

## Facilitators

Project VG13020 was undertaken by RM Consulting Group (RMCG).

## Major findings

Project VG13020 aimed to analyse the current level of food safety management in the vegetable industry, including the key risks.

In their report, the research team emphasised the critical importance of managing food safety, noting that food safety issues affect the public's perception of safety as much as they affect people's actual health. They also noted that media reports about foodborne illnesses can be sensationalist and misleading, and this combination of factors could cause significant damage to the vegetable industry, should an incident occur, and communication is not managed well.

Following extensive research, the team identified a number of key risk factors for the vegetable industry. First, they found that although all food businesses that supply food directly to the public must, by law, have a food safety program in place, not all vegetable growers are aware that they fall under this regulation.

Lead researcher Dr Doris Blaesing from RMCG confirmed this.

"Small scale operations may not have a food safety system, even though legally they should," she said. Costs and the complexity of food safety systems are often mentioned as reasons.

"This can put the entire industry at risk."

Next, the researchers found that the rules and regulations around food safety were inconsistent across the country's states and systems. This means that vegetable growers who operate across state borders must comply with different interpretations of the Food Standards Code.

Another important finding was that major retailers and processors required growers to be certified under their own food safety systems, meaning that many growers had to comply with up to six different systems. This puts a high demand on growers' costs and does not necessarily improve food safety outcomes.

The researchers highlighted that vegetables can become contaminated at any stage during the supply chain. Poor food safety management in any part of the chain may have repercussions for growers

if vegetables are implicated in a foodborne illness outbreak.

Finally, organic vegetable farming was found to have some potential associated risks.

"Organic producers often use organic soil amendments, including manures,"

Dr Blaesing said.

"This may pose a risk to the entire industry if the amendments have not been composted properly and used ahead of growing a high-risk crop that is eaten raw. Especially if the business has no food safety system in place."

## Recommendations

Based on the analysis, the project made recommendations on how to minimise the identified risks.

The first recommendation was that the different food safety certification systems be streamlined in terms of record keeping and auditing. Much of this has since been achieved.

"We recommended that these third-party certification schemes use the FAO/WHO (Food and Agriculture Organization of the United Nations/World Health Organization) hazard categorisation for fresh produce, to characterise risks and then align the food safety requirements to these risks," Dr Blaesing explained.

Secondly, the team advised that the critical limits used in food safety schemes in Australia be reconsidered to determine which limits should be newly established for Australian conditions.

"Not all aspects of food safety quality assurance systems are based on Australian R&D data," Dr Blaesing said.

The team advised that a review be undertaken of scientific research that has been completed under Australian conditions, and, if sufficient research does not exist, that it be undertaken.

A third recommendation was that

the industry foster awareness of food safety risks and legal requirements amongst growers and supply chain members. The team advised extension programs to assist members from different backgrounds who currently do not have suitable measures in place.

Additional recommendations were made to support the industry in its pursuit of providing safe food. These included educating the public, since, according to records, most food related illnesses are due to poor food handling in the home.

The team also advised investigating options to gather further information and data on practical and effective food safety quality assurance needs from and for vegetable producers.

## Background

As a result of this project, the VegPRO project (VG15028) last year produced a food safety training e-learning course for employees, which was well received by vegetable producers.

To deal with the issue of growers needing to comply with multiple food safety systems, HARPS has been introduced. HARPS is a retailer-led scheme designed to assist with compliance to food safety, legal and trade legislation for suppliers to the major grocery retailers in Australia. However, many producers who supply a range of markets still have to run more than one food safety system.

Since the project was completed, new guidelines have also been developed to better manage the risk from organic soil amendments.

The Australian vegetable industry has also invested in a Crisis Management Plan, overseen by AUSVEG, to manage industry crises and mitigate the reputational damage that a crisis can inflict on the broader industry, including as a result from issues with food safety.

## Acknowledgements

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## Further information

For more information, please contact Dr Doris Blaesing at [dorisb@rmcg.com.au](mailto:dorisb@rmcg.com.au).

The VegPRO e-learning course can be accessed here: [vegpro.talentlms.com/catalog/info/id:135](http://vegpro.talentlms.com/catalog/info/id:135)

For more information on HARPS, visit [harponline.com.au](http://harponline.com.au).

The final report for this project is available on InfoVeg. Readers can search 'VG13020' on the InfoVeg database: [ausveg.com.au/infoveg/infoveg-database](http://ausveg.com.au/infoveg/infoveg-database).

# VG14040 – Scoping study of a disorder that reduces shelf life and consumption of green beans

## Facilitators

Project VG14040 was undertaken by Agriculture Victoria Research.

## Major findings

Project VG14040 was a scoping study that aimed to investigate the causes of a post-harvest disorder of green beans that was affecting the aesthetic of the produce and reducing shelf life. The disorder is often referred to as 'rust'.

The research team undertook scoping activities, including a literature review, the collection of anecdotal evidence from growers, researchers and agronomists; a visit to a key production area in Lindenow, Victoria; and laboratory testing of samples of bean plants.

Following these activities, the team concluded that the 'rust' symptoms were consistent with the symptoms of chilling injury.

Descriptions of the symptoms include a general opaque discolouration of the entire bean, water soaked pitting of the surface, discrete rusty brown spots and rust-coloured diagonal lines.

Green beans are primarily fast-growing, immature plant tissue, and, once harvested, are highly perishable and are particularly sensitive to cold temperatures. The expected shelf life for beans is eight to 12 days when stored at 5-7.5 degrees Celsius (°C). Beans can be stored for two days at 1°C, four days at 2.5°C or eight to 10 days at 5°C before these chilling symptoms occur.

The symptoms were also found to be exacerbated when mature bean pods were exposed to chilling temperatures before harvest.

"Although the study took place outside the peak bean growing season, all the evidence pointed to a relatively well-

known problem known as 'chilling injury', which develops during the cool chain cycle after harvest," Project Leader Dr Dolf de Boer explained.

"Shelf life of green beans is 8-10 days when stored at 5°C. It was common for some growers to store their beans at 2°C before transport, which effectively reduced their shelf life. Add to this the time and temperature spent in the rest of the cool chain – transport, intermediate storage and retailer – and the problem is compounded.

"This problem is well-known by some growers and companies and they had taken steps to mitigate the problem, at least in the part of the supply chain under their control."

As part of the scoping study, the team collected samples for diagnosis of pathogens and pests that may have been associated with the disorder. They identified a bacterial disease in a crop in Victoria as *Pseudomonas syringae*.

Based on interviews with growers, they found that bacterial diseases are relatively common in bean production in Australia. They noted that a significant infection of bean pods will, in its own right, reduce the quality of bean pods; however, bacteria were not found to be the cause of the 'rust' symptoms.

"All the information that I was able to gather pointed to chilling injury as the main cause of the so called 'rust' symptoms," Dr de Boer said.

"We had tested the rust symptom in the lab and could not detect bacteria or fungi. This is a very well-known problem in the United States, for instance, which is a major producer of green beans."

## Recommendations

The team recommended that knowing the factors that affect bean quality, and

how best to manage these issues on-farm and in the supply chain, is essential to ensure optimum quality of beans at the point of sale.

It's important that beans are handled carefully, starting at harvest time, ensuring quick and thorough post-harvest cooling and storage at the optimum temperature, which must be continued throughout the supply chain. These measures were considered by the researchers to be the key to maintaining quality and lengthening shelf life of green beans.

The report noted that there is detailed, quality information on chilling injury and on bacterial diseases available online.

## Background

Growers from Lindenow in Victoria submitted the issue because they were concerned about a problem on their harvested green beans, which they referred to as 'rust'.

"The problem had been previously misdiagnosed as 'rust disease', believed to be caused by a pathogen, and efforts to mitigate the symptoms had failed," Dr de Boer said.

"The problem was apparently widespread in produce on supermarket shelves. Growers were concerned that if the problem was not resolved, consumers might switch to frozen product from New Zealand."

## Acknowledgements

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## Further information

For more information, please contact

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Further grower resources can be found at: [postharvest.ucdavis.edu/Commodity\\_Resources/Fact\\_Sheets/Datastores/Vegetables\\_English/?uid=3&ds=799](http://postharvest.ucdavis.edu/Commodity_Resources/Fact_Sheets/Datastores/Vegetables_English/?uid=3&ds=799) and [content.ces.ncsu.edu/postharvest-cooling-and-handling-of-green-beans-and-field-peas](http://content.ces.ncsu.edu/postharvest-cooling-and-handling-of-green-beans-and-field-peas).

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