Delivery partner resource

# Horticulture Impact Assessment Program

## PW17001 – Integrated pest management of nematodes in sweet potatoes – Case study

June 2025

Hort Innovation

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# PW17001 Integrated pest management of nematodes in sweet potatoes

## Eric Coleman

**Table 1 AV16007**

| | |
|---|---|
| Stakeholder | Eric Coleman |
| Business | Fairy Bower Farms |
| Location | Rockhampton |

### What was the project about?

From 2018 to 2023, this project aimed to improve soil health and manage plant-parasitic nematodes in the Australian sweetpotato industry. Through a combination of research, field trials, and extension activities – including Sweetpotato Soil Health Masterclasses and practical resources like handbooks and fact sheets – the project delivered valuable new knowledge and tools to growers.

At its core, the project addressed the significant economic impact of root-knot nematodes (RKN), which are widespread across Queensland and northern New South Wales. These pests cause stunting, root deformities, and substantial yield losses, costing the industry an estimated $20 million annually. With limited chemical options available at the outset, the project focused on integrated nematode management strategies and improving soil health as sustainable solutions.

Key research activities included:

- the first comprehensive nematode species survey on Australian sweetpotato farms, identifying a broader distribution of reniform nematode and documenting the incursion of guava root-knot nematode
- evaluation of cover crops, organic amendments, and reduced tillage for nematode suppression and improved soil function
- screening of 103 cover crop varieties and 24 sweetpotato cultivars for resistance to 2 RKN species, identifying several resistant or highly resistant options
- field trials examining herbicide efficacy for controlling volunteer plants and managing weed hosts of nematodes
- long-term systems trials that demonstrated links between organic matter addition, improved soil carbon levels, and reduced RKN populations.

Sweetpotato growers now have a greater understanding of the nematodes affecting their crops, more resistant plant options, and a suite of integrated management practices to enhance productivity and soil health across diverse growing conditions.

### Eric’s background in the sweetpotato industry

Eric is a sweetpotato grower who owns 2 farms, a 40 hectare one in Rockhampton and a 100-hectare farm 70km inland. Both holdings are irrigated using underground water and have been producing sweetpotatoes for 20 years. He has made contributions to agricultural research and is on the Strategic Investment Advisory Panel

of Hort Innovation's Sweetpotato Fund. In addition to his work in agricultural research, Eric has also provided employment opportunities to refugees. The operation of his farm relies on casual labour, and he has employed refugees from local employment agencies to provide labour.[1]

## Eric's involvement in the project

Eric was involved in the research and extension program for the project and provided access to survey sites for the project team and regularly provided input to the project team. Previously, Eric was a research and extension officer for Queensland Department of Primary Industry and was involved in the initial process of funding and providing input about industry issues. Throughout his years as a researcher and a grower, he has identified a divide between what research is needed in the industry and the research that gets done. There are a limited number of people who are at the intersection where they understand the application of the science behind the research.

## Why do you think the research is important to growers and the industry more broadly and how has it impacted your practice?

The presence of nematodes can reduce yields drastically – from around 70 tonnes per hectare down to just 20 tonnes. This kind of loss is devastating. Nematode management research is crucial for growers because it addresses challenges they face but cannot resolve on their own. Farmers rely heavily on research to guide improvements in crop health and yield, as they typically don't have the time, resources, or technical capacity to conduct this kind of investigation independently.

This project contributed valuable knowledge that will shape long-term thinking and practices across the industry, focusing on shifting mindsets rather than delivering immediate solutions. One of these was highlighting that nematodes are not a single, uniform threat but a complex issue involving different species that vary across regions and seasons. While this wasn't previously well understood, the research has clarified the need for region-specific approaches. This knowledge supports the development of more targeted and effective management strategies, setting the stage for long-term improvements in nematode control and overall crop health.

## What do you see as practical outcomes in the long term?

Farmers currently lack the ability to sample their fields, confirm the presence of nematodes, and confidently decide on appropriate chemical or other control measures. There's still uncertainty about how extensive chemical treatments might affect crop performance and long-term soil health.

The research has laid important groundwork for future practical outcomes. The project also identified key pathogenic nematode species and pointed to the potential of resistant sweetpotato and cover crop varieties. Building on the earlier PW17000 project, this study involved 5 years of site monitoring. During that period, a decrease in one nematode species and an increase in another, both unrelated, were observed, suggesting dynamic shifts in nematode populations over time. This kind of insight could eventually support the development of new tools and management strategies.

## What were the challenges with adopting the recommendations coming from this research?

Although organic matter can be highly effective in reducing the presence of nematodes, its adoption is challenging under current farming conditions. This is due to the intensification of agriculture and pressure from retailers, which results in cover crops needing to be incorporated into the farming system for much

[1] Stunzner, I., (2017), Refugee resettlement in regional Australia brings success but needs more incentives, ABC News, 30 May 2025, https://www.abc.net.au/news/2017-08-01/regions-offer-opportunities-for-refugees/8760412.

longer than currently is the case in order to maintain low nematode populations. With the cost of production having risen significantly, these practices become difficult for farmers to adopt while still maintaining a positive return on investment (ROI).

Previously, a single nematicide was widely relied upon, but it proved unstable and has since been phased out. Three alternative nematicides, currently registered for use in Australia, were trialled, but the duration of testing was too short to assess their consistency across varying seasonal and soil conditions. Nematicides are also costly, at around $2,000 per hectare. Although doing nothing may result in even greater losses, the lack of long-term efficacy data makes it difficult for growers to confidently adopt these treatments.

## Is there a part of the project that could have been improved?

Improving both the seasonality and duration of the project would improve the outcomes of the project. The 5-year duration with no guaranteed follow-on work limited the project team's ability to capture seasonal variations and long-term trends. Eric suggested that a 5-year project is a good start, but a further 5-year would have been more effective for monitoring nematode dynamics across different sites and conditions over multiple growing seasons. One of the most important outcomes of this work has been the monitoring of precise locations over multiple crops and gauging the effect of dry periods versus wet periods.