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## IN THIS ISSUE:

- **Increasing productivity and extending seasonality in soil grown vegetables using capsicum as a candidate**

### Hort Innovation R&D project number: VG12103

VG12103 investigated techniques and growing options identified in the initial literature review that have the potential to enhance capsicum productivity for the Australian industry.

- **Enhancing best practice in vegetable production and business management in the Northern Territory**

### Hort Innovation R&D project number: VG12113

VG12113 engaged vegetable growers in the Northern Territory to develop a comprehensive vegetable grower database and activities to help guide industry best practice.





## Increasing productivity and extending seasonality in soil grown vegetables using capsicum as a candidate

### Facilitators:

Project VG12103 has been recently completed by project leaders David Carey and Mary Firrell of the Queensland Department of Agriculture and Fisheries and their project team.

### Introduction

Australian capsicum production is concentrated in Queensland, accounting for around 80 per cent of national value according to publically available statistics.

The latest Queensland Government AGTrends Update (April 2015) reported that the value of capsicums and chilli grown in Queensland was \$153 million.

Capsicum and chilli are grown year-round, with production in the state centred in the Bowen and Bundaberg regions in the winter and the Lockyer Valley and Stanthorpe regions in the summer.

With production, crop establishment and harvesting costs high and increasing, and a market demand for high-quality produce, specialist growers are being forced to seek out efficiencies and productivity gains.

### About the project

This project evaluated two new capsicum varieties (SV6947 and SV9699), two older varieties (Green Giant and Yolo Wonder) and Plato, and a number of unique rootstock graft combinations using Warlock as the scion.

The commercial capsicum rootstock (Capsifort) was evaluated, along with four chilli lines (Caysan, Hungarian Hot Wax, Inferno and Tree Chilli), several new rootstocks (Kangaroo Apple and Wild Malay Eggplant) and a self-grafted warlock. Warlock (the standard line) was also compared to self-grafted warlock to determine the impact of grafting alone.



A formal literature review of plant material, production techniques and technological advances in capsicum and chilli was undertaken as a first step in determining the project work program.

Two long-term trial plantings were conducted at the DAF Gatton Research Facility over the course of the project, investigating the value of rootstocks, varieties, ratooning and shading.

One grafted cropping trial was established at the DAF Bowen Research Facility and an observational planting of grafted material carried out in a protective cropping structure at Giru.

In all trials, harvested fruit was classified and graded according to the Woolworths capsicum product specification guidelines.

### Selected results

Project leader David Carey from the Queensland Department of Agriculture and Fisheries said the findings revealed that grafting did not alter plant stem diameter, flowering pattern or initial plant vigour during establishment.

“We also analysed the marketable yield from the four initial Gatton crops, which confirmed that graft material can, however, influence plant height and yield,” he said.

Marketable fruit yield was highest and statistically similar in Warlock, Warlock self-grafted and Warlock grafted to Capsifort.

“The new capsicum variety (SV6947) produced the highest total marketable yield, but this was only significantly higher than the chilli graft (Caysan) and the two older varieties,” Mr Carey said.

“SV6947 also displayed more uniform flowering and fruit position pattern within the plant structure, resulting in less deformed fruit caused by bunching.”

Mr Carey said the Caysan chilli and Inferno chilli rootstock both altered plant architecture, height and canopy density.

“The Tree Chilli and Inferno grafts produced less marketable fruit than Warlock, partly due to an increased number of deformed fruit,” he said.

Root health varied with graft treatment, root dry weight was measured in both trials and nematode scarring differences observed in trial number two at Gatton.

### Ratooning

Both long-term Gatton trials were ratooned several times.

“In the first trial this involved hand-pruning all plants back to the second node above the main plant fork, approximately 10cm above ground level,” Mr Carey explained.

“We then measured and monitored each treatment’s regrowth. Findings indicated that if capsicum plants are cut back to the second node above the main plant fork, the plant recovers well.”

The following two ratooning operations were done mechanically with a hedge-trimmer.

“This proved successful, with plants growing well,” he said.

“But ratoon timing is critical — the ratooning operation should be carried out in very late winter or early spring as the weather warms.”

## Sunburn

After a cheap retractable light shade cover was installed over planting two at Gatton, a significant decrease in the incidence of sunburnt fruit, from 34 per cent to four per cent of marketable yield, was observed.

The protective net also increased humidity around the crop canopy under the protective net.

Fruit quality was greatly enhanced with blemish-free high lustre fruit produced in the field during a typical Gatton summer.

## Acknowledgements

This project has been funded by Horticulture Innovation Australia Limited using the National Vegetable Industry Levy with co-investment from the Queensland Department of Agriculture and Fisheries and funds from the Australian Government.

### THE BOTTOM LINE: VG12103

- Two new varieties were identified with improved fruiting characteristics.
- The chilli rootstock identified has the potential to reduce nematode damage to capsicum crop roots.
- The use of temporary shade structures in hot dry conditions has the potential to improve the yield and enhance the quality of marketable capsicum fruit in the Lockyer Valley and potentially other capsicum growing areas in Queensland.
- Automatic yield assessment and harvesting operations may benefit from the more regulated light conditions and temperatures under a retractable crop net.



## Enhancing best practice in vegetable production and business management in the Northern Territory

### Facilitators:

Project VG12113 has recently been completed by project leader Greg Owens from NT Farmers Association, with the assistance of a steering committee of growers and industry representatives.

### Introduction

The Northern Territory is one of Australia's youngest regions for horticulture and vegetable production, with about 95 per cent of growers from South East Asia.

The total industry is worth approximately \$25 million (ABS Survey, 2009), of which 90 per cent comprises Asian vegetables.

Recent research has identified gaps in vegetable production best knowledge and implementation in the Northern Territory in the areas of pest and disease management, IPM strategies for the tropics, irrigation monitoring and scheduling, and supply chain management.

There is also a need for significant support and improved access to the latest research and development (R&D) in the area.

### About the project

This project was designed to identify vegetable growers in the Northern Territory and build relationships with all commercial vegetable growers of the Top End who were predominately Vietnamese and Cambodian.

Led by Greg Owens from NT Farmers Association, the project aimed to engage these growers by providing a dedicated engagement officer to be a stable and trusted point of contact on



best practice farming and business practice.

"While these groups have managed to get by for some time with fairly basic growing practices, they owe their survival to the internal community strength and the support of re-sellers and their market agents," he said.

"This project offered an alternative engagement that looked at growing their capacity - and profitability - as vegetable growers and taking advantage of the available best practices and the new R&D results."

The three-year project updated and consolidated existing vegetable grower databases to reveal 153 active Northern Territory vegetable growers over that period.

"Once we surveyed the current industry practices and identified the gaps, we could design and deliver activities that would build capacity for growers to work towards best practice," Mr Owens explained.



“The key was targeting industry leaders in small regional areas and the people these growers went to for advice.

“We held a number of industry meetings and grower seminars, and worked closely with groups to stage on-farm events on effective spray technology, pests and diseases, and on-farm biosecurity planning.”

## Key issues

Mr Owens said the most significant outcome of the project was the increase in engagement on what was a disengaged sector.

“The initial engagement of growers was key to the ongoing success of this project,” he said.

“Once they saw how to use the new technology and recognised the benefits for improving the effectiveness of their systems they were keen to participate.”

Midway through the project, the Northern Territory vegetable and melon industries were impacted severely with the identification of Cucumber green mottle mosaic virus (CGMMV) in melon crops in Katherine and early 2015 in cucurbit vegetable and melon crops in Darwin.

“The project started with a wide suite of ‘best practice’ priorities, but that was changed dramatically to farm biosecurity when the virus outbreak occurred,” he said.

“The CGMMV incursion put all the NT commercial cucurbit producers under threat. Large watermelon farms in Katherine and Darwin were completely shut down and the interstate market access was severely restricted.”

Mr Owens said the project officer was critical for communicating with growers.

The project officer worked extensively with the affected growers and their neighbours to contain the spread of the virus, implement best on-farm biosecurity practices and keep the industry aware of the threats and how to mitigate them.

“This engagement became a matter of economic survival for individual growers and the industry as a whole,” he said.

“We planned and facilitated regular meetings with the farming community to update growers on the current situation and regulations, but more importantly, what they could do on-farm to protect their businesses.”

This approach was very successful as the infection was held to the original four infected vegetable farms even though there were other cucurbit farms within metres of these farms.

These practices evolved into the on-farm CGMMV biosecurity plans that have now been accepted as the management tool of the disease for interstate market access in Australia.

## Next steps

Mr Owens said the project had achieved its engagement goals, with the next project (VG15044) set to build on this engagement to develop best practices in other areas of farm management.

“Building these strong relationships makes the whole community much more resilient and profitable,” he said.

## THE BOTTOM LINE: VG12113

- The value of building relationships with growers was clearly demonstrated through working with quarantine to manage the infected farms and to support all NT cucurbit vegetable growers to develop on-farm plans to protect their farms.
- The result has been industry-wide practice change.

## Acknowledgements

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### Photo credits:

VG12103: DAF Qld.

VG12113: NT Farmers Association.

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