Hort Innovation

Final Report

Facilitating Adoption of IPM through a Participatory Approach with Local Advisors and Industry – Training Component

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Project code:

VG15034

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Facilitating Adoption of IPM through a Participatory Approach with Local Advisors and Industry – Training Component – VG15034

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Content

Summary

This project aimed to increase the quality of vegetable crops and ensure sustainable vegetable production by increasing uptake of integrated pest management (IPM) in the South Australian vegetable industry.

IPM is an approach that integrates all available methods of controlling pests, rather than just relying on pesticides. IPM is widely recognised as offering many advantages over the conventional pesticide-based approach, but it is seen as being more complicated and growers need access to experienced IPM advisors in order to make the change to IPM.

Globally, rates of IPM adoption are very low, and at the commencement of the project IPM was not seen as a mainstream control option by South Australian vegetable growers. IPM was not widely practiced, IPM advice and services were not readily available to vegetable growers, and grower and advisor experience and confidence in the approach was very low.

In this project, South Australia was used as a model to demonstrate that it is possible to achieve rapid and widespread adoption of IPM through a participatory approach with local advisors and industry. By demonstrating successful IPM to local advisors and training them to give sound IPM advice, this project aimed to remove barriers to IPM uptake and make IPM the mainstream method of controlling pests in the South Australian vegetable industry.

IPM Technologies delivered a training program based on their more than 20 years' experience working collaboratively with growers and advisors to develop and implement IPM. Initial theory workshops were delivered for each of the companies that provide pest management advice to vegetable growers in South Australia (this included chemical resellers and a producer of biological control agents). Advisors invited grower clients that were interested in trialing IPM to attend the workshops. Participants were guided to develop practical IPM strategies for crops of interest, and at the conclusion of the workshops growers agreed to work with their advisors to trial IPM, with support from IPM Technologies.

Practical training was then delivered via a combination of field visits and regular phone and email contact. Participating growers and advisers were trained to monitor crops, identify pest and beneficial species, implement cultural controls, and differentiate between pesticide products based on their relative compatibility with their IPM programs. Advisors were supported to make IPM decisions and formulate IPM recommendations week-by-week and they progressively gained skills, experience and confidence in these tasks. The level of pest control achieved in IPM demonstration trials was equal to or greater than in conventionally managed crops and growers significantly reduced their insecticide inputs through learning to incorporate biological and cultural controls in their pest management programs.

The success of IPM demonstration trials proved the effectiveness of IPM in a commercial setting and helped the project to succeed in changing the negative perceptions of IPM and in delivering widespread practice change. All key advisors providing pest management recommendations to vegetable growers in South Australia accessed IPM training through this program, and the majority are now promoting and supporting grower clients to implement IPM. All South Australian vegetable growers now have access to confident and experienced local IPM advisors and this has already facilitated widespread IPM adoption across all major production regions and all vegetable crop types produced in the state. By leaving a legacy of trained local IPM advisors the project has made IPM more accessible and achievable, both for the growers that have already adopted IPM and those looking to do so in the future.

Keywords

Integrated pest management; vegetables; participatory extension approach; adoption; practice change

Introduction

This project aimed to increase the quality of vegetable crops and ensure sustainable vegetable production by increasing uptake of integrated pest management (IPM) in the South Australian vegetable industry.

The term IPM describes the successful integration of all available methods of controlling pests, rather than just relying on pesticides. An IPM strategy deals with all pests, harnessing biological and cultural controls as the first line of defence, and using compatible chemicals as a support tool only when necessary. IPM offers many advantages over the conventional pesticide-based approach. These include reduced reliance on insecticides;

improved farmer, environmental and consumer safety; delayed development of insecticide resistance; improved management of insecticide resistant pests; and increased farm biodiversity.

Worldwide, IPM has been promoted mainly by government agencies, and uptake has been low despite widespread acknowledgement of the advantages and considerable investment in IPM research and extension. Many publications report the fact that levels of IPM adoption are very often low and rates of adoption are slow (Bajwa & Kogan 2003; Herbert 1995; McNamara et al. 1991; Olsen et al. 2003; Sivapragasam 2001; Wearing 1988). Even in horticultural crops where the theory of IPM is well developed, achieving widespread adoption on farms remains a challenge (Page & Horne 2007; Boucher & Durgy 2004).

Disadvantages of IPM that present themselves as barriers to adoption include the fact that it is more complex than the familiar pesticide-based approach and it requires new skills and a shift in understanding (Page and Horne 2012). There is a large amount of IPM information available, including web-sites, videos, webinars, posters and information sheets, but these tools are not enough to facilitate widespread practice change at the farm level.

To achieve rapid and widespread adoption of IPM, growers need access to experienced and confident advisors who can provide IPM services and decision-making support whenever it is required. Growers that have not seen good working examples of IPM in commercial crops tend to view the approach as too complicated and risky and their advisors (usually reseller agronomists) typically lack the knowledge, skills, experience and confidence to give IPM advice and support them to trial and such an approach.

Despite these barriers, it is possible to achieve high rates of IPM adoption using proven techniques (Horne, Page and Nicholson 2008; Horne and Page 2011). In this project, South Australia was used as a model to demonstrate IPM Technologies' method of facilitating rapid and widespread adoption of IPM through a participatory approach with local advisors and industry. By demonstrating successful IPM to local advisors and training them to give sound IPM advice, this project aimed to remove barriers to IPM uptake and make IPM the mainstream method of controlling pests in the South Australian vegetable industry.

At the commencement of the project, IPM was not seen as a mainstream control option by South Australian vegetable growers. IPM was not widely practiced, IPM advice and services were not readily available to vegetable growers, and grower and advisor experience and confidence in the approach was very low. This project succeeded in changing the negative perceptions of IPM, and advisors trained through this project are now supporting growers across the state to implement IPM and driving ongoing IPM adoption. The high rates of rapid IPM adoption by both farmers and advisors are well above those reported for very many IPM programmes around the world (Bajwa and Kogan 2003)indicating that the approach taken here is an effective method for implementing IPM.

Methodology

This project comprised three separate contracts linked under a single parent project. The contracts were with IPM Technologies, who delivered the training component; AUSVEG SA, who provided some additional access to advisors and growers and managed the communications and collection of evaluation data; and Clear Horizon, independent Monitoring and Evaluation (M&E) experts who oversaw the development, implementation and analysis of the M&E.

The project design was based on the premise that the most efficient and effective way to achieve widespread IPM adoption is to (i) showcase the benefits and effectiveness of the approach by working with growers and local advisors to demonstrate practical, cost-effective and successful IPM in commercial crops; and (ii) provide comprehensive IPM training to the trusted local advisors that growers already rely on, so that they have the skills and confidence to incorporate IPM advice and services into their offering to clients. This project was conceived, proposed and commenced by Jessica Page and Paul Horne in the years prior to the commencement of the project. Workshops and Year 1 and 2 field visits were conducted by Paul Horne and Angelica Cameron. Many of the Year 3 field visits were conducted by Angelica Cameron.

In the initial stages of the project IPM Technologies and AUSVEG SA worked with Clear Horizon to develop a M&E Plan and a Program Logic model (**Figure 1**) that outlines how project activities and outputs were expected to lead to intended project outcomes. Project activities and outputs were then systematically delivered through continued collaboration between the three project delivery partners. Ongoing attention was given to ways in which all aspects of program delivery could be adapted, refined and improved to suit the needs of the target audience and deliver the best possible return on this strategic industry investment.

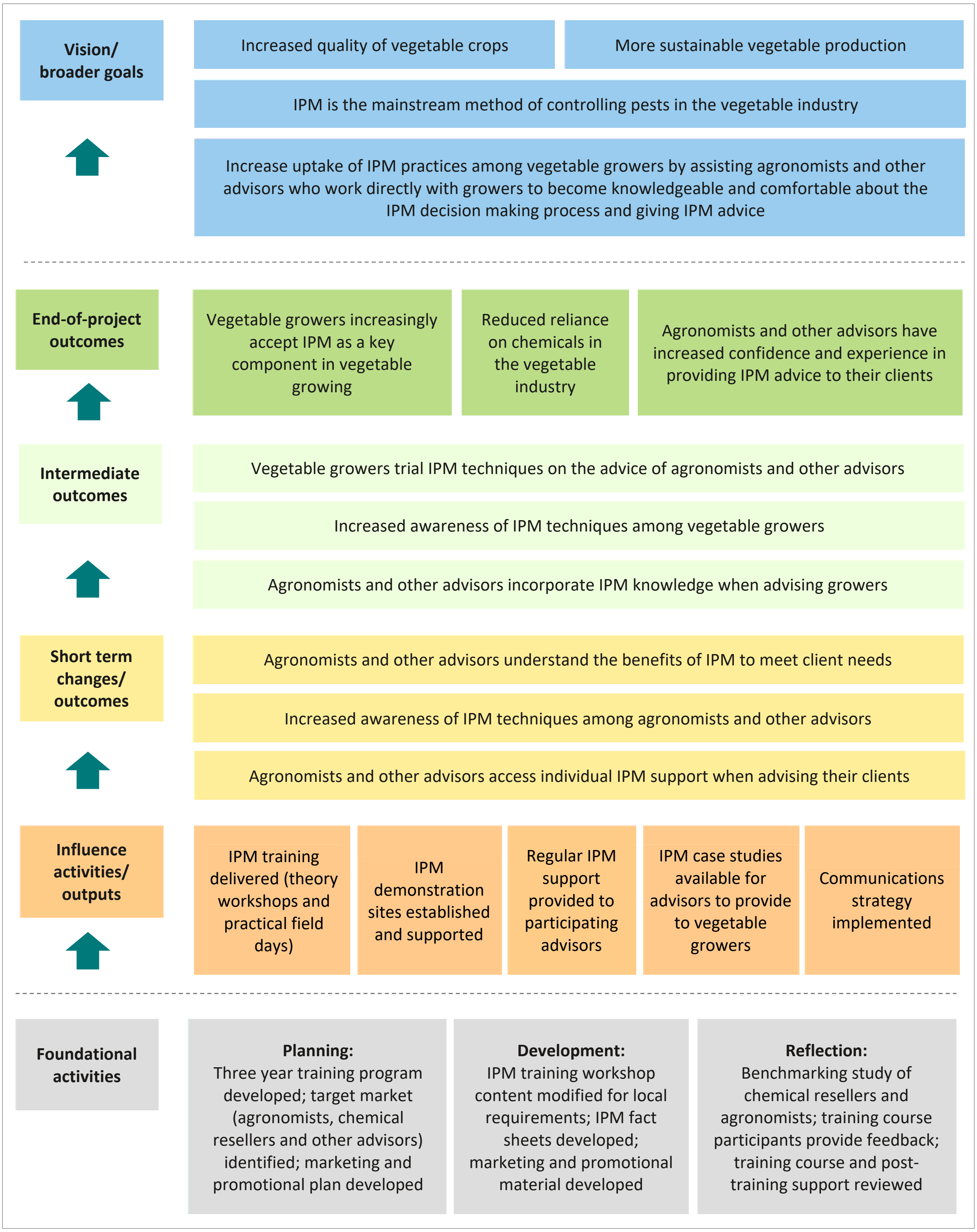

Figure 1. Program Logic

In addition to the initial M&E planning, IPM Technologies was involved in several other key foundational activities and was responsible for delivering both the theory and practical components of the IPM training program for vegetable industry advisors. Details of how these activities were undertaken and details of IPM Technologies' training methodology are provided below.

Foundational activities

Identification of and consultation with project participants

While both growers and advisors participated in this extension program, the advisors were the primary targets for training activities and each participating advisor was responsible for nominating grower clients with whom they could conduct on-farm IPM trials. In order to identify suitable advisor candidates to participate in the project, IPM Technologies made initial contact with each of the companies and independent advisors that provide pest management advice to vegetable growers in South Australia. These companies included both chemical resellers/agronomy service providers and those without a chemical focus. AUSVEG SA also reinforced this work by supporting and promoting the planned series of workshops. IPM Technologies then held a series of project induction meetings with key advisors from each of these companies to (i) invite them to participate in the project; (ii) begin to build a relationship with them; and (iii) consult them on their preferred training delivery model and training needs.

Collection and synthesis of baseline data

Once project participants had been identified, baseline data on their level of IPM knowledge, skills and practice were collected. IPM Technologies developed a Baseline Survey and then worked with AUSVEG SA to collect survey responses from the advisors that participated in Years 1 and 2 of the project. IPM Technologies summarized the findings from Year 1 in a preliminary report, and then prepared a full, confidential, *Baseline Survey Report* once data collection was completed in Year 2. The survey results helped to identify specific gaps in the knowledge, skills and experience of advisors and this information was used to guide the design and ongoing improvement of the training program. The baseline survey results also provided an important point of reference for the independent end-of-project evaluation.

Development and adaptation of training framework

The participatory extension approach proposed by IPM Technologies was based on their more than 20 years' experience working collaboratively with growers and advisors to develop and implement IPM. This approach involved IPM theory training (workshops) followed by establishment of on-farm demonstration trials with individual growers and their advisors. IPM Technologies then provided season-long support to participating growers and advisors (through a combination of field training sessions and regular phone and e-mail contact), to ensure the success of the IPM trials and train the advisors to formulate sound IPM advice.

The initial plan was to identify three vegetable growing regions to focus on in Year 1, and to run a theory workshop for all advisors operating in each region. However, during the project induction meetings we learned that individual advisors within each company travel widely to provide services across multiple vegetable growing regions, and each company expressed a preference to have a single 'in-house' training session at a central location rather than splitting up their staff into different region-based training cohorts. IPM Technologies took this feedback on-board and modified the proposed training framework to include five (rather than three) theory workshops in Year 1, offered on a company-by-company basis for service providers from several companies.

Having already provided general IPM theory training to the majority of the target group of advisors in Year 1, it was decided that Year 2 theory workshops should cater for small groups of growers and advisors that agreed to work together on a demonstration trial or cluster of demonstration trials in a particular crop type. The workshop content for each Year 2 theory workshop was therefore tailored to the specific needs of the group (e.g. IPM in Brussels sprouts, or IPM in field grown head lettuce). Smaller group sizes and focusing on a single crop or small number of related crop types allowed for more in-depth coverage of relevant IPM theory and more thorough preparation for on-farm demonstration trials. Another change to the training framework in Year 2 was the inclusion of a short field session offered as an addition to each theory workshop. For example, at one of the Year 2 theory workshops a field walk was used to showcase the success of a cauliflower and cabbage demonstration trial undertaken in Year 1, to help build confidence among the new cohort of growers and advisors being inducted into the program.

By the end of Year 2 all the main private-sector pest management advisors working in vegetable crops across South Australia had already received theory training, so further workshops targeting this group were not required. Instead, the project team decided to expand its training offering to include government researchers and biosecurity staff in the final year of program delivery. These advisors were identified (during Year 2) as a high priority target group due to concerns raised by private-sector agronomists about a government advisor interacting with growers and providing conflicting advice that threatened to undermine their IPM programs. The workshop provided an opportunity for government policy, agronomy and biosecurity staff to learn about the project and build on their understanding of IPM, thereby minimising the risk of further conflicting advice being given to growers adopting or implementing IPM in South Australia.

The project budget and proposed training framework allowed for practical training in implementation of IPM at demonstration sites to be delivered by IPM Technologies through unlimited phone and e-mail support and a single day of field training per region per year (a total of three days per year). This proposed training framework was modified (without changes to the project budget) so that demonstration sites in each region could be visited more than once per season.

In Years 1 and 3 the allocated time and travel budget was used to make two or more visits to demonstration sites in each region, by visiting several regions on each trip. In Year 2 we were able to make even more frequent visits to demonstration sites by combining trips for this project with trips to South Australia for another Hort Innovation-funded IPM extension project (MT16009). This allowed us to provide field training on six separate trips throughout the season, rather than only three. Participating advisors and growers benefited greatly from the increased number of visits. By demonstrating the practical aspects of IPM implementation at more frequent intervals during the crop cycle, we were able to provide a far more comprehensive training package and our more frequent presence on the ground in demonstration crops helped reduce the perceived risk for growers and advisors.

<u>Development of factsheets to support practical training</u>

Factsheet were developed by IPM Technologies on a needs-basis to support the specific training requirements of participating advisors. These factsheets are included in **Appendix 1**.

Theory training

Theory training was delivered in the form of a three-part workshop, including an introductory presentation covering IPM theory and first-hand examples of successful IPM; a hands-on insect identification training session looking at live and preserved samples of relevant species in various life-cycle stages; and an interactive session in which IPM Technologies supported participants to develop practical IPM strategies for each crop type of interest to the group. These IPM strategies (see examples provided in **Appendix 2**) became the agreed plans that formed the basis for advisors to trial IPM with their collaborating growers in the next phase of the project.

Nine theory workshops were delivered for a total of 49 grower and advisor participants (see example workshop flyer in **Appendix 3**). Theory training was a critical step in the program delivery process, laying the groundwork for establishment of IPM trials at demonstration sites and all further practical training activities.

Practical training

Practical training was delivered by IPM Technologies through a combination of field training sessions at IPM demonstration sites and regular phone and e-mail contact with growers and advisors.

Growers that participated in Year 1 and 2 theory workshops agreed to work with their advisors to trial IPM with support from IPM Technologies. Most growers initially committed to trialing IPM on a single planting but once the first trials were underway and the positive results were becoming evident, growers quickly moved to whole farm adoption. In Year 1 and early in Year 2, establishment of IPM trials relied on the careful groundwork laid during theory workshops, and advisors and growers required a high degree of support from IPM Technologies to establish and implement IPM programs in each trial crop. This changed as the project progressed and participating advisors gained confidence to initiate and manage IPM trials and whole farm adoption with their clients more independently.

IPM Technologies delivered a total of 52 field training sessions attended by participating advisors and their collaborating growers at IPM demonstration sites. Field training was held at key points during the season when pest and or beneficial activity was high and critical decisions needed to be made. These events served as an opportunity to provide intensive training in practical elements of IPM implementation as well as showcasing the success of the IPM trials. The training topics and skills covered all aspects of IPM decision-making, including monitoring techniques; pest and beneficial identification; how to implement or improve the effectiveness of cultural controls; and appropriate selection of sprays if and when they were required.

Regular contact was maintained with advisors and or growers to provide additional training and support between field visits. Their needs ranged from basic support in areas such as pest and beneficial identification and correct spray application methods, through to support with more complex issues such as strategic planning related to cultural control methods and some of the more complex decision-making relating to selection of appropriate chemicals in challenging situations.

Monitoring results provide the basis for good decision-making and this depends on correct identification of both pests and beneficials. The use of smart-phones made rapid identification support possible, with photos of insects or mites being sent to IPM Technologies directly from the field. Then assessments of the relative pest to beneficial ratio could be discussed and decisions and recommendations on which, if any, insecticide was required could be formulated. If an insecticide was required, then IPM Technologies would suggest a product based on the known effects on beneficial species as well as the likely impact on the target pest. This was explained and discussed with collaborators. Then we could also suggest other key factors such as the rate, water volume, and any spray adjuvants (wetters, stickers, penetrants etc) to be used, what day to spray (based on the development stage of pests and predicted weather conditions), what time of day to spray, and the time interval until an effect on the pest should be observed.

All of these factors were discussed with growers and advisors to make sure that the recommendations made were practical and achievable. In this way we demonstrated the IPM decision-making process to both the growers and advisors involved. This approach showed advisors how we work *with* growers to make pest management decisions and through repeating this process week-by-week, participating advisors received very comprehensive training in IPM decision-making and formulating IPM advice.

Initially advisors needed step-by-step guidance with the decision-making process every week, but as they gained experience and confidence they were increasingly able to formulate their recommendations independently and they used the phone and e-mail support service simply as a means to check that they were on the right track.

Outputs

Year 1 outputs

- Engaged with Clear Horizon and AUSVEG SA to develop a Program Logic (**Figure 1** above) and M&E Plan
- Held six project induction meetings with key advisors representing each of the major chemical resellers servicing the South Australian vegetable industry to raise awareness about the project; secure advisor agreement to participate; and consult advisors on their preferred training framework
- Developed Year 1 training framework and workshop content tailored to suit the needs and preferences of participating advisors
- Developed a survey to gather baseline data on IPM knowledge and practice; collected baseline survey responses (in collaboration with AUSVEG SA) from advisors participating in Year 1; summarised results of the Year 1 baseline survey; and reported results to project partners and Hort Innovation
- Delivered five IPM theory workshops to a total of 31 grower and advisor participants
- Established IPM demonstration trials in 10 different commercial vegetable crops at five demonstration sites
- Supported growers and advisors to prepare an IPM strategy for each on-farm demonstration trial (see examples provided in **Appendix 2**)
- Made three trips to South Australia to deliver 12 field training sessions for participating growers and advisors at demonstration sites
- Provided regular IPM advice and decision-making support (via phone and e-mail contact) to participating advisors and growers
- Produced four factsheets to reinforce theory training and support practical training (**Appendix 1**)

Year 2 outputs

- Provided all information and supporting documents required by Clear Horizon for their Year 1 evaluation of the project
- Worked with AUSVEG SA to identify advisors and growers to participate in Year 2 training
- Adapted training framework and content to suit the needs of Year 2 project participants
- Delivered three IPM theory workshops for a total of 12 grower and advisor participants
- Established IPM demonstration trials in commercial vegetable crops at 13 new demonstration sites

- Supported growers and advisors to prepare an IPM strategy for each on-farm demonstration trial (see examples provided in Appendix 4)
- Made six trips to South Australia to deliver 24 field training sessions for participating growers and advisors at demonstration sites
- Initiated regular phone and email contact with new grower and advisor participants and maintained regular contact with participants from Year 1 to provide IPM training and support
- Worked with Clear Horizon to refine the post-training support survey and then uploaded the survey to Survey Monkey so that AUSVEG SA could use this online tool to collect survey responses
- Took part in a half-day reflections workshop on 9 May 2017, along with representatives from Hort Innovation, AUSVEG SA and Clear Horizon
- Summarised and analysed data from Year 1 and 2 baseline survey results and prepared a comprehensive report on the baseline level of IPM knowledge and practice among advisors to the South Australian vegetable industry
- Continued to liaise with Clear Horizon and AUSVEG SA regarding all other necessary project monitoring and evaluation activities
- Delivered a presentation about this project to researchers and growers from around Australia at the Hort Connections field day in South Australia on 15 May 2017
- Delivered a presentation about this project to the Vegetable Strategic Investment Advisory Panel (Farm Productivity Resource Use and Management) at their meeting in Adelaide on 17 May 2017 (see presentation at http://ipmtechnologies.com.au/wp-content/uploads/2018/12/VG15034-SIAP-presentation-2017-Angelica-Cameron.pdf)
- Supported AUSVEG SA to deliver their communications package by taking part in face-to-face and phone interviews with newspaper journalists and helping to prepare for production of IPM video case studies
- Paid for the printing and distribution of 5,400 copies of a Tomato Potato Psyllid pocket monitoring guide (produced by IPM Technologies under project MT16009) to vegetable growers around Australia via the hard copy mail-out of the Vegetables Australia magazine (a digital version of the monitoring guide can be accessed via http://ipmtechnologies.com.au/wp-content/uploads/2017/05/TPP-pocket-guide.pdf)

Year 3 outputs

- Worked with AUSVEG SA to identify advisors to participate in Year 3 training
- Adapted training framework and content to suit the needs of Year 3 project participants
- Delivered one theory training workshop for six government advisors
- Supported participating advisors to induct new growers into the program and establish IPM trials at 13 new demonstration sites, with a further seven IPM trials pending.
- Supported advisors to develop IPM strategies for each new demonstration trial
- Provided ongoing phone and email support as necessary to advisors and collaborating growers from years 1 and 2 of the program and new growers and advisors that joined the program in Year 3
- Delivered 16 field training sessions at IPM demonstration sites during a total of five trips to South Australia between February and November 2018
- Delivered two IPM field walks in collaboration with AUSVEG SA, showcasing results of one of the largest brassica demonstration trials in the state (15 February 2018) and one of the best examples of a grower implementing IPM in protected vegetable crops with a strong emphasis on cultural controls (8 November 2018)
- Provided an article to Vegetables Australia reporting grower experience of adopting IPM (Daniel Hoffman)
- Dedicated 3 half-days (16 February, 26 March and 8 November) to filming of IPM video case studies and then provided input during the editing stage (the three video case studies can be accessed via the following links: https://vimeo.com/302539603/33f95975ef; https://vimeo.com/302016877/e747a877aa;

and https://vimeo.com/302169280/0d7b57b45f)

- Supported Clear Horizon to identify and contact advisors to participate in interviews for final project evaluation
- Took part in project evaluation interview with Clear Horizon and provided all other information and supporting documents required by Clear Horizon for their final project evaluation

Outcomes

Short term and intermediate outcomes

The short term and intermediate outcomes identified for this project were:

- Increased awareness of IPM techniques among vegetable growers and advisors;
- Agronomists and other advisors understand the benefits of IPM to meet client needs; access individual IPM support when advising their clients; and incorporate IPM knowledge when advising clients; and
- Vegetable growers trial IPM techniques on the advice of agronomists and other advisors.

All of these outcomes were successfully achieved in the initial stages of the project and then expanded on in Years 2 and 3. In the first instance, theory workshops attended by the first cohort of advisors and growers raised awareness of IPM techniques and helped participating advisors understand the benefits of IPM to meet client needs. Year 1 theory workshops led directly to the establishment of the first IPM trials in commercial vegetable crops (five growers agreed to trial IPM with support from their advisors and IPM Technologies) and participating advisors began immediately to access individual IPM training and support, and incorporate IPM knowledge when advising these clients.

Year 1 IPM demonstration trials were highly successful – the level of pest control achieved in IPM trial crops was equal to or better than conventionally managed crops in the same regions and growers significantly reduced their insecticide inputs through learning to incorporate biological and cultural controls in their pest management programs. Feedback provided by participating advisors through event feedback forms, written and video case studies prepared by AUSVEG SA, discussions with the project team, and the online post-training support survey was overwhelmingly positive. At the end of Year 1, all participating advisors already reported an increase in their IPM knowledge and skills; their confidence that IPM works; and their confidence to promote IPM and give IPM advice.

Advisors not only reported these changes, they also demonstrated practice change. Following the success of Year 1 demonstration trials, participating advisors began actively promoting IPM to other clients and offered to support more clients to adopt IPM through provision of IPM advice and services.

With key advisors securely on-board, and evidence of practical and commercially effective vegetable IPM available on the ground in South Australia, the project quickly gained momentum. An additional 25 demonstration sites were established in Years 2 and 3 (bringing the total number to 30), and growers participating in demonstration trials quickly moved to whole farm adoption as the positive results of their trials became evident.

Advisor uptake of the training program was so high that by the end of Year 2 the majority of private-sector advisors that give pest management recommendations to vegetable growers in South Australia had undertaken both theory and practical training. The reseller companies that most readily embraced the IPM training and began to integrate IPM techniques into their advice to growers quickly gained a reputation as sources of excellent pest management advice, and their provision of IPM services became a key selling point. Meanwhile, those advisors that had not yet accessed theory and or practical IPM training 'looked over the fence' to witness successful IPM implementation and clearly saw the value in being able to offer IPM advice to their clients. These advisors then made it a priority to get involved in the training program in the final year of the project.

End-of-project outcomes and vision/broader goals

As a result of this project, growers and advisors have seen IPM work in commercial vegetable crops and they have gained confidence and experience in implementing IPM, making IPM-decisions and formulating IPM advice. Participants have increased awareness of and skills in monitoring and identification of beneficial insects and mites, particularly naturally occurring beneficials. Participants have seen the value of biological and cultural controls and now integrate these methods into their IPM strategies rather than focusing on chemical control in the first instance. Participants also have increased knowledge about the effects of pesticides on beneficial insects and mites and are now better able to make informed decisions about insecticide use and product selection within an IPM program.

One of the key aims of this project was to make IPM the accepted, mainstream method of controlling pests in vegetable crops in South Australia and we are now seeing strong evidence of significant progress towards this goal. For example, reseller agronomists estimate that the amount of field brassica production under IPM management has increased from zero to 70% and the amount of head lettuce production under IPM management has increased from zero to 80% as a result of this project.

The reason for this change is that, as a result of this project, most of the vegetable advisors (including reseller agronomists) are now confidently using an IPM approach with many of the growers that they supply and service. IPM is now promoted in South Australia by all key pest management advisors servicing vegetable growers. This includes agronomists from several CRT businesses, Elders and EE Muir & Sons. The project has also directly led to consultants from the biocontrol production company Biological Services (who previously only offered IPM advice in protected vegetable cropping systems) now also providing IPM advice and services in outdoor vegetable crops.

As a result of these changes growers are applying fewer insecticides and using them only when required, based on monitoring; agronomists are offering better pest management advice; and growers are achieving better control of pests. These results demonstrate the successful achievement of each of the intended end-of-project outcomes, namely:

- vegetable growers increasingly accept IPM as a key component in vegetable growing
- reduced reliance on chemicals in the vegetable industry; and
- agronomists and chemical resellers have increased confidence and experience in providing IPM advice to their clients.

These results also demonstrate the achievement of all the vision/broader goals identified for this project, namely:

- increase uptake of IPM practices among vegetable growers by assisting agronomists and other advisors who work directly with growers to become knowledgeable and comfortable about the IPM decision making process and giving IPM advice;
- IPM is the mainstream method of controlling pests in the vegetable industry;
- increase quality of vegetable crops; and
- more sustainable vegetable production.

This project leaves a strong legacy in a state where, previously, IPM was not widely practiced, IPM advice and services were not readily available to vegetable growers, and grower and advisor experience and confidence in the approach was very low. This project has succeeded in changing the negative perceptions of IPM and advisors trained through this project are now supporting growers across the state to implement IPM and driving ongoing IPM adoption. All South Australian vegetable growers now have access to confident and experienced local IPM advisors and this has already facilitated widespread IPM adoption across all major production regions and all vegetable crop types produced in the state. By leaving a legacy of trained local IPM advisors the project has made IPM more accessible and achievable, both for the growers that have already adopted IPM and those looking to do so in the future.

Monitoring and evaluation

All project partners worked together to develop a M&E Plan and the responsibility of executing the plan was shared between project partners. AUSVEG SA was contracted to collect and collate all monitoring data and Clear Horizon was contracted to oversee the M&E process and prepare a Mid-term Review and Final Evaluation. IPM Technologies was responsible for designing the Baseline Survey and then collating and reporting on the results of this benchmarking study. IPM Technologies supported AUSVEG SA and Clear Horizon with all other M&E activities, and made use of the monitoring data (participant feedback regarding the quality, relevance and appropriateness of the training package) throughout the project for reflection and program improvement processes.

Feedback, received both formally through monitoring tools and informally through our own observations and discussions with participants and delivery partners, was used throughout the project to refine project delivery processes and design. The way in which the training program was adapted and improved each year to suit the changing needs of participants is described in detail in the methodology section of this report.

The Reflections Workshop held in May 2017 played an important role in reviewing the effectiveness of the partnerships between IPM Technologies, AUSVEG SA and Clear Horizon. The workshop helped to define the management and communications role of AUSVEG SA in the remaining year and a half of the project and strengthened the relationship between IPM Technologies and AUSVEG SA such that they were able to work much more closely and effectively to deliver their respective contributions to the project.

A full and independent evaluation of this project will be provided by Clear Horizon after the submission of this Final Report. We address here the Key Evaluation Criteria (KEQs) identified in the project M&E Plan, and provide our own assessment of the extent to which these criteria have been met.

Process effectiveness

1. How effective were the approaches used to deliver advice and support to vegetable industry advisors?

a. How effective were engagement processes used?

From our point of view, the engagement processes used were highly effective. The project induction meetings held between IPM Technologies and key target advisors were essential in fostering interest, gaining trust, and securing commitment from advisors to participate in the initial stages of the project. These meetings were also important in guiding the development of an adapted training framework that suited the needs and preferences of the target audience better than the framework initially proposed.

b. How effective was the delivery of the workshops to advisors?

The next stage of engagement, which was the delivery of theory workshops, was also highly effective. Uptake of the theory training by the target audience was very high (by the end of the second round of theory workshops, all target advisors had received theory training) and the workshops succeeded in delivering their intended outcomes (namely to introduce participants to IPM; develop practical IPM strategies for crops of interest; and secure grower and advisor agreement to participate in IPM demonstration trials during the next stage of the project).

Participant feedback (which was collected, collated and reported on by AUSVEG SA) was overwhelmingly positive. Comments regarding the elements of the workshop that participants liked best included:

- “IPM planning section, developing an actual plan based on specific veggie crops; looking at beneficials (live specimens); discussion of impact of agrochemicals on each beneficial”
- “Learning new methods of insect control rather than just chemical control”
- “I like the skilling up that it provides me; I feel that it is a future safeguard to chemicals but still not well enough understood by growers”
- “The chance to identify some of the beneficial insects talked about with specimens brought in”
- “information regarding natural beneficials and examples of these to view; discussion on practical aspects of IPM”

Feedback regarding knowledge gaps was used to tailor practical training to meet the specific needs of advisors and the few suggestions regarding improvements to the workshop format and content were taken into account for future workshops.

c. How effective was the follow-up advice provided to advisors?

The practical follow-up support provided through field training events and regular phone and e-mail contact was also highly effective. Demand for field training was very high throughout the project (IPM Technologies delivered a total of 52 field training sessions attended by advisors and their collaborating growers at IPM demonstration sites) and advisor and grower uptake the phone and e-mail support service was very high, particularly in the first two years of the project. Advisors and or growers typically maintained weekly contact throughout the first season of IPM trials and then required less frequent support in subsequent seasons. As advisors gained experience and confidence, they were increasingly able to formulate IPM recommendations independently and they used the phone and e-mail support service simply as a means to check that they were on the right track. This change provides strong evidence of the effectiveness of the practical training package to meet the needs of participating advisors.

Advisors’ own assessment of the practical training (provided through event feedback questionnaires used at field training events and the online post-training support survey) were also very positive. In the post-training support survey, 100 % of respondents stated that they had increased knowledge of IPM techniques and increased confidence in making IPM decisions and giving IPM advice as a result of the training program. All respondents rated the quality of the practical training as good (22 %) or very good (78 %); the timeliness as good (11 %) or very good (89 %); and the appropriateness of the way post-training support was delivered as high (33 %) or very high (67 %). Participants found it particularly valuable to have theory training followed-up with practical training in the field and weekly decision-making support, and they indicated that they would not have taken the risk of attempting the IPM trials without this level of support.

Project effectiveness

2. How effective was the project in delivering its intended outcomes?

a. To what extent have agronomists and chemical resellers incorporated IPM knowledge when advising vegetable growers?

The fact that most of the key agronomists and chemical resellers that provide pest management advice to vegetable grower in South Australia have now become champions of IPM – actively promoting and facilitating IPM adoption – is testament to the extent to which they have incorporated IPM knowledge and techniques into the services and advice they offer their clients.

While not all advisors have embraced IPM to the same extent, this project has succeeded in changing the culture of pest management advice provision – from a culture of considering pesticides to be the single most effective means of controlling pests and recommending routine broad-spectrum insecticide applications to a culture of offering IPM as a simple, accessible and viable alternative.

b. To what extent have vegetable growers gained an increased awareness of IPM techniques?

The extent to which vegetable growers gained increased awareness of IPM techniques varies depending on their level of engagement in the project. Growers that participated in the initial stages of the project attended theory training, volunteered to participate in the first IPM demonstration trials, and were then actively involved in practical training and decision-making throughout the season. These growers gained a full understanding of the IPM approach and the skill required to implement IPM.

Growers that joined the program at a later stage did so because they gained awareness of IPM and the benefits of this approach through seeing or hearing about the success of the initial trials. In contrast to the early adopters, these growers were less interested in learning about the details of IPM techniques themselves and preferred to rely on their trusted advisors to monitor crops, make IPM decisions and provide simple IPM advice that they could follow.

c. To what extent have vegetable growers trialed IPM techniques on the advice of agronomists and chemical resellers?

IPM trials were established and successfully executed at 30 IPM demonstration sites across South Australia as a result of this project. According to AUSVEG SA, this represents the largest number of trials in commercial crops ever achieved in a vegetable extension project in the state. However it is not only the number of trials that is impressive, but rather the proportion of the vegetable industry that these trials (and subsequent transition to whole-farm adoption) represent. By working with many of the large scale vegetable producers to trial and adopt IPM, advisors trained under this project have reached a very large proportion of the industry. The level of IPM adoption that has occurred as a result of this project is already very high, for example the amount of field brassica production under IPM management has increased from zero to 70% and the amount of head lettuce production under IPM management has increased from zero to 80%.

Legacy

3. How sustainable are the outcomes of the project likely to be?

This project has demonstrated the effectiveness of IPM made IPM as simple and accessible as the conventional pesticide-based approach. The outcomes of the project are likely to be very sustainable because the project leaves a legacy of improved perceptions of IPM, a large proportion of vegetable growers with first-hand experience of the benefits of IPM, and a 'generation' of trained local IPM advisors who are already promoting IPM and facilitating IPM adoption.

The trained IPM advisors, and the change in the culture of giving pest management advice that they represent, are the strongest legacies of this project – they have the capacity to facilitate ongoing implementation of IPM and drive further adoption of IPM into the future.

The strength of this project lies in the proven participatory extension model that allowed for the delivery of outstanding sustainable practice change outcomes in an efficient and cost-effective way.

Recommendations

This project was initially proposed as a "pilot" to demonstrate that IPM Technologies could deliver the aims proposed. This project demonstrates that this can be achieved, and we suggest that the same approach be used nationally so that IPM Technologies can achieve the same results with growers and advisors across Australia.

One reason that IPM Technologies could provide more than expected support in the field was because we also began another project (MT16009) which we decided to commence largely in South Australia. This allowed more than expected visits to South Australia. There would be synergies if such a future project could be conducted at least partly in conjunction with Project MT16009 which is demonstrating IPM in potato and onion crops nationally.

Refereed scientific publications

None to report.

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Intellectual property, commercialisation and confidentiality

No project IP, project outputs, commercialisation or confidentiality issues to report.

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This report was prepared primarily by Angelica Cameron immediately prior to her commencing maternity leave in December 2018. Her considerable efforts on this project were recognized by the SA Vegetable Industry as they presented her with the "Researcher of the Year" award for South Australia in 2018.

Appendices

Appendix 1 – Fact sheets developed to support practical training

Appendix 2 – Examples of IPM strategies developed with participating growers and advisors

Appendix 3 – Example of a workshop flyer

Appendix 1 – Factsheets developed to support practical training

Natural enemies of aphids in vegetable crops

VEG IPM NOTE

Outdoor vegetable crops

In outdoor vegetable crops the most important natural enemies of aphids are lacewings, hoverflies, and parasitoid wasps. Typically some or all of these can be found in the crop shortly after aphids arrive, and can provide excellent control as long as disruptive pesticides have not be applied. Ladybirds often arrive later, and play an important role in cleaning up any large aphid populations that have been allowed to build up.

Protected vegetable crops

In protected vegetable crops the same beneficical insects can also turn up naturally, but often there are too few or they arrive too late to provide control. Parasitoid wasps are available for a range of aphid species, and releases of these beneficials should be considered as soon as aphids are detected in protected crops.

What to look for

When monitoring, look out for both aphids, and the eggs of predators. If aphids are present, also look for signs of parasitised aphids. Take note from one week to the next of the relative numbers of aphids and beneficials, before deciding whether chemical support is necessary.

Chemical support

Selective aphicides can be applied to support biological and cultural controls, if necessary. IPM Technologies can provide assistance when it comes to deciding whether a spray is necessary, and which product is most suitable.

It is important to select the product that will cause minimal disruption to the full range of beneficials that are working to control aphids and other pests in your crop.

Parasitoid wasp (3 mm) inserting egg into aphid (Photo: Denis Crawford, Graphic Science)

Adult brown lacewing (10 mm) (Photo: Denis Crawford, Graphic Science)

Adult hoverfly (10 mm) (Photo: Denis Crawford, Graphic Science)

Adult common spotted ladybird (10 mm)

Parasitised aphids (2 mm)

Brown lacewing eggs (1 mm)

Hoverfly eggs (1 mm) laid amongst a colony of aphids

Ladybird eggs (2 mm)

Adult wasp (3 mm) emerging from aphid mummy

Juvenile brown lacewing (10 mm) feeding on on aphid

Juvenile hoverfly (8 mm) on left, beside aphids and juvenile brown lacewing on right

Juvenile ladybird (10 mm)

These notes have been prepared by IPM Technologies for growers and advisors participating in VG15034. This project has been funded by Horticulture Innovation Australia Limited using the vegetable levy and funds from the Australian Government.

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Pheromone traps for Heliothis

VEG IPM NOTE

How the traps work

A pair of funnel traps (each containing a species-specific pheromone lure) is set up at each site to monitor the adult populations of two species of Heliothis (now called *Helicoverpa*):

- corn earworm (*Helicoverpa armigera*)
- native budworm (*Helicoverpa punctigera*)

How the information can be used

There are a couple of very practical reasons for using pheromone traps to monitor adult Heliothis activity.

Firstly, the traps tell us which of the two species are present, and this will help with selection of any insecticides. *Helicoverpa armigera* is more difficult to control than *H. punctigera,* and so different sprays should be used if this species is present. Secondly, the traps provide an early warning of pest pressure and allow much more precise timing of any sprays to target small and vulnerable stages.

This method of monitoring is not a substitute for direct searching in the crop for moth eggs, small caterpillars and beneficial insects. The two methods are complimentary and together they help to inform timely and appropriate management decisions.

How to set up the traps

1. Set up two traps per site (one for each species), spaced about 10 metres apart.
2. Label both the lid and base of each trap: one with the letter A (for *armigera*) and the other with the letter P (for *punctigera*).
3. Remove the plug on top of the lid, and use a paper clip to attach the pheromone lure to the lid. The lure should hang between the lid and the funnel. Make sure you attach the correct lure to each labelled trap.
4. Half-fill the trap with water and a drop of dishwashing liquid. Mix the solution and close the trap.
5. Suspend each trap from a star picket
6. Replace the lures every six weeks.

How to check the traps

Check traps weekly. Remove the lid, tip the contents of the trap onto the ground and count the total number of moths. Repeat for the second trap, then refill traps with water and dish washing liquid before replacing them on their star pickets.

Top: *an adult Heliothis moth*
Centre: *a pair of funnel traps used for Heliothis monitoring, beside a celery crop*
Bottom: *a funnel trap*

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Monitoring for Heliothis

VEG IPM NOTE

Pheromone traps and direct searching

Pheromone traps and direct searching are two complimentary monitoring methods that help to inform timely and appropriate management decisions for Heliothis (now called *Helicoverpa*).

A pair of pheromone traps can be used to monitor adult populations of the two species (*Helicoverpa armigera* and *Helicoverpa punctigera*). The traps tell us which species are present, and this helps with the selection of suitable insecticides. They also give an early warning of pest pressure.

Pheromone traps are not a substitute for direct searching in the crop.

Weekly monitoring for moth eggs, small caterpillars and beneficials should commence after adult Heliothis have been detected in the traps. By looking at the colour of moth eggs, and predicted weather conditions, it is possible to estimate when the eggs will hatch, allowing for precise timing of sprays to target small vulnerable caterpillars.

A Heliothis moth

A funnel trap used for monitoring adult Heliothis activity

Things to look for

Heliothis eggs are round and about 1mm diameter. Freshly laid eggs are white. A brown ring appears on the egg as the caterpillar inside develops. Just before the caterpillar hatches, its dark head capsule can be seen through the egg shell.

First instar caterpillars are very small (just 1-3mm long).

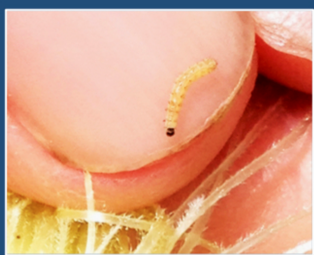
A range of beneficials can contribute to Heliothis control in vegetable crops.

Trichogramma wasps parasitise Heliothis eggs (and other moth eggs). Parasitised eggs are easily recognised because they turn black.

Various generalist predators such as lacewings, ladybirds and predatory bugs feed on Heliothis eggs and caterpillars. The most important predators of this pest in vegetable crops are usually damsel bugs (also called nabid bugs).

Two freshly laid Heliothis eggs (1mm)

A maturing Heliothis egg (1mm)



A first instar Heliothis caterpillar (2mm)

An adult damsel bug (predator, 12mm)

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Getting the most out of Bt sprays

VEG IPM NOTE

Bacillus thuringiensis (Bt) sprays

Bt sprays contain live spores and endotoxins of a naturally occurring bacterium. These sprays are excellent IPM tools because they are highly selective and do not harm beneficial insects and mites.

Different subspecies of *B. thuringiensis* are used to make Bt sprays. These include:

- *B. thuringiensis aizawai* (Bta) for caterpillars
- *B. thuringiensis kurstaki* (Btk) for caterpillars
- *B. thuringiensis israelensis* (Bti) for fly larvae, including fungus gnats and mosquitos

Within an IPM program, Bta and Btk sprays can give excellent control of many caterpillar pests, provided they are applied correctly.

Bts do not kill immediately. Once a caterpillar eats treated foliage it stops feeding, thus protecting the crop from further damage, but it may remain visible on the foliage for 3-4 days before dropping to the ground.

Resistance management

Each *B. thuringiensis* subspecies produces a different toxin, so if Bts are used regularly, we suggest growers minimise resistance selection pressure by rotating between the product that contains Bta (XenTari) and products that contain Btk (e.g. Dipel and Delfin).

In the interests of resistance management, we do not recommend tank mixing Bta and Btk products or the use of Bt products that combine Bta and Btk.

Getting the best results from Bt sprays

Bt sprays need to be applied with care in order to achieve good results. Bts are not residual and to kill the target pest the Bt toxin must be ingested. The caterpillar needs to feed on treated foliage before the Bt toxin is broken down by UV radiation or washed away by rain or overhead irrigation. So factors such as coverage, timing of application and choice of spray adjuvants play an important role in determining the efficacy of a Bt application.

Your Bt application checklist

- ✔ Check the date of manufacture – do not use product that is more than 2 years old
- ✔ Use a high water volume to ensure good coverage, especially on larger plants – at least 500 L/ha, but more if possible
- ✔ Between Spring and Autumn, spray after 3pm to avoid peak UV
- ✔ Use a **sticker,** such as NuFilm-P, if possible
- ✔ Avoid overhead irrigation or rain for 24 hours after application

Additional measures to improve Bt efficacy

- ✔ Use a feeding attractant such as milk powder
- ✔ Target small caterpillars
- ✔ Ensure the tank and lines are clean of other pesticides, especially synthetic pyrethroids
- ✔ Use a wetting agent
- ✔ Keep the pH in the tank neutral
- ✔ Use as part of an IPM program

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Appendix 2 – Examples of IPM strategies developed with participating growers and advisors

IPM strategy for continental cucumbers (protected crop, semi-hydroponic)

Pest	Beneficial	Cultural	Compatible chemicals	Monitoring (weekly from 2-leaf stage)
Whitefly	• Encarsia (wasp) • Eretmocerus (wasp)	• Weed control (include insecticide when spraying off weeds) • Screens?	• Admiral • Applaud • Mainman	Whitefly - adults will fly off plants if disturbed – check youngest leaves. Look out for honeydew and sooty mould. Parasites – check colour of whitefly nymphs on the oldest infested leaves (black or yellow nymphs have been parasitised by Encarsia or Eretmocerus)
Western flower thrips	• Montdorensis (mite) • Cucumeris (mite) • Hypoaspis (mite) • Orius (bug)	• Flowering basil banker plants • Increase humidity during extremely hot/dry periods • Hygiene • Control movement of people	• None	Yellow sticky traps (to distinguish between species, replace weekly and post to IPM Technologies for species ID) Thrips – check flowers (and look on leaves) Montdorensis – look on the underside of leaves, near midrib Cucumeris – look in flowers and on undersides of leaves Orius – look in flowers
Two-spotted mite	• Persimilis (mite) • Californicus (mite)	• Increase humidity during extremely hot/dry periods • Hygiene • Control movement of people	• Acramite • Oil – targeted at the top of the plant, allowing predatory mites to get established below	Two-spotted spider mite – look for earliest signs of damage (speckles on leaves), then check for mites and eggs on the underside of damaged leaves. Predators – look for predatory mites and their eggs amongst two-spotted mite infestations. Look for early establishment on lower leaves.
Aphids	• Aphidius (wasp) • Ladybirds • Brown lacewings • Hoverflies	• Weed control (include insecticide when spraying off weeds)	• Pirimor (not for green peach aphid) • Mainmann • Movento (will disrupt predatory mites)	Aphids – check growing tips and underside of older leaves. Look out for honeydew and sooty mould. Predators and parasites – check for these if aphids are present. Look for eggs of predators and signs of parasitised aphids.
Fungus gnats	• Hypoaspis (mite) • Parasitic nematodes	• Irrigation management	• Vectobac (Bt) drench	Direct search – adults will fly up from base of plant if disturbed.

IPM strategy for lettuce (field crop)

Pests	Beneficials*	Cultural controls	Compatible chemicals	Monitoring (weekly)
Western flower thrips	• Predatory mites • Predatory thrips • Predatory bugs • Predatory beetles	• Sacrificial planting/trap crop • Sequential planting • Control flowering weeds (e.g. fat hen)**	• **NONE**	Direct search for adults, juveniles AND beneficials
Onion thrips	• As above	• As above	• **Success Neo** • **Movento**	As above
Lettuce aphid	• Ladybirds • Brown Lacewings • Hoverflies	• Resistant varieties • Sacrificial planting/trap crop • Weed control**	• ~~**Confidor drench**~~ **(not compatible)** • **Pirimor** (only on young seedlings) • **Versys** (only on young seedlings) • **Movento** (slow kill, but still effective once head has formed, due to systemic effect)	Direct search for aphids AND beneficials. (Typically found in the hearts)
Green peach aphid	• As above, plus *Aphidius* (parasitic wasps)	• Sacrificial planting/trap crop • Weed control**	• **Movento** • **Versys**	Direct search for aphids AND beneficials. (Typically found on the underside of the lower leaves)
Heliothis	• Damsel bugs • *Trichgramma* wasps (egg parasitoids)		• **Vivus**	Use pheromone traps (see info sheet) Direct search for eggs, small caterpillars AND beneficials
Rutherglen bug			• **Natural pyrethrum** (1 day before harvest)	Direct search for adults

*All beneficials listed are expected to occur naturally, if disruptive pesticides are not applied.
**Include an insecticide when spraying off weeds

IPM strategy for brassicas (field crops)

Pests	Beneficials*	Cultural controls	Compatible chemicals/sprays	Monitoring (weekly)
Diamondback moth	• Parasitoid wasps (e.g. *Diadegma*) • Predatory bugs (e.g. damsel bugs) • Brown lacewings	• Sacrificial planting • Sequential planting • Control flowering brassica weeds**	• **Bt sprays** (e.g. Dipel and XenTari) • **Belt or Coragen** • **Movento** Avatar, Success Neo and Proclaim are also compatible under certain circumstances (see notes below)	Check plants for eggs, caterpillars and parasitized pupae, as well as predatory bugs. Large caterpillars can be pulled apart to check for parasitoid wasp maggots inside.
Cabbage white butterfly	• Parasitoid wasps • Predatory bugs	• Control flowering brassica weeds**	• **Bt sprays**	Check plants for caterpillars and eggs. More likely to be a problem in Autumn.
Aphids (Cabbage aphid and green peach aphid)	• Ladybirds • Brown Lacewings • Hoverflies • Parasitoid wasps (e.g. *Aphidius*)	• Sacrificial planting • Sequential planting • Control brassica weeds**	• **Pirimor** (cabbage aphid only, not GPA) • **Movento** • **Chess** • **Versys**	Check plants for aphids AND all beneficials. (Green peach aphid is typically found on the undersides of the lower leaves)
Thrips	• Predatory thrips • Predatory mites • Predatory bugs • Predatory beetles	• Control flowering weeds (e.g. fat hen)**	• **Success Neo** • **Movento**	Check plants for adults and juveniles AND all beneficials

*All beneficials listed are expected to occur naturally, if disruptive pesticides are not applied.
**Include an insecticide when spraying off weeds

<u>Notes on use and compatibility of chemicals and sprays</u>

- **Avatar** can be disruptive to a range of predators, but this effect is non-residual – use on seedlings/young transplants, before predator populations build up.
- **Bt sprays** need to be applied with care to maximise efficacy. Between Spring and Autumn apply after 3pm to avoid peak UV. Use a high water volume (at least 500L/ha but more if possible, especially on larger plants); use a sticker (e.g. NuFilm-P); and avoid overhead irrigation (or rain) for 24 hours after application. Rotate between Dipel and XenTari.
- **Chess** can take up to 10 days to kill aphids. Works best if sprayed under mild conditions, allowing time for it to soak into the leaf before it dries.
- **Movento** is effective against small DBM caterpillars. Movento can take up to 10 days to kill aphids and it must be applied with a penetrant such as Hasten.
- **Pirimor** is not effective against green peach aphid but it will kill other aphids immediately. It also kills adult wasps – repeated use may disrupt populations of parasitic wasps.
- **Proclaim** is toxic to damsel bugs and adult wasps – minimise use if these beneficials are becoming established.
- **Success Neo** is toxic to adult wasps – repeated use may disrupt populations of *Diadegma* and *Aphidius*

Appendix 3 – Example of a workshop flyer

Integrated Pest Management Workshop

Who is this workshop for? Agronomists/advisors to the vegetable industry, and collaborating growers

Who is presenting? Dr Paul Horne and Angelica Cameron, from IPM Technologies

When: 1pm - 4pm, Tuesday 23 August

Where: DJ's Grower Services and Supplies Lot 12 Chalk Hill Rd, McLaren Vale, SA

AUSVEG SA and IPM Technologies have partnered to deliver a three-year IPM training program for agronomists/advisors to the vegetable industry. The program aims to build the capacity of vegetable industry advisors to give IPM advice, and this workshop is the first stage. After the workshop, advisors will be ready to work with collaborating growers to trial IPM in commercial crops. IPM Technologies will hold field demonstrations and provide regular one-on-one support to each participating advisor, helping them make decisions at every step of the way.

What will this workshop cover?

Pest control methods

- Biological, cultural and chemical
- Integrating all three methods (IPM)

Factors to consider in an IPM program

- Pest/beneficial complex
- Pesticide history
- Insecticide resistance
- Pesticide effects on beneficials
- Sources of beneficial insects and mites

Samples of beneficial insects and mites

- Meet the key predators and parasites of pests in vegetable crops

Collaborative development of IPM strategies

- Develop an IPM strategy for each vegetable crop in which you want to trial IPM

What will you take away from the workshop?

Ready-to-implement IPM strategies for the vegetable crops that you give pest management advice in

Ongoing support to trial IPM

Advisors working with collaborating growers to trial IPM will be offered unlimited phone and email support by IPM Technologies for three seasons. Advisors will be supported to develop their skills, confidence and knowledge in key areas including:

- Monitoring effectively for pests and beneficials
- Correct identification of pests and beneficials
- Assessing risk and cost of damage
- How to decide if there are enough beneficials, and whether they will work in time
- How to decide if chemical support is needed
- How to choose the most suitable chemical

What to bring to this workshop

This training program is targeted at advisors, but grower collaboration is essential, and interested growers are encouraged to participate in all stages of the program. Bring along any growers that might be interested in trialling IPM in their vegetable crops!

Got any questions?

Contact Angelica Cameron
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This project has been funded by Horticulture Innovation Australia Limited using the vegetable levy and funds from the Australian Government.

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