do not yet have the necessary level of understanding needed to adapt the information to their own context.

**Review of IPM courses**

***A focus on adoption rather than simply providing information***

Reflection on our experience with IPM courses has identified some key issues that warrant modification and/or development to improve the outcomes, and ultimately IPM adoption.

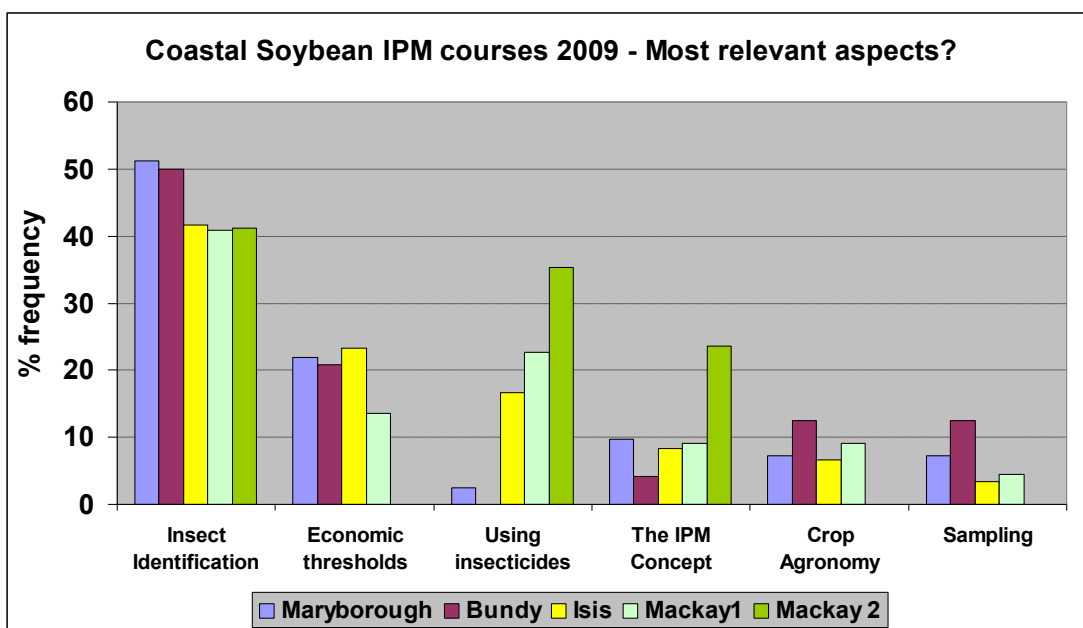
When considering how IPM education is conducted elsewhere, the example of the Farmer Field School (FFS) stands out. This farmer-focused approach aims to develop knowledge through experimental action learning and group discovery. This method allows farmers an opportunity to observe, trial and experiment, draw conclusions and make their own informed decisions regarding sustainable pest control (Braun et al. 2006). The FFS approach, in contrast to the transfer of technology approach, does not assume that simply sharing information will result in practice change in the target audience. Researchers and growers need to work together to develop effective approaches for field conditions (van Schouwbroeck 1999). Such an approach is based on co-research by farmers and scientists rather than research by scientists followed by extension of information to farmers.

We are not alone in sensing that the current approach can be improved. As an eminent entomologist has identified “The degree of success in implementing any change in pest management practice will depend on the extent to which stakeholders (research scientists, extension officers, growers and other key players) interact and work together to effect the change” (Zalucki 2009).

***Engagement with the workshop participants***

In the past our IPM workshops consisted of information that addressed needs of farmers as perceived by researchers and industry representatives. A single workshop course was developed to be delivered to farmers/advisers growing the crop of interest. The workshop content was delivered without reference to current knowledge or experience of the participants.

**Figure 4. Participant feedback on the relevance of course content to their individual needs**



Percent (%) response values are based on the number of responses within each location

Now workshop content and process is better targeted with more understanding of the issues of importance, priorities, values, and aspirations of growers. While data remains an important part of the course content, to demonstrate tangible benefits and build credibility of the research/ers, the needs of the growers must be the focus of the interaction. Allowing time for participants to share their experiences, develop their own insights and test the data is often overlooked in an attempt to cover large volumes of information. Spending time covering information may not be as valuable to participants as learning a process for decision making which can be applied to a wide range pest management decisions. We also need to recognise that growers do not make decisions purely on factual data but rather on how these facts will affect them (Lawrence et al 2000).

**Enabling small, measurable changes**

Complex technology is a major constraint to adoption (Vanclay 2004). At first simplifying IPM might seem to be impossible given the inherent complexity that we perceive as researchers. Surely a grower can't make a sound decision without all the information that we have? To date, we have considered it important to provide a smorgasbord of options, from which farmers and advisers can select those which suited their individual situations. It is now evident that the many farmers and advisers are not equipped to make decisions about which options they should be choosing, and even less so how to combine them into an IPM strategy.

On reflection, pest management can quite readily be divided into manageable components. For example, it is possible to focus on the stages of crop development, rather than simply on taxonomic groupings of pests. Provision of resources that can be accessed post-workshop may meet the needs of farmers who can delve into the resource when they need specific information. We could design a series of more focussed courses that deal with smaller, manageable sections (identification or sampling or applying economic thresholds) that build on the experience of the participants. As the participants work through the series of courses, the researcher becomes more of a resource and less of an authority.

**Eliciting a commitment to change and providing ongoing support to do so**

A simple commitment to do something will often suffice as the first step into changing attitude and practice. A commitment could be to attend a field day, trial a less disruptive insecticide, or leave an unsprayed strip in the paddock to monitor natural enemies. Lawrence et al. (2000), in a series of nitrogen management workshops encouraged growers to apply the recommendations they had developed, as part of the workshop process, once they returned to their farms.

It is critical, however, that growers are supported through this stage of early adoption. Entomologists and extension staff must be available as an important resource with whom growers can discuss, question and test their knowledge and understanding. In an environment

of limited human resources, there is a need to explore how we might use online tools to support participants after workshops. Importantly, the face-to-face contact that the course offered is fundamental to establishing the reputation of the researchers and extension staff, and a level of trust and confidence in these people to provide ongoing support.

Other support methods could include demonstration sites (and integrating these with workshops), field days and farm walks and follow-up workshops at the end of the cropping cycle that allows for reflection, discussion and questioning of results. Another means of providing support to growers and consultants is to work with local champions. This has been done successfully in coastal Queensland where members of local industry took a leading role in assisting with sampling, decision making and driving IPM adoption

### **Monitoring and evaluation**

Gathering quantitative evidence of changes in participant attitudes and practices is not a routine part of the workshop process, and should be. There would be significant benefits to the way workshops are designed and run, if there was a planned program of monitoring and evaluating during the workshops, and post-workshop, once farmers return to their farms. This is an area of expertise that we are lacking, and could benefit from a structured monitoring and evaluation framework to guide evaluation by non-experts.

### **Concluding remarks**

In an environment of shrinking resources, contact with growers and their advisers (agronomists and consultants) relies heavily on group processes, particularly workshops. IPM is perceived to be a complex undertaking, and faces a number of adoption barriers. However, we suggest that by rethinking the way we engage with farmers and agronomists, focussing more on their needs and experience, and less on what we have to tell them, we may be able to get better outcomes from workshops, and better equip them to implement IPM.

### **Acknowledgements**

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