

Introduction

- Located in deep south Texas, the Rio Grande Valley is characterized by a subtropical semi-arid climate that brings about extremely high temperatures and sparse precipitation during the summer. These harsh conditions lead most farmers to abandon their fields during these months, reducing ground cover, crop diversity and eliminating any potential opportunity for profit.
- The sweet potato (*Ipomoea batatas*) is a rhizome native to the tropical regions of the Americas and is recognized for its high heat tolerance and nutrition value, making it an ideal crop to potentially fill these void lands.
- Over the course of a five-month field trial, we have monitored the overall health of the sweet potato plants (root/shoot) both physically and chemically to determine its validity as a summer crop in the Rio Grande Valley.

Objectives

- Through the cultivation of three different sweet potato varieties, we will physically observe which variety(s) are best suited for the unique climate and soil conditions of the Rio Grande Valley when provided each of three different fertilization methods.
- Periodically (30 days) assess various soil available nutrients (NH₄⁺, NO₃⁻, P, K), moisture retention, pH, salinity (EC), and the plants uptake of these nutrients.
- Observe the overall agronomic performance of each sweet potato variety after a 150-day growing season.



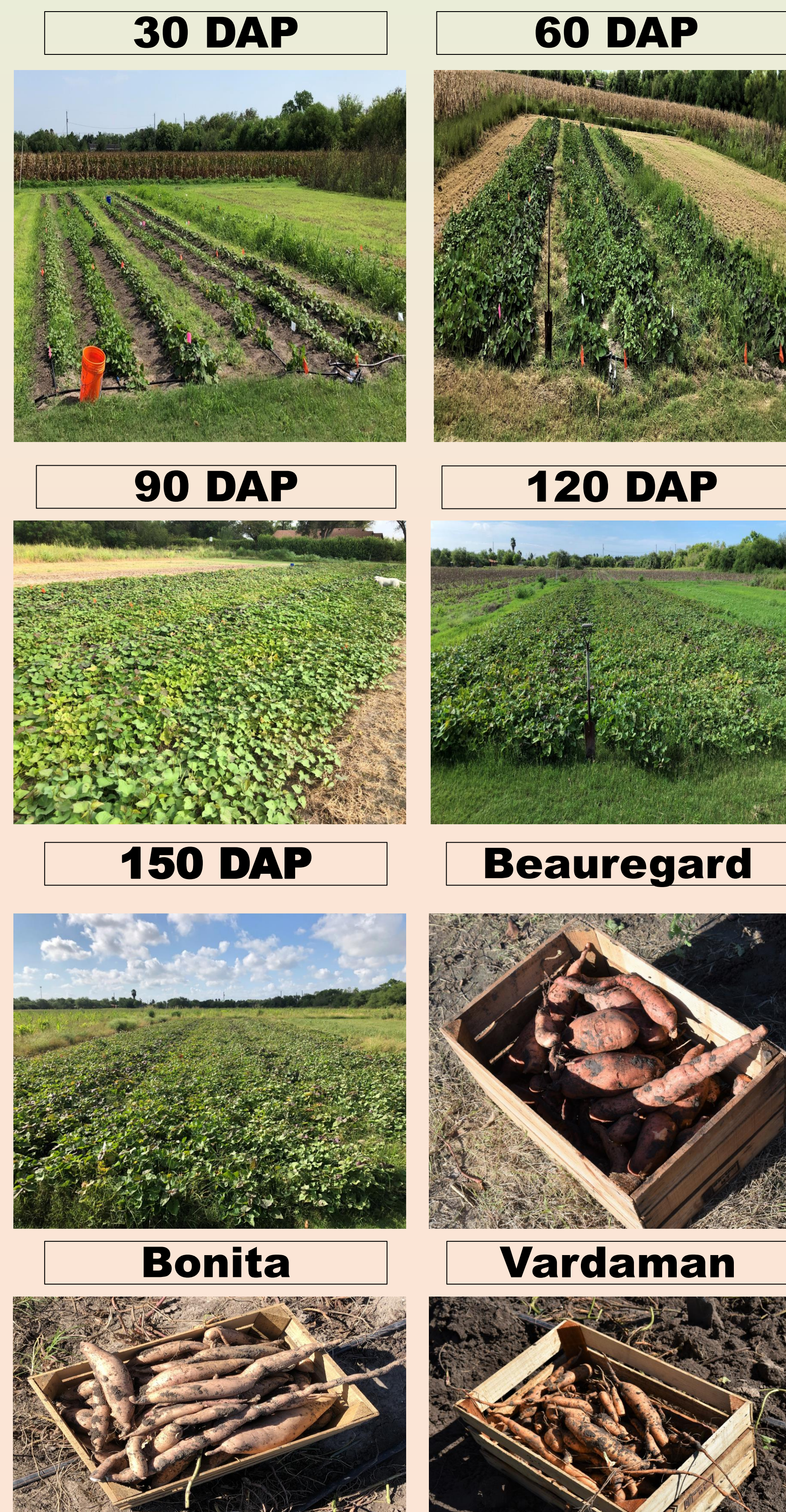
Acknowledgements

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Materials and Methods

- **Location:** Elsa, Texas
- **Plot Size:** 38.5 x 9.75 m site divided into 9 sub-plots using a randomized block design
- **Soil Fertilization methods:**
 - Standard conventional:** June 15/22, 2019
70 kg/ha of N, 40 kg/ha of P, and 90 kg/ha of K
N: Ammonium Sulfate (21-0-0)
P: Super Phosphate (0-18-0)
K: Potash (0-0-60)
 - Organic:** June 15/22, 2019
70 kg/ha of N, 40 kg/ha of P, and 90 kg/ha of K
Epsoma Garden Tone (3-4-4) (Majorly chicken manure but not OMRI-listed)
 - Absent Fertilizer (Control)**
- **Planting Dates:** May 17 - 18th, 2019
- **Initial Harvest Date:** October 27th, 2019
- **Cultivated Plants:** 3 Sweet Potato Varieties

Productivity Results

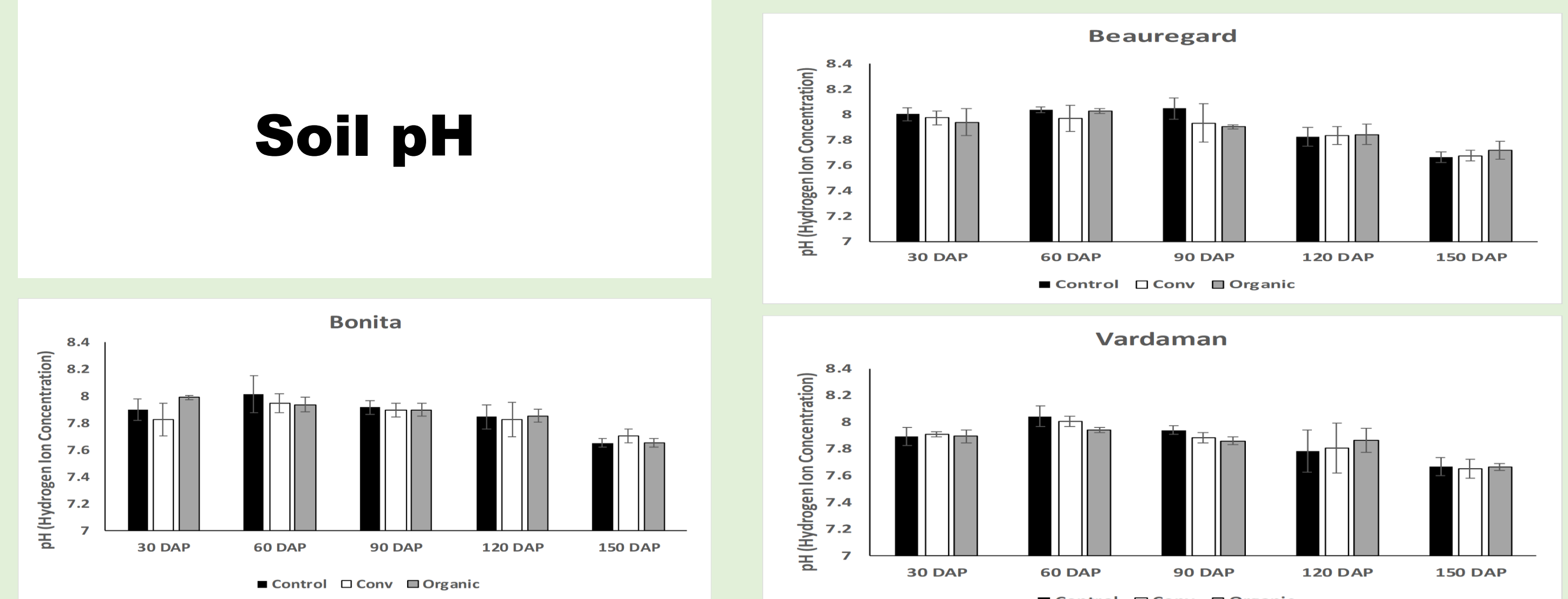


Sweet Potato Yield (LBS/ACRE)

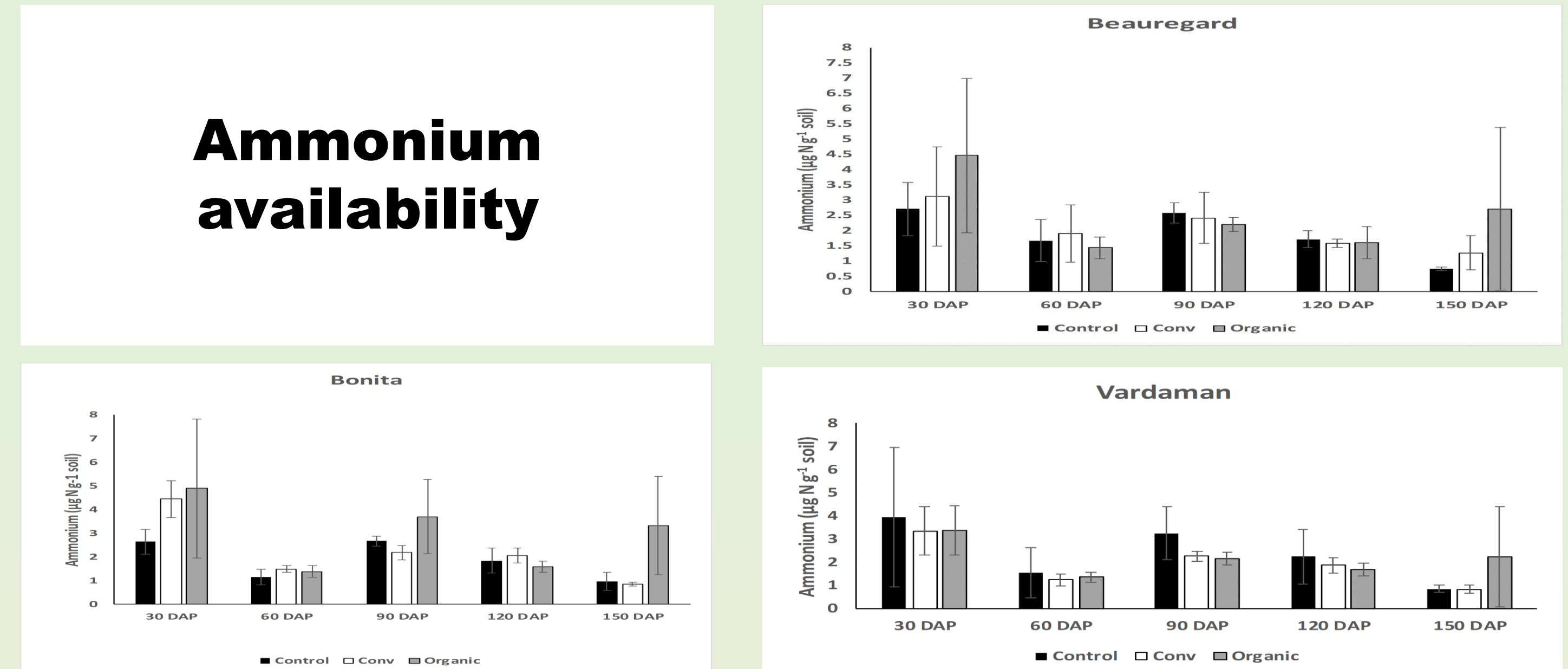
	Control	Yield (LBS/ACRE)
Beauregard	Control	9802
	Std Conv	10478
	Organic	13520
Bonita	Control	8112
	Std Conv	30420
	Organic	11492
Vardaman	Control	16224
	Std Conv	15886
	Organic	17350

Nutrient Results

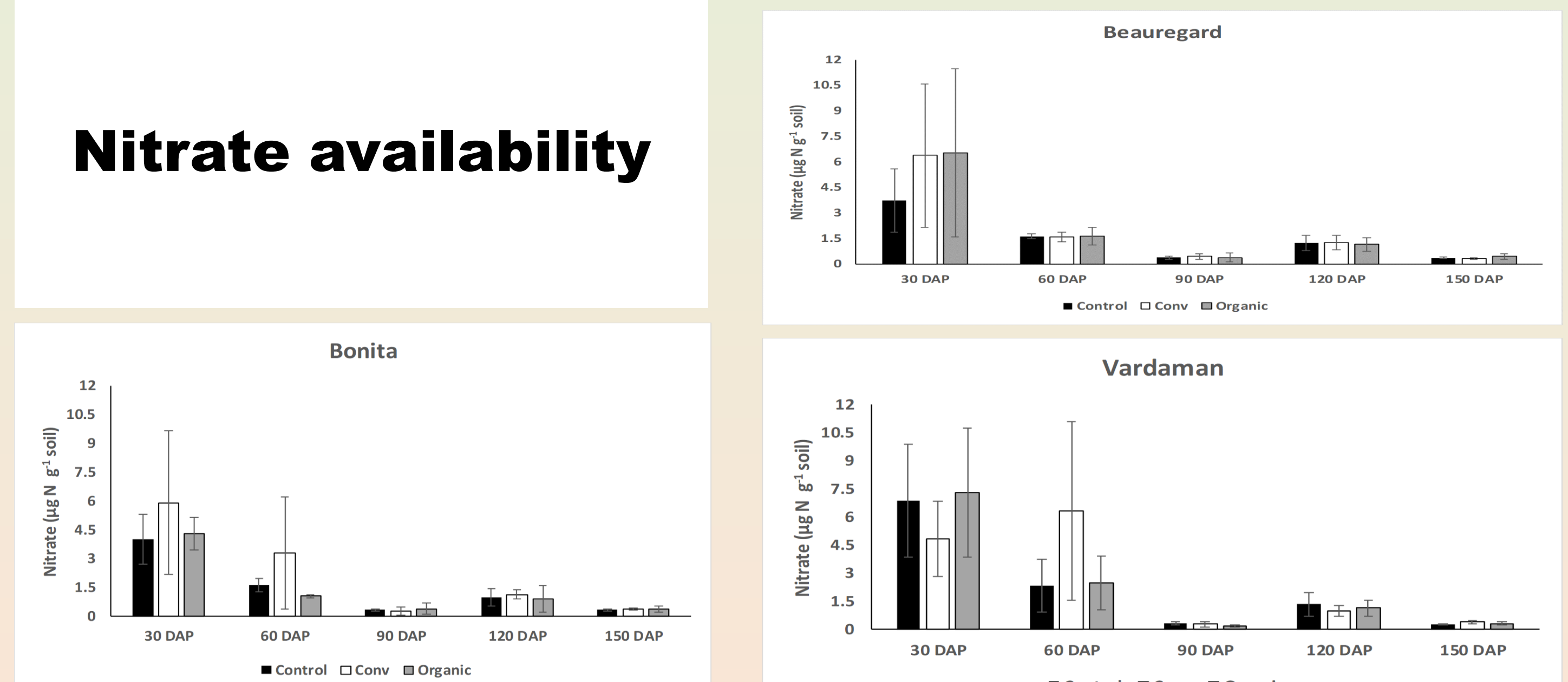
Soil pH



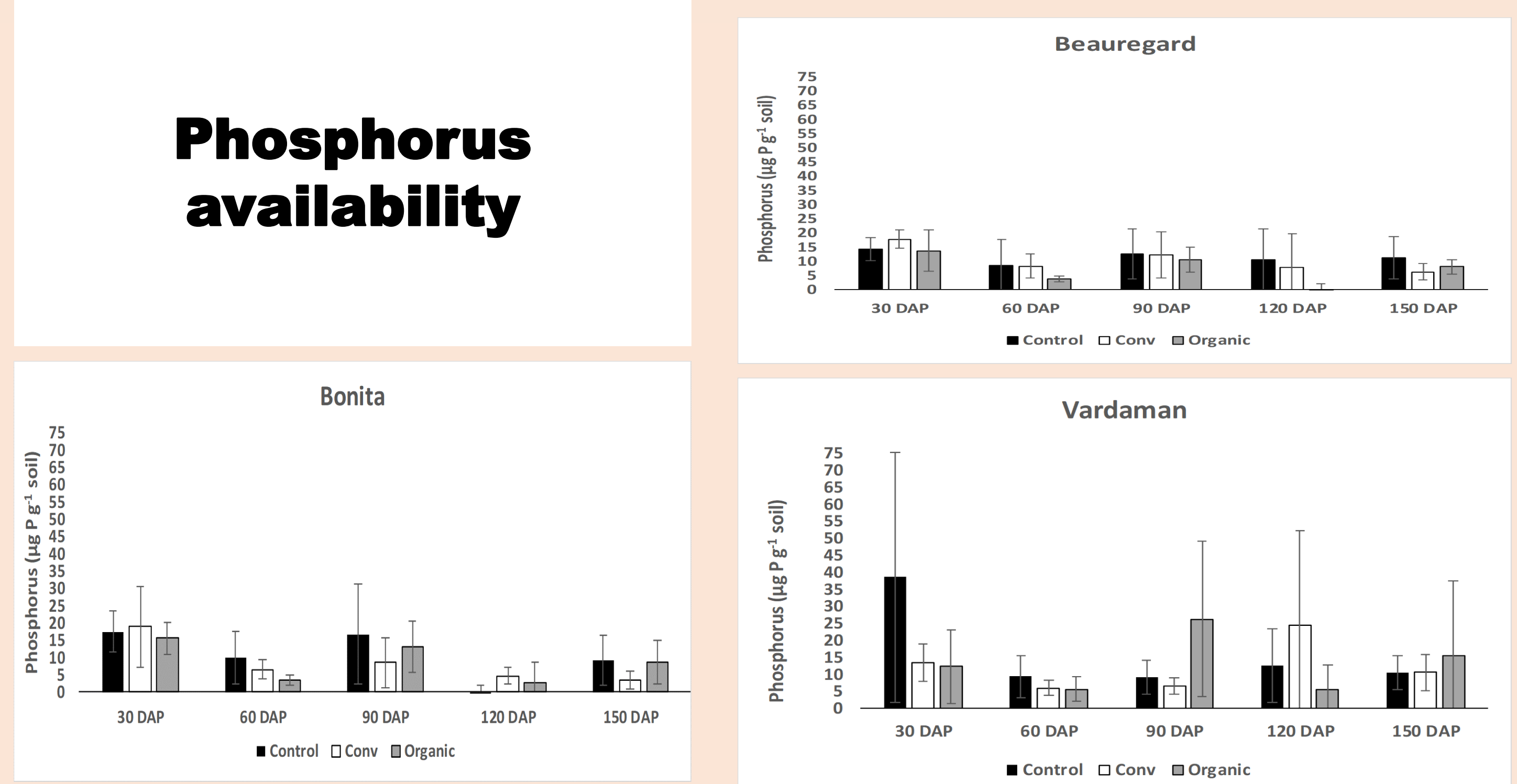
Ammonium availability



Nitrate availability



Phosphorus availability



Key Findings

- Soil pH was not influenced by variety as increases/decreases in the soil were near constant across the growing season.
- Ammonium availability trends were nearly uniform across all varieties, however, those treated with organic fertilizer were the least NH₄⁺ dependent at the conclusion of the growing season.
- Each variety was heavily Nitrate dependent as availability trends were nearly uniform, however, Vardaman NO₃⁻ uptake was very slow between days 30-60 in comparison to both Beauregard and Bonita.
- The availability of Phosphorus was very inconsistent throughout, yet, on average, Vardaman left the most remaining Phosphorus across all fertilization methods, likely due to its much smaller potato size.
- Major floods occurring on June 3rd, 2019 (ruptured irrigation pipe) and June 24th, 2019 (torrential rainfall) were likely a major influence for the observed sporadic nutrient availability rates among most graphs.
- Overall, Bonita treated with standard conventional fertilizer yielded the most pounds per acre upon calculation adjustment.
- Organic fertilizer outperformed standard conventional on two occasions (Beauregard, Vardaman).