



## Introduction

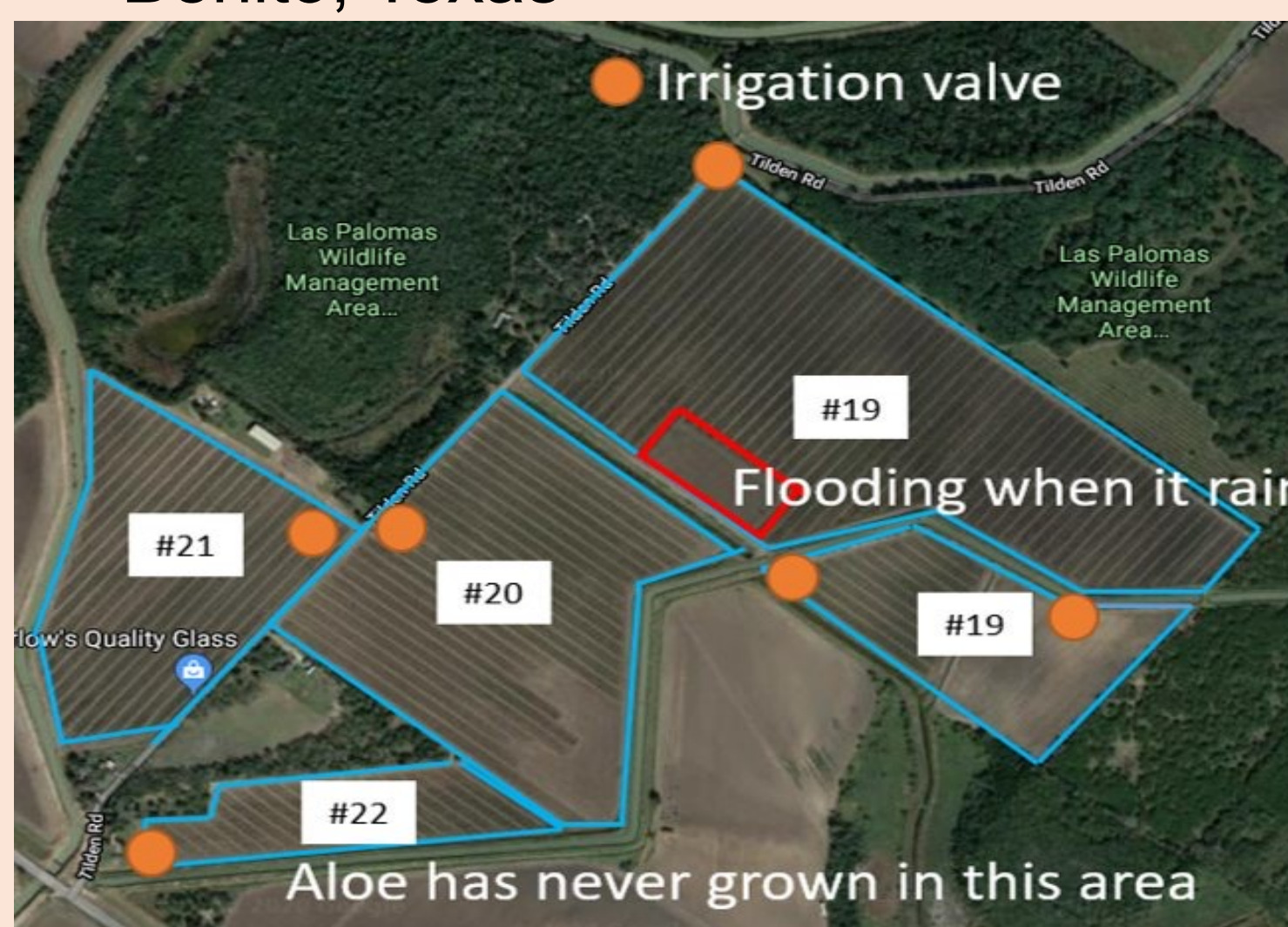
- Located in deep south Texas, the Rio Grande Valley is characterized by a subtropical semi-arid climate that brings about extremely high temperatures and sparse precipitation during the summer. These harsh conditions lead most farmers to abandon their fields during these months, reducing ground cover, crop diversity and eliminating any potential opportunity for profit.
- The Aloe Vera (*Aloe barbadensis Mill.*) is a succulent native to the tropical and semi-arid regions of Africa and is recognized for its high heat tolerance and its medicinal values from the gel membrane that makes up the leaves. Its ability to grow in low moisture conditions makes it an ideal crop to grow in the Rio Grande Valley.
- Observe the overall effectiveness of each fertilization treatment after a year-long growing season.

## Objectives

- Through the cultivation of Aloe Vera using three different fertilization treatments, we will physically observe which treatments are best suited for the unique climate and soil conditions of the Rio Grande Valley when growing Aloe Vera.
- To identify innovative methods of sustainably increasing Aloe Vera production in our region while simultaneously improving soil health and maximizing resource use efficiency.
- Conduct a field trial involving the growth of Aloe (from seedling) under three different fertilization treatments in a 350 ft x 39 ft plot.

## Location

- Aloe Laboratories, Inc. fields in San Benito, Texas

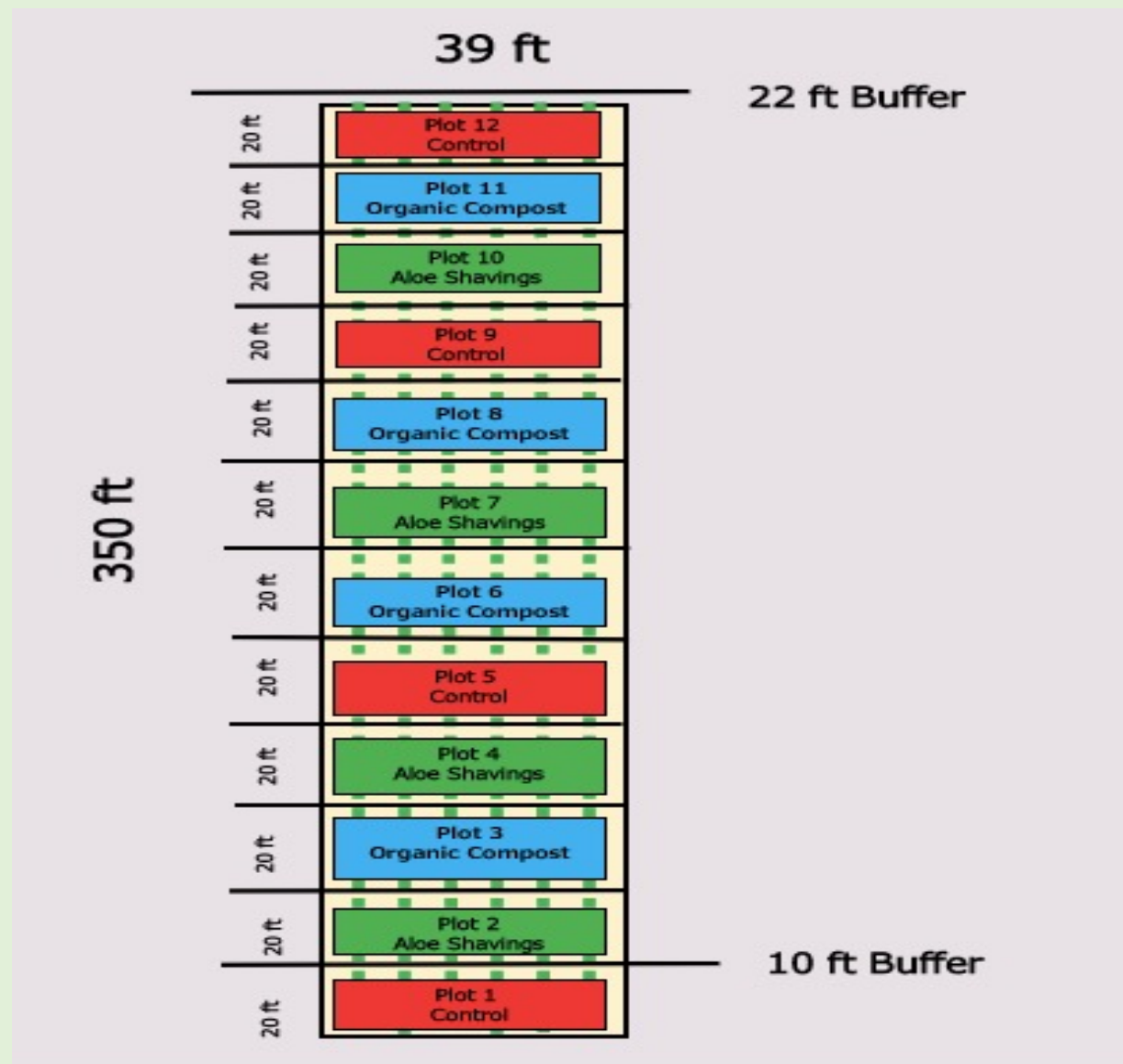


## Acknowledgements

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## Materials and Methods

### Aloe Vera Field Treatment Layout



### Soil Fertilization methods:

- Post-Production Aloe Vera Shavings: Applied approx. 6 inches underground (April 26, 2021)
- Organic Compost: (March 26, 2021) Aloe Laboratories, Inc. organic fertilization method (manure compost + organic sulfur + processed chicken manure) (O.C)
- Absent Fertilizer (Control)

Planting Dates: May 3<sup>rd</sup> – 4<sup>th</sup>, 2021

### Aloe Growth Parameters

- Tallest Leaf Length (cm)
- Leaf Center Width (cm)
- Number of leaves
- Number of new pups
- Total Leaf Weight Yield (g) (12 months)
- Total Gel Weight Yield (g) (12 months)

### Soil Health Analysis

- Soil Moisture (Oven Dry)
- Soil pH
- Wet Soil Aggregate Stability
- Soil Available Nutrients (NO<sub>3</sub><sup>-</sup>, NH<sub>4</sub><sup>+</sup>; Soil Ecology Lab)
- Cation Exchange Capacity

## Productivity Results

### Organic Compost



### Aloe Shavings



### Planting Date



143 DAP

### 112 DAP



173 DAP



### Measurements

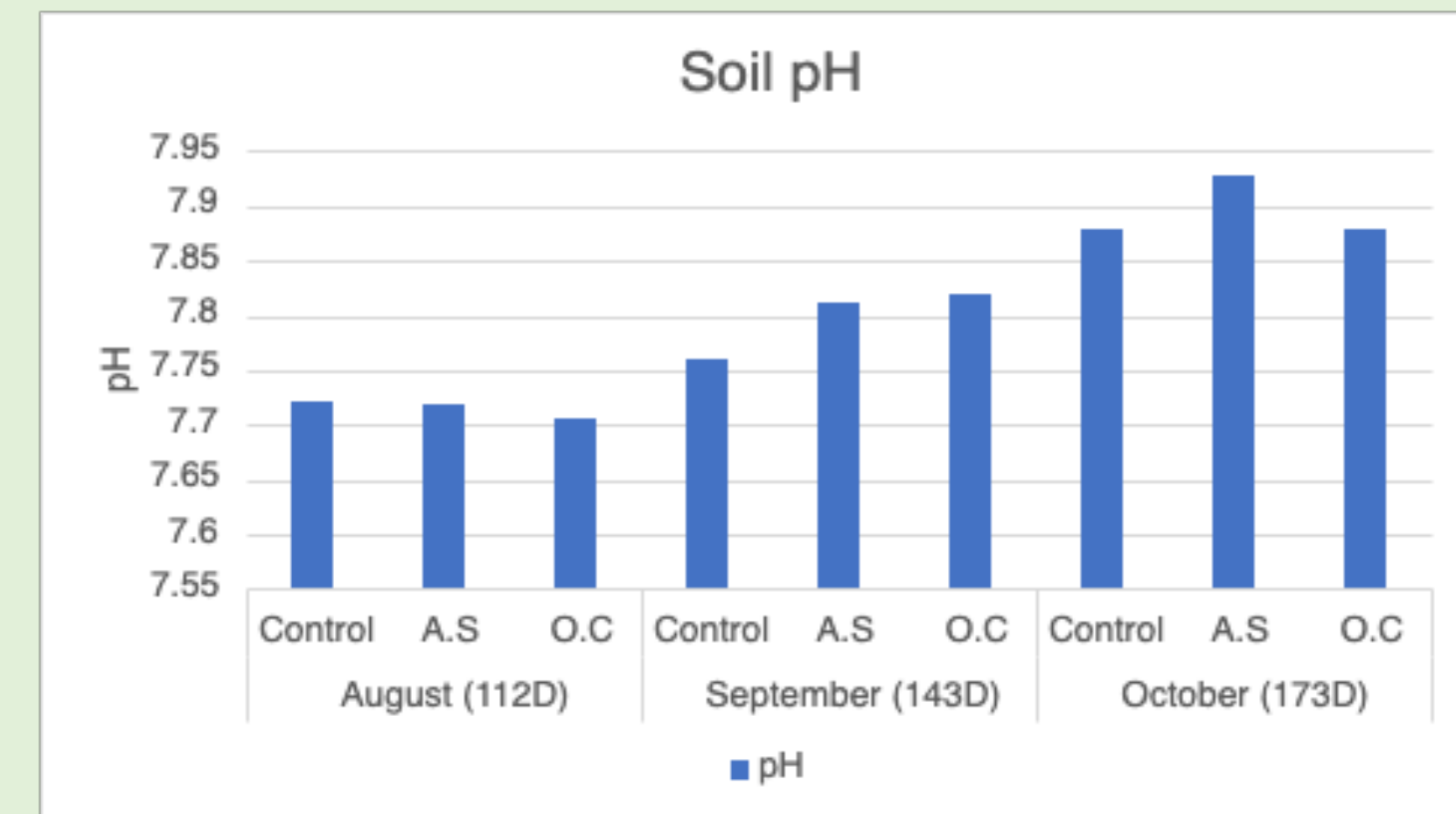


### FieldScout TDR 350 Moisture Meter

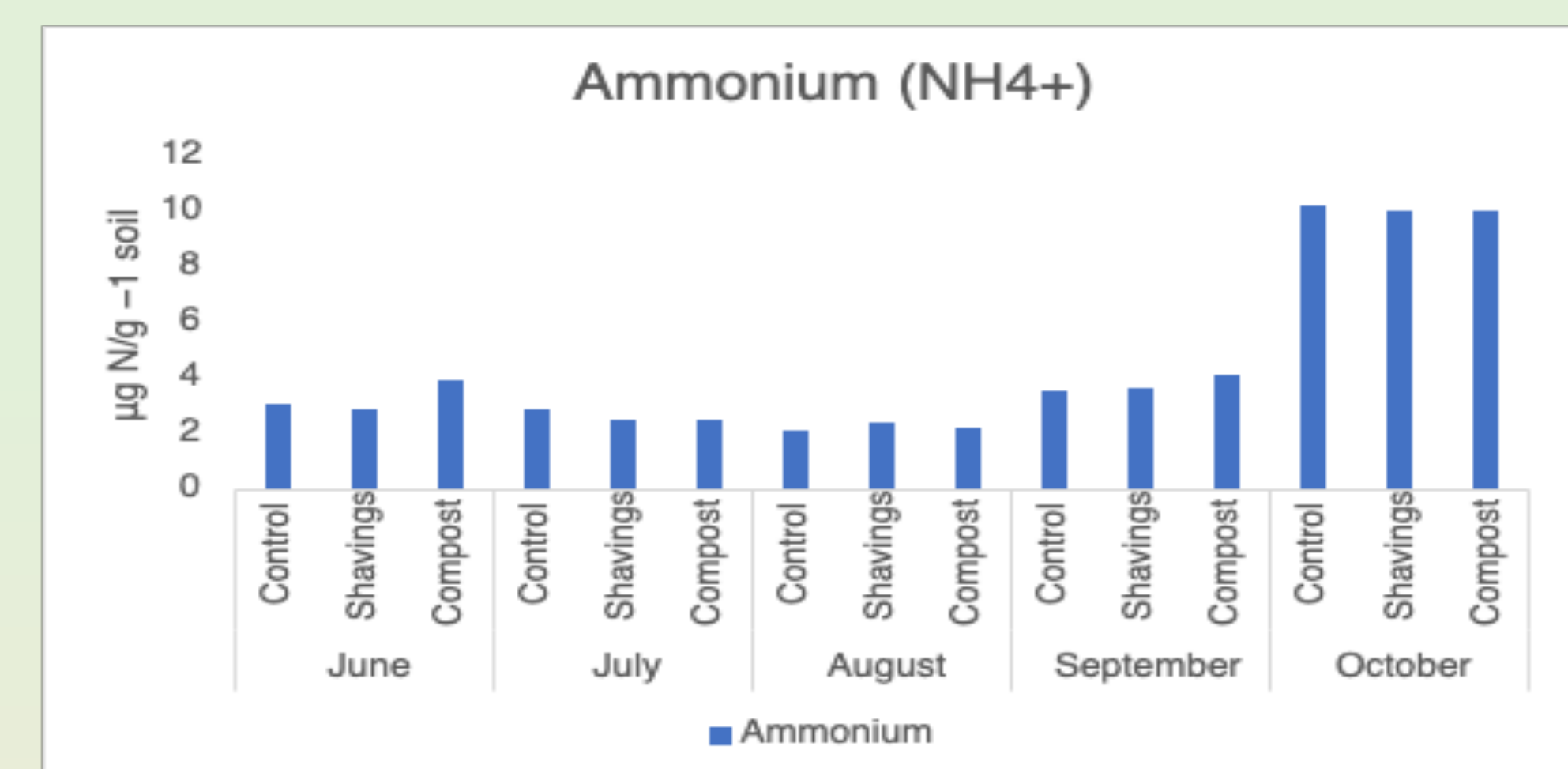


## Nutrient Results

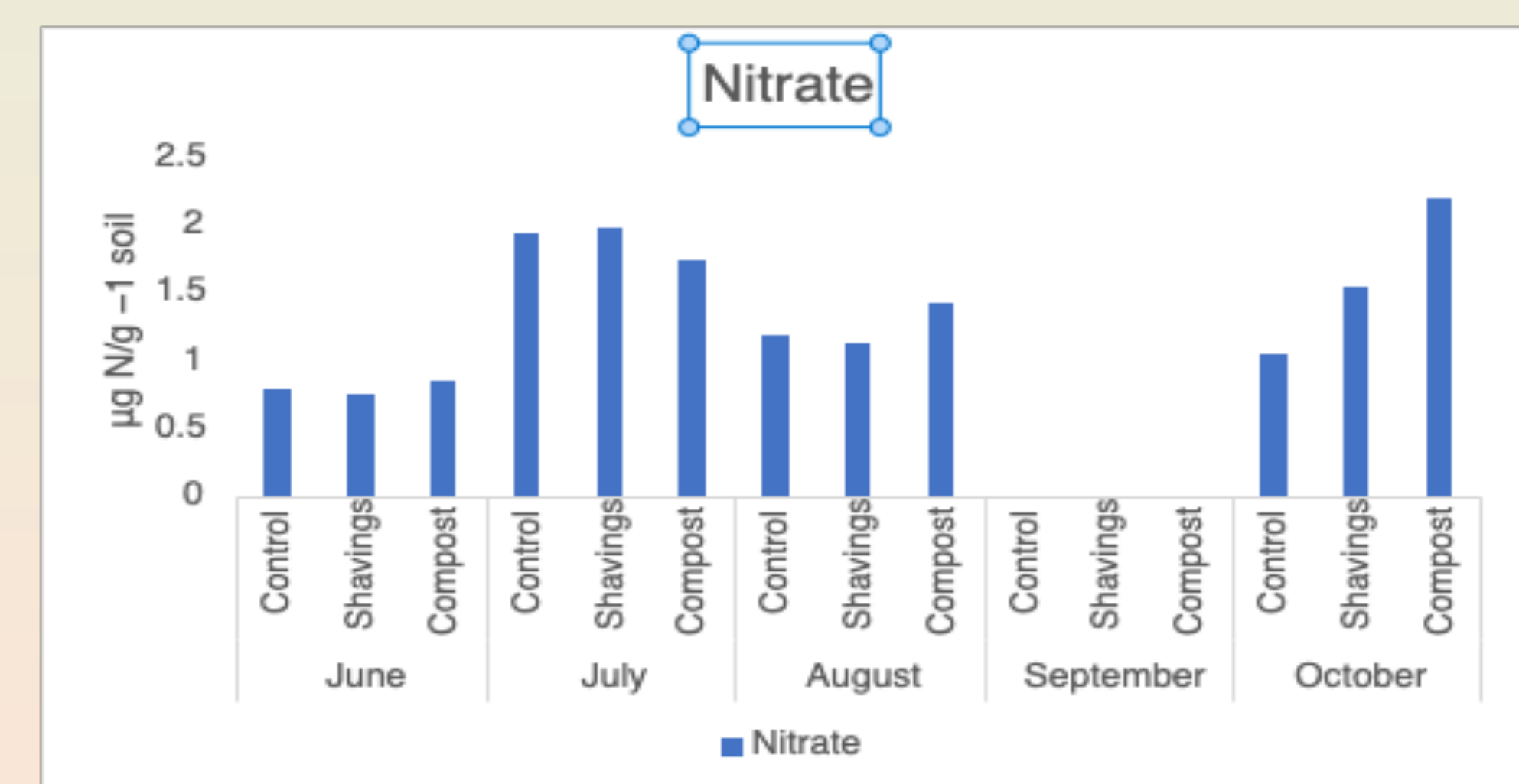
### Soil pH



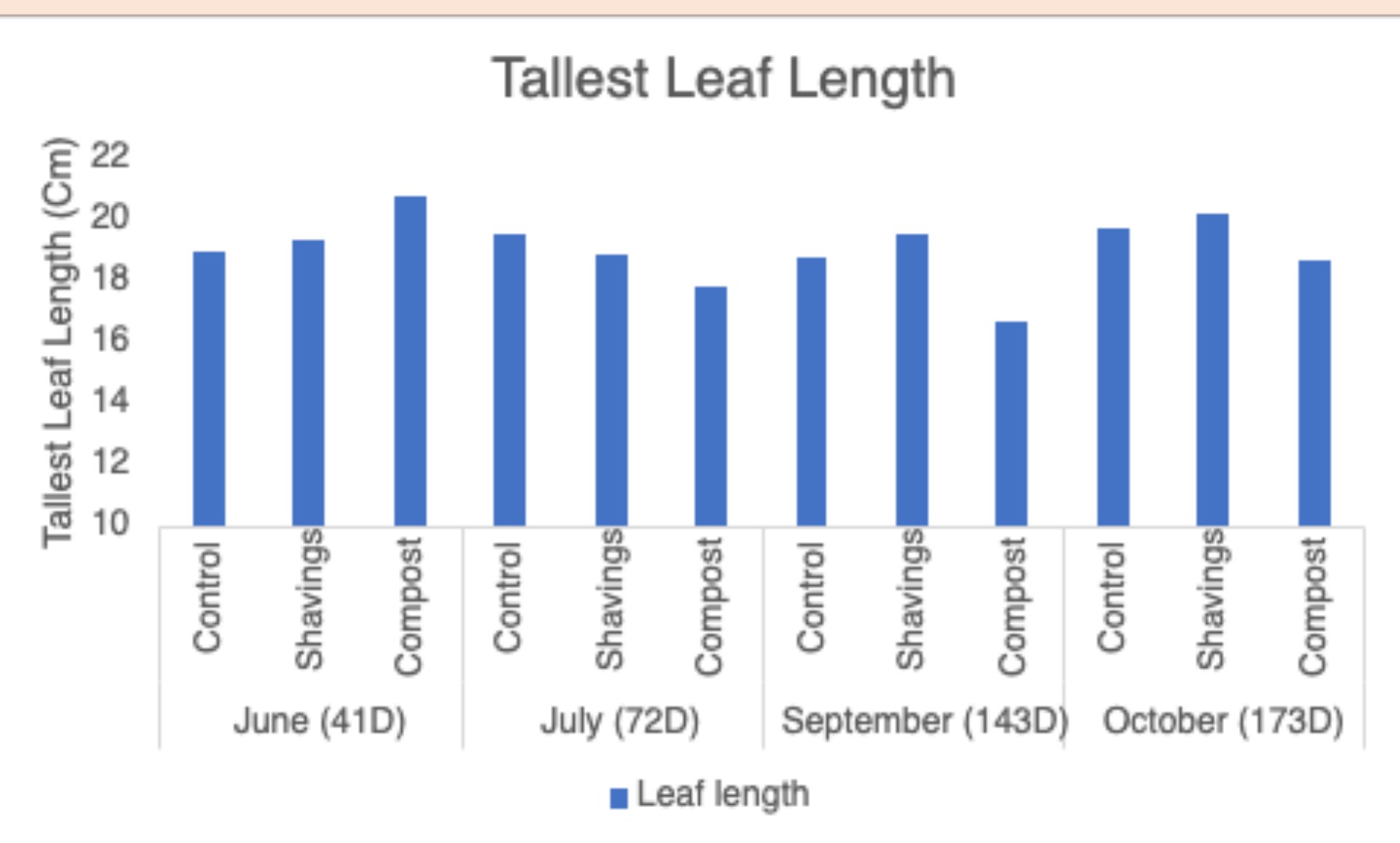
### Ammonium (NH<sub>4</sub><sup>+</sup>) availability



### Nitrate (NO<sub>3</sub><sup>-</sup>) availability



## Aloe Vera Plant Measurements



## Key Findings

- Soil pH was higher in the plots treated with Aloe shavings. An increase in pH did occur in all treatments through 5 months.
- Ammonium availability trends were nearly uniform across all treatments followed by an increase, however, those treated with organic compost were the least NH<sub>4</sub><sup>+</sup> dependent.
- Plots treated with the Organic Compost showed higher available Nitrate, NO<sub>3</sub><sup>-</sup>, than Aloe Shavings or the Control plot through 5 months of growing Aloe Vera
- Being an organic field, over the summer, the weed control got out of control and maintenance was done.
- Rainfall and planned irrigation done prior to soil sampling may be the cause of high nutrient availability in the month of October, 2021.
- Aloe Vera average tallest leaf length has remained nearly the same length (through 170 days) due to the occurrence of Leaf Tip Necrosis.
- Plants with leaf tip necrosis are measured up to the area where necrosis begins.
- Can Aloe Shavings serve as an affordable, yet just as effective, substitution for the Organic Compost?