

Optimising the use of legumes for nitrogen supply to vegetable crops

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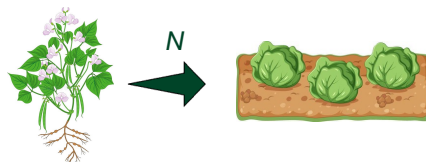
2024, NSW



Research Purpose

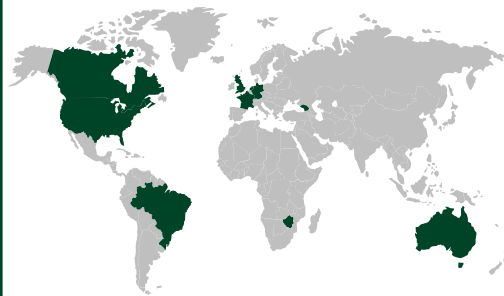
- Reliance on N-fertilisers
 - High **cost**
 - High **emissions**
- Consumer & regulatory pressure for **sustainability**
- **Legumes fix N** from the atmosphere through relationship with rhizobia = free N!
- **Challenge:** N availability from decomposing residues is driven by **temperature, moisture & biology**

Objective: match N supply from legumes, with N demand of vegetables



Mineralisation of legume residues by microbes converts organic nitrogen into **plant-available forms**, such as ammonium and nitrate

Map of Travels



Key Learnings

1. Know the basics

Maximise **biomass**
Maintain a **C:N ratio** <24:1



Inoculate seed with **rhizobia bacteria** at planting
Start with low **soil nitrate** <50kg N/ha
Maintain **soil pH** >5.5

Method of growing legumes:

2. Apply to unique farm context



Cover cropping



Companion cropping



Cash crops

Management of legumes:



Species choice



Timing of planting & termination



Method of termination: Incorporation, surface retention

3. Build a 'healthy system'



Reduce N losses

Adopt practices that build **healthy soils**

People drive success: mindset, learning, collaboration

Monitor & adjust for vegetable crop:



Measure to manage: Soil, plant



Consider vegetable crop N needs & adjust fertiliser application

Recommendations

- **Growers:** start small, get the basics right, trial & error, implement learnings each time
- **Researchers:** develop decision support tools for Australian context, trial legumes in applicable vegetable rotations
- **Industry:** invest in applied research, on-farm demonstrations & grower networks for peer-to-peer learning

Thank you to my sponsor

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Contact

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