Horticulture Innovation Australia

Final Report

Facilitating the development of the Victorian strawberry industry

Leonard O'Connor
Victorian Strawberry Industry Development Committee

Project Number: BS12016

BS12016

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Horticulture Innovation Australia Limited
Level 8, 1 Chifley Square
Sydney NSW 2000
Tel: (02) 8295 2300
Fax: (02) 8295 2399

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Summary

Project BS12016 'Facilitating the development of the Victorian strawberry industry' was established to continue the extension of research and development outcomes from local, national, and international research to the Victorian strawberry industry through the ongoing employment of an Industry Development Officer (IDO). The project was (as has previous industry development projects since December 2000) supported by the Victorian Strawberry Industry Development Committee (VSIDC) and received extremely high levels of grower support.

The VSIDC views the role of the IDO as an important link in the Victorian strawberry industry, enabling new growers to quickly become profitable and sustainable, as well as keep the wider Victorian strawberry industry up-to-date with key research and development findings and emerging trends in changing production systems.

During project BS12016 the development of a new strategic plan for the VSIDC was facilitated, after which the IDO worked to delivery of objectives outlined in the new strategic plan for 2014 – 2016.

These objectives include:

- promote efficient and safe chemical use;
- select new varieties and better manage current varieties;
- increase value-adding opportunities; and
- educate the supply chain.

(Taken from page 3, Victorian Strawberry Industry Development Committee Strategic Plan 2014 – 2016).

The IDO facilitated a range of activities to assist with achieving the outcomes identified within the strategic plan. Such activities included field days and farm-walks, study tours, newsletter publications, and industry fact sheets.

Given the success of, and the high levels support for the project within the Victorian strawberry industry the VSIDC in conjunction with the Victorian Strawberry Growers Association (VSGA) recommend continued support for the industry development project. This continued support will allow for continued development of the following

- industry research and development projects,
- improved extension methods,
- collation and interpretation of industry production and economic data, and
- representation of the industry to service providers and the general community.

The IDO also assisted greatly with the creation and implementation of the VSIDC Plan of Operation (see Appendix 2).

Introduction

The Victorian strawberry industry established the position of the Industry Development Officer (IDO) in October 2000, through a Horticulture Australia Limited (HAL) funded project. The ability of the Victorian industry to fund this position and associated projects through voluntary contributions came through the statutory industry levy, which was established in 1992 under an Order titled 'The Victorian Strawberry Industry Development Order', created under the Victorian Government's Agricultural Industry Development Act 1990. Since the initial Order was made it has been extended on 5 occasions.

During the period of this project the IDO personnel changed from Elizabeth Wharton to Jason Hingston. During this changeover period, the office for the Victorian strawberry industry was relocated to Wandin North which is in the centre of the Victorian strawberry industry.

Previous industry communications projects have led to industry wide practice change in the areas of environmental management, soil and water management, improved business skills, Occupational Health & Safety (OH&S) and food safety guidelines, as well as improving industry cohesiveness and communication methods. The current project continued to develop on these themes, but also explored different methods of communication and grower involvement.

The aim of project BS12016 was to focus on providing regular information delivery to industry: reviewing and monitoring the industry strategic plan; developing, implementing and monitoring an industry communication plan; and accessing available information and developing mechanisms to bring pertinent information to the value chain. These goals were achieved through using a variety of communication strategies (online, print, personal), the collection and analysis of wide ranging industry statistics (production and economics), as well as developing tools and systems to allow fast and efficient information dissemination throughout the industry.

A new web-site was created under the project and has been an extremely successful tool in disseminating information to the growers, and the general public.

The activities conducted by the IDO are developed from the most current Industry Development Needs Analysis (IDNA). The most recent IDNA process validated the continuation of the industry development strategies, including the IDO role, as well as identified the following activities to be carried out by the IDO.

- Identify and formulate solutions to emerging grower production needs and issues,
- develop R&D activities that will benefit the Victorian strawberry industry and communicate these new technologies and/or methods back to the VSGA, VSIDC and growers,
- investigate resources and infrastructure that could potentially enhance industry capacity and viability,
- analyse market opportunities and threats to increasing demand for fruit domestically and internationally. Strengthen the ability of industry to compete within these markets,
- examine and analyse new variety selections using production and marketing criteria,
- evaluate overseas production methods and strategies that could be implemented in Victoria to improve the industry,
- facilitate the formation of alliances and communication pathways throughout the supply chain, and
- identification of opportunities, threats and challenges to the existing and future operating environment of the Victorian strawberry industry, which can be outlined in the industry's strategic plan.

Through Project BS12016 the IDO has facilitated state-based and international study tours, farm walks and field days, conferences, and industry based training courses. The IDO also managed the data collection and analysis

of on-farm variety trails and enabled this data to become available to the wider grower community in a timely fashion.

Methods and activities

This project used a used a number of different approaches to facilitate the flow of information to all sectors of the Victorian strawberry industry. These approaches included workshops, conferences, farm walks, posters, fact sheets, newsletter articles, website development, on-farm and written communications.

Below is a list of the major tasks undertaken throughout project BS12016:

1. Victorian Strawberry Growers Association – technical component of Annual General Meetings (2012/2013/2014/2015)
2. Ladies Dinner (2013/2014/2015)
3. Newsletter and industry publications
4. Development of industry insecticide guide
5. Horticulture Industry Network – a Victorian Department of Primary Industries initiative
6. On-farm evaluation trials
7. BerryQuest conference 2013

1. Victorian Strawberry Growers Association - Annual General Meetings

The Victorian Strawberry Growers Association (VSGA) Annual General Meeting (AGM) is held at the beginning of the harvest season, usually late September/early October. In addition to the association's AGM the day comprises of numerous presentations and discussions where information is disseminated to growers and industry service providers who attend. This event is at a key time, just before the strawberry harvest commences, and therefore is extremely important for not only reminding growers of best practice management systems, but also for demonstrating new production practices which they can trial throughout the coming season.

During this project the IDO presented a range of information on various topics at these meetings. These topics have included:

Industry production trends and demographics

Throughout the project extensive data has been generated and collated on industry production trends and how they are changing. These include items such as reductions in the number of varieties being grown, increasing farm size and the increasing move to more integrated production systems.

Demographics included the trends of mean age of producers increasing, farm size increasing, as well as increasing segmentation and differentiation of product based on quality attributes. These topics also covered the expansion of "co-operative like" operations and the

Figure 1. Growers discussing protected cropping systems.

development of production in not traditional growing regions.

Chemical use and record keeping

The strawberry industry in Victoria has had issues with excessive chemical residues in past seasons, this has been an area of constant work under this project and many information sessions have been presented.

Information presented on chemical use management has generally centered around how to manage use under Victoria's off-label use system and the impacts this has on maximum residue limits. Growers were also given information of the records that they need to keep of chemical treatments and why this is important from a production, food safety and integrity standpoint.

Generally, this information was presented by Industry Development personnel or Victorian Department of Primary Industry's representatives.

Figure 2. Growers hearing about changes to record keeping requirements.

Industry extension review and perceptions

As part of project BS12016, an extensive review of the industry development activities and also the perceptions of the industry held by the grower and service community. This review showed that the industry development activities carried out as part of this project were highly valued by all aspects of the industry. However, the review also resulted in education being conducted to provide the industry members with a better understanding of the different roles of the industry bodies and what the Industry Development Project is able to facilitate.

The industry members were also informed about the differences between the two strawberry industry levies (national and state), how they are managed and invested.

Figure 3. Growers hearing about industry levies and changes at HIAL

2. Ladies Dinner

The industry's Ladies Dinner was initiated in 2002 as a way of recognising the role women play in the Victoria strawberry industry, and also in horticulture as a whole. Since its' inception in 2002 the Ladies Dinner has been held annually and has grown to consistently attract over 90 ladies from all sectors of the Victorian industry. The Ladies Dinner is now a "hallmark" event within the Victorian strawberry industry and revered across the wider horticultural sector.

In addition to the Ladies Dinner serving as a method of acknowledging the role of women within the industry, it also allows for the communication of information to the women within the industry. Throughout the term of this project the dinner has been used to update the women on various issues impact horticulture as well as individual business development.

The dinner also acts as a process of empowering those who attend. This is achieved by inviting guest speakers to address the women to discuss their experiences in agriculture and horticulture.

Figure 4. Growers hearing about industry levies and changes at HIAL

3. Newsletter and industry publications

Through project BS12016 the IDO has authored and distributed the printed industry newsletter titled "Vic Strawberries". This newsletter is distributed free of charge to all Victorian strawberry growers, as well as industry service providers who are on the VSIDC database. A copy of the newsletter is attached as appendix 1. As well as the hard-copy newsletter the project also led to the development of a short format email newsletter. This email newsletter was aimed at more frequent communication and short articles that can be linked through to external sources.

The newsletter is one of the primary modes of communication with the industry and allows for news topics, research and development outcomes, and new production trends to be communicated throughout the industry in greater detail.

Newsletters published throughout this project have covered a wide range of subjects, these are summarised below:


THE VICTORIAN STRAWBERRY INDUSTRY NEWSLETTER

VIC STRAWBERRIES

Victorian Strawberry Growers Association Annual General Meeting 2014

Vic Strawberries www.vicstrawberryeast.au Spring 2014

Figure 5. Cover snap-shot of the industry newsletter 'Vic Strawberries'

- Integrated pest management (IPM)
- On-farm agro-chemical use
- Nutrient management
- New variety information
- Business management (payroll, wage rates, superannuation)
- Cost of production
- Wholesale price drivers and trends
- Emerging technologies (crop protection, protected cropping)

In addition to the above topics the newsletter also reports on industry events, so that those growers who could not attend are still kept well informed of developments within the industry on a state and national level.

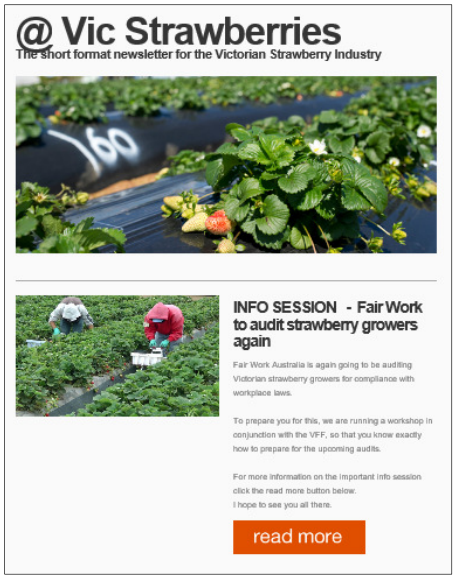

Figure 6. Excerpt of email newsletter.

4. Development of industry insecticide guide

Through project BS12016 the Australia Strawberry Industry's first edition of the Insecticide Information Guide was produced. The guide has been developed to show growers the available insecticide options and what pests they control as well as the relevant withholding periods. Another key aspect of this guide is that it gives an indication of the affect different insecticides have on beneficial insect populations, and how long growers should wait before re-introducing predators after application.

This guide was distributed to all strawberry growers within Victoria, and with the assistance of Strawberries Australia further distributed Australia wide.

Figure 7. Insecticide guide.

5. Horticulture Industry Network – a Victorian Department of Primary Industries initiative

The IDO participated in the Horticultural Industry Network (HIN). The HIN is an initiative of the Victorian Department of Primary Industries, and was established to support horticultural industries in Victoria through professional development activities and training for IDO's.

Professional development undertaken has been in the areas of biosecurity surveillance, presentation skills, communication and leadership, value chain analysis, management, evaluation, web interaction, change management, and corporate governance.

The IDO has also participated in other professional development opportunities such as the HAL Industry Development Forum, International Horticultural Congress, as well as many more.

6. On-farm evaluation trials

The IDO managed the data collection and collation for the Victorian sites of the on-farm new variety evaluation trials. Throughout the period of this project the methods for data collection have been continually improved to allow for greater speed of capture and rapid availability for decision making.

The method of data collection is "cloud" based forms where data can only be added and not changed unless the user has access to the background spreadsheets. These sheets are only accessible by the IDO and breeding staff. This has increased the usefulness of the data collected.

This change in data collection has also allowed for state-wide fruit growers to have instant access to the performance of trial varieties, which enabling them to make easy comparisons throughout the season with the varieties they grow on their own farms.

7. BerryQuest conference 2013

This project was crucial to the success for the BerryQuest conference held in 2013. The cross industry berry conference "BerryQuest" was held at the Foothills Conference Centre in Mooroolbark during the second week of October. BerryQuest is the hallmark conference event of the national strawberry, raspberry and blackberry, and blueberry industries.

The conference was well attended, with in excess of 180 delegates attending various presentations, workshops and field days through the week. Delegates were also able to discuss emerging technology and products with the large number of trade exhibitors present.

The IDO through BS12016 was a key member of the organising committee and an advocate for the importance of the continued running of the event.

Evaluation

The VSIDC conducted a review of the project to determine if the project was still aligned with views and strategic needs of the industry. To achieve this, discussions were had with VSIDC, VSGA and with the wider grower community through the use of surveys and informal discussions.

At a grower meeting held at the Wandin North hall in June 2015, it was widely acknowledged that the industry development projects are of great importance to the industry. This is due to its' ability to represent the industry but more-so provide a mechanism for the industry to respond to crisis situations, whether they be from diseases, insects, adverse weather or adverse consumer views and public relations.

This project and its associated activities have been evaluated by two different processes.

1. The project is managed by a management committee (MC) which is made up from a subcommittee of the VSIDC committee. This MC is responsible for approving work-plans and key activities devised by the IDO. These work-plans are also reviewed by the MC on a six monthly basis to determine any short comings or new and changing requirements.
2. The project and position of the IDO is also subject to annual approval by a vote of all commercial Victorian strawberry growers, in accordance with Victorian government legislation. The results of these polls are as follows:
    - 2013 89 votes in favour, 4 against
    - 2014 Not applicable as growers voted to re-make the "Order"
    - 2015 89 votes in favour, 15 against – this vote was to seek grower approval for the IDO Project to continue for the next four year period (from 1 November 2015 – 30 October 2019) as a National IDO Project.

Implications

Key Learnings

The strawberry industry in Victoria is very mature in structure, the industry bodies function well and respond to the challenges in a professional manner. However, there is a lot of misunderstanding (or lack of knowledge) regarding the purpose of the two state bodies in Victoria amongst the grower community. This has led to some confusion about what this project was able accomplish.

Many growers (in the current industry make-up) are reluctant to make changes to new production methodology or practices due to them seeing themselves as soon to be leaving to industry or too small to be impacted upon by not making the change.

For a grower view point "seeing is believing". Large scale block trails have been the most successful in achieving practice change within the industry and will continue to be so, as it allows for the benefits to be observed on a larger scale.

Industry challenges and opportunities, strengths, and weaknesses

- Challenges
    - Ensure the project is relevant across production regions,
    - Improving fruit quality in January and February,

    - Ensuring nursey plant health status,
    - Soil pathogen control – Holistic soil IPM,
    - Farm biosecurity.
- Opportunities
    - Increased sustainability through greater IPM use,
    - Market for second grade and/or undersized fruit,
    - Soilless production systems,
    - Greater cooperation through national industry structures.
- Strengths
    - Excellent support from grower and service provider community,
    - Stable well established industry,
    - Little competition from imported fresh fruit,
    - Healthy product ready to serve.
- Weaknesses
    - Very low presence of young growers on industry bodies
    - Low numbers of new people taking up committee and/or board positions
    - Industry reliance on same people all the time
    - Lack of cooperation between northern and southern production zones
    - Uncertainty of funding arrangements

Recommendations

- It is recommended that the industry continue to establish communication and facilitation projects which enable the employment of the Industry Development Officer. It is an essential element of the Victorian strawberry industry as the IDO is responsible for many initiatives which have benefited the Victorian and Australian strawberry industries as a whole.
- There are extensive opportunities for the Victorian and Queensland industries to collaborate and share ideas and research which will significantly reduce the amount of duplicated work (both States currently fund IDO positions).
    - Many current Horticulture Innovation Australia funded research projects are conducted by the Queensland department of primary industries the lead strawberry agency, and there would be significant industry benefit if these research projects were conducted in the southern States of Australia - which make up approximately 70-75% of Australia's strawberry production.
    - Horticulture Innovation Australia funded research, conducted by Queensland department of primary industries, is communicated well into the Queensland industry; however there is little communication or extrapolation of these findings to southern Australia production. This is an areas that IDO's from Queensland and Victoria need to improve on in future projects.
- There is a need to constantly focus growers' minds on the desires of the end users (ie. consumers) and what they require in regards to fruit quality, so that growers can further align their processes to meet these desires.

New and younger growers need to be encouraged to take positions on State and National committees and advisory boards. This needs to be facilitated by the representative State bodies.

Acknowledgements

The Project Leader (Len O'Connor – CEO of the VSIDC) would like to acknowledge the work of the following people and committees:

VSIDC committee	**VSGA committee**
John Hasan	Bill Thompson
Sam Violi	Sam Violi
Clarissa Cincotta	Clarissa Cincotta
Anna Hasan	John Hasan
John Frisina	Serge De Iulio
Tony Fay	Sal Biondo
Mauro De Iulio	Mauro De Iulio
Jim Ripepi	Santo Failla
Angela Mulluso	Vince Sorace
Matthew Woods	John Calle

The Project Leader would also like to thank the IDO who held the position of Industry Development Officer during the period of this project, Jason Hingston (2010 - 2015). Without his devotion, commitment and involvement Project BS12016 would not have been so successful.

Finally, the VSIDC would like to thank the staff of Horticulture Innovation Australia for their assistance, guidance and dedication to our industry.

This project has been funded by Horticulture Innovation Australia Limited with co-investment from the Victorian Strawberry Industry Development Committee and funds from the Australian Government.

VICTORIAN
STRAWBERRY
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DEVELOPMENT
COMMITTEE

Appendices

Appendix 1 – Vic Strawberries Newsletter

THE VICTORIAN STRAWBERRY INDUSTRY NEWSLETTER

VICTORIAN STRAWBERRY INDUSTRY DEVELOPMENT COMMITTEE

VIC STRAWBERRIES

Victorian Strawberry Growers Association Annual General Meeting 2014

The Victorian Strawberry Growers Association (VSGA) held their 2014 Annual General Meeting (AGM) on the 10th of October at T&G Farms in Silvan South.

The meeting was well attended by more than 35 VSGA members, the turnout was more impressive given it was a bright clear day with very low winds right before the season commenced.

The meeting had all the hallmarks of any AGM. Previous minutes were moved and seconded, key reports tabled and accepted, and office bearers called for and previous re-elected. However, the AGM was also opened up for presentations to members by key service providers and representatives.

First cab off the rank was Industry Development Officer, Jason Hingston. Jason discussed results of the recently conducted Industry Development Review and the impacts this will have on the way the Victorian Strawberry Industry Development Committee (VSIDC) communicates with growers and stakeholders. He also gave an update on the soil disease *Macrophomina phasolina* (Charcoal Rot) and what the VSIDC is doing about it.

Felicity Collins from the Department of Environment and Primary Industries (DEPI) spoke next on chemical use within the strawberry industry. She spoke on how much the industry has changed over the past 4 to 5 years since intensive residue monitoring was commenced. The major highlight was the decline in residue violations, with only one occurring during last season.

Richard and Jack from Australia Energy Efficient Solutions were next to address VSGA members. They spoke about the ability of solar energy systems to offset rising power costs, as well as methods that can used to finance the solar infrastructure and installation costs included to expected pay-back time.

Julian Horsley from AND Scales followed on from Richard and Jack. Julian spoke about some new technology from AND Scales that makes identifying over and under-weight punnets of packed strawberries easier and quicker. This scale technology and the savings it can make are discussed more in the article on pages 8 and 9.

The Victorian Farmers Federation (VFF) was represented by Lis Blandamer how gave an update on the activities of the VFF and changes to are occurring in regulations and industrial relations. Lis also talked about the possibility of fair work again auditing Victorian strawberry farms in a similar fashion to what was undertaken last season.

NAB followed on from Lis, and spoke about some of their new product offerings and extended on discussions about how NAB can help with finance for funding solar energy installations.

The final speaker of the day was Tony Fay from the Department of Environment and Primary Industries. Tony spoke on the activities and importance of the VSIDC. Tony also discussed with growers present the activities that the VSIDC can undertake and the differences between it and the VSGA.

Once the presentations were complete, attendees embarked on a tour of the farm. The allowed growers and service providers to ask questions and have discussions in a more informal and relaxed setting.

The VSGA would like to thank all the speakers for their involvement in the day, as well as Tony and Grace Molluso for kindly hosting the AGM and opening up their farm for the farm-walk.

For more photos please see the back cover or visit www.vicstrawberry.com.au

Finding a biological control for Botrytis in strawberries

Dr Dean Metcalf
Metcalf Bio Control
phone: 0409 054 323
email: metcalf@tassie.net.au

Botrytis cinerea (grey mould) is among the most costly diseases for strawberry growers. The disease can survive the winter in old fruit (sclerotia) which make spores in the spring that infect the flowers. The flowers are a very susceptible to infection and if Botrytis infects the flowers it will establish latent infections, which appear as the fruit ripen, or in storage. Botrytis makes spores on the infected fruit that spread to nearby fruit and flowers.

Botrytis has often been managed by intensive chemical spray programs, but Botrytis is very good at developing resistance to chemicals and withholding periods often limit when they can be used. Metcalf Bio Control has already developed two biological control agents for Botrytis that are used in grapes and cherries. Both are fungi (Trichoderma spp.) native to Tasmania. The first (Colonizer®) is specifically applied to grape flowers to stop latent infections from becoming established, later on another Trichoderma (Antagonizer®) was developed which is applied late in the season to stop Botrytis spread among bunches of grapes, and is also used in cherries at flowering and ripening. These generally have provided more than 85% reduction in the level of Botrytis at harvest

These biofungicides have not worked as well in strawberries as in grapes and cherries. To try and develop a biological control agent that will suppress Botrytis in strawberries, Metcalf has surveyed the Trichoderma races that can be found naturally growing on strawberries in different strawberry growing regions of Australia (Figure 1). 34 microbes were identified and tested including Trichoderma, Gliocladium, Epicoccum and Alternaria spp. and these were purified in culture.

To find out which of these 34 were the best, an experiment was set up where the test

Figure 1. Dean Metcalf (left) with strawberry IDO Jason Hingston collecting samples from the breeding garden at Wandin, Vic.

microbe and Botrytis were grown together in culture and the effects of the test fungus were monitored by microscope. Fungi that could not kill Botrytis were eliminated from the test. Figure 2 shows Trichoderma TSQ7 (collected from Queensland) attacking Botrytis in culture.

A second experiment to test the 34 microbes effect on Botrytis compared

Figure 2. Trichoderma TSQ7 (the narrower fungus) attacking Botrytis cinerea (the larger fungus). Trichoderma can attack by coiling around the target fungus like a python.

their ability to stop Botrytis from infecting strawberry leaves. Infection of leaves allows the disease to spread very rapidly. Botrytis was inoculated on to wounded strawberry leaves with or without different Trichoderma races tested (Figure 3) and the effect on the size of the lesions that

Figure 3. A strawberry leaf inoculated with Botrytis and Trichoderma. The inoculation site is between the two white dots and the ability of Trichoderma to attack Botrytis is measured by reduced size of the lesion.

grew on each leaf was rated to see how well the treatment had worked.

Figure 4 shows some of the results of these experiments. In the leaves inoculated only with Botrytis the average lesion severity was 5.88. Where leaves were only wounded, the lesion rating was 2.64. Some of the biological control agents tested (eg. GSV11 and GSV13) significantly reduced lesion severity to 1.60.

Overall, there were ten biological control agents with potential to be used against Botrytis identified and these are currently being evaluated in a series of field trials in Queensland, Victoria and Tasmania.

From the strength of inhibition seen in culture tests and the leaf assays there seems to be a good chance of successfully developing a biological fungicide specifically for Botrytis in strawberries.

Any growers that are interested in participating in trials or trialling biological control in a part of their crop could contact Dean Metcalf.

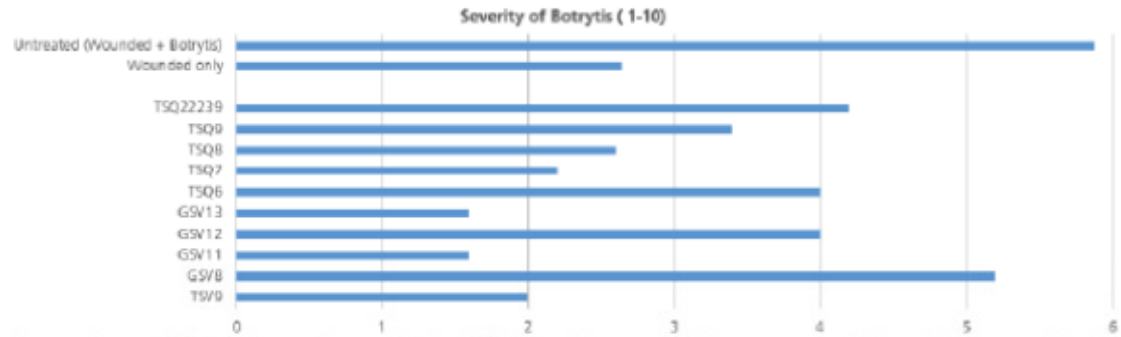

Figure 4. The severity of Botrytis lesions on leaves inoculated with different Trichoderma or Gliocladium races compared to leaves that were wounded only and leaves that were wounded and inoculated with Botrytis cinerea only (LSD0.05=3.62).

Macrophomina phasolina (Charcoal Rot) update

What is Macrophomina?

Macophomina is a genus of fungi with two species, one of which *Macophomina phaesolina* is pathogen responsible for the disease we know as Charcoal Rot, it is a relatively widespread pathogen that has been recorded in Australian strawberry crops dating back to before 2008. These previous occurrences where typically isolated to individual farms or smaller growing regions. However in the 2013/2014 season we observed large scale crop infection and subsequent losses throughout Victoria's major production region the Yarra Valley.

What does it look like?

Symptoms of *M. phaesolina* are similar to those of other strawberry crown rots, such as Colletotrichum and Phytophthora and Fusarium. Infected plants being to show signs of water stress followed by infected plants dying. When crowns of plants infected with *M. phaesolina* are cut open it reveals reddish-brown decaying areas around the inner edges of the crown.

Figure 1. Plant die-back along a section of row by caused by *M phasolina* at Wandin North

Figure 2. Individual plant death casue by *M phasolina* at Wandin North

Figure 3. A discoloured crown is typical of *M phasolina* infection. Be careful not to confuse it with other crown rots. A formal identification is recommended.

Why is it here now?

M. phaesolina has started to become a problem throughout the world where strawberry producers have stopped using methyl-bromide to fumigate fruiting fields. Although we stopped using methyl-bromide many years ago, the disease has taken a while to build up to noticeable levels at which it can be identified as a problem. For example, you may notice one plant die here or there and think nothing of it, but when you have whole beds or large areas of paddocks infected it is much more obvious and easier to identify the cause.

What to do if I think I have M. phaesolina on my property?

1. Ensure you take care not to move soil from you property to another or from infected paddocks to clean paddocks.
2. The first step if you think you have *M. phaesolina* on your farm is to send plants away for a formal diagnosis, this can be arranged through your agronomic provider or IDO can provide you way to do this yourself.
3. If test come back positive, remove ALL plants showing symptoms of disease and destroy plants (preferably by incineration). Ensure access to paddock is restricted to only essential activities and ensure soil is not moved from this paddock to other areas.

Farm hygiene

Hygiene is critical for limiting the spread of all soil-borne diseases. All farm equipment, irrigation pipes, row covers have the ability to spread the disease and should be cleaned. Cleaning off machinery before moving between paddocks is a good practise to get into as it will not only significantly slow the spread of diseases (soil as well as foliage and fruit) but also reduce to spread of weed seeds.

Current best management practises

Currently the M. phaesolina is best managed by the following strategies.

- Farm hygiene and crop rotations – Stop and prevent to movement of soil and infected plant material around your farm and between other farms. This means stopping the sharing of equipment unless it has been properly cleaned down. Where ever possible strawberries should not be planted in fields with a history of M. phaesolina as this will lead to increased disease levels
- Pre-plant soil fumigation – This currently remains one of the key tools for managing M. phaesolina and other soil-borne pests. The use of current fumigants may not provide complete control and infections should still be expected.
- Reducing plant stress – When the plants are stressed plants will succumb to the disease much quicker. It is uncertain the effect stress has on the plants becoming infected, but either way stresses should be minimised as much as possible.

The management of M. phaesolina within Australia and the world is currently undergoing significant amount of research and is constantly changing. Growers, agronomists, and other key service providers are encouraged to attend meetings, keep up-dated with the latest research findings, and discuss these matters widely to ensure the industry is able to successfully overcome this challenge.

The VSIDC is currently in the final stages of commissioning research into controlling this disease within the Victoria and more information on these projects will be released over the coming months.

Project update - Determining the optimum baseline nutrition for Victorian grown "Albion" strawberries

Tim Kimpton
Applied Horticultural Research (AHR)

HAL project BS12010 has completed last season's evaluation of leaf nutrient levels, fruit quality assessments and yield estimates. The results were reliable and consistent, and the key findings were:

- Leaf nitrogen levels on average were too low. Only those growers who consistently applied higher rate of N were in the ideal leaf N range.
- Phosphorus levels were often below optimum, especially late in the season.
- Potassium (potash) levels were nearly always in the adequate to high range
- The highest yields were associated with higher leaf phosphorus and nitrogen levels, particularly later in the season.

The project team are planning to repeat the sampling to increase the data set. The evaluations reported here cover 12 different grower blocks in the 2013/14 season of winter planted Albion across the range of soil types and environments where production occurs in the Yarra Valley and Mornington Peninsula.

Results to date

Leaf nutrient levels in general.

The results from the first season can be separated into four groups:

1. Nutrients which were too low.

Nitrogen (N) values (Fig. 1) sat inside the optimum Californian range from prior to picking until December. However, by February, the Victorian average remained below this band for the remainder of the season. The highest Victorian levels were very consistent with optimum Californian levels.

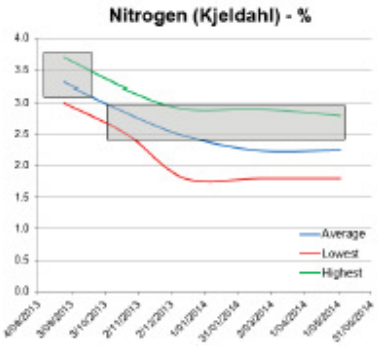

Figure1: Victorian foliar Nitrogen (N) Levels 2013-2014. Boxed areas indicate Californian reference ranges, prior to fruiting (LHS) then during production (RHS).

Phosphorus (P) levels (Fig. 2) generally struggled to reach the optimal Californian range, both before and during the production period. However, as with N, the highest Victorian levels were very consistent with optimum Californian levels.

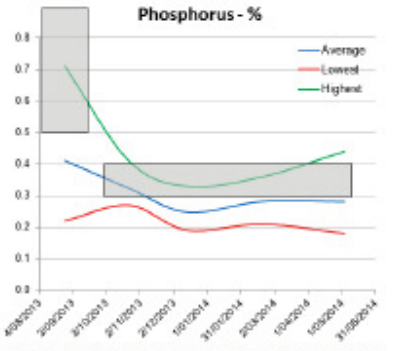

Figure 2: Victorian foliar Phosphorus (P) Levels 2013-2014. Boxed areas indicate Californian reference ranges, prior to fruiting (LHS) then during production (RHS).

2. Nutrients which were marginal compared to Californian levels.

Boron (B) and Sulphur (S). Boron levels were generally similar but marginal-low at the beginning and end of the production period. By contrast, Sulphur levels were within the optimal range at the beginning and end of the season but just marginal/ below in the middle of the production season from December to February.

3. Nutrients which were adequate compared to Californian levels.

This was the largest group and covered most of the minor (trace) elements - Calcium (Ca), Magnesium (Mg), Manganese (Mn), Iron (Fe), Copper (Cu) & Zinc (Zn).

4. Nutrients which were high compared to Californian levels.

Potassium (K) levels (Fig. 3) before picking began were similar to Californian values. However, average Victorian values remained just above the Californian range for most of the production period. Even the lowest Victorian values sampled were well within the optimum Californian range.

Seasonal Reference Levels

Nutrient comparisons discussed here refer to a set of recently established Californian values for Albion (Hartz T. et al, 2012), not other references such as local values broadly established for strawberries generally.

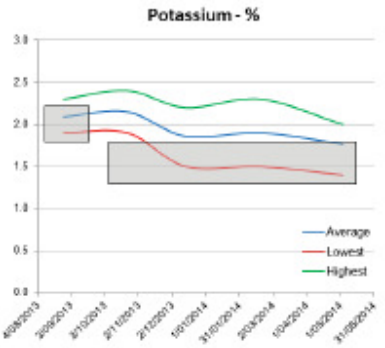

Figure 3: Victorian foliar Potassium (K) Levels 2013-2014. Boxed areas indicate Californian reference ranges, prior to fruiting (LHS) then during production (RHS).

Unlike traditional nutrient references which simply set a minimum level or a range for each nutrient, the recent Californian values separate the season into the pre-production (non-fruiting) and production (fruiting) parts of the season. This helps track which nutrients generally decline, stay the same or increase slightly as the season progresses.

Trends

All of the major nutrients and some trace elements started with high pre-production levels (N, P, K, S, Zn) and steadily declined during the production period. Some nutrients remained at fairly constant levels before and during production (Mg, Mn, Fe, Cu, Mo). Two nutrients showed a seasonally increasing trend – Ca (Fig. 4) & B. These trends were similar both in Victorian and Californian values. It should be noted that no Californian reference exists for Molybdenum (Mo) while local data is being collected.

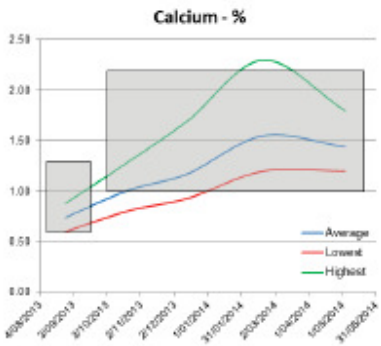

Figure 4: Victorian foliar Calcium (Ca) Levels 2013-2014. Boxed areas indicate Californian reference ranges, prior to fruiting (LHS) then during production (RHS).

Clearly the biggest difference between Victorian and Californian production is the "Summer Ebb" in Victorian production induced by much higher temperatures. This may explain why some Victorian nutrient levels showed a peak in the production period during mid-February (B, Fe, possibly Mn). However, this effect is more subtle and it will be interesting to see whether these trends are repeated in the current season.

Nitrogen

The most consistent and useful way for measuring plant nitrogen has proven to be through a dry ash analysis of total nitrogen, rather than nitrate-N levels (either as dry ash or in petiole sap tests).

Nitrate levels are highly variable even within a single crop, depending on such factors as time of day when sampled. This has certainly been seen to be the case in samples analysed for this project. Leaf nitrate levels have ranged from <50-1500mg/kg and have born very little relationship to total leaf nitrogen levels which have followed much more consistent trends (1.8-3.7%) in the same time frame.

Prior to fruit production, plant nitrate-N showed less variation from highest to lowest and levels were lower than at any time once fruit production had begun. However, the level escalated rapidly between pre-production and first/early fruit production, then declined over the remainder of the production cycle. In contrast ammonium-N was at its highest level pre-production and was also most variable at this stage. It then declined steadily over the production period and sample variation narrowed. It will be interesting to see whether nitrogen trends in this current season are similar.

Yields

Californian optimum nutrient ranges for Albion were established by evaluating nutrient levels in over 100 crops (about 50/season for 2 seasons) and correlating these with yield. A mathematical procedure evaluated nutrient ratios and differences in levels between high yielding crops (those which averaged about 50% greater yield than the low yielding crops) while intermediate yield were not used in the calculations.

While in general, all crops evaluated showed good fruit quality and no obvious production issues, reliable local yield data based on actual records has only been provided so far for about a third of the sites tested last season. More data hopefully forthcoming shortly will mean there is reliable data for about half the sites.

Total seasonal yields for Victorian crops with reliable data shows yields between about 650g and 1120g picked per plant for 2013-2014. However, once plant spacing is taken into account and reported on a kg/m2 of bed basis (plant spacing, row spacing), picked yields were much closer (9.0-10.9 kg/m2 of bed) or 36,900-42,200 kg/ha (bed spacing, row spacing & number of rows/bed).

While only based on a small sample, this would appear to cover the true yield range fairly well, and indicates less variation than in California, despite Californian yields being much greater (45,000-70,000 pounds/acre = 50,400-78,500 kg/ha. The lower figure being an average of the "low yield" group and the higher figure the average for the "high yield" group in the reference study).

Again, while the sample group is small, there is some evidence to suggest growers able to maintain higher phosphorus and nitrogen levels, particularly later in the season, also managed to achieve higher yields.

Excellent grower records at one site show just how critical the summer period is in terms of lost production with 70% of seasonal yield falling in the Oct-Dec period, 23% in the Apr-Jun period and a meagre 7% occurring in the three months from Jan-Mar.

Individual growers participating in the survey can obtain copies of all the data collected from their own farms by contacting either Jason Hingston or Tim Kimpton (AHR).

Reference:

Hartz TK, Bolda M, Gaskell M, Fallon J, Sanchez M (2012) – "Establishing Nutrient Management Practices For High-yield Strawberry Production", California Strawberry Commission Annual Production Research Report 2011-2012, Plant Nutrition, 41-55.

Industry website updated

The VSIDC has recently completed a complete re-build of the industry's website, www.vicstrawberry.com.au . The re-build was completed to enable more documents and information to be uploaded that has relevance to your business.

As with the old website, there is a secure log-in section for Victorian grower access only. This area has information on chemical permits, market prices, the performance of new varieties from the breeding program, along with loads of other information. You will be sent log-in details in the near future, if you happen to lose them, or want them sooner please contact the IDO on 0408 416 538.

Information across the entire site is continually being updated and modified. If you notice something that does not make sense or is not working as it should let us know so we can have it fixed ASAP.

If there is anything that you would like to see on the website that is not currently there, please let one of the VSIDC members know and we'll see if it can be accommodated. It is your website when it comes down to it.

So please head across the www.vicstrawberry.com.au and have a look at the new website.

Strawberries Australia Inc update
"Major changes confront our industry"

Len O'Connor
Strawberries Australia Inc.
(SAI)

Strawberries Australia Incorporated (SAI) held its Annual General Meeting; its Normal 6 monthly SAI Meeting in Sydney and the Annual Levy Payers Meeting at Kemp's Creek NSW (western Sydney grower land) on 2 October this year. Sam Violi was re-elected unopposed for his 15th year as SAI's Chairman. Brian Taylor (NSW) was re-elected Deputy Chair and Nathan Roy was re-elected as the Treasurer.

The most recent Strawberry Financial budget and graphs and the Strawberry R&D Levies Information were tabled at these 3 meetings and showed a large increase in revenue. This information will be supplied to all of Australia's Commercial (levy paying) strawberry growers in the next few weeks in the form of an Annual Report and which will be distributed by either the State Industry Development Officers (Vic and QLD) or by the State Association Secretaries (NSW, S.A. TAS, and W.A.).

The latest season has seen another significant lift in runner numbers and subsequently levy income for 2013/14. The end of year levy income figure (30 June 2014) was $690,252 which is in excess of 20% above the original budgeted forecast/ estimate of March 2013. The levy income equates to 86,281,500 runners (and next year this should reach over 91 million plants).

Total estimated levy income for next year (2014/15) was expected to be $640,000 based on estimate of 80,000,000 runners. That estimate will be exceeded greatly and is a significant increase on the original forecast and the highest year to date figure for levy collection to August 2014. Based on previous years levy collection trends, the final full year figure could potentially be well in excess of $700,000. This income will be used for the payment of Strawberry Projects – but how that money is to be spent was the main worry confronting our industry.

The Horticulture Australia (HAL) Service Manager, Stuart Burgess explained to the various meetings that the HAL that we all knew for 14+ years has been abolished and a "New" HAL has been created called HORTICULTURE INNOVATION AUSTRALIA LIMITED (HIAL) which would be a grower owned organisation and - as best he could explain, most of the details of the new organisation are still being devised, and are awaiting the new Board's approval and implementation which will take some months. In the meantime ALL of Australia's Peak Industry Bodies – including SAI are in limbo land.

The current operational developments around the implementation of the new grower owned RDC for horticulture have been difficult and there have been many uncertain time for HAL in trying to get greater clarity around the future organisation, particularly given the time constraints imposed and the need for a new Board (which was only appointed on 6 October) to sign a new Statutory Funding Agreement (SFA).

HAL has made progress in developing a new organisation and has started to shape the structures that might serve the new company. The proposed new structure gives effect to the changing nature of the organisation and although there is still some way to go before they will be fully developed, they are now at a stage where they can be shared with the Members (the Peak Industry Bodies). The annoying point about all this change is that it happened so quickly and with virtually NO INPUT from the Owners of HAL (the PIB's) - who have been treated disgracefully by this government and Minister). How 30,000 growers, large and small will control and manage the new entity is completely unknown and the future of all PIB's is unknown.

The name of the new entity will be Horticulture Innovation Australia Ltd (HIAL) and a new Model has been actioned by HAL/ HIAL for the grower owned entity that incorporates two R&D investment pools – one for industry specific levy funds (Pool 1), and the other for strategic co-investment that will comprise a series of individual investment funds based around key medium to long term R&D programs (Pool 2).

Confusing – it sure is.

This model will effectively preserve the integrity of industry specific levy programs and government co-funding for these up to the GVP cap for each industry. This includes industry programs that are established under an industry wide and recognised voluntary levy mechanism. (previously known as VC's)

Under the new model, the old concept and terminology of VCs will no longer exist.

Instead, these will be replaced by the concept of strategic co-investment funds with contributions (from industry, government, commercial and academia) will be eligible for Commonwealth co-contribution when they are invested in nominated strategic funds found in Pool 2.

It is anticipated that strategic advisory/ guidance mechanisms will exist at all levels of investment and reflect the nature of the investment program. For example, the advisory mechanisms for individual levy R&D programs in Pool 1 would appropriately include a cross section of relevant industry stakeholders, including grower representative bodies, to advise on matters such as priorities, communications, investment strategies etc.

On the other hand, the Pool 2 strategic co-investment funds might more fittingly be guided by an expert steering panel relevant to the subject matter of the fund.

The new subsidiary company (with all current financial and other assets, liabilities and staff transferred from HAL to HIAL) has been established and reasonable progress has been made on drafting a new constitution for consideration by the government and the new Board which was announced on 6 October.
The new Board has five nominees from the old HAL, with Selwyn Snell remaining as the Chairman and four nominees (growers) nominated by the Minister, making up a Board of nine.
The new Statutory Funding Agreement (SFA) is to be signed on 3 November and it is expected that the Minister will declare the new company as the recipient of levy funds under the Horticulture Marketing

and Research and Development Services Act 2000 on that day.
As part of becoming a grower owned organisation, HIAL will be moving as quickly as possible to establish a membership register that will comprise growers and other parties that participate in Australia's horticulture sector.

The establishment of a member register is an important next step in developing a mechanism by which these members can (if eligible) activate their voting rights.

To assist with establishing the register, HIAL will be seeking to work with grower and industry representative bodies (formerly known as Peak Industry Bodies, but which are no longer recognised under the new structure) to identify potential members and to encourage them to register with the new grower owned organisation. You as growers will have to supply all your details to get the correct number of votes (still to be advised how this will operate).

It is anticipated that this process will commence early November following the signing of the new SFA.

In addition to developing a grower register, HAL/HIAL has also been considering possibilities for a new grower consultation model involving broad based regional consultation programs that would be held across all key growing areas in all States and Territories on a regular basis.

It is proposed that forums in this program would provide the opportunity for grower levy payer consultation and feedback, as well as an opportunity to showcase applied research relevant to a regional/industry audience.

The current transformational program will make up to $1 million in funding available annually over five years for co-investment and further leveraging with either domestic or international research agencies or institutes that can demonstrate novel approaches to transformational research associated with reducing the labour component of production and post harvest activities.

Additionally it is anticipated that the new Board will wish to accelerate the establishment of further funds in the strategic co-investment program of Pool 2 (assuming that SIT Plus/Fruit Fly is already an established fund). HIAL are also therefore seeking proposals in the areas of:

- pollination and bee health,
- robotics,
- orchard improvement/productivity,
- market access/trade,
- protected cropping,
- national breeding programs, and
- industry leadership and education.

which HIAL refer to as "the seven pillars".

How the new entity treats State Associations and State Levies (when they apply for co-investment funds (such as the VSIDC making a VC for the IDO – are matters to be devised and discussed over the coming days/weeks/months.

As your CEO of SAI, I am completely weighed down with red tape and new principals to learn and implement over the next 12 months – if in truth – SAI can last that long – due to lack of recognition and funds. I will keep you all informed as progress and changes occur.

Len O'Connor.

Record your ag-chemical use

In Victoria, it's a legal requirement for agricultural chemical users to make and keep prescribed chemical use records.

Some chemical users mistakenly believe they only need to keep records of certain chemicals used on their crops, such as fungicides and insecticides. Records are, in fact, required for all agricultural chemicals used.

Keeping robust chemical records captures valuable data that can be used to assist you in your business. For example, they can be useful when evaluating if a product has worked effectively on your property. They can also be used to demonstrate that due care was taken at the time of spraying, which may prove valuable if allegations of spray drift are made.

It is compulsory that you record the details specified within Table 1 within 48 hours of using an agricultural chemical product, and keep these records for two years from the date of use.

Details required to be recorded
Full product trade name *(eg. Ozcrop Captan 900WG, CropCare Captan WG)*
Date the product was used *
Application rate of product
Crop/commodity treated *(e.g. pasture, apples)* or the situation in which the product was applied *(e.g. roadway, channel spraying)*
Extent of use *(the area of land treated, or he volume of water treated, or the volume of stored commodity treated, or the weight of the commodity treated)**
Specific location where the product was used *(e.g. paddock name)*
Name and address of the applicator/ supervisor
Name and address of the person for whom the application was carried out
Wind speed and direction at the time of application**
If using products that are poison baits for pest animal control (e.g. 4 080 or Pindone baits), two additional records are required: • Date the baiting period began*** • Date the baiting period ended***

** not required when using poison baits for pest animal control*
*** only required where a product is being sprayed outdoors (excludes hand-held devices e.g. knapsacks)*
**** only required when using poison baits for pest animal control.*

You can keep these records in a format that suits your individual business (e.g. hand written, computer generated, included in your quality assurance program records). The only requirements are that they contain all the required information, are clear, accurate and must be readily available to a DEPI authorised officer upon request.

For more information on agricultural chemical record keeping and downloadable record keeping templates, visit the DEPI Chemical Use website or contact the Industry Development Officer.

Closing the gender gap and superannuation

Some women may have to work until the age of 85 to retire with the same amount as men when they retire at age 60. Sounds crazy doesn't it? According to the Westpac Women & Retirement Readiness Report released in December 2013 that is the reality some Australian women are facing today. Whilst working until the age of 85 is not a realistic or desirable option for most of us, women do tend to live longer than men so it is essential for women to accumulate enough super to last throughout retirement.

Women also face unique challenges when it comes to retirement savings such as lower pay, time out of the workforce to raise children and running a single-parent household, thus making it challenging to build a reasonable amount of super through employer Super Guarantee (SG) contributions alone. Luckily there are some things you can do to boost your retirement savings so you're hopefully not caught short at retirement, or find yourself having to work until you're 85!

Make personal contributions
You can make contributions to your super out of your own pocket. These are known as 'after-tax' or 'non-concessional' contributions. Plus depending on your income, you may also be eligible for a government co-contribution to your fund. Salary sacrificing can be a tax-friendly way to grow your super, so ask your employer to pay part of your pre-tax wage or salary into your super fund. The government limits the amount of after-tax and pre-tax contributions you can make so check with the ATO for the latest limits.

Track down and consolidate your super
If you have more than one super account this could be costing you extra in fees each year. Speak to your super fund about how you can consolidate your accounts into one. If you've lost track of your super, you can use the ATO's online SuperSeeker tool to track down any lost super.

Get your partner to help you out
Ask your partner or spouse to make contributions on your behalf. He or she may be able to claim a tax offset on the contributions made to your fund.

Have an investment strategy
Choosing the right investment strategy for your age and tolerance to risk can be an important factor impacting on your super balance at retirement. You can speak with your super fund for more information about your investment choices and options.

PRIME SUPER
Part of your Community

Now incorporating hip
Health Industry Plan

Protect yourself with insurance
Make sure you have the right level of death, total and permanent disability and income protection insurance, in case one day you are unable to work because of illness or injury. Most super fund members will have a default level of insurance but in most cases this is nowhere near adequate.

Further details
Please speak to your local Prime Super Regional Manager for more information on how you can plan a healthy retirement.

- Victoria and Tasmania: Rod Stewart on 0428 558 158 or rstewart@primesuper.com.au.

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Improved Packing Shed Process Increases Strawberry Farm Profits

Gil Harkness
Department of State Development, Infrastructure and Planning, QLD

The Queensland Government's Department of State Development Infrastructure and Planning (DSDIP) and Department of Agriculture, Fisheries and Forestry (DAFF) have been working to evaluate precision agriculture methodologies and technologies and their application within the strawberry industry.

DAFF activities in this field are predominantly concerned with improving soil and plant health while complimentary work has recently been undertaken by a DSDIP process specialist with a range of Queensland industries to introduce business best practice and improve competitiveness. This work has investigated improvements to packing systems.

Analysis of efficiencies in strawberry pack-houses was recently considered as part of a project aimed at identifying whether there were opportunities for improvement in this area, particularly related to the accuracy of packed punnet weights.

The process flow at Coolhaven Farm's Beerwah pack-house consisted of two packing lines each with twelve packing stations and an end of line quality inspector (checking for: damage, ripeness, grade of berries and spot checks for weight). Packers used digital scales to pack punnets of fruit between 288g and 311g limits. Team leaders and management regularly briefed and reminded packers to pack within the designated limits. These two packing lines terminated in a carousel where personnel packed eighteen (250g) punnets into trays. Trays were then moved via gravity conveyor into a cold store prior to being road freighted in chilled containers to market. As the two packing lines were effectively identical, sample punnets were taken from the carousel for analysis.

Initial evaluation of the process revealed that a number of punnets were being packed with fruit above their upper limit, resulting in the need for more in-depth analysis.

Results
Using a sample size of 344 punnets (n=344), packed weights were recorded

and plotted on a distribution graph shown in Fig. 1. Note how the mean weight □ (309.6g) is only ~2g below the upper limit and how the spread is much greater than that required by the upper and lower limits. It was found 38% of the punnets packed had some degree of over-packing. A follow up sample was taken ~4 weeks later confirming the initial sample results.

Analysis of these results showed that the current processes in place (verbal reinforcement of weight limits, 'numeric response only' digital scales and end of line quality inspection) was not statistically capable of meeting the packing specifications, suggesting a need to reduce the spread of packed weights and better align the measured mean weight with the required mean weight.

Corrective action

The use of LOW, OK, HIGH scales (AND: SJ-30KWP) was identified as an option to improve packing efficiency. These scales are set with upper and lower specification limits and have the option to set warning limits. When a packed punnet weighs between the upper and lower warning limits the scales are illuminated by a green LED. If the weight reads between the warning limit and the upper or lower specification limit the scales register with an amber LED, and if the weight reads outside the upper or lower specification limits a red LED is displayed and in this way packers are provided with a second reference check. (Fig 3.)

Statistical models were run to look at potential weight/cost savings based on a reduced spread and re-centred mean packing weight. The results generated identified significant savings, resulting in a recommendation to adopt the use of the scales into the pack-house process. Coolhaven Farms purchased 30 sets of these scales in July 2014, immediately integrating them into their packing process. Figure 2 shows how the spread of results has reduced and how the mean has moved towards the lower specification limit. When factored across Coolhaven Farms' yield profile, use of the scales prevents a 5.5% total crop weight giveaway.

Conclusions

- Written and verbal reinforcement of upper and lower pack weight specification levels to pack-house employees has little effect on packing weight accuracy.
- Although the implementation of LOW, OK, HIGH scales doesn't prevent non-conforming packed weights, it does significantly reduce the likelihood of their occurrence.
- For best results, the scales should be combined with an automated end-of-line check weigher.
- If an automated end-of-line check weigher were used without prior implementation of LOW, OK, HIGH scales it is envisaged the reject rate at the check weigher would be excessive, resulting in a substantial amount of rework.
- Use of these scales had no adverse effect on the capacity of packers meeting their daily requirements.
- At Coolhaven Farms, the payback period from investing in the LOW, OK, HIGH scales was one week.
- Over-packing has a direct adverse impact on bottom-line profitability.

Acknowledgements and thanks

Terence and Nathan Roy, Coolhaven Farms, Beerwah, Queensland.
Ian Layden: DAFF, Queensland Government.

Figure 3. Examples of Pass and Fail scale outputs (limits set between 288g to 308g.

Figure 1. Distribution graph for sample punnet weights (9/7/13)

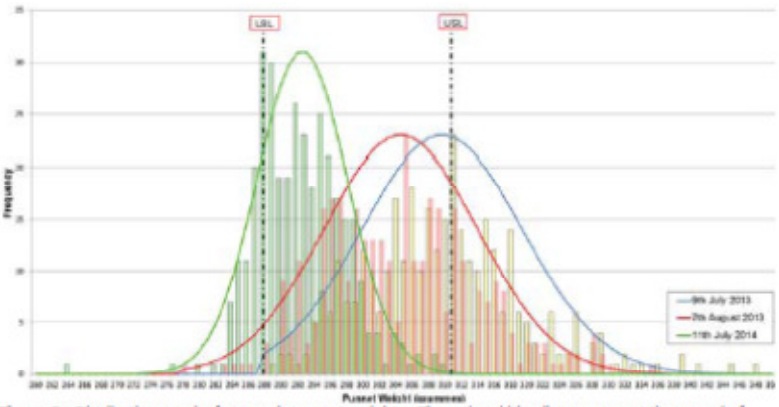

Figure 2. Distribution graphs for sample punnet weights. The red and blue lines represent the spread of packed weights prior to implementation of the new scales. The green line represents the spread of packed weights after the implementation of the new scales.

Industry Development Project review

The Industry Development Project (IDP) is a wide-ranging project/program; it enables many activities such as communications, research planning, and industry representation to occur. In addition to these activities the IDP also allows the VSIDC to employ an Industry Development Officer to undertake such tasks. In mid-2014 the VSIDC undertook a review of the IDP to ensure the project remained focused on the needs of the industry.

The review was conducted by surveying the grower community by informal discussions as well as online and in person feedback surveys. Feedback was sought on communication, project purpose, and key activities amongst others. In all 35 percent of the industry choose to respond.

Results

Purpose and key activities of the VSIDC

The results for the purpose of the VSIDC and the IDP are presented in Figure 1. Figure 1 shows that there are some areas where to industry needs continued education on what the IDP can "get involved with". For example, due to the projects funding model, the IDP project cannot lobby government to achieve outcomes for growers or provide advice (agronomic or other) to growers.

Communication

Overwhelmingly the most preferred method of communication was via email (Figure 2), which was surprising given the low number of email addresses with are currently on file. These results were confirmed by the fact that over 35 percent of respondents wanted an electronic copy of the newsletter in addition to the regular hard-copy.

In the past one of the major communication methods was via printed newsletter; however, when respondents were asked "How would they like to receive updates from the VSIDC" over 65 percent preferred short fortnightly email updates and 6 monthly printed newsletters as opposed to quarterly newsletters (Figure 3).

Website use

The website (www.vicstrawberry.com.au) is used by over 60 percent of those who completed the surveys. However, the frequency of visits is quite low with very few growers accessing information with the growers-only portal. Figure 4, shows the data and/or information that growers have requested is on the website. The only one that is currently not available is the weekly evaluation data, making this available is currently being investigated.

Outcomes

- Activities and purpose not change required
- Primary mode of communication changed to email and sms
- Communication type and frequency changed to short fortnightly email updates and 6 monthly printed newsletters
- Six monthly newsletters will be supplied as printed and electronic formats
- Weekly evaluation data is to be added to website portal for growers.

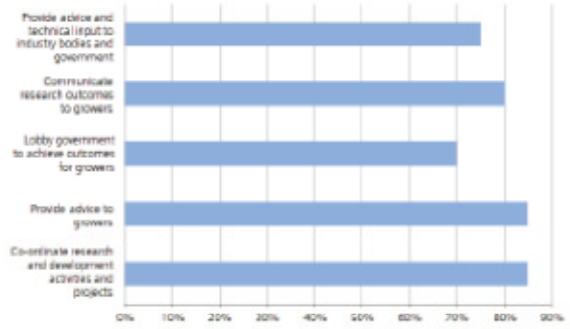

Figure 1. Purpose of the VSIDC and Industry Development Project.

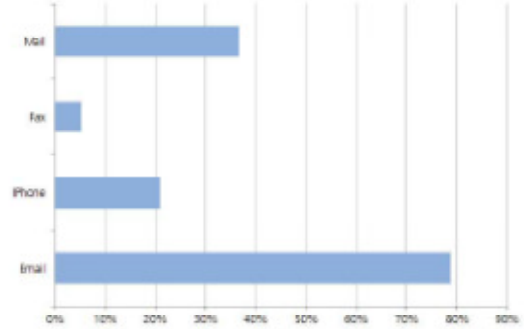

Figure 2. Preferred communication method

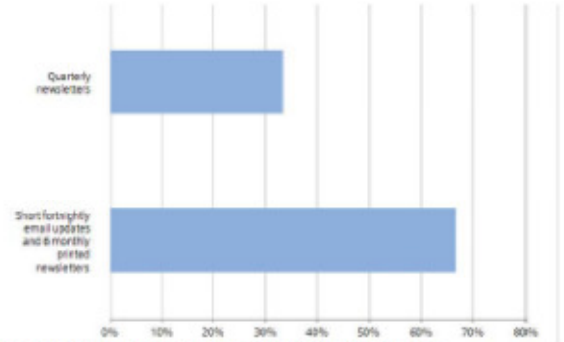

Figure 3. Preferred communication update frequency and type

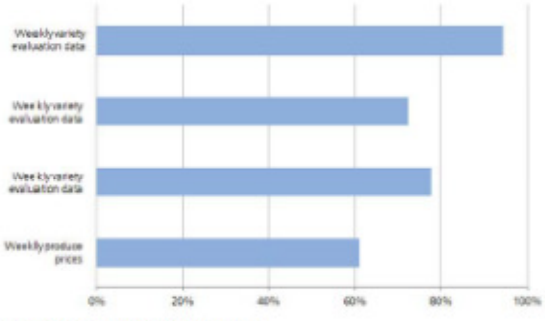

Figure 3. User desired website content.

Improving the control of grey mould and stem-end rot in strawberry plants

Chris Menzel, Apollo Gomez & Lindsay Smith
Department of Agriculture, Fisheries and Forestry

Fruit diseases cause losses worth millions of dollars each year to the strawberry industry across Australia. These diseases are mainly caused by the grey mould, powdery mildew, black spot and stem-end rot fungi. We are assessing the effectiveness of a range of chemicals to control fruit diseases in strawberry fields on the Sunshine Coast. Both standard fungicides and biological agents are being evaluated over three years in experiments at Maroochy Research Station. This work is being funded by the Queensland Strawberry Growers' Association and Horticulture Australia Limited (HAL).

An experiment was set up in April this year to screen different chemicals for their effect on controlling plant and fruit diseases affecting strawberry fields on the Sunshine Coast. The range of different treatments evaluated included the standard programs based on captan and thiram, with and without the products iprodione, fenhexamid, penthiopyrad, and cyprodinil + fludioxonil (registered), and chlorothalonil, guazatine, *Bacillus subtilis*, *Bacillus amyloliquefaciens*, and a plant extract (see Table 1). Information was collected on fruit yield, and the losses due to the various diseases. Recommendations will be provided to industry on the best strategies to control fruit diseases and methods to reduce the risk of the various fungi becoming resistant to chemicals. This article reports on the response of the plants from mid-June to early September. The first sprays were applied in May and the first fruit harvested in mid-June.

Figure 1. Grey mould on mature strawberries.

Thiram and captan are registered for use on strawberry plants in Australia. There are also registrations for iprodione (Rovral® and other products), fenhexamid (Teldor®), penthiopyrad (Fontelis®), and cyprodinil + fludioxonil (Switch®) for use on strawberry plants in Australia. None of the other chemicals used in these experiment are registered for their use on strawberry plants in Australia. The list of registered products and permits for strawberry production are available on the Australian Pesticide and Veterinary Medicine Authority (APVMA) website (http://www.apvma.gov.au).

The season was relatively dry in 2014. Total rainfall from mid-June to early September was 182 mm (long-term average is 280 mm). The plants were watered with over-head irrigation for about ten weeks from early July to early September to promote the development of fruit diseases during dry weather.

Both standard and soft chemicals were evaluated in 2014. The main diseases affecting the fruit were grey mould and stem-end rot, with lower incidences of the other diseases, including back spot. The standard chemicals gave good control or very good control compared with the incidence of disease in the untreated plots (see Table 1). Thiram alone, thiram/captan with systemic fungicides in wet weather, and chlorothalonil were best, followed by captan alone, thiram/captan, and guazatine.

Figure 2. Grey mould on strawberry stems and immature fruit.

There was a mixed response with the soft chemicals (see Table 1). *Bacillus subtilis* alone was intermediate, while *B. subtilis* applied with thiram/captan and systemic fungicides when needed during wet weather was good. *B. amyloliquefaciens* alone was intermediate and only slightly better when alternated with the standard protectants. The plant extract alone was ineffective, and intermediate when applied alternatively with thiram/captan. Only B. subtilis applied with thiram/captan and systemics was as effective as thiram/captan and systemics. This suggests that the response recorded in this mixed application was due to the standard chemicals. To summarize, the biological treatments applied alone were only intermediate or poor.

There was some evidence of phototoxicity with guazatine. The chemical reduced plant growth and caused the leaves to yellow. Chlorothalonil left residues on the plants, which were not readily washed off by rain or by the over-head irrigation.

Table 1. Effect of standard and soft chemicals on the incidence of grey mould and stem-end rot in 'Festival' strawberry plants grown at Nambour in 2014. Data are the means of four replicates per treatment from mid-June to early September. Systemic fungicides applied with the thiram/captan program during wet weather include iprodione, fenhexamide, cyprodonil + fludioxonil, and penthiopyrad

Treatment	Grey mould & stem-end rot (%)
Control (non-treated)	28
Thiram	5
Captan	9
Thiram alt. with captan	8
Thiram/captan applied with systemic fungicides when needed	3
Chlorothalonil	6
Guazatine	9
Bacillus subtilis	15
Bacillus subtilis applied with thiram/captan, and systemic fungicides when needed	4
F9110-1 (plant extract)	25
F9110-1 (plant extract) alt. with thiram/captan	11
Bacillus amyloliquefaciens	16
Bacillus amyloliquefaciens alt. with thiram/captan	10

Not all the chemicals mentioned in this report are currently registered for use on strawberry fields. Please check current registrations for strawberries before using any of the chemicals. The product label is the official authority and should be used to verify all data relating to the use of a chemical. Thiram currently has a seven-day with-holding period (WHP) for the use on strawberry plants in Australia, and work is being progressed to investigate the possibility of bringing this to two days. Efforts are also being made to change the label for captan to allow for more frequent applications during the production season.

VICTORIAN STRAWBERRY INDUSTRY DEVELOPMENT COMMITTEE

Victorian Strawberry Industry Development Committee
Jason Hingston (Industry Development Officer)
6a Union Road, Wandin North, 3139
Mobile: 0409 416 538
Email: jhingston@victstrawberry.com.au
Website: www.victstrawberry.com.au

HAL
horticulture Australia