Scoping Study on IPM Potential and Requirements

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Scoping study on IPM Potential and Requirements

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This report provides the results of a survey of vegetable growers and advisors into adoption, and non-adoption of IPM. It describes the levels of adoption, reasons for non-adoption by growers and discusses the requirements for improved adoption of IPM.

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September 2007

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Media Summary

Integrated Pest Management (IPM) has been a priority area for many horticultural industries and funding from HAL has been directed towards IPM. However, in most horticultural industries there has not been great adoption or implementation of IPM despite this funding support, and we need to know why, and what is needed to improve adoption of IPM.

- To achieve this end, HAL commissioned this survey of both growers and advisors to help to determine who is adopting IPM and why. Also, who is not adopting IPM and why not, and for advisors, what are the reasons influencing adoption.

- To assess this, a questionnaire was sent to growers and advisors in all states.

- The number saying that they currently use IPM was 49% but the figure varied massively between states (Tas 22%, Vic 68%, SA 31%, NSW 64%, WA 68%).

- When the responses were analysed further it is more likely that only about 28% are actually using IPM well. However, a very high percentage (80%) of those who had previously used IPM continued to use IPM.

- One of the main factors contributing to non-adoption of IPM was the fact that current pesticide approaches still worked. It is not the case that growers or their advisors believe that IPM is too expensive, too complicated or that there are not enough selective chemicals.

- That is, there is little motivation to change to using IPM.

- Local demonstrations of IPM and contact with advisors specializing in IPM were seen as desirable by most respondents. The results indicate that there is good awareness of IPM but the benefits and practicality of IPM need to be demonstrated before this group will change.

- The vegetable industry needs to have a clearly communicated and accepted definition of IPM.

- Offering growers information first-hand by crop advisors who can give simple and clear advice is the best means of maintaining and improving IPM implementation.

Technical Summary

IPM has been a priority area for many horticultural industries and funding from HAL has been directed towards IPM. However, in most horticultural industries there has not been great adoption or implementation of IPM despite this funding support, and we need to know why, and what is needed to improve adoption of IPM. To achieve this end, HAL commissioned this survey of both growers and advisors to help to determine who is adopting IPM and why. Also, who is not adopting IPM and why not, and for advisors, what are the reasons influencing adoption.

To assess this, a questionnaire was sent to growers and advisors in all states. The response rate varied between states from 11% to 23% (WA 11%, Tas 13%, NSW 16%, Vic 18%, SA 23%,) but the response from QLD was extremely poor (<1%).

The number saying that they currently use IPM was 49% but the figure varied massively between states (Tas 22%, Vic 68%, SA 31%, NSW 64%, WA 68%).

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One of the main factors contributing to non-adoption of IPM was the fact that current pesticide approaches still worked. It is not the case that growers or their advisors believe that IPM is too expensive, too complicated or that there are not enough selective chemicals. That is, there is little motivation to change to using IPM.

Local demonstrations of IPM and contact with advisors specializing in IPM were seen as desirable by most respondents. The results indicate that there is good awareness of IPM but the benefits and practicality of IPM need to be demonstrated before this group will change.

The vegetable industry and HAL need to have a clearly communicated and accepted definition of IPM to avoid problems of different expectations and also to avoid poor results where IPM was not used correctly.

Offering growers information first-hand by crop advisors who can give simple and clear advice is the best means of maintaining and improving IPM implementation.

Introduction

IPM has been a priority area for many horticultural industries and funding from HAL has been directed towards IPM. However, in most horticultural industries there has not been great adoption or implementation of IPM despite this funding support, and we need to know why, and what is needed to improve adoption of IPM. To achieve this end, HAL commissioned this survey of both growers and advisors to help to determine who is adopting IPM and why. Also, who is not adopting IPM and why not, and for advisors, what are the reasons influencing adoption.

At this point it is essential to have a definition of IPM. Ours is as follows:

Definition of IPM

The term "IPM" is well known these days and the letters stand for **I**ntegrated **P**est **M**anagement.

IPM involves 3 control components and they must be INTEGRATED so that they are compatible (ie working together, not against each other).

The three components are
1. Biological control
2. Cultural control
3. Chemical control

It is an approach to pest management that can be applied to any crop from glasshouse flowers to broad-acre cropping.

The "I" part of IPM has often been forgotten. It is essential in any IPM programme in any crop that control measures are integrated so that they work together in a compatible way. It is also essential that biological control agents are integral in any IPM strategy.

Dealing with all pests:

In practice, an IPM approach needs to deal with all pests, not just one or two. There are definitions of IPM that include diseases and weeds and vertebrates as pests as well as invertebrate pests. Such an holistic approach is obviously desirable, but, at present, there is an entomological bias with IPM reflecting the greater amount of research into control of invertebrates using IPM.

For example, in brassica crops we need to deal with Plutella, Cabbage White Butterfly, Aphids, Centre grub and Grasshoppers (and others). There is no such thing as IPM for Plutella alone.

That means that the control options (especially pesticides) need to be integrated to make sure that the control of aphids does not interfere with the control of Plutella. That is, an IPM approach needs to avoid broad-spectrum sprays for one pest (eg. synthetic pyrethroids, organophosphates, fipronil) in order to avoid the disruption of the control of other pests. That means, avoid killing beneficial species that would otherwise have helped to control pests such as aphids with the sprays you are using for Plutella.

It is very possible to see IPM in action. It is currently occurring not only in hydroponic and outdoor vegetable production, but also in a range of broad-acre cropping.

Methods

150 reply-paid surveys were sent to the Industry Development Officer in each state, making a total of 900 surveys sent in all. The IDO selected those in the industry to receive the surveys.

The questionnaire

The survey consisted of questions in three sections. The first section, (7 questions) asked for information about the location (state), crops grown, whether the respondent was a grower or advisor, and whether or not the respondent currently or had ever used IPM. Responses to these questions allowed us to sort data by state, grower/advisor, and crop type.

The second section was to be completed only by those not using IPM and was designed to find out why they were not. We provide 12 options for respondents to simply circle the one or more that best described their reasons, or they could write their own.

The third section (17 questions) was for those who said that they used IPM. We asked a set of questions to assess the level of knowledge about IPM by those who said they used it. The original concept of IPM was developed by Stern *et al* (1959), and involved integrating several control measures, including biological and chemical options. We wanted to find out how many people that said they used IPM were actually using this approach.

Discussion and Conclusions

There is currently a low rate of adoption of IPM given the amount of effort and funding directed towards IPM research. However, there is also a strong interest in seeing local demonstrations of IPM and a very high retention of using IPM once it is trialled.

So far the low level of adoption, despite all the information available on many aspects of IPM, has been because of lack of motivation to change from existing pesticide-based strategies.

The use of pesticide-based strategies has been well adopted over the last 60 years because it provides farmers with a simple approach to pest management. For example, a regular day for spraying can fit well into whole-farm management practices. Asking farmers to abandon this simple approach while it still works in favour of a more complex approach (involving crop monitoring, insect identification, decision-making based on trends in pest and beneficial populations, use of selective insecticides etc) requires that the farmer sees benefits in doing so, and that it can also fit easily into the production schedule. For many this will mean utilising an IPM advisor.

The practical benefits of using IPM compared to current pesticide-based control measures have not been recognised by most growers responding to this survey.

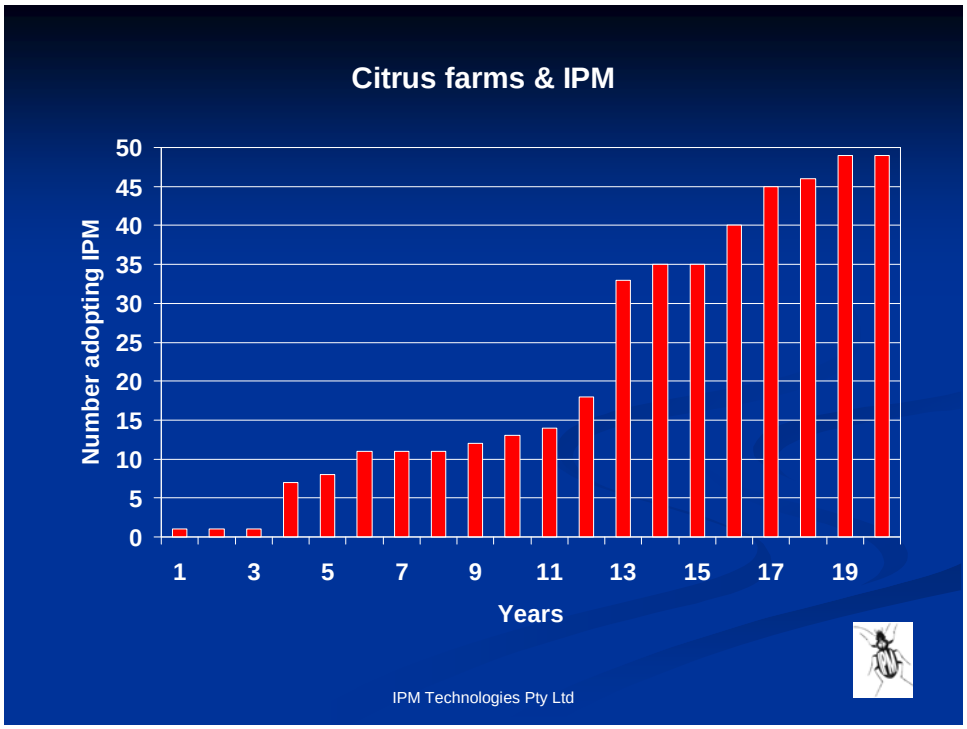
Motivation

The high level of support for demonstrations of IPM and more information on IPM shows that there is not fundamental opposition to the concept of IPM, but that the benefits need to be made clear. These benefits include factors such as avoiding secondary pest problems, pesticide resistance problems, environmental issues, worker safety and residue problems. The high rate of retention of using IPM identified in this survey supports the suggestion that these benefits are valued once the change to using IPM has been made, but that they are not sufficient motivation for change on their own while IPM is seen as risky compared to the current, successful, pesticide-based approach.

In order to increase adoption it will be essential to address this lack of motivation. Local demonstrations in commercial crops (that show the advantages and practicality of IPM), and also provide access to specialist IPM advice are proven methods to achieve change of practice (Horne *et al* 1999; Nicholson *et al*. 2003).

The high level of interest in demonstrations of IPM amongst those who currently do not use IPM provides the target group for work to improve adoption of IPM. Such work, aiming to increase adoption of IPM should focus on those who are interested in using IPM. The small percentage who is not interested will probably change slowly as their neighbours adopt IPM and IPM becomes the norm. Such examples occur in Australia, eg. in citrus, in the Central Burnett region (Papacek and Smith 1998).

Figure 6: Adoption of IPM in Citrus in the Central Burnett (QLD) Papacek and Smith 1998. Total growers = 53



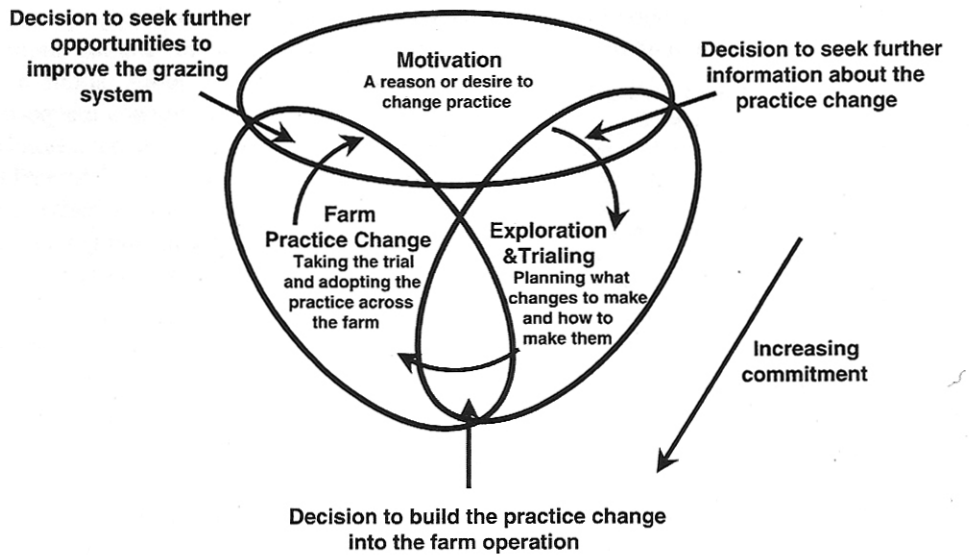
Local demonstrations using a collaborative approach with small groups having personal contact with an IPM specialist to help interpret information is far more likely to influence adoption of IPM than (for example) provision of manuals alone.

The means in which information on IPM is presented to farmers is likely to determine whether or not that information is used. It has been pointed out (Heisswolf and Kay 2007) that information itself does not produce change and that too much information at once can be overwhelming. We believe that resistance to change is not restricted to pest management practices but is common to any change that farmers have to make.

For example, Nicholson *et al* (2003) describe a research-extension model for encouraging changes to practices on dairy farms (Figure 7). The elements of their approach apply exactly to vegetable farmers making changes to pest management (ie. adopting IPM) because it is the fact that change itself is involved. In the absence of a crisis (such as insecticide resistance or withdrawal of pesticides) growers will change to using IPM only if it can be shown very clearly by local examples that it can be made as simple as their current approach. In most cases that will only happen with the assistance of an IPM specialist who can take away the complexity and condense the information into a simple recommendation (eg. “do not spray an insecticide this week”).

Figure 7: A model for influencing farmers to change practices

From Nicholson *et al*., (2003)



The HAL Plant Health Strategic Plan (May 2007) lists eight advantages and five disadvantages of IPM. However, in the absence of a pest control crisis only two of the listed advantages are going to deliver an immediate benefit (increased safety and reduced pesticide contamination). There will not be huge apparent advantages in shifting to IPM for growers who currently have no major pest problems, as there will still be no pest problems. For most growers, these immediate benefits are not sufficient motivation to change, especially when they are outweighed by the perceived disadvantages.

These perceived disadvantages (barriers to adoption) can all be dealt with by a trained IPM advisor. The advisor needs to have greater knowledge of pesticides, pests and beneficials not the grower. The advisor can then make IPM simple for the grower, so the decision to change to implementing IPM is made easier. Then, the benefits of IPM become apparent and these reinforce the decision to change.

Once the change has been made, both immediate and long-term advantages of IPM become valued. Some growers who have made the change to using IPM see it as something that they want to use when marketing their produce. For example, Peter Schreurs and Sons (vegetable growers in Victoria) have an IPM section on their website.

Improving and Maintaining IPM

This study reveals that not only is there low adoption of IPM but that even the growers that profess to use IPM are in many cases actually relying totally on pesticide applications and this group has a poor knowledge of the key components of IPM. If these pesticides fail, for whatever reason, then the grower will regard "IPM" as a failure.

This situation means that the methods used until now to promote the use of IPM have failed. We have growers responding to this survey that are using broad-spectrum insecticides which kill all beneficial species (in some cases for 3 months or more) that believe they are using IPM. It is an indication that growers have not been provided with sufficient guidance on the integration of pest control options. Rather, it suggests that growers have been provided with alternative pesticide options which are easy to fit within their existing pesticide-based approaches that they believe to be IPM. The confusion about IPM is not restricted to growers but includes researchers. McDougall (2007) points out that most researchers begin IPM studies by concentrating on only one pest in a system. This is obviously not IPM although it may be a step towards IPM.

Other Pest Control Strategies that can be confused with IPM

There are several other legitimate strategies for controlling pests that can be confused with legitimate IPM strategies. These include:

1. Spraying organic certified products

The sprays may be certified organic but a regular spray based programme is not IPM. IPM requires more than an organic spray programme.

2. Spraying "IPM" products

Some people believe that by simply using products (organic or conventional) that can possibly be incorporated into IPM strategies that they are implementing IPM. This is not so. The insecticides that may be used in an IPM strategy do not in themselves make an IPM strategy.

3. IPM = Integrated Pesticide Management

IPM is sometimes interpreted as Integrated Pesticide Management. Obviously if the requirements for biological and cultural components of IPM are not met then this is a completely different version of IPM, and not one that could be accepted. (see next item)

4. Pest Monitoring

Monitoring for pests and using insecticides according to pest levels (pest thresholds) is a legitimate approach to pest control but is not IPM as it does not incorporate biological and/or cultural control options.

5. IRM strategies

Insecticide Resistance Management strategies are legitimate approaches to prolonging pesticide efficacy but are certainly not IPM strategies. These are methods to prolong the effectiveness of pesticides with or without IPM.

6. No insecticides used.

Although the aim of any IPM strategy is to minimise the use of insecticides, the simple stopping of use of insecticides (conventional or organic) does not mean that IPM is being practised.

Why is a definition of IPM so important?

In the Objectives section of HAL Plant Health Strategic Plan the first item includes promotion of the economical and environmental benefits of IPM, including a "clean and green" image. IPM must be able to deliver this outcome or there will be a serious backlash. If growers believe that IPM can mean regular use of broad-spectrum insecticides, then the clean and green image of IPM will be misleading. For example, if a so-called IPM crop is found to have unacceptable levels of pesticide residues then the image of IPM will be damaged.

Another important reason for clearly defining IPM is to avoid the problem of growers using something that is not IPM (but they think it is) and having pest control failures. This leads to a situation where growers say they tried IPM and it did not work. It is usually harder to get farmers to try something a second time when they have had poor results the first time.

Like any other standard, it needs to be clearly defined and understood. There is a definition in the HAL Plant Health Strategic Plan but it needs to be clearly communicated and accepted by industry and researchers. The results of this current survey confirm that the term IPM is used by industry to deal with invertebrate pests and if HAL wishes to broaden the definition then it will require significant effort.

Definition of IPM

The letters stand for **I**ntegrated **P**est **M**anagement.

IPM involves 3 control components and they must be INTEGRATED so that they are compatible (ie working together, not against each other).

The three components are

1. Biological control

2. Cultural control
3. Chemical control

It is an approach to pest management that can be applied to any crop from glasshouse flowers to broad-acre cropping.

Pesticide based strategies are valid options for growers but IPM must involve biological and cultural methods and not just reliance on pesticides.

Failure to achieve successful implementation of IPM and more importantly to maintain successful implementation after initial adoption will mean failure of any attempts to implement IPM across industry.

In addition to the group that are not using IPM but are receptive to change there are those who are using IPM but need further advice and support. It will be very important to maintain examples of successful IPM as well as increasing levels of adoption. That is, once growers trial an IPM approach and adopt it, they need on-going support to maintain IPM strategies and possibly expand the use over many crops. Nicholson *et al* (2003) comment that "Not everyone is able, or should be expected, to adopt at a single point in time" and also that "a program does not end with initial adoption but when the participants have met their needs".

Even for those currently using IPM there needs to be on-going support and improvement of the IPM strategies. Some growers will be willing to make great changes very quickly but others will make smaller changes and assess results over time. IPM support for all of these growers is required.

IPM strategies need continual refinement as many aspects of farm production can influence pest management. A couple of examples are (i) new pesticides become available, (ii) the requirements of buyers can change (such as putting lettuce into plastic bags in the field), and (ii) different equipment used by farmers can influence control of pests (eg. new spray equipment). There will be a need to provide on-going advice on IPM to those already using it, to make sure that new problems are dealt with and new solutions to problems are made available. If contact between growers and IPM advisors is not maintained then it is easy for growers to resume reliance on pesticides (even if they are less hazardous) and forget about the biological and cultural components.

Next Steps

It needs to be remembered that pest management is simply one of very many activities that growers undertake as part of growing their crops and it needs to be made simple and straightforward. Offering growers information first-hand by trained crop advisors who can give simple and clear advice is the best means of maintaining and improving IPM implementation.

We suggest that collaboration between researchers and other advisors to provide demonstrations of IPM on commercial farms is where there is the best chance for motivating growers to adopt IPM.

Communications/ Extension

Preliminary results of this project have been discussed with Brad Wells and Leanne Wilson of HAL (August 2007) and the same preliminary results were discussed at the annual meeting of Australasian Biological Control, Inc. in Brisbane (August 2007).

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