

## **Final Report**

# **Vegetable Agrichemical Pest Management Needs and Priorities**

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Vegetable Agrichemical Pest Management Needs and Priorities VG16060

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## Summary

Project VG16060 Vegetable Agrichemical Pest Management Needs and Priorities was designed to employ a Project Coordinator to undertake a range of engagement and communication activities that would engage growers and agronomists to identify insect, disease and weed priorities for the vegetable industry. VG16060 coordinated the vegetable industry agrichemical pest needs by identifying and prioritising pest issues and potential agchem gaps through implementation of an effective prioritisation process for the industry. The central contact point is referred to in this project as the Vegetable Agrichemical Pest Management Needs and Priorities - Project Coordinator, or simply the Project Coordinator. The Project Coordinator interacted directly with growers and agronomists to ensure that the pest priorities and agrichemical needs for the vegetable industry were accurately recorded and understood. Utilising the existing 2014 Strategic Agrichemical Review Process (SARP) pest priorities, in conjunction with regional Industry Development Officers (IDOs), the consultations were done on a regional basis by commodity and pest.

VG16060 ran from July 2017 to 2 July 2020 and it involved engagement and consultation primarily with members of the vegetable industry, specifically growers and agronomists, relevant personnel at Horticulture Innovation Australia Ltd. (Hort Innovation), and other relevant stakeholders, such as entomologists, researchers and chemical registrants.

A total of thirty regional crop specific workshops were completed, where pest priority issues for vegetable growers were recorded and understood. Regional crop specific workshops were complemented with one-on-one grower and agronomist consultation. Additionally, in conjunction with the Hort Innovation R&D Manager, the VG16060 Project Coordinator developed the AUSVEG Online Crop Specific Pest Survey. These online crop specific pest surveys were developed as another platform to capture and rank the vegetable industry's insect, disease and weed issues of concern, and to capture feedback from growers and agronomists that were not directly consulted via workshops nor via one-on-one consultation. Identified pest priorities, agrichemical gaps and potential solutions informed industry actions at the annual AgChem Priority Access Forum.

Pest priorities gathered during industry were utilised to produce crop specific reports for thirty five vegetable crops that will aid in the update and development of the vegetable industry SARP documents, which will give the vegetable industry a clear outlook of priority pests and potential gaps in existing agrichemical pest control options. Broader outcomes of the project are to inform and direct R&D funding for crop protection purposes and to increase the number of Agchem options for managing relevant pest priority issues.

When needed by the industry, the VG16060 Project Coordinator, with the Hort Innovation R&D Manager, assisted growers and agronomists with requests for Minor Use Permits. Minor Use Permit Requests received by the VG16060 Project Coordinator were reviewed, processed and then submitted by the Hort Innovation R&D Manager to the APVMA to assist vegetable growers to improve agrichemical access for managing pest priority issues of concern, where there are limited or no agchem options.

## Keywords

Pest priorities; industry consultation; project coordinator; regional crop specific workshops; online crop specific pest survey; prioritisation process; vegetable industry; minor use permit request; agchem priority access forum.

## Introduction

### Agrichemicals in Australia

While the Australian horticulture industry is a high value industry, with current estimates of industry size to be 30,000 businesses located in every state and territory with a collective farm gate value of \$13 billion, growers of horticultural crops frequently suffer from a lack of legal access to crop protection products (pesticides). High costs for developing on-label requirements for use of agrichemicals in Australia has contributed to a limitation of control options. It is often the case that individual commodities are produced at too low a level for agrichemical companies to pay for registration of products for use on them. This limitation is also faced by growers of larger crops when a pest problem may be localised (regionally) or sporadic (some seasons) in nature.

In Australia, agrichemical supply is tightly regulated, with requirements for approval and maintenance of on-label usage consisting of safety criteria information, evidence of efficacy (trial or laboratory data), information for identification and mitigation of trade risks, residue-management strategies, and accompanying data. An agrichemical product must be registered by the Australian Pesticides and Veterinary Medicines Authority (APVMA) before it can be supplied to the market. If a registrant were to supply an unapproved active constituent or a product that is not registered, they may be at risk of legal action under the *Agricultural and Veterinary Chemicals Code Act 1994*.

Limited access to agrichemicals is of particular concern to the Australian vegetable industry, which is Australia's largest horticultural industry at an estimated annual gross value of production of \$4.3 billion in 2017-2018 for over 150 levied products. While vegetables are grown in every state and territory of Australia, production of some commodities (especially niche products) are often regionally grown. As such, agrichemical needs may differ between regions. The consequences of unregistered or non-permitted pesticide use can be severe, including product rejection and fines. In response to increasing agrichemical needs, Australia introduced a national "Minor Use" system in the 1990's, which was modelled on overseas experiences, such as the Canadian system.

### The Australian minor use system

Due to market failure and the economic landscape of Australia in terms of limited agrichemical availability for minor crops, Australian vegetable growers have a long history of needing Minor Use permits to gain access to chemical control options. Intended users may apply to the APVMA for consideration of a minor use permit to authorise an off-label use.

According to the Agricultural and Veterinary Chemicals Code Regulations (1995), minor use is defined as: 'A use of the product or constituent that would not produce sufficient economic return to an applicant for registration of the product to meet the cost of registration of the product, or the cost of registration of the product for that use, as the case requires (including, in particular, the cost of providing the data required for that purpose).'

The minor use area is a dynamic one, with chemicals being withdrawn, new pests and diseases emerging, and new crops being grown for which no approved chemicals are available. In processing a minor use permit application, a principle consideration for the APVMA is whether a suitable Maximum Residue Limit (MRL) can be established for the proposed use. Hence, data trials may be necessary in order to provide appropriate information to the regulator for permit approval. In establishing MRLs, the APVMA considers all available data, including overseas data if available and determined relevant. Collating information for application, approving and undertaking data trials, and processing of permits can take six to nine months, and sometimes longer.

In 1998, project VG97066 was commissioned by Hort Innovation (then HRDC) and AgriFutures Australia (formerly Rural Industries Research and Development Corporation; RIRDC) to consider the issue of approvals for the use of pesticides on minor crops. The forum that was the keystone of this project included visitations from program leaders of minor use projects in California and the United Kingdom. Following the commissioning of a limited survey of vegetable growers to demonstrate the extent of the minor use problem, the forum investigated solutions to the minor use problem and developed recommendations for the establishment of a national minor use program.

As yet, no single national minor use program is established within Australia, although there is coordination of data generation and permit applications amongst a number of industries, most notably horticulture and grains via Hort Innovation and Grains Research and Development Corporation (GRDC). Five sectors represent the majority of minor

use permit applications lodged, namely vegetables, fruit and tree nuts, non-crop situations, broad-acre crops, and forestry.

The APVMA issues permits for emergency use, minor uses (minor crops, or minor uses in major crops) and for research purposes. Permits are issued when the use would otherwise be illegal according to state or territory legislation (Victoria is an exception and other states allow for some exemptions). Hort Innovation, as well as holding minor use permits for the vegetable industry, manages the data acquisition and generation, strategic and tactical development, and tendering out of research and development required for permit preparation.

### **Preceding work and current linkages**

In 1999, Hort Innovation (then Horticulture Australia Limited) supported a minor use project for the vegetable industry with AUSVEG and Crop Protection Approvals, a grower-owned company. A coordination project was then established in 2004 as a means of facilitating access to minor use permits by levy-paying horticultural industries. The first iteration was AH04009 (Pesticide Minor-Use Coordinator), which continued work from the 1999-2003 minor use initiative, but broadened the project across all horticultural crops.

Following a 2007 review of project AH04009 by Scholefield Robinson Horticultural Services Pty Ltd. (AH06104), the coordination project was continued in the 2007-2010 iteration, MT07029 (Managing pesticides across horticulture). MT07029 aimed to assist horticultural industries gain access to pesticides necessary for sustainable production by critically assessing pesticide uses and requirements, developing a systematic approach to facilitate access to minor use permits, and conducting a Strategic Agrichemical Review Process to plan for future pesticide requirements.

Determination and prioritisation of vegetable industry chemical access needs largely took place via industry consultation in MT10029 – Managing Pesticide access in horticulture (cont. from AH04009 & MT07029), which began in 2010 and was subsequently brought in house to Horticulture Australia Limited in August 2013.

Growcom was the service provider for Hort Innovation for 3 vegetable industry projects. Project VG10127 – Minor use permit management for the vegetable industry, which was contracted in July 2011 through to July 2012. Following this project there were two continuation projects VG12035 and VG12114 which concluded in November 2016. The primary purpose of these projects was Growcom to be the permit holder for the vegetable industry. All other activities were carried out internally by Hort innovation or through the previous project MT10029 – AgAware. Since the completion of project VG12114, Hort Innovation is now the permit holder for all vegetable permits and is responsible for the preparation and now submission of the applications to the APVMA.

In 2012/13 Hort Innovation, (as Horticulture Australia Limited) commissioned a review of the Minor Use system that is currently in place for the vegetable sector. Project VG12105 (Review of pesticide investment in the vegetable industry) assessed both the minor use system and how industry stakeholders understood and were engaged with this system. As an outcome of VG12105, project VG13096 (Minor Use and Agronomy Coordinator – Minor Use Priorities and Awareness Program) was funded to undertake a range of engagement and communication activities that would increase knowledge, awareness and involvement in the minor use system for the vegetable industry.

### **Strategic Agrichemical Review Process (SARP)**

As previously emphasised, access to appropriate pesticides is adequate in some vegetable crops but limited in others. This hinders management of plant pest issues, especially in minor crops. Hort Innovation, and previous iterations of the RDC, have regularly funded Strategic Agrichemical Reviews of vegetable commodities. A SARP involves a desktop audit and industry liaison component to assess the importance of plant pests affecting a specific horticultural industry. The SARPs aim to identify key pest priorities by examining existing registrations and determining where a lack of suitable options exist to control key pests. Determination of priority chemical options that industry may pursue for inclusion on labels or minor use permits include considerations of resistance management, residue profiles, withholding periods, efficacy, trade requirements, human safety, environmental issues, and the potential to work into Integrated Pest Management (IPM) systems.

SARPs for the vegetable industry were undertaken during AH04009, MT07029 and MT10029 and involved meetings held around Australia with growers, retailers, consultants, IDO's and government agencies. During these projects, the SARP identified pests and weeds of concern for vegetable growers and available management options (pesticide and non-pesticide solutions) were evaluated for these pest and weeds of concern. Ultimately, a SARP determines gaps in the industry pest control strategy and identifies suitable new or alternative pesticides to address these gaps.



SARP reports were reviewed again by industry and updated through VG12081 – Review of vegetable SARP reports. The SARP reports were last updated and issued to industry in March 2014.

### **Project intent**

According to the project agreement, the VG16060 Project Coordinator was tasked with establishing an effective pest prioritisation process for the vegetable industry by engaging with growers and agronomists from all major vegetable growing regions of Australia on relevant pest priority issues, and subsequently communicating this information to the Hort Innovation R&D Manager.

At establishment, it was determined that the project would be comprised of the following elements: Project Coordinator appointment, establishing & implementing the pest prioritisation process, engagement and consultation, project awareness, regional crop specific workshops, online crop specific pest surveys, grower and agronomist visits/meetings, communications activities, top five pest priorities for the annual AgChem Priority Access Forum, crop specific reports for the update of the vegetable SARP documents, and final report.

Core responsibilities of the Project Coordinator included strong vegetable industry consultation with growers and agronomists across Australia in order to establish a pest prioritisation process and establish pest priorities by region for each crop for the industry. Major tasks, as outlined in the project agreement, included setting up a network of key vegetable growers and agronomists, organising regional crop specific workshops, and developing crop specific reports for the update and development of the vegetable SARP documents.

The Project Coordinator also provided a link between growers and the minor use permit submission process, and that through the grower and agronomist consultation, the Project Coordinator would ensure that the Hort innovation R&D Manager was kept informed about the minor use requests and pest priorities of Australian vegetable growers.

The intended outcomes of this project included regional engagement and consultation with members of the Australian vegetable industry, which would facilitate an effective pest prioritisation process to effectively establish pest priorities for the vegetable industry, providing a clear outlook on priority pests and potential gaps in existing agrichemical pest control options. Broader outcomes of the project are to inform and direct R&D funding for crop protection purposes and an increase in the number of Agchem options to manage relevant pest priority issues. By establishing a central point of contact within the vegetable industry on pest priorities and minor use issues, it was expected that more growers would gain an understanding of how important it is to be involved and provide input into the system for prioritisation purposes.

### **Project objectives**

The project VG16060 Vegetable Agrichemical Pest Management Needs and Priorities – Project Coordinator was initiated to achieve the following:

1. Appointment of a suitably qualified VG16060 Project Coordinator
2. Establishing and implementing a pest prioritisation process
3. Engagement and consultation with growers and agronomists
4. Engagement and consultation with Hort Innovation
5. Communications activities

This final report details methodology, activities, outputs and outcomes undertaken from project inception on 17 July 2017 to its conclusion on 2 June 2020. This report also includes recommendations to shape any further related projects.

## Methodology

### Method to address industry development needs

As stated in the project agreement, key elements of VG16060 were:

1. Employment of a suitably qualified Project Coordinator,
2. Monitoring and Evaluation Plan (development and actioning),
3. Communication and Engagement Plan (development and actioning),
4. Twelve regional workshops per annum,
5. Project awareness material in the form of printed flyers (five flyers over the project as the need arises to supply to VegNET and other extension networks),
6. Database developed and maintained on behalf of Hort Innovation,
7. A top five priority list generated for each vegetable commodity supplied directly to Hort Innovation prior to the AgChem Priority Access Forum,
8. Generation and collection of agrichemical information for use in the SARP updates,
9. Quarterly project updates to industry members that include key dates, information on project progress, and other relevant agrichemical information,
10. Articles as necessary for communication via the Vegetable Industry Communication Program,
11. Two CAAG meetings per year over the course of the project with associated permit request reports and priorities list and,
12. Milestone reports (three per year – four-month intervals).

### Appointment of a suitably qualified VG16060 Project Coordinator

At the outset of VG16060, a Project Coordinator was employed to undertake requirements of the project. From July 2017 - July 2020 Patrick Arratia was based at AUSVEG, Melbourne, and responsible for engaging with growers from all major vegetable growing regions of Australia, to identify and understand pest priorities, agchem needs and gaps and subsequently communicating this information to Hort Innovation.

The VG16060 Project Coordinator demonstrated more than seven years of experience in the agricultural industry. Prior to commencement with AUSVEG, the Project Coordinator worked at the Bayer CropScience for six years as part of the Australian and North American Canola breeding program.

### Engagement and Industry Consultation

Through the regional crop specific workshops, one-on-one grower consultation, AUSVEG online crop specific surveys and other engagement and communications activities, the Project Coordinator was tasked with ensuring that the Hort Innovation R&D Manager was aware of the industry pest priorities (per crop and state) and Minor Use Permit requests for the vegetable industry. The Project Coordinator was also tasked as the liaison person between vegetable industry minor use requests and Hort Innovation.

#### Regional Crop Specific Workshops

The Project Coordinator was required to conduct 12 regional crop specific workshops per year to present on the prioritisation process and to discuss and understand pest priority issues and agchem access needs and gaps affecting vegetable growers across Australia. Regional crop specific workshops were communicated to vegetable growers and agronomists for targeted regions via the AUSVEG Weekly Update and VegNET regional e-newsletters. Workshop flyers were also developed and distributed to regional VegNET officers to communicate to local growers and agronomists. Group discussions around pest priorities and agchem access for targeted crops were conducted where pests of concerns, agchem needs and gaps, and grower practices were recorded. During the course of VG16060, the

Project Coordinator presented to over 230 growers and agronomists. Each of these regional crop specific workshops ran for roughly 2 hours, where VG16060 Project Coordinator presented about the project objectives and activities, pest prioritisation process, followed up by a group discussions around grower practices, insect, disease and weed issues and agchem access needs and gaps affecting targeted vegetable crops. The Project Coordinator collated the available registered and permitted agrichemical control options for all targeted vegetable crops and pests. This information was utilised during the group discussion and the Project Coordinator captured in what manner growers and agronomists utilise available agchem options to manage pest priority issues of concern.

The Project Coordinator discussed and recorded agchem gaps and needs mentioned by growers and agronomists, including minor use requests. It was also expected that the Project Coordinator capture other relevant issues such as new insect, disease and weed issues and/or pesticide resistance that were not previously recorded in the 2014 SARP Documents. Pest priorities of concern and grower practices for managing these issues were recorded and added to VG16060 database, which was then utilised to produce the top 5 pest priority list for the AgChem Priority Access Forums and for the update and development of the SARP documents.

#### **One-on-one regional grower consultation**

Throughout the life of this project, the Project Coordinator conducted individual grower and agronomist visits as part of the broader consultation and engagement activities with industry – working in tandem with raising awareness of the project. The Project Coordinator used these visits to gain feedback on insect, diseases and weed issues, grower practices and agchem needs and gaps, including minor use requests. One-on-one regional grower and agronomist visits, which played an important role in establishing a network of stakeholders interested in providing feedback on pest priorities and agrichemical needs, targeted major vegetable growing regions around Australia. During these one-on-one grower and agronomist visits, the structure was the same as in the regional crop specific workshops, where identifying pest priorities, grower practices and agchem needs and gaps was the objective.

#### **AUSVEG Online Crop Specific Pest Survey**

The AUSVEG Online Crop Specific Pest Surveys were developed by the Project Coordinator and the Hort Innovation R&D Manager to capture the vegetable industry's main insect, disease and weed issues per crop and region. These surveys were developed to capture feedback from growers, agronomists and other relevant industry stakeholders that were not directly consulted. The AUSVEG Online Crop Specific Pest Surveys gave growers and agronomists another platform to provide relevant feedback regarding insect, disease and weed issues of concern for their crops and regions. The AUSVEG Online Crop Specific Pest Survey were developed using Survey Monkey and pest priorities identified within the 2014 version of the SARP documents.

The AUSVEG Online Crop Specific Pest Surveys were extensively circulated and communicated to the vegetable industry via the AUSVEG weekly update articles, AUSVEG Vegetables Australia magazine, AUSVEG targeted emails via Mailchimp, regional e-newsletters, Mailchimp campaigns, regional e-newsletters and other communication platforms. The AUSVEG Online Crop Specific Pest Survey was also communicated to VegNET coordinators across all growing regions with the intention of being extended to growers and agronomists in their respective regions. Insect, diseases and weed priorities recorded via AUSVEG Online Crop Specific Pest Survey were used to complement data gathered from industry consultation via workshops and one-on-one consultation.

#### **Minor use permit request liaison role for the vegetable industry**

When required by the vegetable industry, the Project Coordinator aided vegetable growers and agronomists, requiring access to minor use permits, mediating requests for Minor Use Permits with the Hort Innovation R&D Manager and assisting Hort Innovation with any permit related matters for which grower input was required. The Project Coordinator played a pivotal role between Hort Innovation and vegetable growers for pest management solutions. The Project Coordinator worked closely with growers and agronomists to complete minor use requests forms, evaluated initial requests, and consulted validity and/or alternative options with Hort Innovation and the Chemical Access Advisory Group (CAAG).

#### **Communications activities**

VG16060 engagement and consultation was key to effectively identify insect, disease and weed priorities, to gather feedback on agrichemical needs and gaps, and raise awareness of the minor use process for which communication activities were essential. Methods of increasing project awareness and engagement included:

- Articles in the AUSVEG Weekly Update e-Newsletter,

- Articles in AUSVEG Vegetables Australia,
- Information on regional crop specific workshops and online crop specific pest surveys were provided by the Project Coordinator for inclusion in the AUSVEG Weekly Update e-Newsletter and Vegetables Australia; and
- Dedicated project webpage on the AUSVEG website that included relevant links to the AUSVEG Online Crop Specific Pest Survey, industry updates, contact details for the Project Coordinator.

In addition, to raise awareness of the project, the Project Coordinator participated in industry conferences, field days and other industry events. It was the intention that building awareness of the project would encourage growers and agronomists to participate and contribute to the project via the AUSVEG Online Crop Specific Pest Survey, regional crop specific workshops and one-on-one consultation.

### **Pest Prioritisation Process**

The primary role of the VG16060 Project Coordinator was to establish and drive a formal prioritisation process for pest priorities and agrichemical access needs and gaps, including minor use requests, for the vegetable industry. In order to gather relevant information on pest priorities and to raise awareness of VG16060, the Project Coordinator presented to growers at regional crop specific meetings, one-on-one to industry stakeholders, industry events, and met with growers and agronomists on site to discuss pest priority issues of concern. As a result of ongoing engagement, stakeholders opted to contribute information on relevant pest priorities and agrichemical needs for the vegetable industry.

The first key task of the VG16060 Project Coordinator involved setting up a network of key vegetable growers, agronomists, and other relevant stakeholders and identify growing regions for each vegetable crop across Australia. The VG16060 Project Coordinator established a database to create a network of vegetable industry stakeholders from which feedback on pest priorities and agrichemical needs and gaps could be collated.

The Project Coordinator, in conjunction with VegNET officers, engaged and consulted extensively with vegetable growers, agronomists and other industry stakeholders. Utilising pest priorities established within the 2014 SARP reports for the vegetable industry, the Project Coordinator captured direct input from growers and agronomists relating to individual vegetable crops, with this input being categorised by region. In order to supplement information collected from regional crop specific workshops, the Project Coordinator produced the AUSVEG online crop specific pest surveys. These online surveys were distributed to industry stakeholders to complete. Regional crop specific workshops and online crop specific surveys were developed to collect feedback on pest priorities for each vegetable crop and agchem needs and gaps, including minor use permit requests.

The Project Coordinator, when available for targeted crops, utilised pest priority information gathered from the 2014 SARP reports, priorities ranked for each crop and pest as high, moderate and low and determined if recorded insect, diseases and weed issues were ranked the same or not, also recorded new pest issues that were not recorded during industry consultation for the development of the 2014 SARP documents. Also, as previously mentioned, the project Coordinator collated the available registered and permitted agrichemical for all targeted vegetable crops and pests. This information was utilised to discuss and record in what manner growers and agronomists utilise available agchem options to manage pest priority issues of concern. The Project Coordinator discussed and recorded agchem gaps and needs mentioned by growers and agronomists, including minor use requests. The Project Coordinator was also expected to capture any other relevant issues, for instance new pests, diseases and weeds, and pesticide resistance, that were not previously recorded.

### **AgChem Priority Access Forum**

In conjunction with the Hort Innovation R&D Manager, as per the research agreement, a top five commodity priority pest/gap list was generated each year and submitted to be used at the AgChem Priority Access Forum, held annually in the middle of the year. To produce and narrow down the list of pest priorities to a manageable top 5 pest priority issues per crop, the Project Coordinator considered a number of different factors such as:

- Ranking of pest issue,
- Percentage of specific crop affected by this specific pest issue,
- Current registered and permitted chemistry available to manage this issue (active ingredients and mode of actions),

- Major or minor crop,
- Grower cultural practices,
- Registrants or Hort Innovation projects under development for label registration and/or minor use permit, and
- Active ingredients under review by APVMA.

As previously mentioned, information around industry pest priorities was additionally gained via the online AUSVEG Crop Specific Pest Surveys results. Once priorities were identified and had been presented to the Chemical Access Advisory Group (CAAG), Hort Innovation finalised the priority list for potential permits and/or label registrations, which was then presented at the AgChem Priority Access Forum.

#### **Strategic Agrichemical Review Process (SARP)**

The VG16060 Project Coordinator utilised all the pest information gathered via industry consultation, including regional crop specific workshops, one-on-one consultation, online crop specific pest surveys, and further consultation with growers and agronomists via phone call interviews to produce VG16060 Crop Specific Reports for thirty five vegetable crops in order to develop the VG18004 - Vegetable Strategic Agrichemical Review Process (SARP) Reports.

The VG16060 Project Coordinator devoted significant time towards developing VG16060 crop specific reports for the update and development of VG18004 - Vegetable Strategic Agrichemical Review Process (SARP) Reports. Pest priorities for crops in Table 1. where ranked as high, moderate, and low for each pest and, when applicable by state, with an overall ranking for each crop/pest, taking into consideration the percentages of where that crop is grown. The VG16060 Project Coordinator also recorded some of the management practices utilised by growers to manage some of these pest issues such as: agchem used and gaps, crop rotation, cover cropping, IPM practises, etc.

#### **Chemical Access Advisory Group (CAAG)**

The CAAG was made up of experts in each of the relevant disciplines relevant to this project's delivery, such as the management of insects, plant diseases and weeds. A CAAG meeting was to be held at the beginning of the year when the top five priorities list had been generated as well as prior to the AgChem Priority Access Forum. The resulting priorities report would be presented to the Hort Innovation R&D Manager and the CAAG for further review before progression of any requests to a full application, including any data generation requirements by Hort Innovation if recommended by the group.

The Project Coordinator served in a secretariat role for the CAAG, which involved:

- Setting a calendar for CAAG meetings,
- Arranging CAAG meetings twice yearly (meeting agenda and travel arrangements),
- Developing agrichemical priorities reports for review at CAAG meetings,
- Providing follow up services for any questions raised by the CAAG that require clarification, and
- Taking meeting minutes and distribution to CAAG members.

The Coordinator presented to the CAAG the industry pest priorities based on online surveys and regional crop specific workshop results and minor use permit requests received during industry consultation. However, as pest priorities were formed, potential solutions were suggested i.e. specific chemical solutions (requests) for pest priorities that required further discussion. The CAAG assisted with this and other specific permit requests the Project Coordinator received during industry consultation. Initially two CAAG meetings per year were scheduled for the lifespan of the project, for a total of six CAAG meetings. In the February 2018 project variation request it was agreed to change two face to face CAAG meetings per year to one face to face CAAG meeting per year, with the second CAAG meeting, follow up on the agchem forum, done via teleconference.

#### **Project Database**

Over the life of the project, the Project Coordinator developed the VG16060 database, which collated and organised information gathered during industry consultation. The pest priorities database was utilised to produce top 5 pest priorities for the AgChem Priority Access Forums and to produce the VG16060 Crop Specific Reports for the update

of the SARP reports. A breakdown of the database is presented in Table 1.

Table 1. VG16060 database breakdown

Crop Group	Crops	Growers		Agronomists		*Number of Industry Surveys Completed
		1/1	Survey	1/1	Survey	
Bulb Vegetables	1. Leek	9	8	9	4	30
	2. Spring Onions	8	3	3	3	17
	3. Shallots	3	1	1	3	8
	4. Fennel bulb	3	4	2	0	9
Brassica Vegetables	5. Brassica Vegetables	32	19	18	24	93
Fruiting Vegetables - Cucurbits	6. Cucumber	16	7	10	11	44
	7. Chokos	0	0	0	0	0
	8. Zucchini	14	6	6	4	30
	9. Pumpkin	11	6	2	4	23
	10. Squash	4	0	2	0	6
Fruiting Vegetables other than Cucurbits	11. Eggplant	5	4	11	6	26
	12. Capsicum	19	11	8	9	47
	13. Chilli	4	2	2	3	11
	14. Sweet Corn	11	6	6	4	27
	15. Okra	8	3	1	3	15
Leafy Vegetables (including brassica leafy vegetables)	16. Lettuce (head lettuce)	17	8	5	10	40
	17. Leafy lettuce	10	4	3	6	23
	18. Spinach	15	2	7	7	31
	19. Silverbeet	5	4	4	5	18
	20. Fennel	1	2	1	0	4
	21. Brassica Leafy	7	10	6	11	34
Legume Vegetables (succulent seeds)	22. Green Beans	7	10	5	9	31
	23. Snow Peas	7	0	6	4	17
	24. Sugar snap peas	7	0	4	2	13
Root & Tuber vegetables	25. Sweet Potato	10	0	4	1	15
	26. Carrot	17	6	13	8	44
	27. Beetroot	8	4	2	5	19
	28. Swede	5	3	2	1	11
	29. Turnips	3	1	3	0	7
	30. Parsnips	5	3	1	1	10
	31. Radish	5	2	1	0	8
	32. Horseradish	2	0	0	0	2
Stalk & Stem Vegetables	33. Celery	11	3	3	1	18
	34. Artichoke	4	1	2	1	8
	35. Rhubarb	9	6	0	1	16
Herbs	36. Parsley	6	4	2	6	18
<b>Total</b>		<b>308</b>	<b>153</b>	<b>155</b>	<b>157</b>	<b>773</b>

## Outputs

### Regional Crop Specific Workshops

During the lifespan of VG16060, a total of 30 regional crop specific workshops were completed, targeting different growing regions and vegetable crops. During the first year of VG16060, the Project Coordinator spent a considerable amount of time visiting growers and agronomists in a one-on-one setting. This was due to the project being new and not being known by vegetable growers and agronomists as yet, making it difficult to attract growers and agronomists to attend regional crop specific workshops.

Regional crop specific workshops were extensively communicated to vegetable growers and agronomists for targeted regions and crops via the AUSVEG Weekly Update, VegNET regional officers, e-newsletters, and other communication platforms. Regional crop specific workshop flyers were developed and distributed to regional VegNET officers to communicate to local growers and agronomists. The VG16060 Project Coordinator also followed up with targeted phone calls and emails to extend invitation to growers and agronomists to attend regional workshops. As previously mentioned, each of these regional crop specific workshops ran for roughly 2 hours, where the VG16060 Project Coordinator presented about the project's objectives and activities, followed by a group discussion around pest priorities and agchem access needs and gaps for targeted crops. Pest priorities of concern and grower practices for managing these issues were recorded and added to the VG16060 database, which was used to produce the pest priority list for the AgChem Priority Access Forums and for the update and development of the SARP documents.

Table 2: Total number of regional crop specific workshops

#	Date	Region	State	Targeted Crops
1	20 September 2017	Werribee	VIC	Brassicas
2	28 September 2017	M. Peninsula	VIC	Leek
3	28 September 2017	M. Peninsula	VIC	Celery
4	14 February 2018	Devonport	TAS	Carrots
5	14 February 2018	Devonport	TAS	Peas
6	4 May 2018	Bundaberg	QLD	Sweet potato
7	4 May 2018	Bundaberg	QLD	Zucchini
8	16 May 2018	Mareeba	QLD	Pumpkin
9	17 May 2018	Atherton	QLD	Sweet potato
10	29 August 2018	Myalup	WA	Brassicas
11	29 August 2018	Myalup	WA	Carrots
12	30 August 2018	Manjimup	WA	Brassicas
13	20 September 2018	Bathurst	NSW	Sweet corn
14	20 September 2018	Bathurst	NSW	Brassicas
15	11 November 2018	Virginia	SA	Capsicum and eggplant
16	20 February 2019	Gatton	QLD	Brassicas



#	Date	Region	State	Targeted Crops
17	20 February 2019	Gatton	QLD	Lettuce
18	21 February 2019	Stanthorpe	QLD	Capsicums
19	7 March 2019	Darwin	NT	Okra
20	8 March 2019	Sydney	NSW	Brassicas
21	9 April 2019	Geraldton	WA	PC Cucumbers and Capsicums
22	31 July 2019	Werribee	VIC	Head lettuce
23	28 August 2019	Devonport	TAS	Rhubarb
24	28 August 2019	Devonport	TAS	Root vegetables (other than carrots)
25	3 September 2019	Bundaberg	QLD	Chillies
26	3 September 2019	Bundaberg	QLD	Capsicums
27	4 September 2019	Bundaberg	QLD	Snow and sugar snap peas
28	10 September 2019	Sydney	NSW	Snow and sugar snap peas
29	23 October 2019	Gatton	QLD	Root vegetables
30	24 October 2019	Gatton	QLD	Spring onions and shallots
<b>Total consulted</b>			<b>236</b>	

The Project Coordinator completed 30 regional crop specific workshops out of the 36 total workshops budgeted for this project, in part due to COVID – 19 but also, as previously mentioned, during the first year of the project one-on-one grower and agronomist consultation was the focus. The Project Coordinator gathered sufficient information to produce quality crop specific pest reports for the development and update of the SARP reports and the top 5 pest priorities per crop to be utilised at the AgChem priority access forums. Minor crops were more challenging to collect pest priority information. In general, minor crop growers did not completed the AUSVEG online crop specific pest surveys and only utilise agronomists to some extent. The majority of minor crop growers were consulted via one-on-one setting and phone interviews. Minor crop growers normally grow smaller quantities and are dispersed across the Australian vegetable growing regions, making regional crop specific workshops unsuitable for these crops. The VG16060 Project Coordinator consulted extensively with vegetable growers and agronomists across Australia to gather and record insect, disease and weed issues of concern, grower pest management practices and agrichemical gaps and needs expressed by the vegetable industry.

### One-on-one grower and agronomist consultation

During the course of VG16060, the Project Coordinator regularly conducted regional grower and agronomist visits as part of the broader consultation and engagement activities with the vegetable industry. The Project Coordinator endeavoured to visit all major vegetable growing regions around Australia. Grower visits over the course of the project are detailed in Table 3.



Table 3: Grower and agronomist visits over the course of VG16060

#	Date	Region	State	Crops
1	23 August 2017	Werribee	VIC	Brassicas, lettuce, fennel
2	6 September 2017	Werribee	VIC	Brassicas, lettuce, Artichoke
3	5 October 2017	Werribee	VIC	Brassicas, lettuce, artichoke
4	11 October 2017	Werribee	VIC	Brassicas, lettuce, artichoke
5	26 October 2017	Gippsland	VIC	Lettuce, spinach, sweet corn, carrots, brassicas, and beans
6	27 October 2017	Gippsland	VIC	Lettuce, spinach, sweet corn, carrots, brassicas, and beans
7	9 November 2017	Shepparton	VIC	Sweetcorn, carrots, squash beans, zucchini, brassicas
8	10 November 2017	Swan Hill	VIC	Sweetcorn, carrots, squash beans, zucchini, brassicas
9	13 November 2017	Bowen	QLD	Sweetcorn, beans, capsicums, pumpkins, eggplant, zucchini, cucumbers
10	14 November 2017	Bowen	QLD	Sweetcorn, beans, capsicums, pumpkins, eggplant, zucchini, cucumbers
11	15 November 2017	Ayr	QLD	Sweetcorn, beans, capsicums, pumpkins, eggplant, zucchini, cucumbers
12	13 December 2017	Virginia	SA	PC Capsicums, cucumbers, eggplant, baby spinach, broccoli, lettuce
13	14 December 2017	Virginia	SA	PC Capsicums, cucumbers, eggplant, baby spinach, broccoli, lettuce
14	24 Jan 2018	Lockyer Valley	QLD	Brassica leafy vegetables, brassicas, beans, sweetcorn, lettuce, baby spinach
15	25 Jan 2018	Stanthorpe	QLD	Brassica leafy vegetables, brassicas, beans, sweetcorn, lettuce, baby spinach
16	8 Feb 2018	Sydney Basin	NSW	Brassica leafy vegetables, brassicas, sweetcorn, cucumber, eggplant
17	9 Feb 2018	Richmond	NSW	Brassica leafy vegetables, brassicas, sweetcorn, cucumber, eggplant
18	15 February 2018	Devonport	TAS	Carrots and Peas
19	16 February 2018	Hobart	TAS	Leafy vegetables
20	28 August 2018	Gingin	WA	Carrots, sweet corn, lettuce, brassica leafy vegetables, lettuce
21	5 September 2018	Katherine	NT	Pumpkins

#	Date	Region	State	Crops
22	6 September 2018	Darwin	NT	Okra, snake beans, Asian cucurbits, cucumbers
23	19 September 2018	Griffith	NSW	Broccoli, Asian leafy vegetables, curly parsley, basil, kale, lettuce
24	13 November 2018	Virginia	SA	PC Capsicums, cucumbers, eggplant, baby spinach, broccoli, lettuce
25	14 November 2018	Mount Barker	SA	Brussels sprouts
26	15 November 2018	Riverland	SA	Brassicas, sweet corn, carrots
28	21 February 2019	Stanthorpe	QLD	Brassica leafy vegetables, brassicas, beans, sweetcorn, lettuce, baby spinach
29	6 March 2019	Darwin	NT	Okra, snake beans, Asian cucurbits, cucumbers
30	8 April 2019	Perth	WA	Carrots, sweetcorn
31	9 April 2019	Geraldton	WA	PC cucumber and capsicums
32	11 April 2019	Carnarvon	WA	PC Eggplant, capsicums, Carrots, sweet corn, lettuce, brassica leafy vegetables
33	30 May 2019	Shepparton	VIC	Sweetcorn, carrots, squash beans, zucchini, brassicas
34	6 August 2019	Werribee	VIC	Head and leafy Lettuce, brassica leafy vegetables
35	29 August 2019	Devonport	TAS	Rhubarb, Sweetcorn, beetroot, parsley, zucchini, leeks, carrots, and peas
36	9 September 2019	Sydney Basin	NSW	Leeks, head lettuce, peas, chillies, brassicas, and brassica leafy vegetables
37	24 October 2019	Cabarlah and Gatton	QLD	Rhubarb, beetroot, swedes, turnips, spring onions
<b>Total consulted</b>			<b>161</b>	

### AUSVEG Online Crop Specific Pest Survey

During the lifespan of VG16060, the Project Coordinator developed 2 versions of the AUSVEG online crop specific pest surveys. The two versions of the AUSVEG Online Crop Specific Pest Survey were developed by the Project Coordinator and the Hort Innovation R&D Manager to capture the vegetable industry's main insect, disease and weed issues by crop and region. The AUSVEG Online Crop Specific Pest Survey gave growers, agronomists, and other relevant industry stakeholders another platform to provide relevant feedback regarding pest issues of concern for their crops and regions. As previously mentioned, the AUSVEG Online Crop Specific Pest Surveys were developed using the 2014 SARP documents pest priorities, when available, and Survey Monkey.

Both versions of the AUSVEG Online Crop Specific Pest Surveys were hosted on the AUSVEG VG16060 project dedicated webpage. Both versions were extensively circulated and communicated to the vegetable industry via the AUSVEG weekly update, AUSVEG Vegetables Australia magazine, AUSVEG targeted emails via Mailchimp, regional e-newsletters and other communication platforms. The AUSVEG Online Crop Specific Pest Surveys were communicated to VegNET officers across all growing regions to be extended to growers and agronomists in their respective regions. Pest priorities recorded via the AUSVEG Online Crop Specific Pest Surveys were utilised to

complement data gathered from industry consultation via regional crop specific workshops and one-on-one grower and agronomist consultation.

The first versions of the online crop specific pest surveys were named *AUSVEG National Pest Surveys*. These first versions of the online surveys were hosted on the AUSVEG VG16060 dedicated webpage from late December 2017 until July 2018. The online AUSVEG National Pest Surveys consisted of 18 crop specific pest surveys for Beans and Peas, Beetroot, Brassica Leafy Vegetables, Brassicas, Carrot, Celery, Cucumber, Eggplant, Leek, Lettuce, Parsley, Peppers, Silverbeet and Spinach, Snow Peas and Sugar Snap Peas, Spring Onions and Shallots, Sweet Corn, Sweet Potato, Zucchini, and Other Vegetables.

The second versions of the online crop specific pest survey were named *AUSVEG 2019 Online Crop Specific Pest Surveys*. For these versions of the AUSVEG online crop specific pest surveys, the Project Coordinator developed new online crop specific pest surveys for crops that did not have a SARP document to work from, such as: Pumpkin, Okra, Fennel, Squash, Artichoke, Choko or chayote, Rhubarb, Root Vegetables Other than Carrots (Swede, Turnips, Parsnips, Radish, Horseradish and Chicory) and Other Vegetables. The total number of AUSVEG 2019 Online Crop Specific Pest Surveys that were hosted on the dedicated project website, including new crops, was 28.

The second online version, the AUSVEG 2019 Online Crop Specific Pest Survey, was launched on the 5<sup>th</sup> of June 2019. This launch included:

- Regular Mailchimp campaigns,
- Regular AUSVEG Weekly Update articles,
- Regular Social AUSVEG media support (Facebook and Twitter),
- Reduced number of clicks to access online surveys, and
- Design and print of AUSVEG 2019 Crop Specific Pest Survey Flyer.

The AUSVEG 2019 Online Crop Specific Pest Surveys were closed down staggered in three groups. The first group of online surveys were for vegetable crops where there was sufficient information gathered to produce a report that accurately represented grower pest priorities, to feed the update and development of the SARP documents. The first-round closure was the 26th of July 2019, where nine crop specific pest surveys were closed. This gave extra time for the remaining crops surveys to capture responses.

The second closure group of online surveys was closed on the 26th of October 2019, where ten crop specific pest surveys were closed, leaving open crop specific surveys for minor crops until the 28th of February 2020, allowing growers and agronomists extra time to provide feedback for these crops, which at the time had insufficient data to support the update and development of the SARP documents. The scheduled closure dates were extensively communicated to the industry via the VG16060 quarterly industry updates, the AUSVEG Weekly Update and Mailchimp campaigns.

Table 4: Closure dates for AUSVEG 2019 Online Crop Specific Pest Surveys.

Surveys Closed 26 July 2019	Surveys Closed 26 October 2019	Surveys Closed 28 February 2020
1. Brassica Leafy	1. Beetroot	1. Artichoke
2. Brassica Vegetables	2. Lettuce	2. Chokos
3. Carrot	3. Parsley	3. Fennel
4. Celery	4. Peas	4. Okra
5. Cucumber	5. Peppers (capsicum & Chilli)	5. Pumpkins
6. Eggplant	6. Snow & Sugar snap peas	6. Rhubarb
7. Green Beans	7. Silverbeet	7. Squash

Surveys Closed 26 July 2019	Surveys Closed 26 October 2019	Surveys Closed 28 February 2020
8. Leek	8. Spinach	8. Swede, turnips, Parsnips, Radish, Horseradish & Chicory
9. Sweet Corn	9. Spring Onions & Shallots	9. Other vegetables
	10. Zucchini	

The Project Coordinator considered Mailchimp campaigns to be most effective communication tool to engage with vegetable growers and agronomists to provide pest priority and agchem needs and gaps feedback via AUSVEG online crop specific pest surveys. The initial Mailchimp campaigns captured most of the survey responses.

Responses to the AUSVEG 2019 Online Crop Specific Pest Survey version were higher when compared to the previous version. The first version of the online surveys, the AUSVEG National Pest Survey, produced 117 responses and the second version of the online survey produced 193 responses.

Table 5: VG16060 Online Crop Specific Pest Surveys responses.

Crop Group	Crop	Growers	Agronomists	Total Online Surveys Responses
<b>Bulb Vegetables</b>	Leek	8	4	12
	Spring Onions	3	3	6
	Shallots	1	3	4
	Fennel bulb	4	0	4
<b>Brassica Vegetables</b>	Brassica Vegetables	19	24	43
<b>Fruiting Vegetables - Cucurbits</b>	Cucumber	7	11	18
	Chokos	0	0	0
	Zucchini	6	4	10
	Pumpkin	6	4	10
	Squash	0	0	0
<b>Fruiting Vegetables other than Cucurbits</b>	Eggplant	4	6	10
	Capsicum	11	9	20
	Chilli	2	3	5
	Sweet Corn	6	4	10
	Okra	3	3	6
<b>Leafy Vegetables (including brassica leafy vegetables)</b>	Lettuce (head lettuce)	8	10	18
	Leafy lettuce	4	6	10
	Spinach	2	7	9
	Silverbeet	4	5	9
	Fennel	2	0	2
	Brassica Leafy	10	11	21
<b>Legume Vegetables (succulent seeds)</b>	Green Beans	10	9	19
	Snow Peas	0	4	4
	Sugar snap peas	0	2	2
<b>Root &amp; Tuber vegetables</b>	Sweet Potato	0	1	1
	Carrot	6	8	14
	Beetroot	4	5	9
	Swede	3	1	4
	Turnips	1	0	1

Crop Group	Crop	Growers	Agronomists	Total Online Surveys Responses
	Parsnips	3	1	4
	Radish	2	0	2
	Horseradish	0	0	0
	Chicory	0	0	0
Stalk & Stem Vegetables	Celery	3	1	4
	Artichoke	1	1	2
	Rhubarb	6	1	7
Herbs	Parsley	4	6	10
<b>Total</b>		<b>153</b>	<b>157</b>	<b>310</b>

Both versions of the AUSVEG online crop specific pest surveys acted as a crucial platform to record pest priority and agchem needs and gaps feedback and to reach out to a wider network of growers. Insect, disease and weed issues recorded via online crop specific surveys was added to the VG16060 database and has been used to complement data gathered from industry consultation.

### Strategic Agrichemical Review Process (SARP)

As previously mentioned, the Project Coordinator utilised all the pest priority information gathered during industry consultation, from regional crop specific workshops, one-on-one consultation, and online crop specific pest surveys, to produce VG16060 Crop Specific Reports for thirty five vegetable crops to feed the update and development of the SARP reports for the vegetable industry via VG18004 - Vegetable Strategic Agrichemical Review Process (SARP) Reports.

The VG16060 Project Coordinator devoted significant time in developing VG16060 Crop Specific Reports for the update of VG18004 - Vegetable Strategic Agrichemical Review Process (SARP) Reports, which included further consultation with growers and agronomists via phone calls and one-on-one interviews. Pest priorities for each crop in Table 6. were ranked as high, moderate, and low, when possible for each, state with an overall ranking for each particular crop and pest, taking in consideration the percentages of where that particular crop is grown. The VG16060 Project Coordinator also recorded some of the management practices utilised by growers to manage some of these pest issues such as: agchem used, agchem needs and gaps, crop rotation, cover cropping, IPM practises, etc.

As previously mentioned, extensive industry consultation was conducted in the form of phone interviews with key growers and agronomists from different states to complement and to gather further details around pest priorities and grower practices for managing these issues, including agchem needs and gaps. The Project Coordinator endeavoured to include stakeholders representing all targeted crops and regions across Australia. Growers and agronomists from all major vegetable growing regions were targeted as well as other stakeholders, such as technical field personnel, private consultants, scientists, etc.

Table 6. VG16060 vegetable consulted crops table.

Codex number	Commodity group	VG16060 Crop Specific Reports
009	Bulb Vegetables	1. Leek
		2. Spring Onions Shallots
		3. Fennel bulb and herb
010	Brassica Vegetables	4. Brassica Vegetables
011	Fruiting Vegetables - Cucurbits	5. Cucumber
		6. Zucchini
		7. Pumpkin

Codex number	Commodity group	VG16060 Crop Specific Reports
		8. Squash
012	Fruiting Vegetables other than Cucurbits	9. Eggplant
		10. Capsicum
		11. Chilli
		12. Sweet Corn
		13. Okra
013	Leafy Vegetables (including brassica leafy vegetables)	14. Head lettuce
		15. Leafy lettuce
		16. Spinach
		17. Silverbeet
		18. Brassica Leafy
014	Legume Vegetables (succulent seeds)	19. Green Beans
		20. Snow Peas Sugar snap peas
016	Root & Tuber vegetables	21. Sweet potato
		22. Carrot
		23. Beetroot
		24. Swede Turnips
		25. Parsnips
		26. Radish Horseradish
017	Stalk & Stem Vegetables	27. Celery
		28. Artichoke
		29. Rhubarb
027	Herbs	30. Parsley

### AgChem Priority Access Forum

In conjunction with the Hort Innovation R&D Manager, utilising information gathered during industry consultation, a top 5 pest priority gap list for pest issues of concerns, was developed for the vegetable industry and was successfully used for discussion with agchem registrants and other plant industry stakeholders at the 2018 and 2019 AgChem Priority Access Forums. In this forum, potential agchem solutions were suggested and put forward by agchem registrants and Hort Innovation R&D Manager to address pest priority issues presented by the industries.

The second phase of this process was to develop a list of potential solutions, solutions that were previously suggested by manufacturers at the industry AgChem Priority Access Forum and or Hort Innovation, to put forward on behalf of industry through the Australian Government's Access to Industry Uses of Agricultural and Veterinary (AgVet) Chemicals program to possibly obtain assistance grants at the priority forum to aid with the generation of sufficient data to support applications to the APVMA for agchem uses and improve agchem access for vegetable growers by addressing gaps identified during industry consultation and pest prioritisation process. When needed, the Project Coordinator assisted the Hort Innovation R&D Manager in developing the list of priorities and potential solutions for assistance grants. The top 5 pest priority gap lists, in conjunction with the update and development of the SARP reports, will direct the vegetable industry Agchem access in the future.

### Chemical Access Advisory Group (CAAG)

As previously mentioned, it was agreed that the vegetable industry would benefit from a Chemical Access Advisory Group (CAAG). This group was tasked with reviewing and providing comments on pest priorities and minor use permit requests received by the Project Coordinator during industry consultation.

The Chemical Access Advisory Group (CAAG) consisted of:

- Jodie Pedrana – Hort Innovation R&D Manager
- Len Tesoriero – Plant Pathology
- Barbara Hall – Plant Pathology
- Andy Ryland – Integrated Pest Management
- Tony Cook – Weeds, Technical Specialist
- Siobhan de Little – Insecticide Resistance, replaced with Jessica Page in the second CAAG meeting.
- Patrick Arratia – VG16060 Project Coordinator

The first Chemical Access Advisory Group (CAAG) meeting took place at AUSVEG's Camberwell office on the 7th of March 2018. This first meeting ran for roughly 3.5 hrs. Key topics of this meeting were: VG16060 project overview presentation, introduction to AgChem Priority Access Forum, and CAAG expectations including:

- Assist the project in developing an effective prioritisation and data gathering process,
- Assist the project to shortlist top five priorities per crop in preparation for AgChem Priority Access Forum
- Assist the project with any permit requests,
- Assist the project with technical guidance, and
- Assist in pest prioritisation process and data gathering methodology.

The main objective of the first CAAG meeting was to familiarise CAAG members with the project and to improve the prioritisation process and the data gathering methodology. In this first CAAG meeting only one minor use permit request was presented and reviewed by the CAAG members, which was a minor use request for the use of VERDICT (haloxyfop, group A) for the control of rye grass in carrots. The CAAG considered this minor use request, discussed it, and concluded not to support this request, due to not being a viable nor sustainable solution for carrot growers to manage annual rye grass issues.

The second CAAG meeting took place on the 21st of November 2018 at Sydney's Hort Innovation offices. Potential solutions and Hort Innovation projects were discussed with the Chemical Access Advisory Group (CAAG) and they assisted with identifying the vegetable industry's highest priority agrichemical gaps for potential projects for label registrations and/or minor use permits. CAAG members were also presented with minor use permit application requests received during industry consultation.

As in the project variation request from February 2018, CAAG meetings were noted to be scheduled as required. The Project Coordinator completed two CAAG meetings out of the three that were agreed in the variation, originally six were budgeted for the lifespan of the project. The Project Coordinator continued to deal directly with the Hort Innovation R&D Manager on minor use requests received during industry consultation. This approach was thought to be more efficient and quicker for the industry, and if needed, the CAAG members were consulted via phone to assess the viability of permit requests and for feedback on pest priorities.

### Minor use permit request liaison role

When needed by the vegetable industry, the VG16060 Project Coordinator assisted growers and agronomists in mediating requests for Minor Use Permits with the Hort Innovation R&D Manager. A total of 14 Minor Use Permit Requests were received by the VG16060 Project Coordinator during industry consultation and have been processed and submitted by Hort Innovation to the APVMA to assist vegetable growers to improve agrichemical access for managing pest issues where there is limited or no agchem access. The majority of the minor use requests received during industry consultation were in line with the 2018 and 2019 AgChem Priority Access Forums pest priorities.

- Minor use permit requests received during VG16060 industry consultation: **19**
- Minor use permit requests submitted by Hort Innovation to the APVMA: **14**

Table 7: Grower and agronomist minor use permit request received by VG16060

#	Permit	Crop	Pest	Type	Trade name	Group	Active
1	PER86245	Sweet corn	Maize Rust	Fungicide	VERITAS	3/11	Azoxystrobin + tebuconazole
2	PER86482	Taro	Post-harvest rots and moulds	Fungicide	TECTO	1	Thiabendazole
3	PER86551	Organic green beans	Bean podborer	Insecticide	PYGANIC	3A	Pyrethrins
4	PER86665	Carrots	White fringed weevil & Symphylids	Insecticide	REGENT	2B	Fipronil
5	PER87563	Brassica Vegetables (including broccoli, brussels sprouts, cabbage, cauliflower)	Leafminer, including the vegetable leafminer	Insecticide	PROCLAIM	6	Emamectin
6	PER87630	Brassica vegetables, Brassica leafy vegetables, Lettuce & Green beans. (Field and Protected)	Xanthomonas Campestris	Fungicide	SERENADE OPTI	44	Bacillus amyloliquefanciens
7	PER87631	Spinach & Silverbeet	Leaf miner	Insecticide	CORAGEN	28	Chlorantraniliprole
8	PER87670	Brassica Leafy Vegetables	Diamondback moth, Cabbage White Butterfly, Helicoverpa, Vegetable looper	Insecticide	XENTARI	11	Bacillus thuringiensis subsp. Aizawai (Xentari WG BtA)
9	PER87773	Brassica Vegetables (transplanted only)	Broadleaf & Grass weeds. Including suppression of chickweed	Herbicide	DEVRIKOL	K	Napropamide
10	PER87852	Capsicums, Cucumber & Eggplant (protected situations)	Green peach aphid, Melon aphid & Suppression of Silverleaf whitefly	Insecticide	VERSYS	9D	Afidopyropen
11	PER88032	Eggplant (Field & Protected cropping)	Early blight, Botrytis grey mould, Powdery mildew, and Suppression of Bacterial spot (Xanthomonas spp.)	Insecticide	SERENADE OPTI	44	Bacillus amyloliquefanciens
12	PER88179	Sweet corn	Two spotted mites	Miticide	OMITE	12C	Propargite
13	Pending by the APVMA	Sweet corn	African Black Beetle	Insecticide	LORSBAN	1B	Chlorpyrifos
14	PER12565 (ext. to incl	Field Grown Capsicum	Internal rot	Fungicide	SCALA	I	Pyrimethanil



#	Permit	Crop	Pest	Type	Trade name	Group	Active
	field grown capsicums)						
15	Not supported	Carrots	Resistant Rye Grass and Cleavers	Herbicide	BOXER GOLD	J/K	S -Metholachlor + Prosulfocarb
16	Not supported	Carrots	Resistant rye grass	Herbicide	VERDICT	A	Haloxypop
17	Not supported	Snow peas tendrils	Downy Mildew	Fungicide	ZORVEC	49	Oxathiapiprolin
18	Not supported	Protected Capsicum, Cucumbers and Eggplants	Aphids	Insecticide	MAINMAN	9C	Fonicamid
19	Not supported	Rhubarb, Spinach, Silverbeet	Broad mites	Insecticide	ACRAMITE	20D	Bifenazate

Minor use requests not supported by Hort Innovation and/or the CAAG:

1. VERDICT (Haloxypop, group A) for the control of resistant rye grass in carrots. This was discussed by the CAAG members in the first meeting, and the permit request was not progressed as there are already other herbicides available with the same mode of action.
2. ZORVEC (Oxathiapiprolin, group 49) for the control of Downy Mildew in Snow peas tendrils.
3. MAINMAN (Fonicamid, group 9C) for the control of Aphids in protected Capsicum, Cucumbers and Eggplants. This was discussed at the second CAAG meeting. It was decided to progress VERSYS instead as it is already registered for these crops.
4. ACRAMITE (Bifenazate, group 20D) for the control of mites (Broad mites) in Rhubarb, Spinach, Silverbeet. This was not progressed due to the Canadian label specifically stating that Bifenazate “is not effective against rust mite, broad mites and flat mites”.
5. BOXER GOLD (S -Metholachlor + Prosulfocarb, groups J/K). This was not supported due to carrots not being listed as a minor crop, so this request cannot rely on the minor use permit system. The Hort Innovation R&D Manager is already working with registrant to pursue label registration.

The minor use requests evaluation was facilitated by the Project Coordinator on each occasion and where necessary, the Project Coordinator researched validity of application, and subsequently forwarded the application to the Hort Innovation R&D Manager for final assessment.

### Communication activities

The Project Coordinator utilised the AUSVEG database, AUSVEG communication platforms and regional VegNET officers to reach key growers and agronomists, set up workshops, promote online crop specific pest surveys and increase project awareness. To this end, at the outset of the project, the Project Coordinator developed a fact sheet for VegNET distribution to industry members. Enhanced awareness of the project among Australian vegetable growers and agronomists assisted the Project Coordinator in gathering industry feedback for pest priorities and agchem access needs and gaps.

The VG16060 Project Coordinator extensively engaged with the vegetable industry to communicate VG16060 objectives, activities such as regional crop specific workshops and online crop specific pest surveys. The Project Coordinator utilised a range of AUSVEG communication platforms such as the AUSVEG Weekly Update, AUSVEG Vegetables magazine, and AUSVEG database for Mailchimp campaigns. In addition, the Project Coordinator utilised other communication platforms such as grower groups e-newsletters and VegNET communication platforms and industry networks to inform, on a regional basis, project objectives and activities.

Table 8: Outputs since project commencement

Detail	Total
AUSVEG Weekly Update (including online survey and regional workshop promotion)	71
VG16060 Quarterly Industry Updates	8
VG16060 Project Flyers	5
VG16060 Project Banners	2
VG16060 Regional Crop Specific Workshop Flyers	30
AUSVEG Online Crop Specific Pest Surveys (V1 and V2)	35

## Outcomes

### End-of-project outcomes

The End-of-project outcomes identified for this project were:

1. Vegetable grower and agronomists giving AUSVEG information on pest disease and weed priorities and AgChem needs and gaps,
2. AUSVEG has information on priority areas for AgChem access for effective and efficient pest and disease management,
3. Hort Innovation having agrichemical gap reports for the AgChem Priority Access Forum,
4. Hort Innovation uses agrichemical gap and solutions reports to assist on the update and development of the SARP documents, and
5. Hort Innovation having informed R&D levy funding arrangements to ensure crop protection options for the Australian vegetable industry.

All these outcomes were successfully achieved during the lifespan of VG16060. The initial part of the project consisted of the Project Coordinator contacting VegNET officers and key vegetable growers and agronomist across the Australian growing regions to communicate project commencement and objectives. The first part of this project focused on raising awareness of the project and collecting pest priority information through one-on-one interviews and regional crop specific workshops. As the project gained traction among vegetable stakeholders, vegetable growers and agronomists started to contribute to the project by attending the regional crop specific workshops and via the online crop specific pest surveys.

In terms of the general effectiveness, the project delivered the following outcomes:

- Growers at the workshops gained information around minor use permit request system and project awareness,
- Input from vegetable growers and agronomists around pest priorities and agchem needs and gaps was recorded and understood,
- When possible, pest priorities were distinguished at a regional level,
- The top 5 pest priorities list per crop was developed and utilised at the annual AgChem Priority Access Forums,
- VG16060 Crop Specific Pest reports were produced for the update and development of the vegetable industry SARP documents,
- Aid vegetable industry to process minor use permit requests.
- Minor use permit requests were received and processed by the Project Coordinator and the Hort Innovation R&D Manager,
- Increased agchem access was provided to the vegetable industry on pest priorities identified during VG16060 industry consultation, and

### Broader outcomes

Broader outcomes for establishing pest priorities for the vegetable industry will provide better insight for Hort Innovation and agrichemical companies within the Australian vegetable industry regarding pest priorities, which will then translate to the vegetable industry gaining better AgChem access to manage pest priorities of concern. This will increase vegetable growers' ability to manage pest priority issues and pesticide resistance due to broader diversity of available agrichemicals, increasing the vegetable industry's productivity and competitiveness. Vegetable pest priorities will also direct R&D resources to relevant related areas such as vegetable grower pest management, cultural practices, IPM, etc.

## Monitoring and evaluation

AUSVEG and Hort Innovation worked together to develop the M&E Plan. AUSVEG was responsible of establishing pest priorities for the vegetable industry and to develop the pest priority list for AgChem Priority Access Forums and to provide pest priorities for the update and development of the SARP documents for the vegetable industry. 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.

### Project Effectiveness

1. Was the project effective in providing Hort Innovation with information on priorities for the Australian vegetable industry relating to agrichemical access for effective and efficient pest and disease management?

From AUSVEG's point of view, VG16060 provided Hort Innovation quality information on pest priorities via top 5 pest priorities presented for the AgChem Priority Access Forums and VG16060 Crop Specific Pest reports for the update and development of the SARP documents for the vegetable industry.

2. Was the project effective in providing AUSVEG with information on priorities for the Australian vegetable industry relating to agrichemical access for effective and efficient pest and disease management?

VG16060 provided AUSVEG relevant pest priority and agchem access needs and gaps information relating the vegetable industry. This was accomplished via VG16060 engagement and communication activities.

3. Was the project effective in gaining information on priority areas for agrichemical access from growers?

From AUSVEG's point of view, VG16060, through its various engagement activities, was effective in gaining information on pest priorities and agchem access needs and gaps.

4. Was the project effective in providing Hort Innovation with information to assist in updating SARP documents?

From AUSVEG's point of view, VG16060 provided Hort Innovation quality information on pest priorities via VG16060 Crop Specific Pest reports for the update and development of the SARP documents for the vegetable industry.

### Project Sustainability

5. Did the project create an enduring legacy – will the program highlight the importance of continued investment in prioritising agrichemical access needs?

VG16060 highlighted the importance of performing a pest prioritisation process for the vegetable industry every 2-3 years. As previously mentioned, pest priorities do not change too much from year to year. Considering the number of different commodities within the vegetable industry, regulatory reviews of existing active ingredients, biosecurity threats and new pest issues not recorded during industry consultation, it is extremely important to identify pest priorities and agchem access needs and gaps on a regular basis to inform and direct future R&D funding for crop protection purposes, increasing the number of Agchem options for accurately managing relevant pest priority issues.

### Project Relevance

6. Did the project produce relevant information on priorities for the Australian vegetable industry relating to agrichemical access for effective and efficient pest and disease management?

As previously mentioned, VG16060 produced relevant information on pest priorities for the Australian vegetable industry. Over the course of VG16060, AUSVEG was not on track in terms of accomplishing targeted 12 regional crop specific workshops per year, due to difficulties, particularly during the first year, to attract attendees to workshops. As a result, the Project Coordinator adapted to engage with industry stakeholders on a one-on-one growers visit settings. This approach was also encouraged and by VegNET officers. VG16060 was also affected by COVID-19 isolation restrictions, not being able to accomplish any crop specific workshops during the last milestone period.

## Learnings from VG16060 Vegetable Agrichemical Pest Management Needs and Priorities

With some exceptions, most of the pest needs and priorities identified during VG16060 industry consultation were the same pest priorities identified and recorded within the 2014 SARP documents. For some priorities, growers ranked them differently, possibly due to climatic conditions, geographic location, agchem availability, seed varieties and grower practices at the time of grower consultation. There were some new pest priorities that were not previously recorded during industry consultation for the development of the 2014 SARP documents. It was noticed during VG16060 industry consultation that many of the pest priorities change depending on grower practices, for example: in regions where brassica crops are intensively grown, with no crop rotation or cover cropping, growers would rank club root as a high priority issue, while other brassica growers, even in the same region, that practice crop rotation and/or cover cropping would rank club root as a moderate to low priority issue. Similar situations occurred for other pest issues such as mites and western flowers thrips, which are normally ranked as high priority when harsh broad-spectrum insecticides are used, and other growers with an IPM approach, would rank them as a moderate to low priority. Another finding was that vegetable growers, in general do not test pest issues to correctly identify the issue. For example, to some extent growers do not identify to the species level thrips, aphids, whiteflies, helicoverpa and others.

It was noticed at times that regional crop specific workshops were difficult for the Project Coordinator to attract participants, particularly due to the fact that these regional crop specific workshops are exclusively for VG16060 and for a specific crop. Growers and agronomists want to benefit from a number of topics when taking time out to attend a workshop. Regional crop specific workshops were particularly difficult on minor crops where there are a smaller number of growers are distributed across all vegetable growing regions and not concentrated in one region like most of the major vegetable crops.

Also, during industry consultation, significant off-label use was observed, especially by smaller growers that sell to fresh markets. This was particularly noticed amongst culturally and linguistically diverse (CALD) vegetable growers.

Another learning from VG16060 during industry consultation was the difficulty expressed by growers and agronomists to find agchem labels, but particularly to have an overview of what agchem options are available for a particular host/pest scenario. This is a crucial step for growers to organise their spray programs and to ensure there is enough rotation of mode of action. In general, vegetable growers would leave this task to agronomists. Simple and easy access to available chemistry options is critical. While information is available on various websites, it is often difficult to find and it is recommended to have a dedicated one stop, easily findable access to this information.

## Concluding Statements

This project has updated pest priorities which will be used for the update of existing SARP documents and developed pest priorities for a range of different vegetable crops that did not originally have SARP documents. This will ensure that the vegetable industry has a clear outlook of priority pests and potential gaps in existing agrichemical pest control options, informing and directing R&D funding for crop protection purposes, increasing the number of Agchem options for managing relevant pest priority issues.

Going forward, industry consultation and the pest prioritisation process for the vegetable industry, allows for high quality information to be directed into the AgChem Priority Access Forum. In the long-term, it is expected that continuation of an effective prioritisation process through industry engagement will result in increased agrichemical access for vegetable growers through the approval of necessary new permits, renewal of useful minor use permits, cancellation of redundant or unnecessary permits, and greater on-label usage options.

## Recommendations

### Pest Priorities and Industry Consultation

VG16060 would recommend engaging with the vegetable industry for pest priorities every 3 years. As previously mentioned, pest priorities do not excessively change, particularly targeting agronomists as they normally work with multiple growers in the vegetable growing regions, giving a better representation of the region and also providing more technical details such as correct species for insect, disease and weed issues and having better knowledge around agchem access needs and gaps.

For the purposes of facilitating agrichemical access where needed, it is recommended that future projects include the following key deliverables:

- Annually produce the top five pest priority gaps for each vegetable commodity to be put forward to Hort Innovation to be used at the annual AgChem Priority Access Forum,
- Identification of industry pest priorities to assist with updating existing vegetable SARP documents,
- Identification of industry pest priorities to assist with development of new vegetable SARP documents to ensure that each commodity is well represented in the SARP documents,
- CAAG group should continue with at least one meeting per year,
- Although pest priorities established during VG16060 industry consultation and SARP documents will give a clear outlook in terms of agchem access, to some degree, CAAG members should have some input in planning what minor use permits get renewed,
- Direct interaction with growers and agronomists to ensure that the agrichemical needs for the vegetable sector are adequately reflected,
- Continuing industry engagement via regional crop specific workshops and online crop specific pest surveys; and
- Combine workshops with other workshops taking place within the area or organise workshops with a wider range of topics around agchem, to enable attendees to have better benefit from these workshops, encouraging attendance.

Explore and develop other methods such as a dedicated webpage or a mobile app for growers to access in order to express concerns around pest priorities and agchem needs and gaps. This platform could also aid growers to access information about the minor use system for the vegetable industry, including submitting online minor use requests, status on submitted minor use requests, information on projects for label extensions and minor use permits, notifications for minor use permit expiration dates, etc.

### **AgChem related recommendations**

As previously mentioned, growers commented on the need to have easy and simple access to agchem labels and minor use permits when in the field. Many growers suggested having a mobile phone app where they could check for labels, permits and industry updates around agchem issues, which could be potentially developed not only for the vegetable industry but for all plant industries. Growers commented on the APVMA pubcris webpage being good to search for labels and minor use permits when they know what they are looking for, but not good for when growers want to plan a spray program around available agchem options for a specific host/pest. Some growers commented preferring to do this using InfoPest (Growcom) as they can search by host and pest. An easy and simple platform would help growers identify available agchem options and potentially help reduce the amount of off label use in the vegetable industry.

Comments in general were that APVMA and InfoPest are both difficult to navigate and would appreciate a project where growers could subscribe to whatever crop they grow and receive updates and notifications for minor use permits, including new minor permits issued by the APVMA, reminders for expiration dates, label extensions, etc. Growers also commented that the search result could be colour coded for IPM, which would be an easy way for growers to learn and implement IPM or at least be a gateway to IPM practices. This app could also include a section where growers could submit requests for minor use permits and pest priorities of concern.

During industry consultation, it was also noticed the amount of off-label use in the vegetable industry, particularly from medium to small scale growers that usually sell to markets and other less regulated platforms. This was also noticed amongst culturally and linguistically diverse (CALD) growers. The Project Coordinator suggests allocating some resource for general agchem training, particularly for culturally and linguistically diverse (CALD) growers, around pest management, searching and understanding labels and minor use permits, rotation of mode of action, cultural practices, IPM, minor use system, etc.

## Refereed scientific publications

None to report.

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## Intellectual property, commercialisation and confidentiality

None to report

## Acknowledgements

AUSVEG would acknowledge the following persons for their input into the project:

Jodie Pedrana, Hort Innovation

Zarmeen Hassan, AUSVEG

Patrick Arratia, AUSVEG

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Madeleine Quirk, AUSVEG

CAAG Members

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Appendix 1: VG16060 Factsheet.

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## VEGETABLE AGRICHEMICAL PEST MANAGEMENT NEEDS AND PRIORITIES (VG16060)

### THE PROBLEM

Growers of some horticultural crops suffer from a lack of legal access to crop protection products (pesticides). Often disease, pests or weeds may be a regional or an occasional issue, potentially making AgChem companies unable to bear the initial high cost of registering suitable pesticides.

### THE SOLUTION

Establish direct grower interaction and ensure that the agrichemical needs of the vegetable sector are accurately recorded and understood, through the Vegetable Agrichemical Pest Management Needs and Priorities (VG16060) project, a strategic levy investment under the Hort Innovation Vegetable Fund, coordinated by AUSVEG.

### INFORMATION

For more information about this project, quarterly industry updates, media releases and National Pest Survey please refer to:

EMAIL: [patrick.arratia@ausveg.com.au](mailto:patrick.arratia@ausveg.com.au)

WEB: [ausveg.com.au/vg16060](http://ausveg.com.au/vg16060)



This project has been funded by Hort Innovation using the vegetable research and development levy and contributions from the Australian Government.

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## WHAT'S INVOLVED

In this three year project, the Project Coordinator, Patrick Arratia will:

- Carry out crop specific regional workshops to consult with industry,
- Establish a priorities database by crop,
- Identify industry pest priorities and categorise them regionally,
- Assist on the update of the Strategic Agrichemical Review Process documents (SARP),
- Annual development of a gap analysis that identifies the top five pest priorities, per crop, to be used at the Agchem collaborative forum.

## THE AGCHEM FORUM

The Agchem forum provides a platform for information sharing and cross industry collaboration to support product registration applications that can deliver cost savings, productivity gains and improve access to agchem technologies for Australian growers.

## NATIONAL PEST SURVEY – GET INVOLVED!

We take this opportunity to remind growers and agronomists to get involved and to please take the time to fill in the crop-specific surveys. This online national pest survey is an extremely important tool for this project to gather pest, disease and weed information from vegetable growers and agronomists across Australia.



This project has been funded by Hort Innovation using the vegetable research and development levy and contributions from the Australian Government.

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Appendix 2: VG16060 Flyer for 2019 Online Crop Specific Pest Survey.



**THE PROBLEM:**

Growers of some horticultural crops suffer from a lack of legal access to crop protection products.

Diseases, pests, or weeds may be a regional, occasional or may not be of sufficient size issue, making agchem companies unwilling to bear the initial high cost of registering suitable pesticides.

**THE SOLUTION:**

Establish direct grower interaction and ensure that the agrichemical needs of the vegetable sector are accurately recorded and understood, through the Vegetable Agrichemical Pest Management Needs and Priorities project.

**THE RESULT:**

The successful rollout of this project will result in an effective agrichemical prioritisation process for the vegetable industry. This will direct R&D funding for crop protection purposes, which will translate into better agchem access for priority issues for vegetable growers.

**2019 CROP SPECIFIC PEST SURVEY:  
GET INVOLVED HERE**

Please take the time to fill in these crop-specific surveys. This online national pest survey is an extremely important tool to gather pest, disease and weed information from vegetable growers and agronomists across Australia.

[ausveg.com.au/vg16060](http://ausveg.com.au/vg16060)

**INFORMATION:**

For further information contact the Project Coordinator – Agrichemical Pest Management Needs and Priorities, Patrick Arratia at [patrick.arratia@ausveg.com](mailto:patrick.arratia@ausveg.com) or on 03 9882 0277.

This project has been funded by Hort Innovation using the vegetable research and development levy and contributions from the Australian Government.



Appendix 3: Survey Monkey - 2019 Online Crop Specific Pest Survey - Carrots

Carrots - 2019 Vegetable Industry Strategic Agrichemical Review Process (SARP) update

VG16060 National Pest Survey

**VG16060 Vegetables Agrichemical Pest Management Needs and Priorities.**

All information gathered will be used by VG16060 Vegetables Agrichemical Pest Management Needs and Priorities project through AUSVEG (for Hort Innovation) and the Minor use Programme through Hort Innovation, for the update of the Strategic Agrichemical Review Process (SARP), to give strategic direction to the minor use programme investments, and to play a pivotal role in the successful development and delivery of the Plant Industries AgChem Access Priorities for the AgChem Access Priorities Forum.

Increasing access to agricultural chemicals is the focus of the AgChem Access Priorities Forum (Forum), a collaborative process that has been held for the past three years. The forums are funded by plant-based Research and Development Corporations (RDCs) and CropLife Australia. The Forum aims to promote information sharing, industry prioritisation and coinvestment opportunities for supporting applications for AgChem uses. The Forum held in October 2018 was the fourth time the forum has been run and was again successful in facilitating interaction between the RDC's, users of AgChem technologies and Chemical Companies.

At the Forums, plant-based RDCs, APVMA and commercial chemical registrants come together to deliver a cross-industry agreed list of priority needs and solutions for uses of agricultural chemicals. Each plant-based RDC, in consultation with industry, puts forward the top five pest priorities for which chemical solutions are sought for each crop. Chemical registrants have the opportunity to suggest solutions and comment on options proposed by industry. The Forum facilitates discussion between industry representatives and chemical registrants, where opportunities to improve access to agricultural chemicals can be identified.

This review process provides horticulture industries with sound pesticide options for the future that the industry can pursue for registration with the chemical companies, or minor-use permits with APVMA for clearly identified crop protection needs.

Vegetables industry SARPs was initially undertaken during 2014. Vegetable SARPs process identified diseases, insect pests and weeds of major concern to the vegetable industry. Against these threats, available registered or permitted pesticides, along with non-pesticide solutions, were evaluated for overall suitability in terms of IPM, resistance, residues, withholding period, efficacy, trade, human safety and environmental issues. Where tools were unavailable or unsuitable, the process aimed to identify potential future solutions.

The purpose of the 2019 SARP surveys is to update the vegetable industries priorities outlined in the 2014 SARP and provide comment on priority pests (diseases, insects & weeds). Prioritisation of the major pests into high, moderate and low categories will identify the vegetable industries priorities and help determine the highest priority gaps in the vegetable pest control strategy.

This project has been funded by Hort Innovation, using the vegetable research and development levy, and contributions from the Australian Government. Hort Innovation is the grower-owned, not-for-profit research and development corporation for Australian horticulture.

For further information please contact the VG16060 Project Coordinator – Agrichemical Pest Management Needs and Priorities, Patrick Arratia at [patrick.arratia@ausveg.com](mailto:patrick.arratia@ausveg.com)

**Hort  
Innovation**  
Strategic levy investment

**VEGETABLE  
FUND**



**Carrots - 2019 Vegetable Industry Strategic Agrichemical Review Process (SARP) update**

**Privacy Collection Notice:**

**Hort Innovation is requesting this information from you so that we can update the Vegetables Industry Strategic Agrichemical Review Process Report (SARP) (which will be publicly disseminated) and the AgChem annual prioritisation Forum. We may include your operational information in the SARP. We may also use your contact information in order to obtain clarification or additional information relating to the survey from you.**

**We will not disclose your contact information to anybody else, unless you have given consent, or we are authorised or required to do so by law. Providing us with the requested information is not required by law. If you choose not to provide us with the information we may not be able to effectively update the SARP Report and/or the AgChem Prioritisation Forum priorities for the vegetable industry.**

**You may request access to your information at any time. To access or update your information, or for more details, please contact Patrick Arratia at [patrick.arratia@ausveg.com](mailto:patrick.arratia@ausveg.com)**

Carrots - 2019 Vegetable Industry Strategic Agrichemical Review Process (SARP) update

Contact Information (optional)

1. Please fill in contact details

Name	<input type="text"/>
Business	<input type="text"/>
Address	<input type="text"/>
City/Town	<input type="text"/>
State	<input type="text"/>
Postcode	<input type="text"/>
Email Address	<input type="text"/>
Phone Number	<input type="text"/>

Carrots - 2019 Vegetable Industry Strategic Agrichemical Review Process (SARP) update

Operational information (required)

2. What is your role?

Grower/Owner

Agronomist

Other (please specify)

[Redacted]

3. Region of growing/consulting operations?

[Redacted]

4. Do you export carrots? If YES, please specify:

Destination [Redacted]

Volume [Redacted]

5. Production system?

Field  Hydroponic

Protected

Other (please specify)

[Redacted]

6. What is the number of hectares of carrots that you grow per year? (Optional)

[Redacted]

Carrots - 2019 Vegetable Industry Strategic Agrichemical Review Process (SARP) update

Pathology

**The following disease list was recorded and ranked as HIGH, MODERATE or LOW through industry consultation in 2014.**

7. Please rank the following diseases in carrots as high, moderate or low.

	N/A	Low	Moderate	High
<b>HIGH</b>				
Powdery mildew ( <i>Erysiphe heraclei</i> )	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sclerotinia rot ( <i>Sclerotinia sclerotiorum</i> , <i>Sclerotinia minor</i> )	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>MODERATE</b>				
Soft rot ( <i>Unidentified species</i> )	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>LOW</b>				
Alternaria leaf spot ( <i>Alternaria dauci</i> )	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Black rot ( <i>Alternaria radicina</i> )	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cavity spot ( <i>Pythium sulcatum</i> , <i>Pythium violae</i> )	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Damping off ( <i>Pythium spp.</i> )	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Leaf spot ( <i>Cercospora carotae</i> )	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Please insert any further comments

8. Is there any other disease issues not previously mentioned?

If YES, please specify issue, rank them and comment on agchem used to manage this issue.

Carrots - 2019 Vegetable Industry Strategic Agrichemical Review Process (SARP) update

Entomology/Nematology

**The following insect list was recorded and ranked as HIGH, MODERATE or LOW through industry consultation in 2014.**

9. Please rank the following insect and invertebrate pests in carrot as high, moderate or low.

	N/A	Low	Moderate	High
<b>MODERATE</b>				
Root-Knot Nematodes ( <i>Meloidogyne</i> spp.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Aphids including: Carrot aphid ( <i>Cavariella aegopodii</i> )	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Rutherglen bug ( <i>Nysius vinitor</i> )	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Thrips ( <i>Thysanoptera</i> )	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>LOW</b>				
Budworms ( <i>Helicoverpa</i> spp.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Caterpillars ( <i>Lepidoptera</i> - unidentified species)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cutworms ( <i>Agrotis</i> spp.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
False wireworms ( <i>Gonocephalum</i> spp.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Green vegetable bug ( <i>Nezara viridula</i> )	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Jassids ( <i>Cicadellidae</i> - unidentified species)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Loopers ( <i>Geometridae</i> - unidentified species)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
White-fringed weevil ( <i>Naupactus leucoloma</i> )	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Wireworm ( <i>Arachnodima</i> spp., <i>Agrypnus</i> spp.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Please insert any further comments				

10. Is there any other insect issues not previously mentioned?

If YES, please specify issue, rank them and comment on agchem used to manage the issue.

Carrots - 2019 Vegetable Industry Strategic Agrichemical Review Process (SARP) update

Weed Science

**The following weed list was recorded and ranked as HIGH, MODERATE or LOW through industry consultation in 2014.**

11. Please rate the following weeds in carrots as high, moderate or low.

	N/A	Low	Moderate	High
<b>HIGH</b>				
Resistant ryegrass - predominantly Group A ( <i>Lolium rigidum</i> )	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Pre planting, post planting or in crop weed issue	<input type="text"/>			

12. Other weeds? Please specify and rank as HIGH, MODERATE or LOW, also indicate if specific weed is a pre planting, post planting or in crop issue.  
Please insert any further comments.