

Molecular mechanisms of microbe-enhanced plant performance under limited nitrogen

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Introduction & Methods

- Nitrogen fertiliser application causes environmental pollution (e.g. nitrate leaching into groundwater bodies)
- Plant growth promoting rhizobacteria (PGPR) can reduce application of mineral fertiliser
- Brachypodium distachyon* cultivated under two N levels:
 - Low N (1.6 mM NH₄NO₃)
 - High N (16 mM NH₄NO₃)
- Pseudomonas koreensis* (Pk) inoculation for 16 days
- Non-invasive shoot phenotyping
- Invasive harvests over 72 h (19 DAS, 20 DAS, 21 DAS)
 - Phenotyping: n = 5 / timepoint
 - Molecular analyses: n = 6 / timepoint

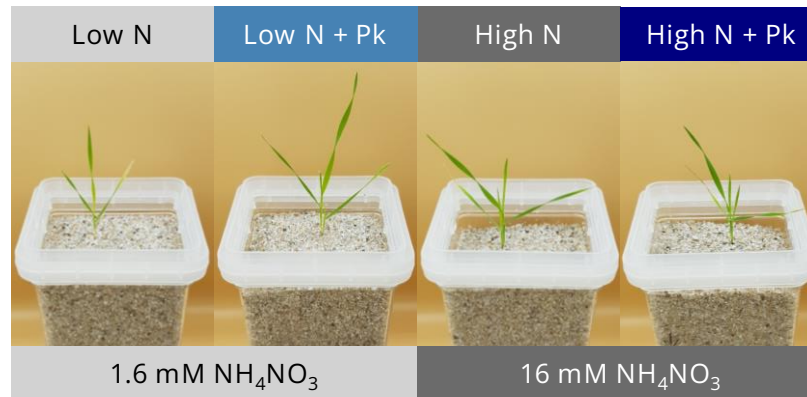
Outlook

The molecular plant-microbe interaction will be elucidated in this time-series approach via :

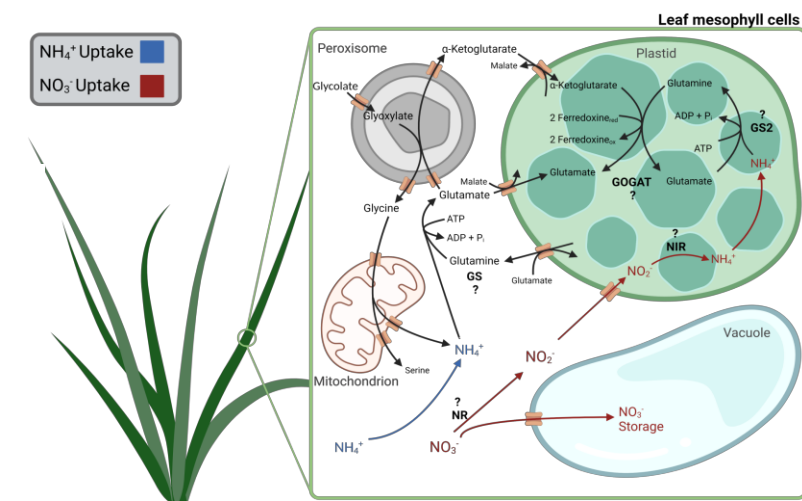
- Targeted qPCR
- Proteomics(microsomal enrichment)
- Lipidomics
- Elemental analysis (C & N content)
- ¹⁵N natural abundance (¹⁵NH₄⁺-¹⁵NO₃⁻)

Plant phenotype

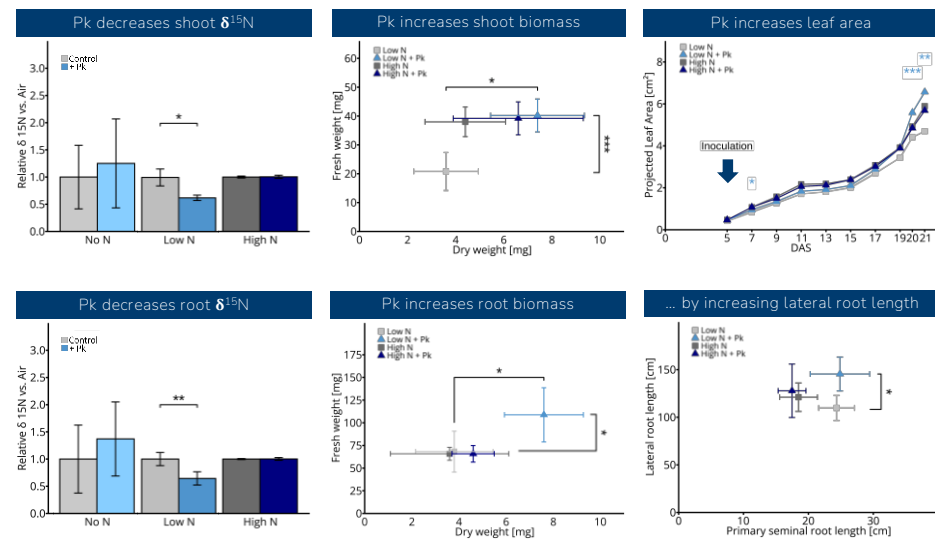
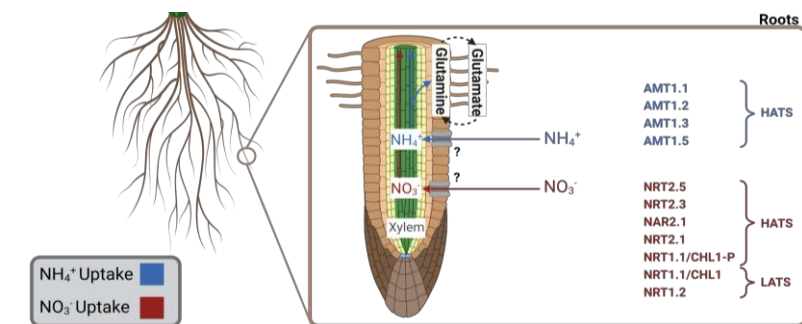
Brachypodium distachyon Bd21-3 21 DAS, n = 11



How does Pk alter protein abundance?



Altered abundance of N transporters?



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