National Vegetable Extension Network

VegNET

TASMANIA

CASE STUDY

September 2024

Understanding the common factors driving yield in Tasmanian pea production

Introduction

Peas are an important rotational vegetable crop in Tasmania, providing a good source of organic nitrogen and a positive effect on soil health.

Tasmania grows approximately 99% of Australia's processing peas, and they are essential to crop rotations in different farming systems in Tasmania including vegetables, poppies, grain and pyrethrum.

With input costs rising and a comparatively slower increase in the sale price for peas, it is becoming a more marginal crop to grow. Therefore, processing company Simplot and its contracted growers in Tasmania wanted to look at crop production in more depth to ensure growers, agronomists and field officers were making the best crop production decisions.

VegNET Tasmania worked with the Soil Wealth ICP project, Simplot and processing pea growers to deliver extension and foster better crop management decision making by collecting, analysing, and benchmarking data from 12 pea crops in one production region for the 2023/24 season.

This case study explores the common factors driving yield by drawing comparisons between different farming production systems in Tasmania to inform pea growers on how they can improve returns per hectare.

Key messages

- Improving nutrient use efficiencies and building soil health can help vegetable growers overcome the rising costs of inputs, particularly nitrogen fertiliser. In addition, legume crops such as peas can provide an alternative source of nitrogen.
- In Tasmania, peas are an important – yet marginal – rotational crop. VegNET Tasmania worked with the Soil Wealth ICP project, Simplot and processing pea growers to collect benchmarking data from 12 pea crops in one production season to support better decision making on crop management.
- The results from three high performing pea crops provided insights into optimum pH levels and ideal application of fertiliser inputs, and a comprehensive benchmarking report was produced for each participating grower.

Image: Grower discussion group in the paddock

Hort Innovation Strategic levy investment | VEGETABLE FUND

This project has been funded by Hort Innovation using the vegetable research and development levy and funds from the Australian Government. For more information on the fund and strategic levy investment visit horticulture.com.au

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Participating farm site information

The project spanned across 12 sites in three weather regions: Epping Forest, Hagley and Cressy. The required data was collected at key points during the crop cycle as listed in Table 1.

Table 1: Data collected

Sowing	Establishment	In-season	Harvest
• Planned sowing date • Actual sowing date • Variety	• Established population per square metre (pl/m^2) • Establishment conditions • Drone photographs	• SILO (Scientific Information for Land Owners) climate data – precipitation and radiation • Normalised difference vegetation index (NDVI) • Fertiliser inputs • Irrigation rates and frequency • Spray inputs • Flowering sap tests	• Harvest date • Yield • TR (tenderness rating) reading • Value ($/ha)

Importance of nitrogen cycling

As Australia does not manufacture enough nitrogen to supply its domestic market, Australian farmers are faced with rising costs of nitrogen fertiliser.

While input costs have stabilised since the large cost increases seen during the COVID-19 pandemic, nitrogen fertilisers can still be a substantial expense in vegetable production. This cost means that it is important to improve nutrient use efficiencies to support sustainable cropping systems by improving soil health.

Crop residues contribute to soil mineral nitrogen through biological degradation and mineralisation by soil microbes into plant available forms, including nitrate and ammonia. In nitrogen cycling, the carbon to nitrogen ratio (C:N) is an important factor to consider.

A legume crop like peas is a good alternative source of nitrogen when inoculated with rhizobium, which has potential to add 160-200 kg/ha of nitrogen, providing a significant cost saving.

In a high crop rotation system (e.g. without long pasture or cover crop resting periods), a large amount of vegetable biomass in the crop residues provides a high nitrogen content and low C:N ratio, which results in higher mineralisation (the desirable C:N ratio is 24:1). A higher C:N ratio can result in nitrogen loss by leaching, runoff and as nitrous oxide. Immobilisation or "tie up" will occur when the net immobilisation exceeds 24:1.

Key findings

At the end of the season, three of the 12 participating growers produced a high performing pea crop. The project team analysed the data and found the following consistencies across the three high performing growers:

- Seeder type
- 20-40 per cent of sulphur in the fertiliser program
- Very little nitrogen applied in the program
- A calcium to magnesium (Ca:Mg) ratio of 4.3-4.5 which is desirable
- Plant counts at establishment being between 90-100.

Further investigation showed that, to maintain soil health, it is important to avoid the application of fertilisers containing high levels of chloride such as Muriate of Potash (MoP).

For heavily cropped soils, it is important to maintain optimum pH levels of 6-6.5 to ensure availability of macro- and micronutrients.

To improve soil structure, calcium can be applied as gypsum or calcium thiosulphate which in turn can raise soil pH levels.

In addition, critical elements for flowering, such as boron and calcium, can be applied as a foliar spray for rapid plant uptake.

Due to the small sample size and lack of repetition, it's not possible to make conclusive statements about management and crop performance.

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CASE STUDY
Tasmania

Improving grower productivity, profitability, preparedness and competitiveness

Overall, there was a positive grower response with a good level of interest among the 12 participating growers.

A comprehensive benchmarking report was developed for each participating grower which provided an in-depth crop and seasonal summary which included a set of benchmarks to show how each grower was positioned in the dataset.

"It was great to see so much in-depth information about [my] pea crop," one participating grower said.

On-farm extension activities and grower-led discussions encouraged sharing of knowledge to improve farm production practices. These in-paddock discussions with growers, agronomists and field staff covered topics including soil test interpretation, irrigation, soil microbiology and factors driving yield.

Ultimately, this project was a demonstration of the feasibility of running other crop benchmarking projects in the future.

Next steps

Future VegNET Tasmania projects will focus on extending the findings of this study to other regions and crops in the state.

In-paddock discussions will continue to support growers to improve soil health, as well as water and nutrient use efficiencies, reduce the reliance on expensive inputs and optimise yield.

Acknowledgments

Thank you to Simplot and AUSVEG for conducting the data collection.

The Soil Wealth ICP project is funded by Hort Innovation using the vegetable and melon research and development levies and contributions from the Australian Government.

Image: Networking is an important part of any extension activity.

Further information

Contact VegNET Tasmania Regional Development Officer Ossie Lang at ossiel@rmcg.com.au or 0430 380 414.

Soil Wealth ICP nutrient use efficiency in vegetable, potato and onion crops video: soilwealth.com.au/2024/07/nutrient-use-efficiency-tas/

Nitrogen use calculator – https://bit.ly/NUE_Calc