Developmental Dynamics of Nodulation in Nordic Faba Beans

Implications for Biological Nitrogen Fixation (BNF)

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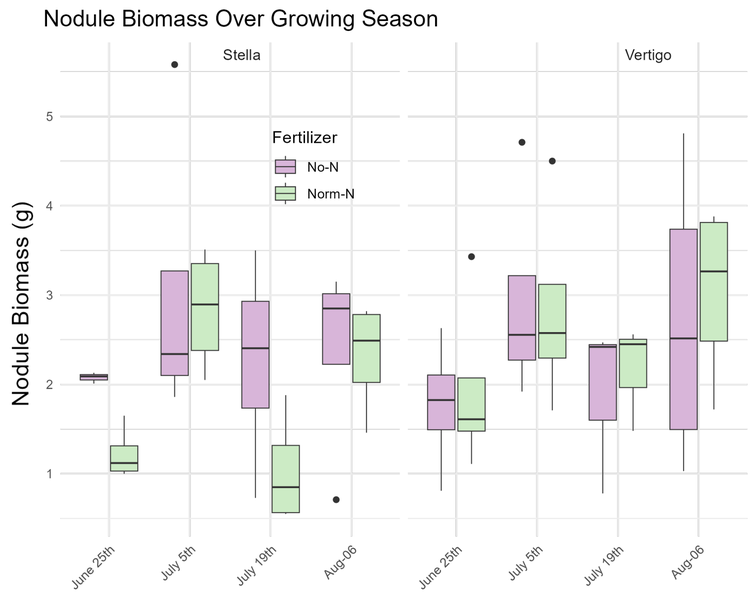
Overview

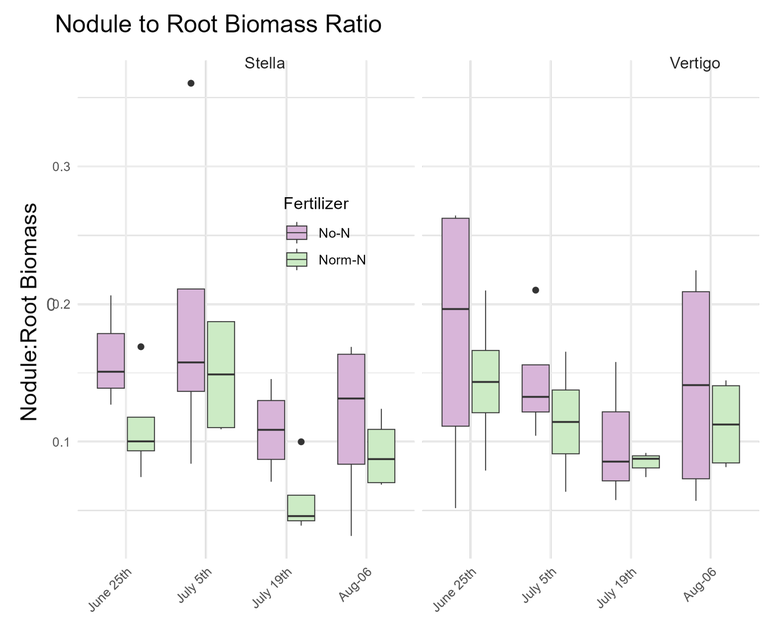
BNF in faba bean (*Vicia faba*) is essential for sustainable cropping

Sweden: short and cool growing seasons

Understanding cultivar-specific nodulation dynamics is key to optimising nitrogen (N) uptake and yield.

'Vertigo' July 19, 2024, Uppsala, SWEDEN





Hypotheses

Genetic differences between cultivars affect

- nodulation timing, intensity, and distribution,
- soil N levels,
- N efficiency, and grain yield

Nodulation

Initial results show distinct cultivar and treatment effects:

- 'Stella' initiated nodulation earlier under no-N,
- 'Vertigo' produced more nodule biomass later, especially with fertiliser.

These patterns suggest cultivar-specific mechanisms regulating symbiosis under varying N.

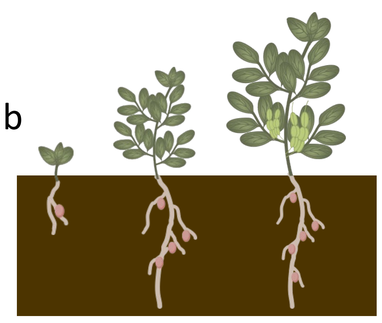
Method

Field trial with two N treatments:

11 treatment/split block with different cultivars and mixed/pure cultures

Root sampling

Phenotyping in the lab

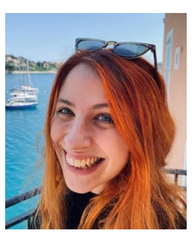


'Vertigo' root July 19, 2024, Uppsala, SWEDEN

Future Research

- Nitrogen use efficiency by investigating total and atmospheric N (BNF).
- Nutrient (P, K, Ca, Na, S) concentrations at different developmental stages.
- Additional field season with more cultivars ('Stella', 'Vertigo', 'Birgit', 'Sampo')

This will determine how cultivar and N management shape N dynamics and productivity in monoculture systems in different N fertilisation in a short growing season.



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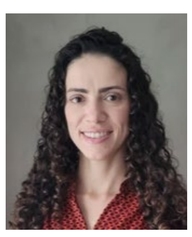

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