

Collaborative Industry Organisation - New South Wales - Support to VIDP

NSW Farmers Association

Project Number: VG10098

VG10098

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Purpose of report: to document for Horticulture Australia Ltd the support work that has been undertaken in NSW for the duration of the Collaborative Industry Organisation project to assist in building grower awareness of the Vegetable Industry Development Program and the Vegetable R & D Program.

Support: assistance has been provided by NSW DPI District Horticulturalists in Yanco (based at the Vegetable Industry Centre) and Dareton

Report Date: 21 September 2012

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Media Summary

The Vegetable Industry Development Program holds the objectives of assisting vegetable growers to develop their enterprises and improve their competitiveness in the face of domestic market pressures driven by supermarket, and increased international competition. It seeks to meet this objective through the translation of research into the vegetable industry into hands on information and products that can be used by vegetable growers; increasing growers understanding of end market consumers; building business and leadership capacity within enterprises and organisations; and cultivating an innovative and collaborative culture within the Australian vegetable industry.

NSW Farmers, as the Collaborative Industry Organisation for VIDP in NSW has utilised its connections with grass roots vegetable growers to be a conduit of information and outcomes that have been delivered as part of VIDP. These outcomes have been communicated to growers through the coordination of face to face workshops, the use of NSW Farmers' membership list and the NSW vegetable database to distribute InnoVeg outcomes to growers and stakeholders, and personal contact between NSW Farmers' regional staff and growers.

The project, in conjunction with NSW DPI, has also developed specialised resources on spray application and integrated pest management for vegetable growers with a language other than English (LOTE) background.

As a result of NSW Farmers' activities in VIDP, over 1200 growers have had contact, with over 30 InnoVeg fact sheets being distributed to targeted growers. A large number of growers and industry representatives have attended workshops to gain greater exposure to the practical outcomes of vegetable R&D, and new resources have been made available for disadvantaged groups to aid their production and to help them meet developing market requirements.

Introduction

The project purpose was to ensure effective delivery of industry development outcomes and information packages to vegetable growers at a state and regional level by conducting measurable industry development activities and providing tangible outcomes, enabling growers and growing business to become more market focused, efficient and competitive.

NSW Farmers has been delivering VG10098, being coordinated by Project Leader Justin Crosby and Regional Advisor Alicia Harrison with support from Regional Services Managers and NSW DPI District Horticulturists in Yanco and Dareton. The program was initially developed and coordinated by Dr Alison Anderson.

A range of industry development activities have been undertaken for the duration of the project to support delivery of the Vegetable Industry Development Program (VIDP) in NSW. These include face-to-face activities, mail outs of fact sheets, workshops, VIDP information on the NSW Farmers webpage and translations of InnoVeg fact sheets for LOTE growers. There have been some issues with the delivery of workshops, predominantly with availability of appropriate speakers and dates for each growing region in NSW.

Instead of having a specific NSW newsletter, the focus for direct mail outs to growers in NSW has been the fact sheets developed by InnoVeg and the Brassica and Lettuce Best Management Practices ute guides. The Vegetables Australia magazine is an excellent regular

update of the Vegetable Research and Development Program and is well regarded by growers in NSW (most growers express a preference for printed material).

This report details the activities undertaken by NSW Farmers for the duration of the project, and includes recommendations for future R&D activities as per grower and industry feedback.

Technology Transfer Strategy and Methodology / Activities:

There were three main approaches to technology transfer: face-to-face communication, written information, and workshops. Industry stakeholders (who advise growers) attended workshops and other face-to-face activities, which greatly assisted in getting information adopted on-farm. Details of the three approaches are outlined below:

1. Face-to-face activities

The project has focussed on a number of face-to-face activities so as to improve knowledge and uptake of outcomes the VIDP and the Vegetable R&D Program. So as to maximise exposure to growers in NSW the majority of growers outside of the Sydney region have been contacted by telephone. This has also given the opportunity to update the NSW vegetable industry database.

Vegetable producers have also been visited on-farm, at times giving the opportunity to demonstrate the resources available on the AUSVEG website. Farm visits have been conducted by either NSW Farmers Regional Services Managers or NSW DPI District Horticulturists (Yanco and Dareton).

In Sydney the Regional Services Manager for NSW Farmers has visited the growers shed at Sydney Markets, accompanied by NSW IAC member Peter Ward, to speak with growers and distribute InnoVeg produced fact sheets.

VIDP updates have been provided at NSW Farmers Horticulture Branch meetings. Information has also been made available at major agricultural field days across the state where NSW Farmers has a presence.

Supporting posters for the Brassica and Lettuce Best Management Practice ute guides have been made available at Leppington Speedy Seedlings, the source of seedlings for a large number of NSW vegetable growers.

2. Written Information

Written information is the preferred communication channel of the majority of growers in NSW.

Mail outs and Email Updates

Fact sheets developed by InnoVeg have been distributed to vegetable growers and industry stakeholders.

The Brassica and Lettuce Best Management Practice ute guides have been distributed to brassica and lettuce growers in NSW. Posters supporting the ute guides have been sent to growers who have requested them.

Other fact sheets that have been mailed out to growers and industry stakeholders include the following:

- Accessing Useful Resources Online
- Spray Application Basics
- Business Management: Thinking Through the Numbers
- Gross Margins: Using VegTool
- MegaPests: The Basics of Protecting your Crops
- MegaPests: Managing Sucking Insects
- MegaPests: Managing Foliar Diseases
- MegaPests: Managing Soilborne Diseases
- MegaPests: Managing Chewing and Biting Insects

Email is still not used by a large number of vegetable growers in NSW. Additionally, email addresses regularly change. Email has been used to provide updates for information such as how to provide feedback to the draft Vegetable Strategic Investment Plan, and information regarding AUSVEG events such as Education Road Shows. Vegetable growers have been encouraged to subscribe to the AUSVEG Weekly Update emails through articles in NSW Farmers Horticulture Updates and during face-to-face activities.

Website

A Vegetable Industry Development Program section has been added to the NSW Farmers website:

http://www.nswfarmers.org.au/policy_committees/horticulture/vegetable_industry_development_program

The aim of the webpage is to give an introduction to the Vegetable Industry Development Program and to encourage growers to visit the AUSVEG webpage for more information about the Vegetable Research & Development Program. It also contains news such as information about the Strategic Investment Plan, workshops and fact sheets developed by InnoVeg.

LOTE grower activities

NSW DPI has partnered with NSW Farmers to translate the following fact sheets developed by InnoVeg:

- Spray Application fact sheet into Cantonese
- general Vegetable IPM fact sheet into Khmer and Chinese

NSW Farmers has worked with InnoVeg and NSW DPI to develop a program of activities for delivery by NSW DPI to LOTE growers in NSW until September 2012.

In NSW the Spray Application fact sheet was distributed to growers at DPI-run Sanitation workshops and at the Chemical User training that has occurred since they were produced. The Vegetable IPM and all the other fact sheets produced in the LOTE project will be mailed to those growers who were not present at the workshops.

General feedback has been appreciation that more translated resources are available to growers. NSW DPI has had many positive emails from extension staff or people who work with LOTE growers that the resources are easily accessible and very useful. Translated fact sheets are available on the InnoVeg section of the AUSVEG website and also on the DPI

website, as well as being distributed to all CIO state grower organisations for further distribution.

LOTE growers in other states are also able to benefit from these translated resources as they have been listed in the translated resources guide given to the LOTE Community of Practice Group.

3. Workshops

Peri-urban issues Workshops – Sydney Basin – April 2011

Two workshops were facilitated by NSW Farmers in April 2011 to discuss issues facing vegetable (and horticulture) production in peri-urban areas with Gerard McEville (Horticulture Supply Chain Services) so as to provide input to VG10059 (Issues facing vegetable production in peri-urban areas – review and scoping study). Individual face-to-face meetings were held with representatives of the Chinese and Lebanese vegetable grower communities.

Vegetable and Melon Growers Workshop – Mildura/Dareton – September, 2011

A workshop for vegetable and melon growers was held in Mildura for growers in the Mildura/Dareton area on 30th September 2011. It was organised with the assistance of NSW DPI District Horticulturist Gerard Kelly and the Victorian Vegetable Growers Association Industry Development Officer Helena Whitman. Vic DPI funded the attendance of Nic Gowans to speak on precision horticulture. Other topics presented were pollination (Trevor Monson, Apiarist), Interstate Certification Assurance and the impact of the suspension of dimethoate on interstate trade (Eryn Knobel, NSW DPI), production costs calculator (Gerard Kelly, NSW DPI), update on food safety certification (Helena Whitman, VGA Victoria) and an update on the Vegetable Industry Development Program (Alison Anderson, NSW Farmers and Helena Whitman, VGA Vic). Attendees were very interested in obtaining a copy of the vegetable levy funded production costs calculator (VegTool – VG08021) and expressed interest in a soil workshop in May 2012 when asked about industry development activities they would like held in Mildura/Dareton. Unfortunately this has not occurred to date due to staffing changes, but we are continuing to monitor whether there is sufficient grower interest to hold this workshop in the future.

Protected Cropping Workshop – Sydney and Coffs Harbour – October 2011

Protected Cropping Workshops were held in Sydney (21st October, 2011) and Coffs Harbour (22nd October, 2011). Along with a VIDP update there were presentations from Jeremy Badgery-Parker (NSW DPI): Benchmarking; Len Tesoriero (NSW DPI): Disease Management and Graeme Smith (Protected Cropping Australia): Outcomes of the national greenhouse recycling project and pesticides residues in hydroponics project; How to get the best out of high volume spraying; Overview of a 5 day greenhouse technical management course. The Coffs Harbour workshop was part of a trade show/seminar for protected cropping and banana growers being organised by local rural suppliers and wholesalers.

Bathurst Workshops

On 8th December 2010 NSW Farmers assisted in the organisation of a Brassica R&D workshop in Bathurst with speakers from NSW DPI and DPI Victoria.

On 23rd September 2011, NSW Farmers assisted AUSVEG with promotion of the consultation workshop for the Vegetable Strategic Investment Plan in Bathurst. NSW

Farmers also attended and gave an update on information material available to growers (e.g. Brassica and Lettuce ute guides and posters).

A precision agriculture workshop for sweet corn growers in the Bathurst/Cowra region was set for October 2011. This workshop, which was originally being delivered in partnership with Simplot, was postponed due to the availability of the Simplot speaker from Tasmania. The workshop ended up going ahead with an EnviroVeg component on 23rd March 2012 and featured key speaker Brett Whelan from the Australian Centre for Precision Agriculture (utilising yield maps for nutrient and input management).

VegTool Workshop – Sydney – September 2011

A small workshop for NSW DPI staff was held on 28th September at Richmond so that they could learn about the production costs calculator (VegTool – VG08021) and provide feedback to project manager, Gerard Kelly (NSW DPI).

Reducing Insecticide Sprays in Greenhouses – Coffs Harbour – February 2012

A workshop was held on 16th February 2012 in conjunction with the NSW DPI. Guest speakers spoke on topics including insect management in greenhouses, using predatory insects in cucumber crops and converting from insecticides to bio-control. The NSW Farmers Regional Services Manager gave an update on the VIDP.

Seminar for Hydroponic Growers – Windsor – April 2012 (postponed)

This scheduled workshop was postponed due to lack of grower interest.

Evaluation and Measurement of Outcomes – impact and adoption

NSW Farmers has acted as a delivery agent for products and services produced by VIDP. Extension and interaction with growers for adoption and implementation through increased awareness of the research outcomes and development opportunities has taken place for the duration of the project.

In line with the CIO KPIs, NSW Farmers has worked towards achieving the following goals:

1. Increased capacity within state based industry organisations to deliver information and industry development packages to industry participants, regions and groups, ensuring they have access to levy funded R&D outcomes
2. More growers actively adopting market focused industry development packages and evolving their business models to meet new challenges posed by the market
3. Increased capacity within state based industry organisations to facilitate product development, education and training services to growers
4. A market focused R&D program that is responsive to industry needs identified through growers and sub-program partners
5. Industry engagement in providing feedback and input into levy funded R&D priorities for the vegetable industry

To evaluate and measure project outcomes, the below table has been included:

Goal	Activity	Timeframe	Method	Status	Achieved
<i>1. Project Coordination</i>	1.2 Coordination of project (external)	On-going	Regular communication between Project Leader, Regional Services Managers (RSMs) and select NSW Department of Primary Industries (NSW DPI) staff to plan activities and ensure RSMs have the information required for delivery of the project; also to determine how NSW DPI staff can assist.	Complete	Yes
	1.2 Coordination of project (external)	On-going	Regular communication between Project Leader, HAL program coordinator, InnoVeg and other VIDP project leaders via email, phone and teleconferences.	Complete	Yes
	1.3 Communication with other state farming organisations delivering CIO sub-programs; a unified approach to project delivery and support to VIDP	On-going	Regular communication between Project Leader and Project Leaders in other states through email, phone and teleconferences to exchange information about project activities and delivery, provide support and to ensure national consistency	Complete	Yes

<p>2. <i>Information Delivery</i></p>	2.1 Maintenance of NSW vegetable industry database	On-going	Project Leader to continue to update NSW database as required. RSMs will continue to check growers contact details through phone calls and at workshops.	Complete	Yes (will require ongoing maintenance to ensure currency)
	2.2 NSW vegetable industry R&D newsletter	As required	Instead of a NSW specific newsletter, fact sheets from InnoVeg have been distributed by mail and will continue to be distributed; other R&D products (e.g. Ute guides) have also been distributed; growers have given feedback that they do like Vegetables Australia magazine so do not want to re-do what is already available; printed newsletters will be sent if InnoVeg fact sheets do not continue.	Complete	Yes (no specific newsletter but regular distribution of InnoVeg information has taken place)
	2.3 Email updates distributed to the NSW vegetable industry	On-going	Email has been difficult to get uptake with in 2011/2012; growers have been encouraged to subscribe to AUSVEG email updates and this will continue.	Complete	Yes
	2.4 R&D workshops for the NSW vegetable industry	On-going	Workshops planned for 2012 are as follows: Protected Cropping IPM (Coffs Harbour, Feb 2012); Hydroponic Lettuce Post-harvest	Complete	Not all scheduled workshops took place due to staffing changes

			and IPM (Sydney, March or May 2012); EnviroVeg/Precision Ag (Bathurst, April 2012); Soil Workshop (Mildura/Dareton, May 2012); Field veg workshops at NSW DPI demo farm (Feb and May, season dependent); Business workshops depending on outcome of visit to Sydney Basin by RMCG in November 2011		and level of grower interest
	2.5 Vegetable grower meetings, one-on-one information delivery	As required	RSMs will attend vegetable grower meetings (e.g. NSWFA Horticulture Branch meetings) where they can give updates on the CIO project, VIDP and the Vegetable R&D Program; RSMs will also undertake some one-on-one meetings with vegetable growers as part of their activities (which also includes workshops, meetings, phone calls and emails to total 50 days per year across the state).	Complete	Yes

	2.6 LOTE grower activities	On-going	Activities for 2012 to be determined between Project Leader and NSW DPI so they are complimentary to LOTE activities funded through InnoVeg; attendance at LOTE grower meeting facilitated by InnoVeg in Nov 2011.	In progress	Translation of general Vegetable IPM fact sheet has been translated into Chinese and Khmer and will be distributed shortly. It is available on DPI website.
	2.7 Distribution of market focussed industry development packages	As required	Project Leader will distribute the Veginsights e-newsletter and vegetable economic case studies and other resources by email as available and urge vegetable growers to subscribe; copies will also be available at meetings and workshops	Complete	Yes
	2.8 Increased knowledge within the NSW vegetable industry about the AUSVEG website and e-communications	On-going	Project Leader and RSMs to increase awareness of the availability of resources online at the AUSVEG website and e-newsletters such as the AUSVEG Weekly. Update and encourage their use by showing vegetable growers how to register at workshops and through information in the NSW	Complete	Yes

			vegetable industry newsletter; particular attention will be made to updating email addresses in the NSW vegetable industry database.		
	2.9 VIDP information available on the NSWFA website	On-going	Project Leader to have information about VIDP and the Vegetable R&D Program available in the Horticulture section of the NSWFA website with important links (e.g. AUSVEG website).	Complete	Yes
	2.10 VIDP supported through delivery of sub-program information packages	On-going	Deliver information packages such as fact sheets to the NSW vegetable industry through direct mail out, dissemination at meetings and workshops and assist VIDP sub-programs organise training workshops or other activities as required (subject to budget constraints).	In progress	Yes
	2.11 Dissemination of VIDP information and R&D outcomes enhanced by building networks with industry service providers	On-going	Project Leader and RSMs to identify key industry service providers (e.g. rural suppliers, processor field staff) and industry associations who can assist in the delivery of VIDP products and services and R&D outcomes.	Complete	Yes

3. <i>Feedback</i>	3.1 Industry input and feedback to the Vegetable R&D Program	On-going	Industry feedback through RSM's and Project Leader to HAL	Complete	Yes
4. <i>Review</i>	4.1 Final report	Mid Sept 2012	Final report	Complete	Yes

Discussion

Through NSW Farmers' involvement as the Collaborative Industry Organisation over 1200 growers have had contact, either through receiving InnoVeg fact sheets via mail or through workshop attendance to gain greater exposure to the practical outcomes of vegetable R&D, and new resources have been made available for disadvantaged groups to aid their production and to meeting developing market requirements.

The program highlighted continued concerns over the present efficacy of email as a means for delivering extension information into the vegetable industry in NSW. NSW Farmers encourages the Vegetable IAC to monitor the ongoing uptake of the AUSVEG newsletter from levy payers, and other extension delivery platforms, such as the recent EnviroVeg platform, to continue to assess the internet's ongoing capacity to deliver extension into vegetable growers.

Feedback arising as a result of grower workshops and one-on-one contact with growers and NSW Farmers' regional staff identifies the continued strength of face to face opportunities in providing extension into the vegetable industry.

Recommendations / Grower Feedback

- Continue to increase the number of key rural suppliers onto the NSW Vegetable Database to assist with distribution of R&D information
- Need more support to get minor use permits for hydro lettuce
- Not much information is available on organic production
- Chinese farmers do not understand posters or fact sheets – need more translated material
- Need more information on pesticide resistance management and disease control in Chinese
- Field Days at the demo farm at Uni of Western Sydney are valuable, would like to see another one in April on variety trials in spinach and zucchini
- Want subsidised agronomy work eg soil tests on farm
- Compost trials
- More agronomists need to be involved
- Field day with variety trials, best practices etc (not during winter, best location is Demo Farm at UWS Richmond)
- Farm-specific information on IPM expertise, water testing capabilities etc
- Issue of abandoned orchards and the resulting disease and pest issue for neighbouring producers.
- Any research related to reducing costs of production would be welcome (growers primarily concerned with low farm gate returns)

Appendix

A selection of sample fact sheets and workshop flyers are attached.



PRESENTING

Coffs Coast Growers Seminar

for growers of Banana, Avocado, Lebanese Cucumber and all Hot House Produce.

VENUE: Norm Jordan Pavilion, Coffs Harbour Showground

DATE: 22nd October 2011

TIME: 1pm – 6 pm

Representatives from all facets of your industry will be in attendance and will be available to answer your questions and discuss the needs of your business.

Protected Cropping Session (1 pm – 3 pm):

- Michael Burt (NSW Farmers) – Introduction to the Vegetable Industry Development Program and NSW Farmers' Association.
- Len Tesoriero (NSW DPI) – Disease management. We encourage you to bring any plants showing signs of disease to the workshop in **a sealed plastic bag** for discussion.
- Jeremy Badgery-Parker (NSW DPI) – Greenhouse productivity.
- Graeme Smith (Protected Cropping Australia) - National Greenhouse Recycling Project; Pesticide Residues in Hydroponic Project; How to get the best out of high-volume spraying; Information about the 5-Day Greenhouse Technical Management Course.

Banana Session (3 – 4 pm):

- Geraldine O'Flynn (Sub Tropical Banana Development Committee) - Implementation of the new market strategy and branding of Coffs Harbour Bananas.

Representatives from the companies that help make your business grow and prosper will have information stands.

We are excited to be able to bring this event to the growers in our region and hope that you will support it so that we can look to make the seminar and trade show an annual event.

Please contact us at Golden Dawn on 6652 5205 or 0409 564 191. We look forward to seeing you there.



Protected Cropping Session is funded by HAL using the vegetable levy and matched funds from the Australian Government and is supported by NSW Farmers' Association, NSW DPI and Protected Cropping Australia.

FREE

AUSVEG and the NSW Farmers Association invite vegetable growers to attend a free EnviroVeg information session and dinner

Precision Agriculture Master Class

The potential of precision agriculture for growers to save money on farming inputs, while achieving higher yields and consistent quality product in an environmentally responsible manner

EnviroVeg

AUSVEG



Location: Bathurst RSL, 114 Rankin Street Bathurst NSW

Date: Friday 23 March 2012 Time: 6:00pm to 8:30pm

AUSVEG invites growers from Bathurst and surrounds to join us for a free information session and dinner. Growers have an opportunity to meet their AUSVEG and NSW Farmers Association representatives.

Places are limited so avoid disappointment and register now!

Register by getting in touch with our Environment Coordinator Jordan Brooke-Barnett by email at info@ausveg.com.au or phone (03) 9822 0388.

Key Speaker:

Dr Brett Whelan,
Senior Lecturer, Precision Agriculture, University of Sydney



Come and meet one of Australia's leading precision agriculture experts and discover opportunities to manage farming inputs and optimise yield across your crops. Dr Brett Whelan will discuss opportunities to apply precision agriculture in the vegetable industry and optimise the use of inputs (nutrients, water, pesticides) and output (yield, quality) to increase grower profits and minimise environmental impacts. Dr Whelan will be available to answer questions on the potential savings achievable through precision agriculture, start-up costs, as well as technical questions about its implementation on-farm.

And more!

Meet your AUSVEG and NSW Farmers Association representatives

AUSVEG Environment Coordinator, Jordan Brooke-Barnett, will be on hand to discuss the role of the EnviroVeg Program in helping growers to manage their environmental performance.

Growers also have the opportunity to meet their NSW Farmers Association representatives.

We look forward to seeing you there.

REGISTRATION:

To register via email, please send your details to: info@ausveg.com.au.

To register via phone, please contact Jordan Brooke-Barnett on (03) 9822 0388.

To register via fax, please complete your details below, and fax to (03) 9822 0688.

Name _____

Occupation _____

Email _____

Phone Numbers (Mobile/ Home) _____

Address _____

Industry communication is funded by HAL using the National Vegetable Levy with matched funds from the Australian Government.

蔬菜綜合病蟲害管理

Sandra McDougall, Industry Leader (Field Vegetables), Yanco Agricultural Institute

什麼是綜合病蟲害管理(IPM) ?

許多病蟲害管理的問題出現，是源於完全依靠農藥控制。綜合病蟲害管理 (IPM) 是一種策略，引用了一系列的管理工具，務求以最少的生態破壞性的技術來管理害蟲在經濟上可以接受的水平的目標。害蟲可以包括昆蟲，蟎類，疾病，線蟲，雜草和脊椎動物害蟲。

IPM最初被定義為綜合管理昆蟲和蟎類，而實際上大多數IPM的種植者開始時都以昆蟲和蟎蟲為防治對象，後來才結合疾病和線蟲等害蟲於策略中。IPM涵蓋範圍從"聰明的農藥管理的做法"，延續到以生物集約為主的策略。

在最基本的IPM涉及常規作物監測，以確保農藥只在需要的時候及適當的時機使用。在最先進的生物集約IPM則主要依賴有益的生物去管理害蟲，當有必要加大害蟲的控制時，這些干預措施的選定是要有利於有益生物的生存。當把更多其他害蟲融入綜合管理，就需要採取更多的預防策略，從而降低了需要直接控制的做法。

IPM是一個持續改進的模型 (見圖1)。種植者採用IPM通常首先集中在一個主要害蟲管理策略，通常是在"常規"的殺蟲劑無法充分控制的害蟲或該殺劑的註冊已被撤銷。當針對目標害蟲的策略已發展，重點就轉移到其他主要或次要害蟲。IPM可以成為一個完全集成的農場管理系統，並有可能涉及到整個市場鏈。

IPM以全面的方式考慮生產系統，並關注在各方面可能增加或減少病蟲害數目的農業企業，並在可能的情況下，提高可減少這些害蟲數目的活動。

雖然本資料單張以昆蟲害蟲為主要模式，同樣的原理也適用於疾病，雜草和脊椎動物害蟲。

在自然生態系統中，害蟲數目限制於糧食供應，氣候條件和天敵，如捕食性和寄生性昆蟲或昆蟲疾病等。IPM的目的，是加強而不是破壞生態平衡。當直接控制是必要的時候，選擇一個管理策略，可減少害蟲種群至經濟上可以接受的水平，而又對環境的影響最小。

IPM是知識密集的。一個IPM計劃是建立在所有兼容控制策略：栽培，生物，化學和機械防治；旨在隨著時間的推移，加強預防措施，以減少需要控制策略。

IPM週期



圖1. IPM週期

ខែមេសា ឆ្នាំ២០១១

កម្មវិធីអភិវឌ្ឍន៍នៃឧស្សាហកម្មបន្លែ មូលដ្ឋាននៃ ការអនុវត្តន៍ បាញ់ថ្នាំគីមី



គោលដៅ

សារធាតុគីមីមានស្ថានភាពសំខាន់ក្នុងការផលិតផលបន្លែ ហើយត្រូវបានគេប្រើប្រាស់ជាដើម្បីគ្រប់គ្រងសត្វល្អិត សត្វចង្រៃ ជម្ងឺ និងរុក្ខជាតិកូចា ឬស្មៅចង្រៃ។ នៅពេលប្រើសារធាតុគីមី ត្រូវមានបំណងធ្វើឲ្យទទួលបានសម្រេចគោលដៅមានច្រើនបំផុត និងធ្វើឲ្យទទួលបានសេវាគោលដៅមានតិចបំផុត។

គោលការណ៍នៃការអនុវត្តន៍ បាញ់ថ្នាំគីមី

ភាគច្រើននៃសារធាតុគីមីដែលប្រើក្នុងការផលិតផលបន្លែ ត្រូវបានបាញ់ស្រោចក្នុងទ្រង់ទ្រាយជាតំណក់ទឹកតូចៗ បង្កើតឡើងដោយក្បាលប្រដាប់បាញ់ស្រោច និងគ្រឿងបរិក្ខារដែលមានផងរាងសំរាប់បាញ់ស្រោចប្រភេទខុសៗគ្នា។ ដើម្បីធ្វើឲ្យការបាញ់ស្រោចមានប្រសិទ្ធភាពច្រើនបំផុត តំណក់ទឹកតូចៗនៃការបាញ់ស្រោចត្រូវចែកចាយទៅឲ្យខាងលើនៃគោលដៅឲ្យបានដូចគ្នា ហើយការបាញ់ស្រោចមានយ៉ាងតិចបំផុតដោយសារការសាត់អណ្តែត ការចេញជាចំហាយទឹក ឬការហៀរចេញមកឲ្យខាងលើដី។ បច្ចេកទេសអន់ថយលើការអនុវត្តន៍បាញ់ស្រោចបណ្តាលឲ្យ:

- ការថយចុះលើការគ្រប់គ្រងសត្វចង្រៃ
- ការថយចុះនៃទិន្នផល
- ការប្រើសារធាតុគីមីខ្លះខ្លាញ់
- កម្រិតចូលកាន់តែខ្ពស់បំផុតដល់អ្នកដាំដុះ។

ការដឹងយល់អំពីសារៈសំខាន់នៃទំហំ និងដង់ស៊ីតេរបស់តំណក់ទឹកតូចៗ និងចំណុះទឹក គឺជាជំហានដំបូងបំផុតនៃការបាញ់ស្រោចទទួលបានលទ្ធផលល្អបំផុត ដែលអាចមាន។ ពេលបាញ់ស្រោចសម្រាប់រុក្ខជាតិ តំណក់ទឹកតូចៗនៃការបាញ់ស្រោច គួរតែចែកចាយឲ្យបានដូចគ្នាទៅលើរុក្ខជាតិទាំងមូល រាប់បញ្ចូលទាំងផ្នែកខាងក្រោមស្លឹក ក៏ដូចផ្នែកខាងលើរុក្ខជាតិដែរ។ ដើម្បីឲ្យការនេះបានសម្រេច តំណក់ទឹកនៃការបាញ់ស្រោច ត្រូវមានទំហំតូចល្មមដែលវិលតូច ជុំវិញពេលធ្លាក់ត្រូវឆ្លងខាងលើរុក្ខជាតិ។ តំណក់ទឹកទំហំដែលធ្ងន់ជាងគេ ចង់តែធ្លាក់ត្រង់ចុះក្រោម ហើយសារធាតុគីមី រុក្ខជាតិចេញដោយចលនាខ្យល់ឡើយ ដូច្នេះការចែកចាយតំណក់ទឹកសាជាថ្មី ក្នុងរង្វង់ស្លឹកដំណាំគឺមានកិរិស។ តំណក់ទឹកទំហំតិចតួចត្រូវបានបាញ់ស្រោចលើដី ដោយវាចង់តែខ្លាត ឬរមៀលចេញធ្លាក់ចុះពីស្លឹក និងទៅលើដី។ នៅពេលតំណក់ទឹកធំៗត្រូវបានបង្កើតឡើង តំណក់ទាំងនេះមានទំនួនតិចជាងយ៉ាងច្រើន ដែលមានន័យថាភាពទំនងជាអាចទាំឲ្យតំណក់ទឹកទាំងនេះ ធ្លាក់ដល់គោលដៅមានតិចតួចបំណ្តោះ។

សារធាតុគីមីសំរាប់កសិកម្ម មានស្ថានភាពសំខាន់ក្នុងការផលិតផលបន្លែ។ ដើម្បីឲ្យបានលទ្ធផលល្អបំផុត:

- តាមស្តីបម្រើលទ្ធផលច្រើនជាងគេគឺដំណាំ ដើម្បីសម្រាល់ដឹងឲ្យបានច្បាស់អំពីសត្វល្អិត ជម្ងឺ និងសត្វចង្រៃដែលមាននៅក្នុងរុក្ខជាតិកូចា ឬស្មៅចង្រៃ
- ជ្រើសរើសទំហំតំណក់ទឹកដែលសមស្រប និងចំណុះទឹកសំរាប់ការងារបាញ់ស្រោចនីមួយៗ
- ត្រួតពិនិត្យស្រោចជាញឹកញយ និងចែកចាយបរិក្ខារសំរាប់បាញ់ស្រោចទឹក ដោយប្រើតែទឹកស្អាតតែប៉ុណ្ណោះ។

ទំហំតំណក់ទឹក

តំណក់ទឹកមានទំហំតូចៗណាស់ ហើយសារធាតុគីមីត្រូវបានគេរាប់ជាមីក្រូន (µm) មួយមីក្រូនស្មើនឹង 0.001ម.ម។ ពេលធ្វើប្រតិបត្តិការនៅសម្ពាធដាក់លាក់ណាមួយ ប្រដាប់បាញ់ស្រោចដោយកម្លាំងទឹក បង្កើតឲ្យមានជាតំណក់ទឹកទំហំផ្សេងៗគ្នាមួយចំនួន។ ក្រុមប្រឹក្សាការពារដំណាំអង់គ្លេស (BCPC) បានចាត់ថ្នាក់តំណក់ទឹកទំហំផ្សេងៗគ្នាមួយចំនួនទាំងនេះ ទៅក្នុងក្រុមខុសៗគ្នា។ ការចាត់ថ្នាក់ជាក្រុមនេះ មានដាក់បញ្ចូលក្នុងសៀវភៅស្រាវជ្រាវប្រដាប់បាញ់ស្រោចភាគច្រើន និងជាសេចក្តីណែនាំដ៏មានប្រយោជន៍សំរាប់វាយតម្លៃលើភាពសមស្រប សំរាប់ការងារបាញ់ស្រោចដាក់លាក់ណាមួយ។

ប្រភេទ BCPC	ទំហំតំណក់ទឹកតូចៗ	ការពិពណ៌នា	ប្រើប្រាស់ក្នុងការបាញ់ស្រោច ធ្វើកសិកម្ម
ល្អិតខ្លាំង	<150 µm	សន្លឹម ឬអំបូ	
ល្អិត	150-250 µm	ការបាញ់ស្រោច តំណក់ទឹកតូចៗ	ថ្នាំសម្រាប់សត្វល្អិត និងថ្នាំសម្រាប់រុក្ខជាតិកូចា ឬស្មៅចង្រៃតាមការប៉ះពាល់
មធ្យម	250-350 µm	ការបាញ់ស្រោចតំណក់ទឹកទំហំមធ្យម	ថ្នាំសម្រាប់រុក្ខជាតិកូចា ឬស្មៅចង្រៃដែលមានប្រសិទ្ធភាពល្អ
ក្រោតក្រាត	350-450 µm	ទឹកភ្លៀងគ្រាប់ល្អិតខ្លាំង	ថ្នាំសម្រាប់រុក្ខជាតិកូចា ឬស្មៅចង្រៃដែលមានប្រសិទ្ធភាពល្អ និងជំនួយប្រើលើស្លឹក
ក្រោតក្រាតខ្លាំង	450-550 µm	ទឹកភ្លៀងគ្រាប់ល្អិត	ជំនួយប្រើលើស្លឹក
ក្រោតក្រាតខ្លាំងបំផុត	>550 µm	ភ្លៀងខ្លាំង	ជំនួយប្រើលើស្លឹក

តំណក់ចំណាំ: តំណក់ទឹកដែលតូចជាង 80 µm ពុំអាចមើលឃើញដោយភ្នែកទទេឡើយ។



“កម្មវិធីអនុវត្តន៍នៃឧស្សាហកម្មបន្លែ ផ្គត់ផ្គង់ទឹកដោយ HAL ដោយប្រើពន្លឺលើបន្លែ និងទឹកដែលត្រូវបានដាំដុះក្នុងបណ្តាញ”

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The involvement of NSW Farmers staff and elected representatives has also ensured maximum exposure of the project to the NSW vegetable industry, raising awareness of the way vegetable levy funds are used to improve productivity and profitability for growers.