



Optimising nutrient management for improved productivity and fruit quality in cherries

This project will use an integrated approach to quantify plant nitrogen (N) demand and cycling through the soil-plant-atmosphere system of cherry crops to develop management strategies for increasing the quantity and quality of cherry yields whilst effectively mitigating loss of N to the environment.



Cherries are a significant deciduous tree crop grown in cool temperate climates of Australia. Nitrogen (N) is essential for cherry tree development, fruit production and quality. Presently, only limited data is available for Australian cherry growing regions on the relative importance of soil N processes, total N loss from current management practices and plant N requirements.

The research will use stable isotopes to quantify plant N demand, soil supply and current practice N use efficiency (NUE) to develop best management practices (BMP) for optimising N fertiliser use, including biological fertiliser. The project aims to maximise NUE in the Australian cherry industry to increase productivity, profitability and good environmental management.

The Research Questions

- What is the dynamic of N concentrations in the different parts of the tree crop plant-soil-atmosphere system across multiple seasons?
- What is the measured utilisation, availability and timing of N released from crop residues and soil organic matter (SOM) mineralisation?
- How do various biological fertiliser technologies perform under field conditions?



Photo: Michele Buntain UTAS

Methodology

The project activities will be primarily field research undertaken on two commercial farms in Tasmania.

1. ¹⁵N and plant residue field trial:

- Located at Lucaston, Huon Valley.
- Labelled fertiliser ¹⁵N will be used to quantify the inter-annual dynamics of N through the different parts of the cherry tree and soil profile including uptake, storage, and remobilisation.
- ¹⁵N will also be used to determine plant residue N contribution to mineralisation.
- Manual chambers will collect ¹⁵N-N₂O and CO₂ produced from the residues and will then be compared with a zero residue treatments to determine nitrification, denitrification and decomposition rates in the soil.



2. Fertigation field trial:

- Located on a relatively new commercial orchard at Jericho, Midlands region.
- Application of biological fertilisers will be used to optimise fruit quality outcomes in drip irrigated orchard systems.

Extending the outcomes

- The project will work directly through a steering committee comprised of commercial growers which will host annual project partner forums.
- Project activities and outcomes will be promoted and extended at events including regional and national conferences, industry workshops, seminars and farmer focused field days.
- Research findings will be communicated in scientific journals, industry magazines and agricultural media.

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