

MacroPrima - Coorow (Paddock Scale Demonstration)

Crop: Wheat , Application Method: In-Furrow with Seed Growth Stage: Seeding Season: 2025

This trial was conducted to evaluate whether improving calcium availability and plant physiological status through the addition of MacroPrima to UAN at sowing would enhance crop performance, nutrient use efficiency, and grain quality.

A full systems dataset was collected, including:

- Soil chemistry (saturated extract)
- In-season plant measurements (leaf nutrients, Brix, pH)
- Final grain composition (Ca, K, NO₃, Brix)

The objective was to determine not only if the system improved, but whether those improvements translated into yield and grain quality outcomes.

Soil Response – A Clear Chemical Shift

The addition of MacroPrima resulted in a measurable and consistent change in soil chemistry.

- Calcium availability increased across all sampling points
- Soil pH was moderated slightly, shifting away from highly alkaline conditions
- Potassium availability was altered, indicating a redistribution within the soil solution

These changes confirm that the product **actively modified the rhizosphere environment**, improving calcium availability and influencing cation balance.

The soil response was real, measurable, and consistent.

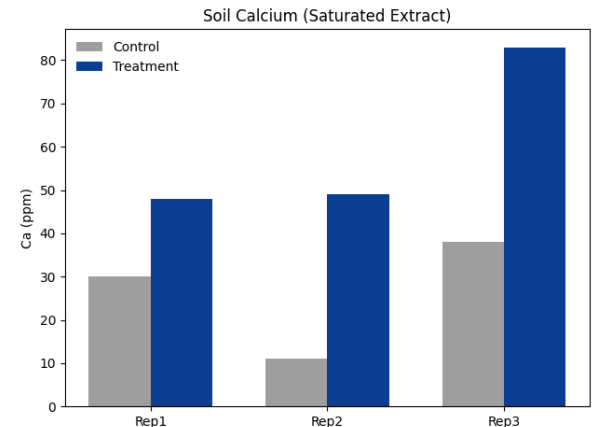
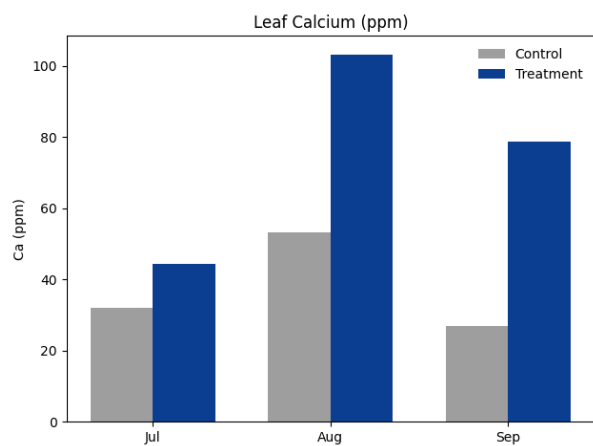
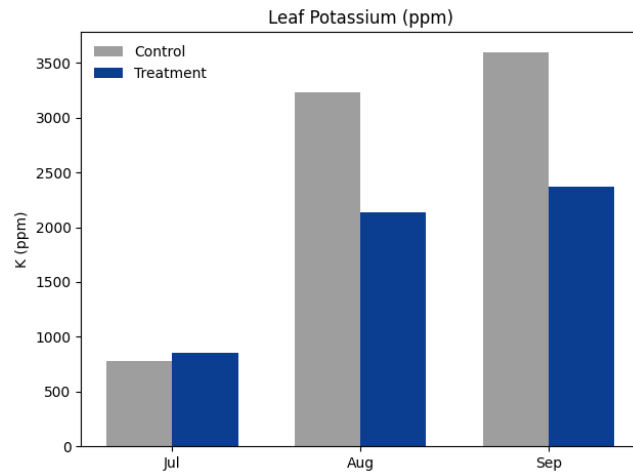
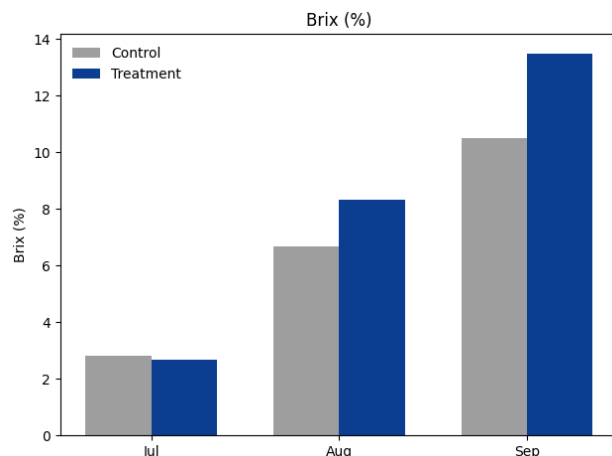
In-Season Plant Response – Improved Function

The changes in soil chemistry translated strongly into plant response.

- Leaf calcium increased significantly across all replicates
- Leaf potassium decreased, indicating a shift in cation balance
- Brix levels were generally higher, reflecting improved metabolic activity
- Plant pH moved closer to neutral, reducing the soil-to-plant gradient

Together, these results indicate that the treatment created a more **regulated and physiologically balanced plant system**.

The crop under treatment was clearly functioning differently — and, in many respects, more efficiently.



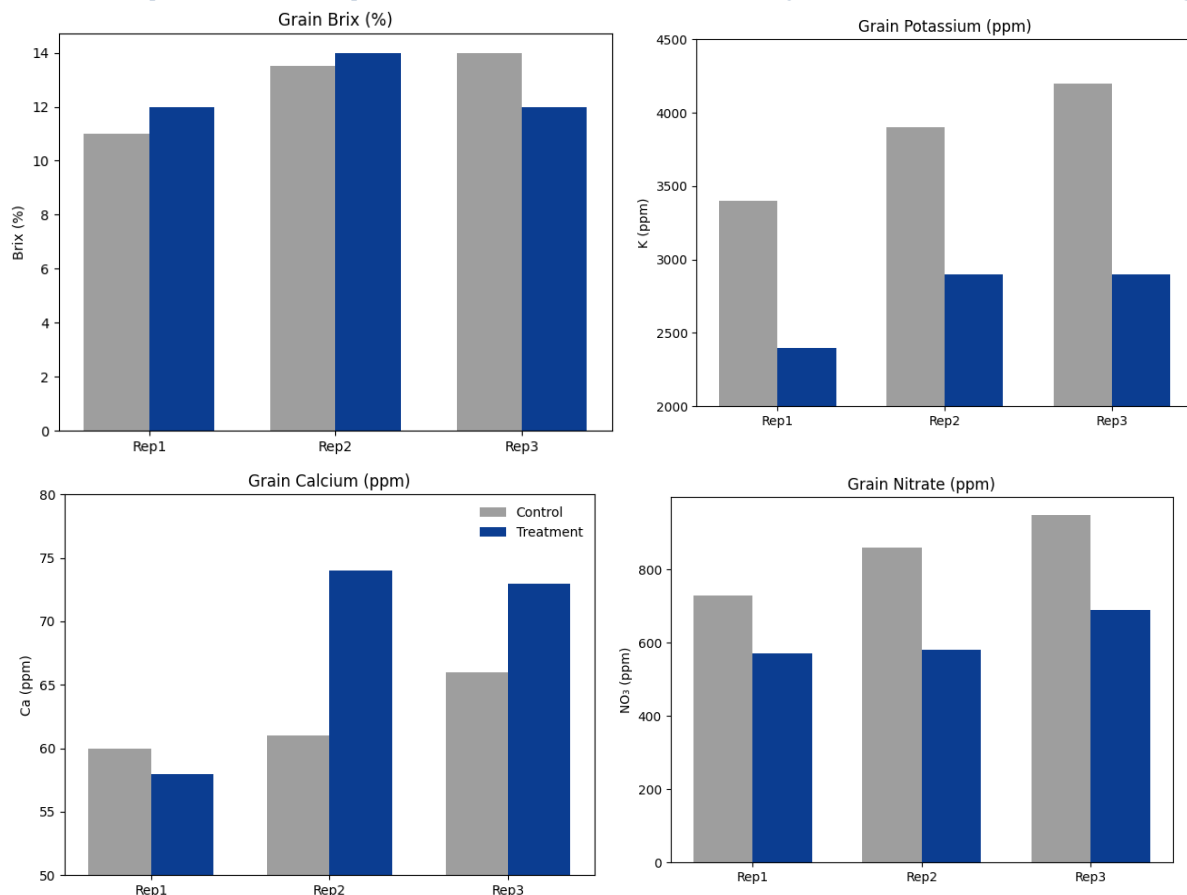
Grain Outcomes – Where the System Diverged

Despite improved plant status, the final grain results revealed a different outcome.

- Despite a substantial increase in plant calcium, only a small proportion was transferred into the grain
- Grain potassium was consistently lower in the treatment
- Grain nitrate (NO_3) was consistently lower in the treatment
- Grain Brix showed no consistent advantage

This indicates that, although nutrient uptake into the plant improved, **the transfer of nutrients into the grain was reduced.**

The system improved the plant, but not the delivery of nutrients into the grain.



System Interpretation – Function vs Flow

This dataset highlights a critical distinction:

Plant function improved

- Higher calcium
- Higher Brix
- Better internal balance

But nutrient flow decreased

- Lower potassium in plant and grain
- Lower nitrate accumulation in grain

Yield and protein are not driven by plant status alone — they are driven by the **movement of nutrients into the grain during grain fill.**

Potassium plays a central role in this process by driving osmotic flow and nutrient transport. By reducing potassium levels, the system reduced the intensity of nutrient movement into the grain.

The treatment improved efficiency, but reduced throughput.

Yield and Grain Quality Outcome

Yield response across both zones was minimal, with no consistent advantage observed from the treatment. In the South, yield was slightly reduced under treatment, while in the North a marginal increase was observed.

Screenings were significantly reduced in the treatment, particularly in the South, indicating improved grain fill and kernel uniformity.

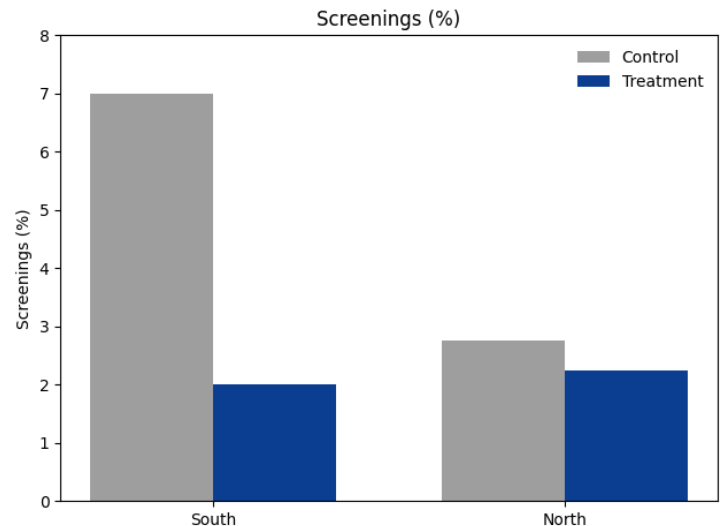
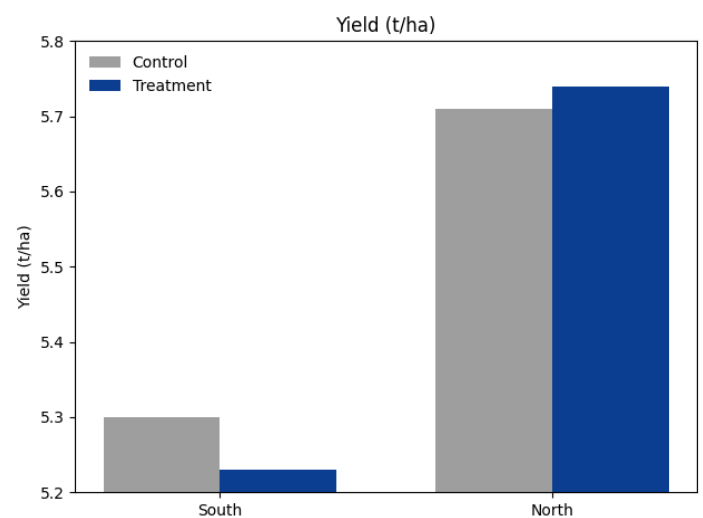
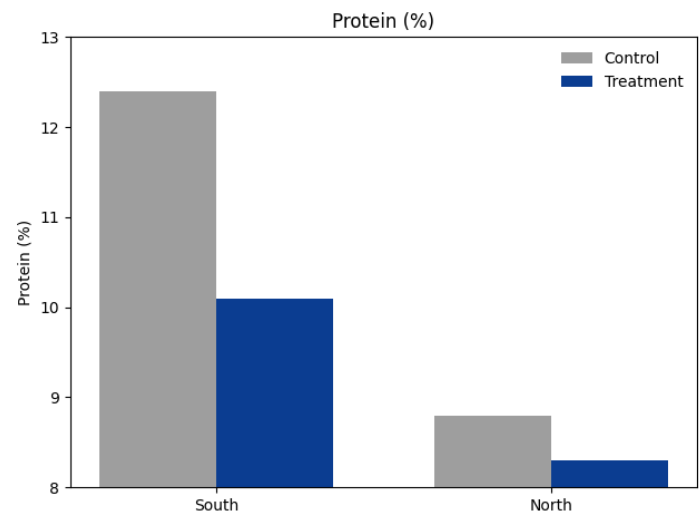
This confirms that grain fill improved structurally, but nutrient loading into the grain did not.

Protein levels were consistently lower in the treatment, aligning with the reduction in grain nitrate and confirming reduced nitrogen accumulation in the grain.

Final Interpretation – What This Trial Proves

This trial clearly demonstrates that:

- Increasing calcium in the soil and plant was **successful and repeatable**
- Plant physiological indicators (including Brix and balance) were **improved**
- Grain fill (as shown by reduced screenings) was **enhanced**



Take-Home Message

- Calcium is important, but **not in isolation**
- Grain production depends on **nutrient movement, not just nutrient presence**
- The **balance between Calcium and Potassium** is more critical than increasing Calcium alone