Genotype-Specific Inhibition of *Nitrosospira multiformis* by Sorghum

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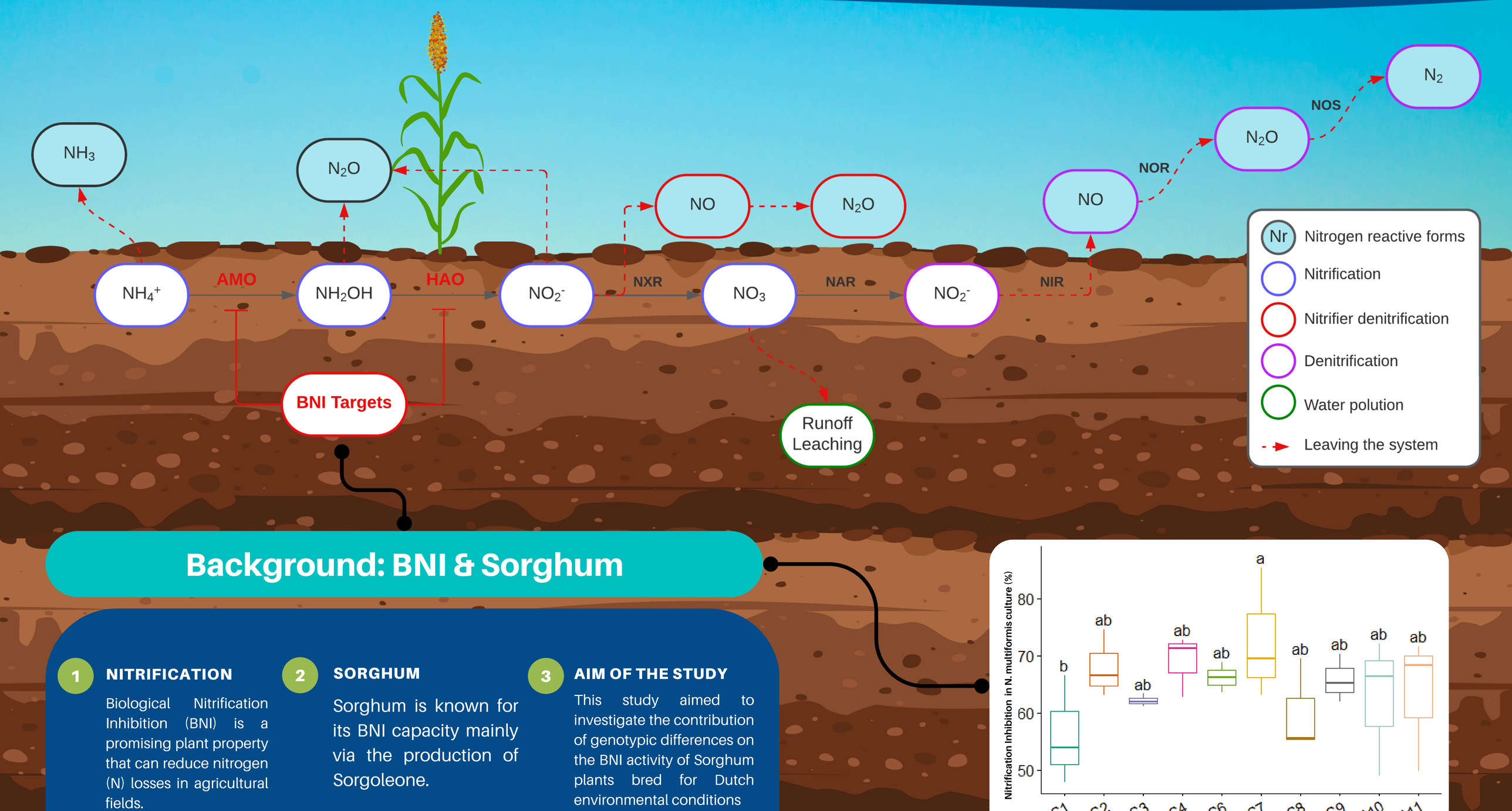

Background: BNI & Sorghum

1 NITRIFICATION

Biological Nitrification Inhibition (BNI) is a promising plant property that can reduce nitrogen (N) losses in agricultural fields.

2 SORGHUM

Sorghum is known for its BNI capacity mainly via the production of Sorgoleone.

3 AIM OF THE STUDY

This study aimed to investigate the contribution of genotypic differences on the BNI activity of Sorghum plants bred for Dutch environmental conditions

BNI plants are a sustainable alternative to synthetic inhibitors

Fig 1. Nitrification inhibition in N. multiformis cultures. Measured based on the quantification of nitrite accumulation in the media.

Genetic distance and metabolites

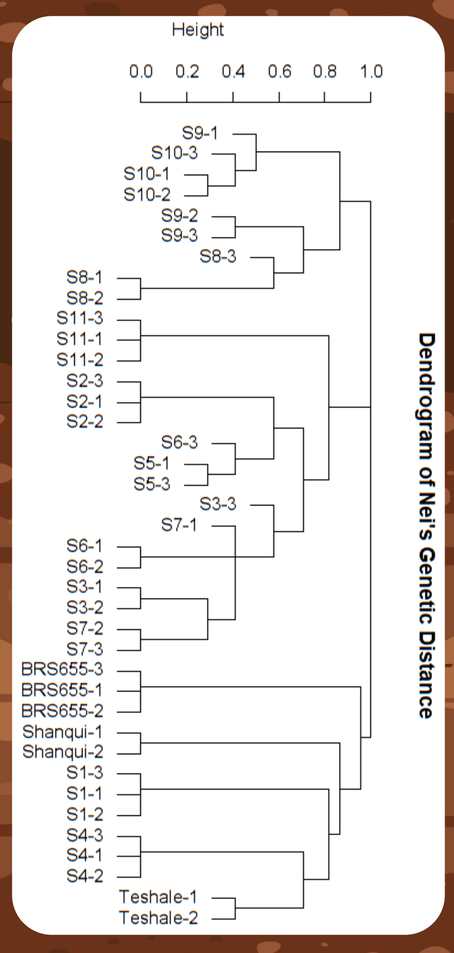

Fig 2. Genetic distance. Measured based on microsatellites.

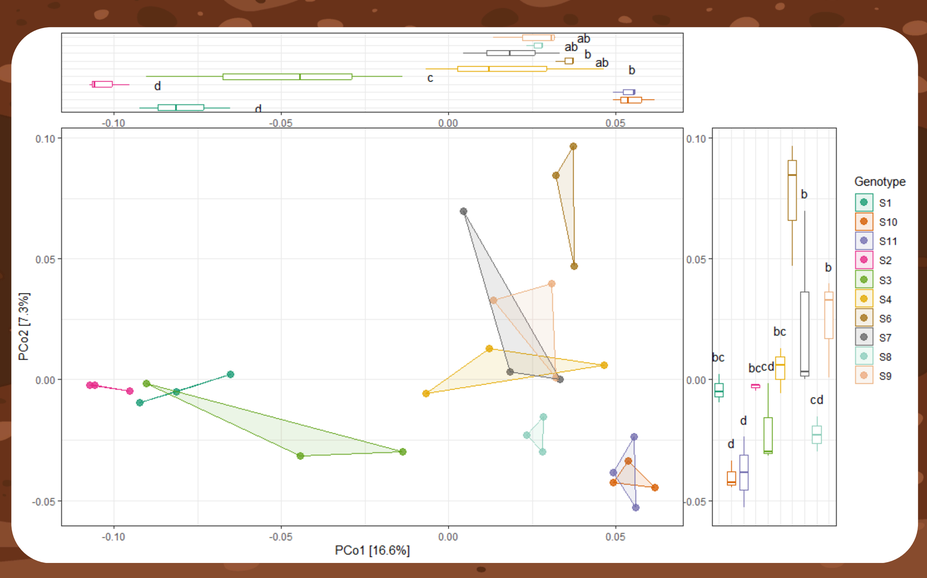

Fig 3. PCoA of the metabolome of Sorghum genotypes. Bray-Curtis distance was used to calculate the differences between genotypes. Letters in PCo1 and PCo2 are shown based on ANOVA.

Take home message

All 11 genotypes exhibit BNI activity, though the rate was genotype-dependent, with genetic distance not influencing the differences. Untargeted metabolomics was used to identify putative BNI compounds. These results demonstrate Sorghum's potential to reduce nitrogen losses, offering opportunities for breeding genotypes that contribute to more sustainable agricultural practices in the Netherlands.

Putative inhibitors

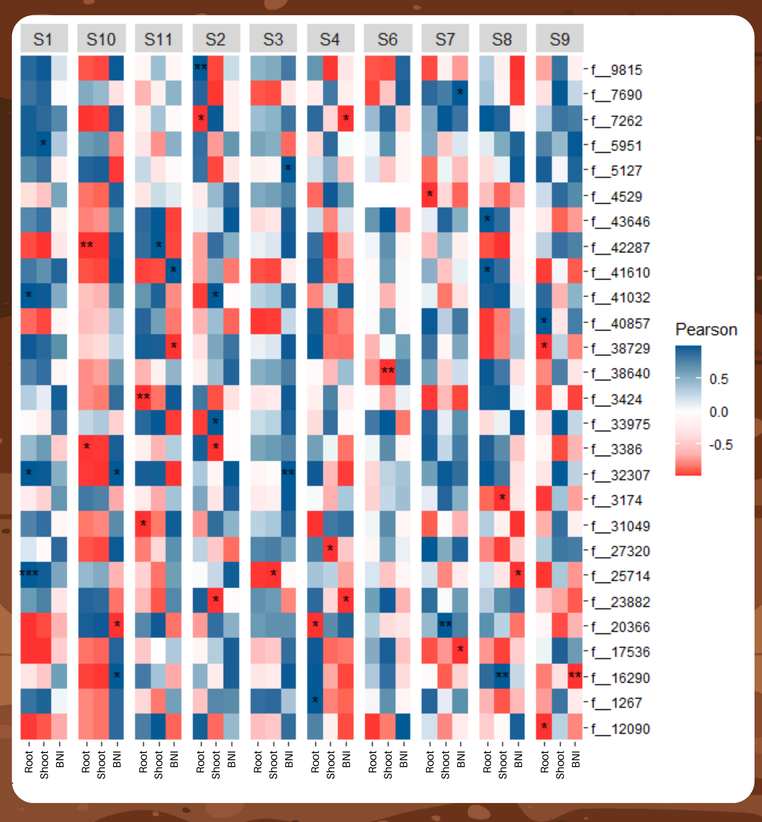

Fig 4. Correlation heatmap based on differentially abundant features and the BNI capacity. Differentially abundant features were selected based on a RandomForest analysis.

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