Genotypic variation in grain yield and grain protein content under zero nitrogen and high nitrogen application conditions in aerobic rice production

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Background & Research Question

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Conventional Flooded Rice Production

- Flooding with large water requirement
- High Cost
- Low water productivity

Transformation →

Aerobic Rice Production(AP)

- Non-Flooded, but well-watered
- High Water productivity
- Low cost
- Environmental benefits

- GY: Grain Yield
- GPC: Grain Protein Content

Objectives & Methodology

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❖Objectives :

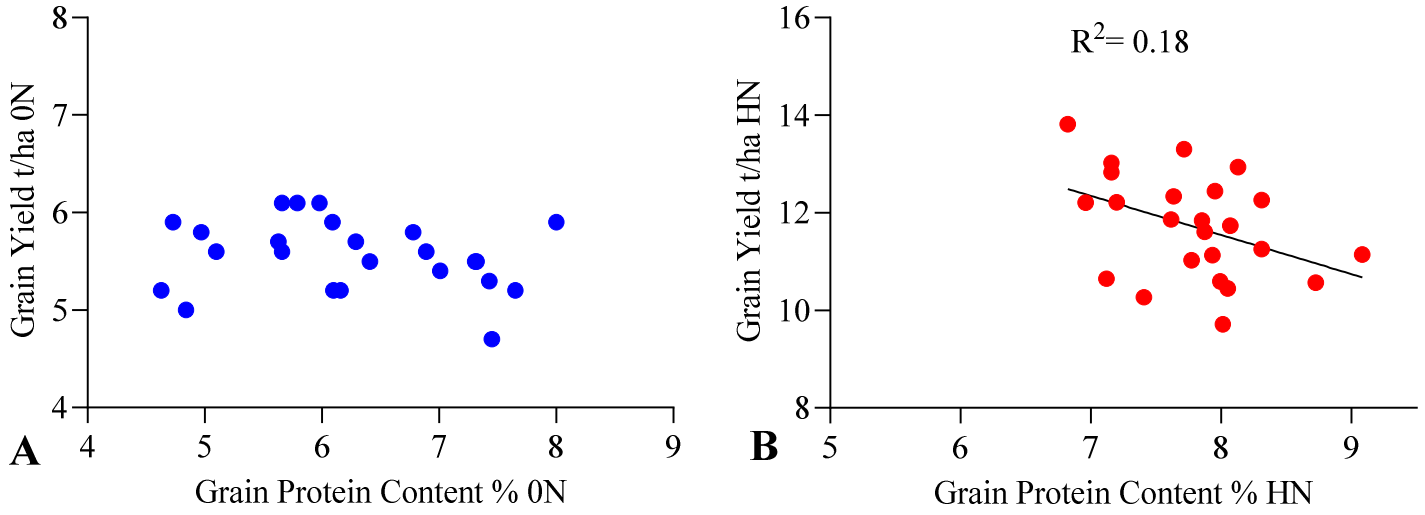
- ❖To explore the genotypic variation in GY & GPC under 0N and high-N application conditions in AP.
- ❖To explore the contributing factors for such variations under two N levels.
- ❖ To study if there is any relationship between GY and GPC under two N levels.

❖Methodology :

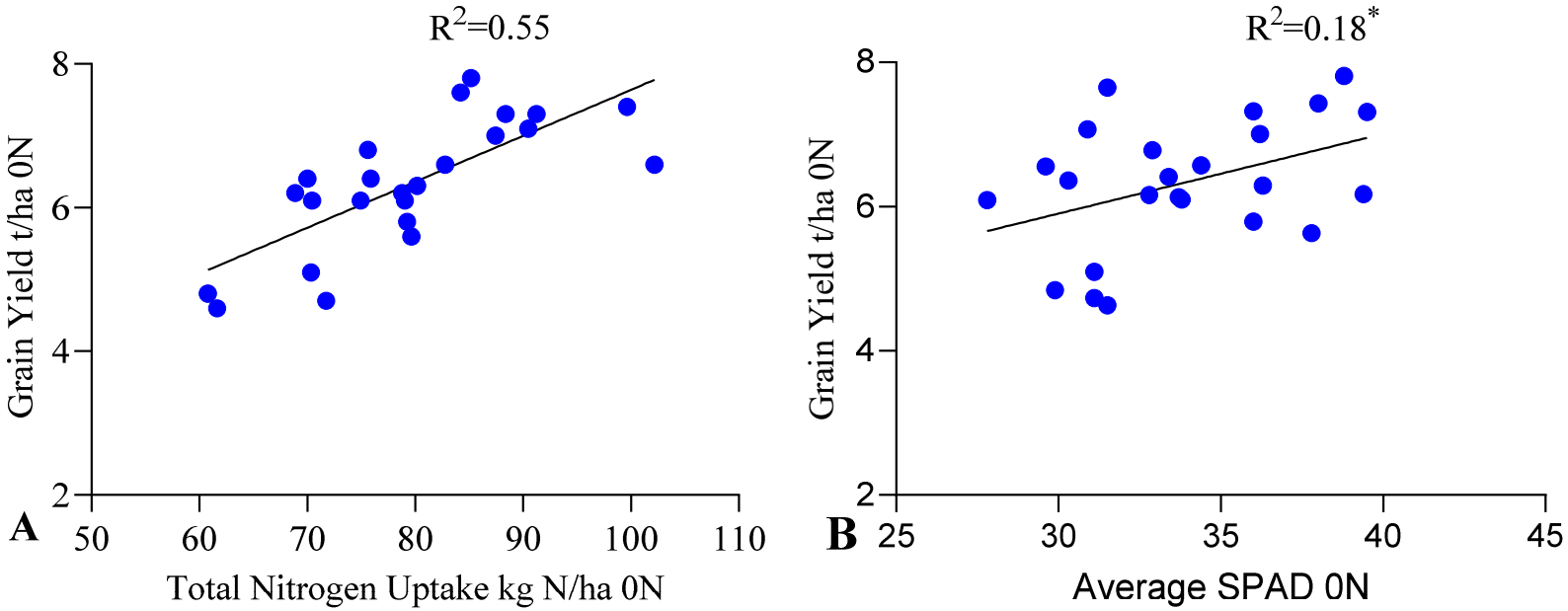
- ❖ 24 Japonica rice genotypes
- ❖Two N levels: 0N & 240 kg N/ha
- ❖3 Replications
- ❖Measurements →
  - Grain yield
  - Grain protein content
  - Stomatal conductance
  - Leaf Chlorophyll concentration (SPAD)
  - Total N uptake
  - N Harvest Index

Results

- Grain yield varied from 4.6 - 7.8 t/ha and 9.7 - 13.8 t/ha, and grain protein content from 4.7% - 6.1% and 6.8 - 9.1 % at zero N and high N, respectively.
- A significant negative correlation was observed between GY and GPC under 240 kg N/ha supply conditions, which was not evident under 0N conditions.

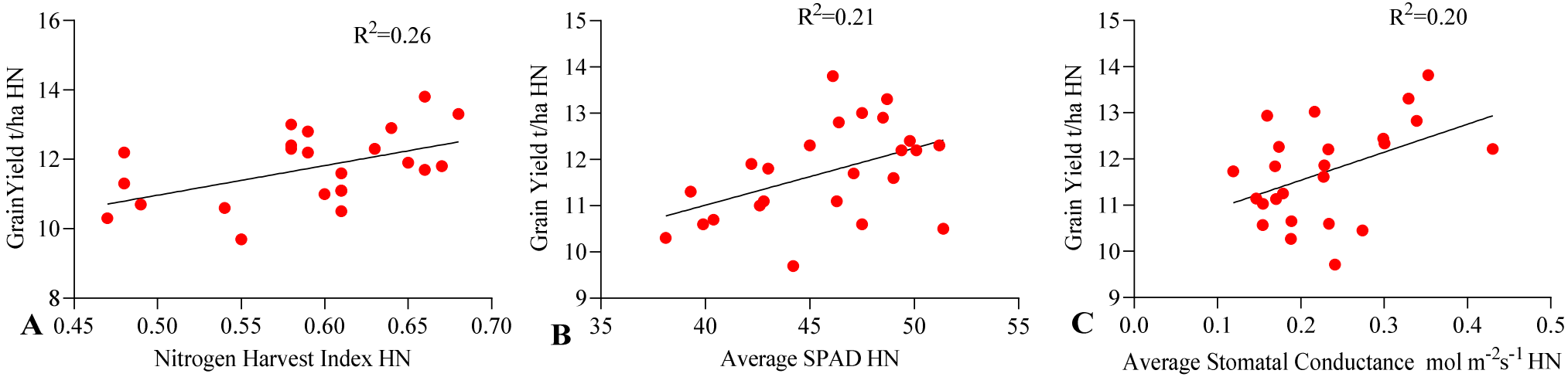


Factors determining GY under 0N fertiliser application conditions



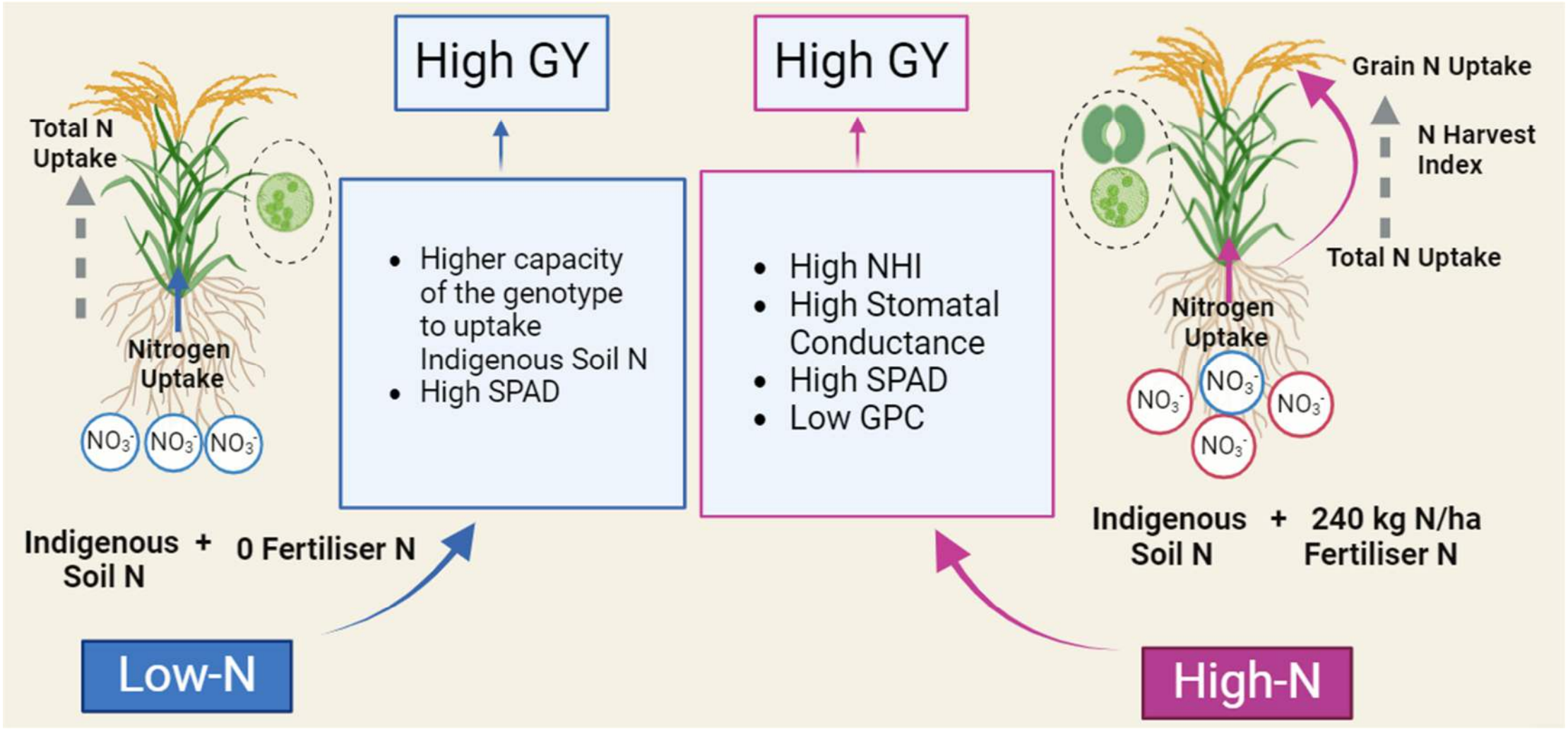
- 0N : GY exhibited significant positive correlations with
  - Total Nitrogen Uptake (TNU)
  - Leaf chlorophyll Concentration (SPAD)

Factors determining GY under 240 kg N/ha application conditions



- 240 kg N/ha supply conditions: Grain yield significantly correlated with
  - Nitrogen Harvest Index (NHI)
  - Leaf Chlorophyll Concentration (SPAD)
  - Leaf Stomatal Conductance (g_s)

Conclusions



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Thank you

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