

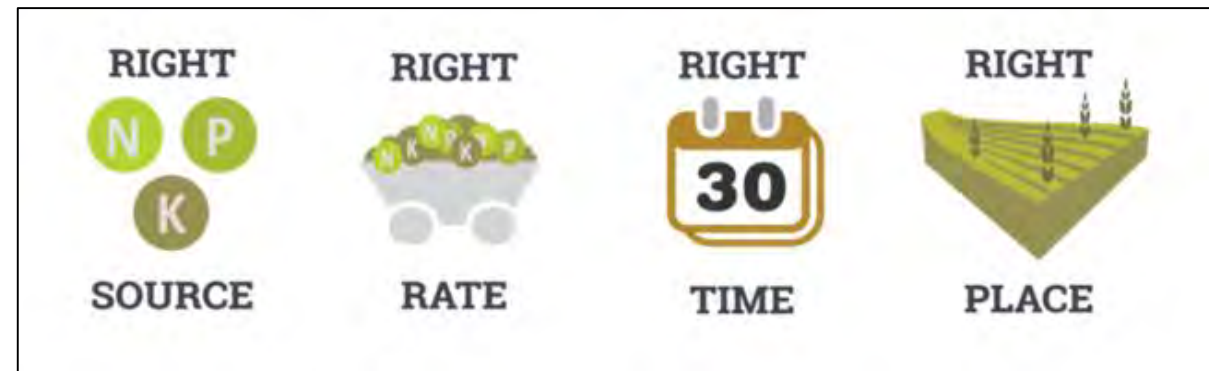
Evaluating Corn Growth and Yield Response to Non-Uniform Dry Fertilizer Application: A Case Study

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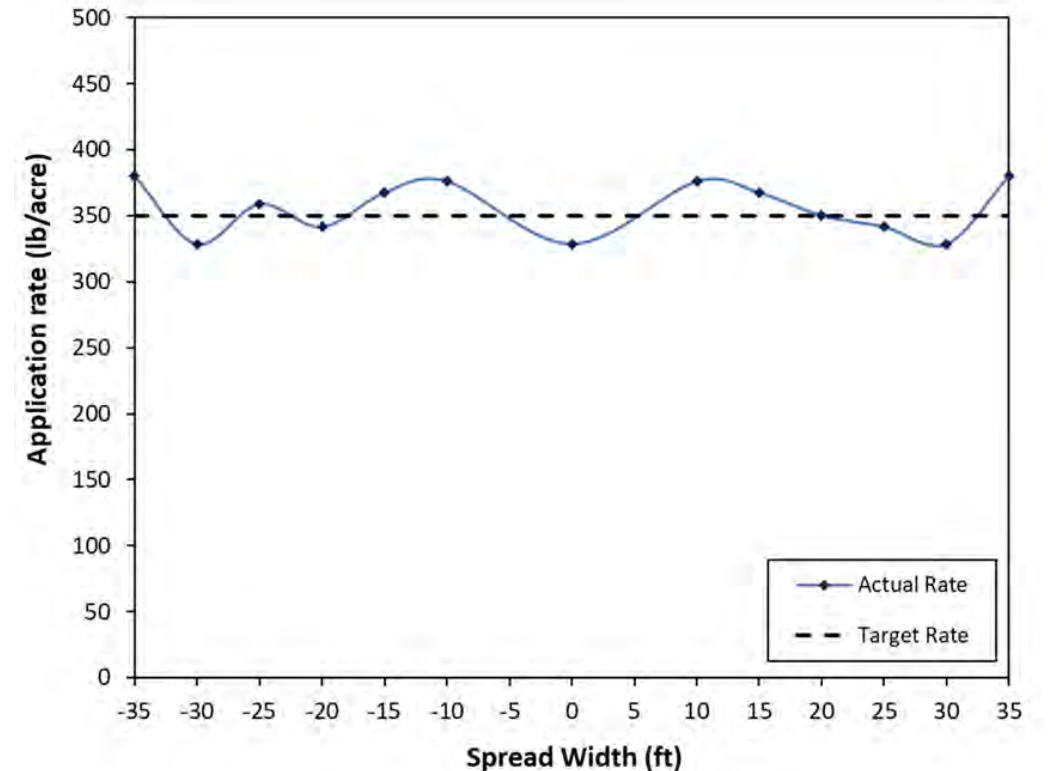
INTRODUCTION

- ❑ **Proper nutrient management** – one of the most important aspects in corn production for attaining higher yields.
- ❑ **4R's of nutrient management** – consideration for right source, rate, time and place.
- ❑ **Granular Fertilizer** – single or blended products (N-P-K) are commonly applied to meet (pre-plant) nutrient requirements



SPINNER-DISC BROADCAST SPREADERS

- Common application equipment to broadcast apply dry granular fertilizer and lime.
 - Application issues are very common (requires proper setup and calibration)
 - Material properties influence application rate and uniformity



Research Motivation

Considering high fertilizer prices and application inaccuracies associated with spinner-disc spreaders, it is important to understand non-uniform rate and distribution effects of pre-plant fertilizer on corn growth and yield.

OBJECTIVE

To evaluate how non-uniform (dry pre-plant) fertilizer application affects corn growth and yield

METHODS

Locations:

- UGA Tifton Campus Farms, Tifton, GA
- Southeast Research and Education Center, Midville, GA

Equipment:

- Chandler Pull-behind Spinner-disc spreader (Model: 9-PT)

Application:

- Pre-plant broadcast (N-P-K) [+ *starter* (N-P) + *side-dress* (N)]



DATA COLLECTION



During Pre-plant Broadcast Application:

- Pans (36.8 cm x 26.8 cm) placed within the swath at 1.8 m spacing intervals (*ASABE S341.5*)
- Material from each pan was weighed and used to compute applied rate (kg/ha) and distribution uniformity (CV%)

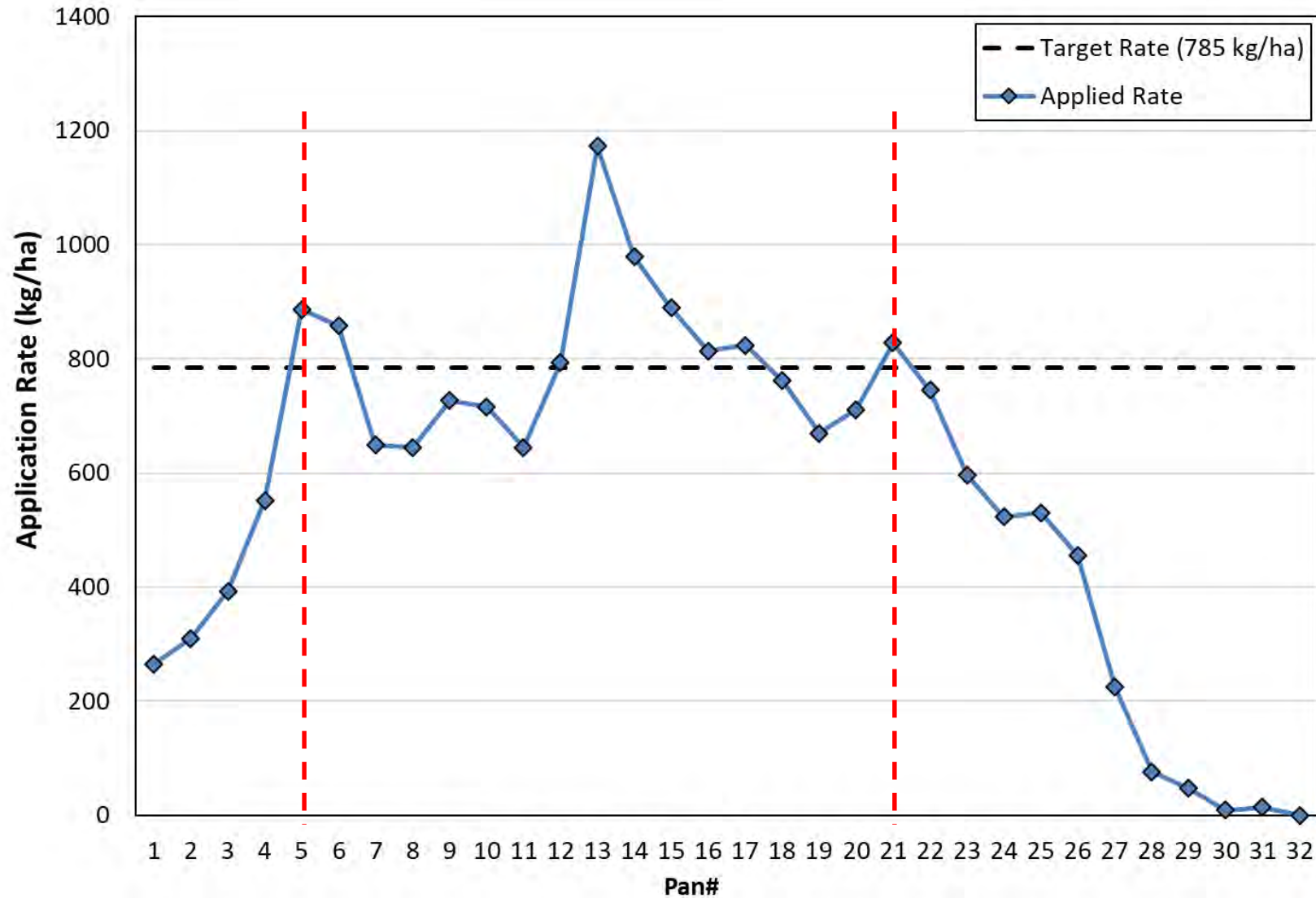
In-season:

- Growth stages and tissues samples bi-weekly through the season (at each pan location)

End of the season:

- Yield by harvesting 2-rows (either side of the pan)

RESULTS

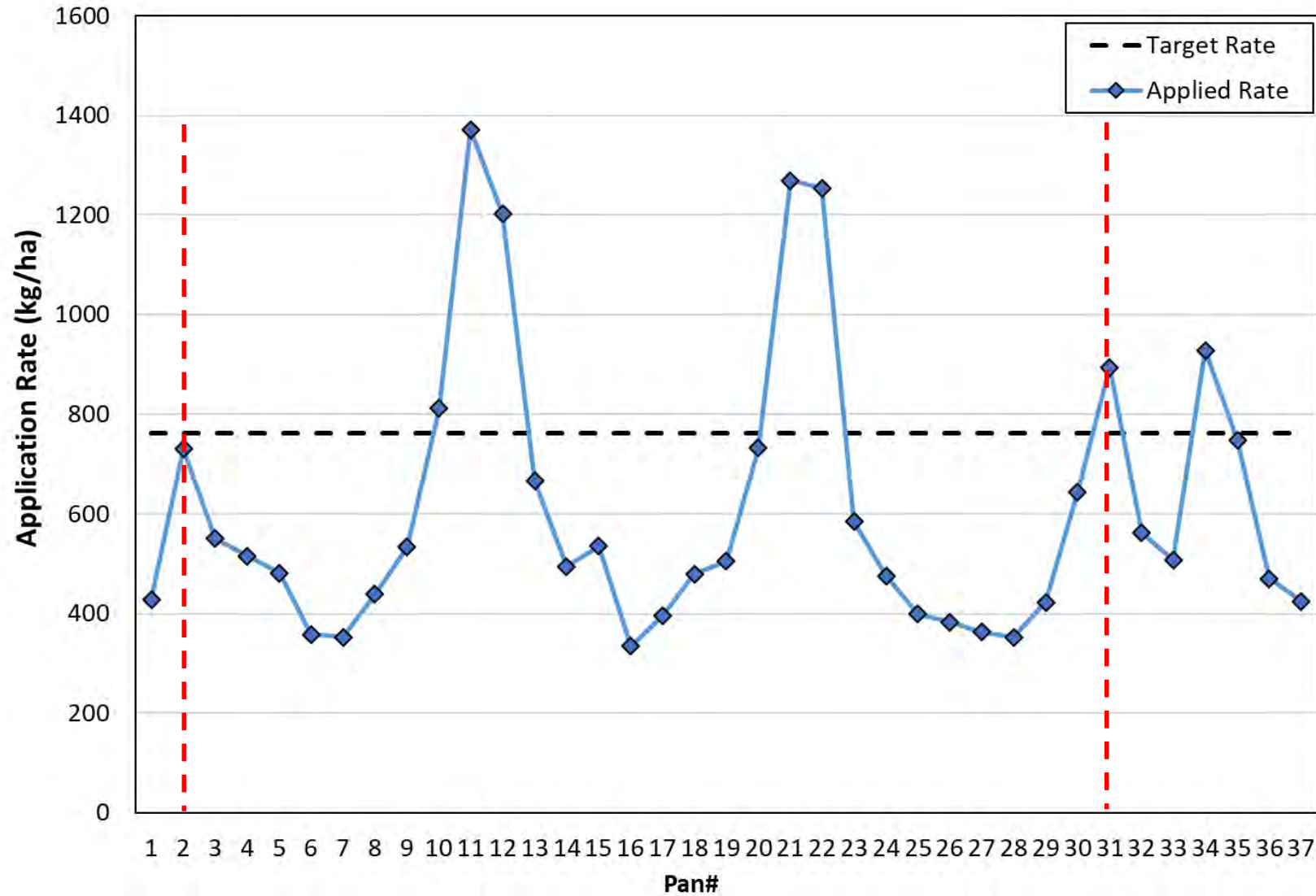


Field 1: N-P-K : 10-17-24 (%)

- Mean Application Rate: 572 kg/ha
- CV = 54%

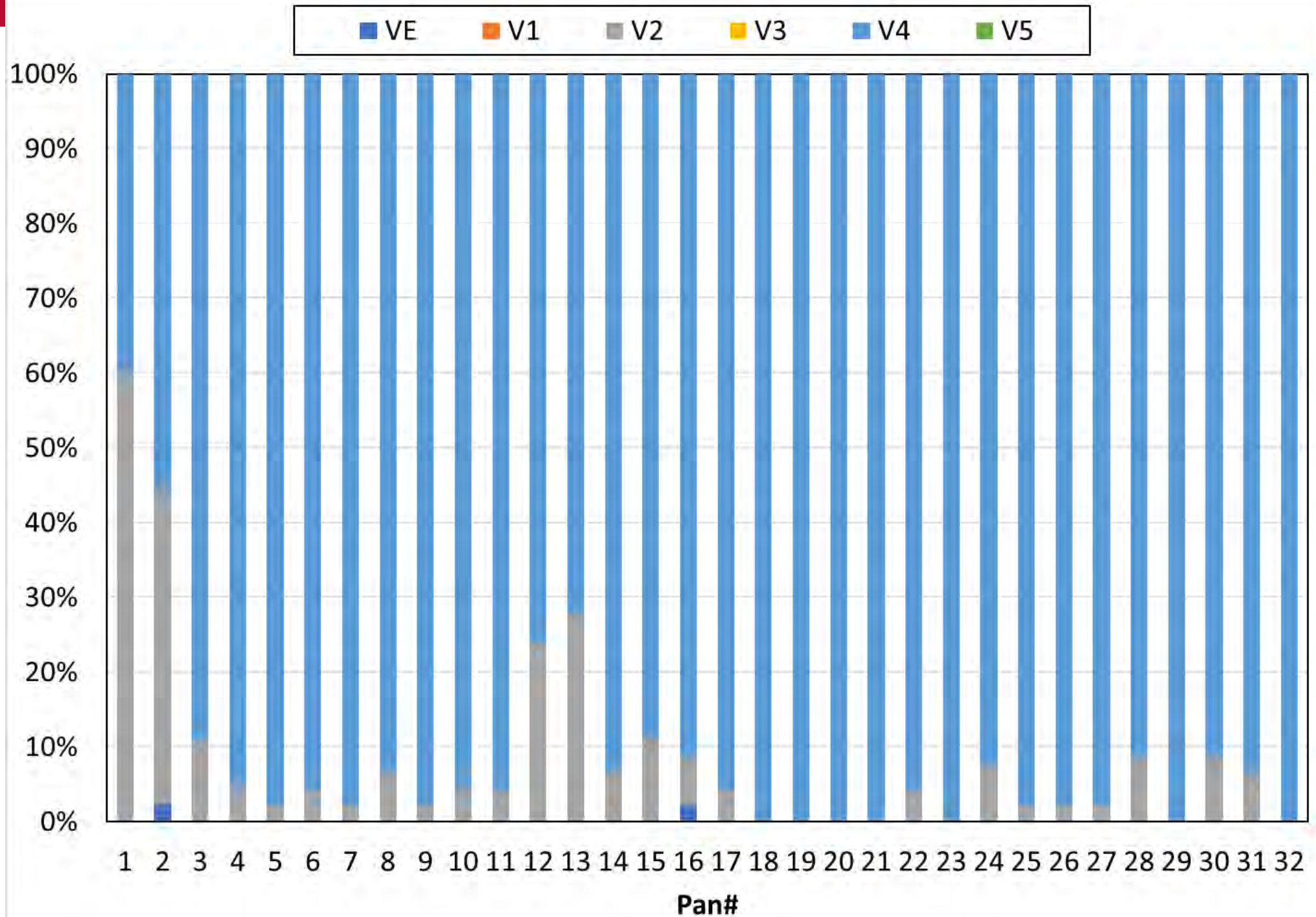
Field 2: Midville

N-P-K : 13-23-20 (%)

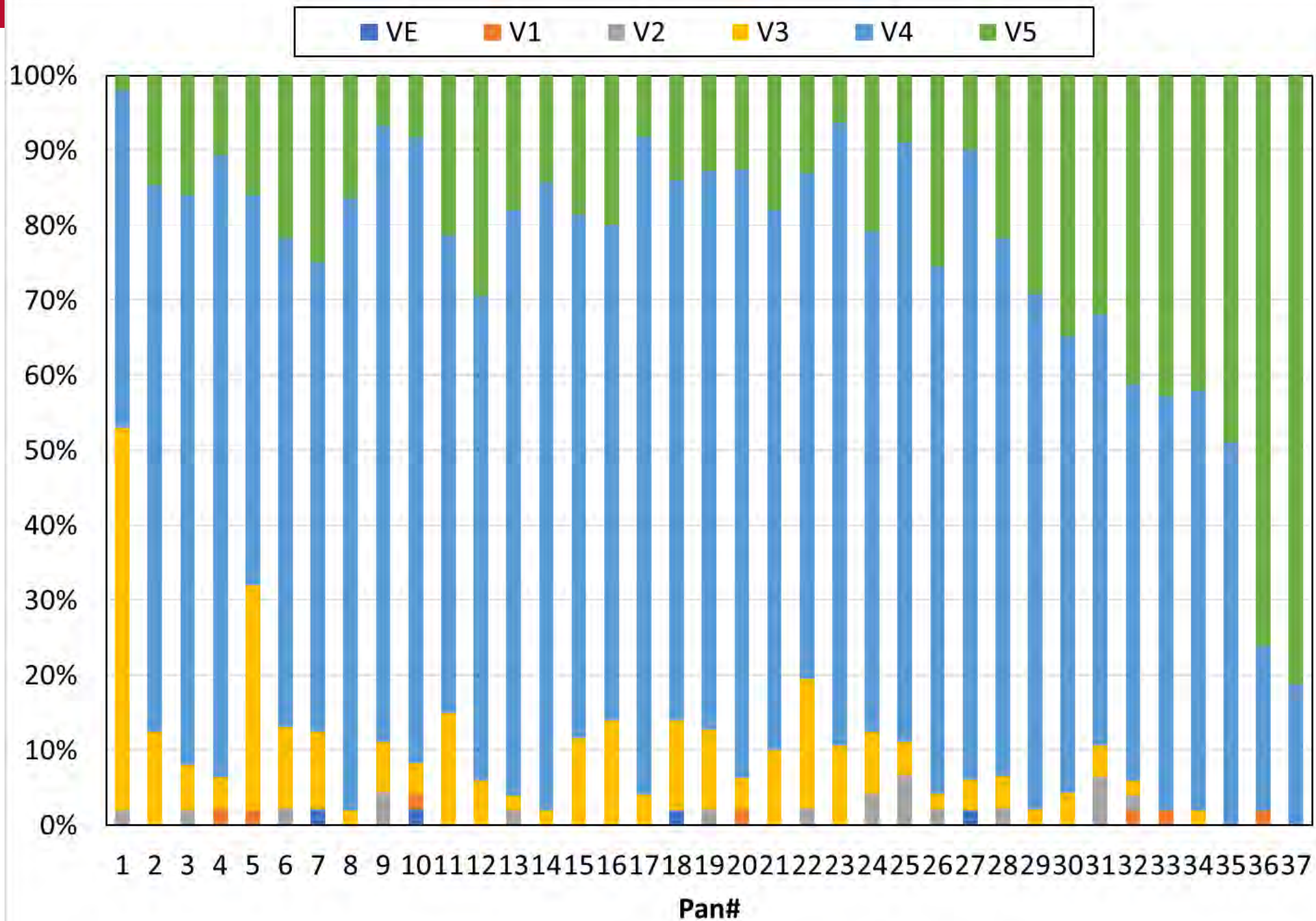


- Mean Application Rate: 611 kg/ha
- CV = 46%

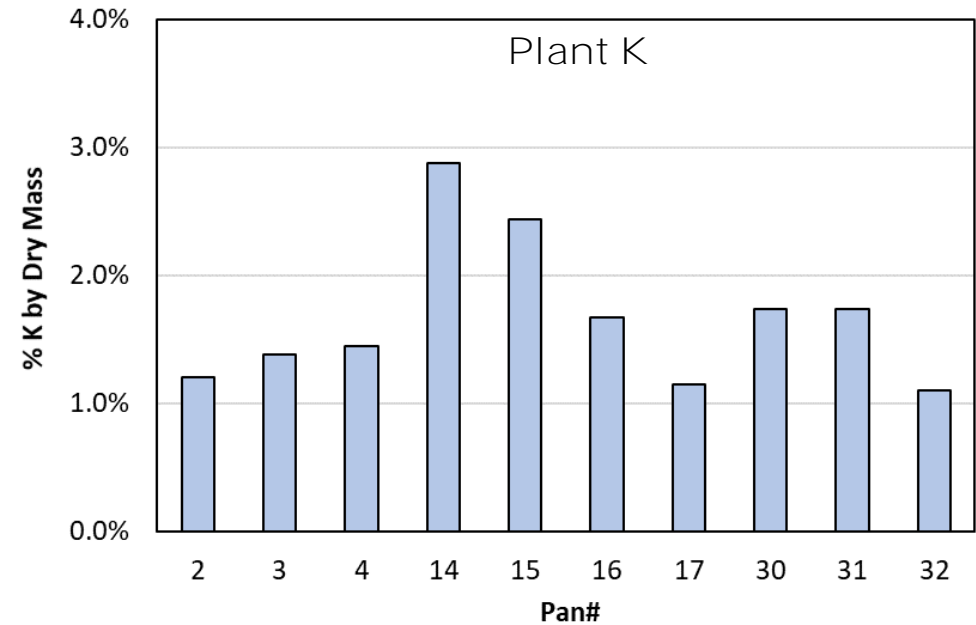
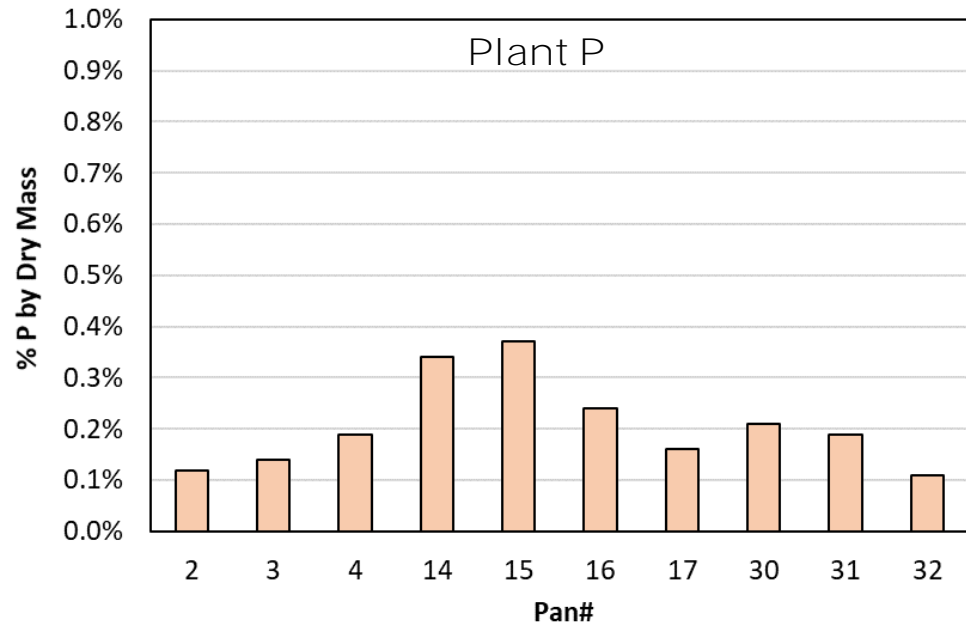
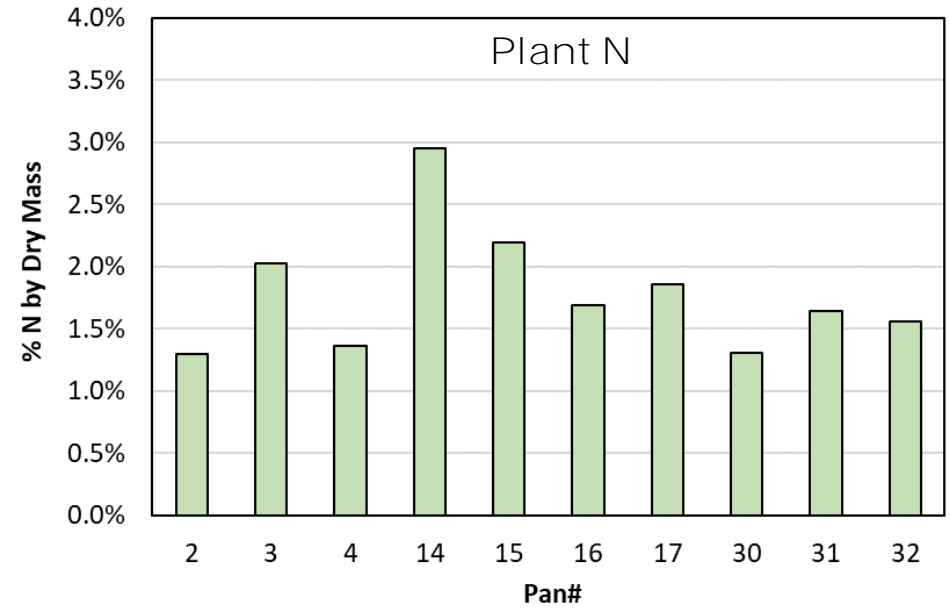
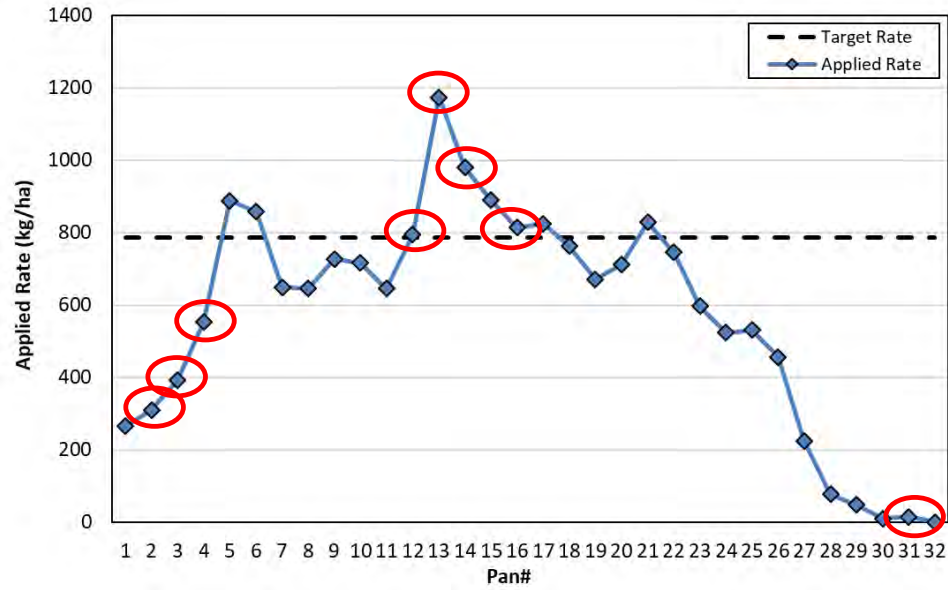
Field 1: Tifton
Percent of the plants in each growth stage



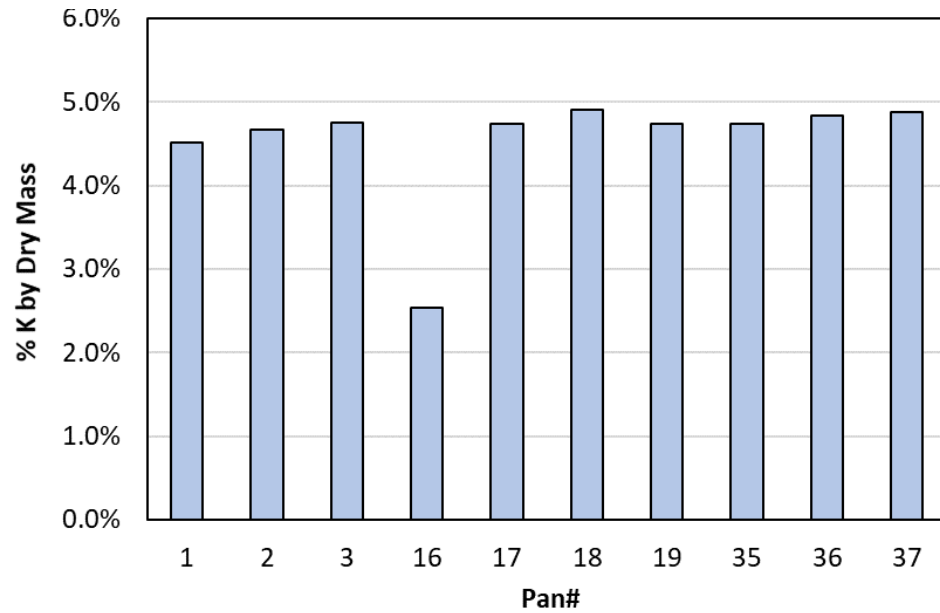
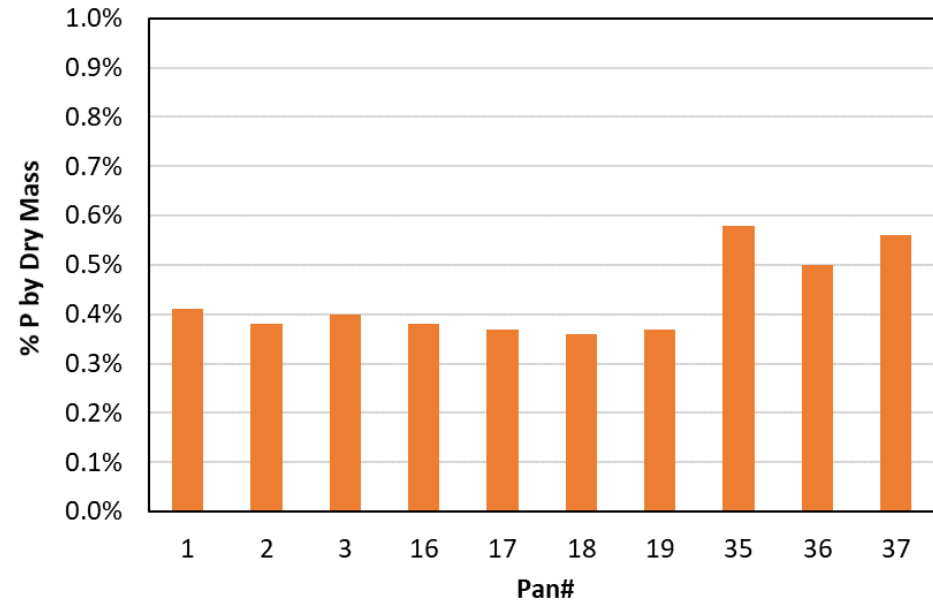
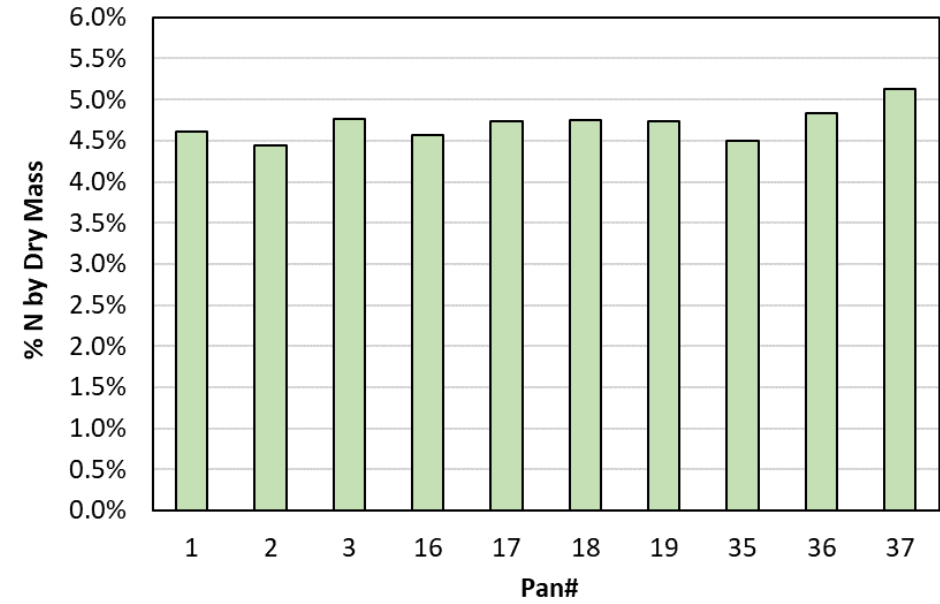
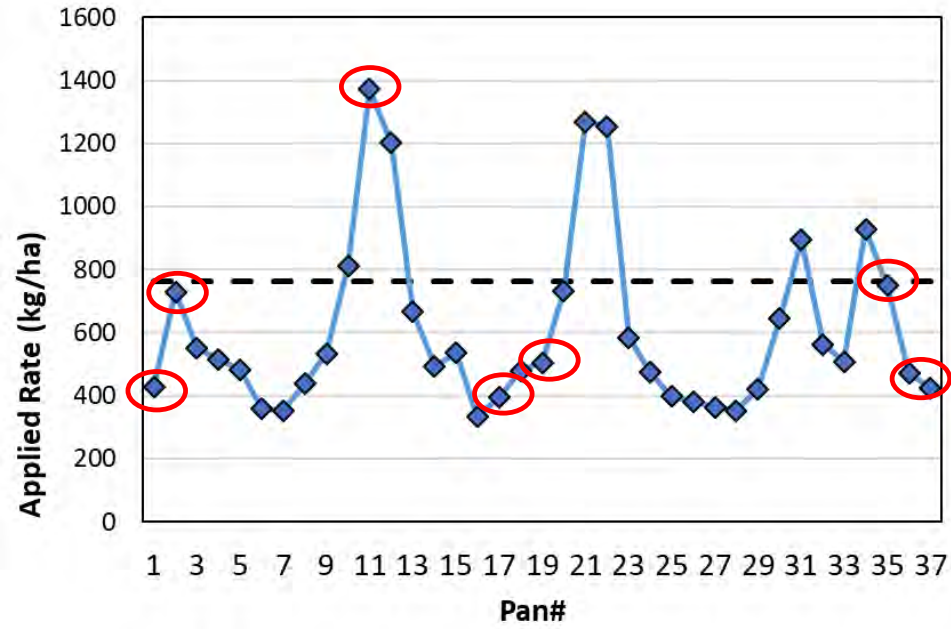
Field 2:
Midville
Percent of the
plants in each
growth stage



Field 1: Tifton

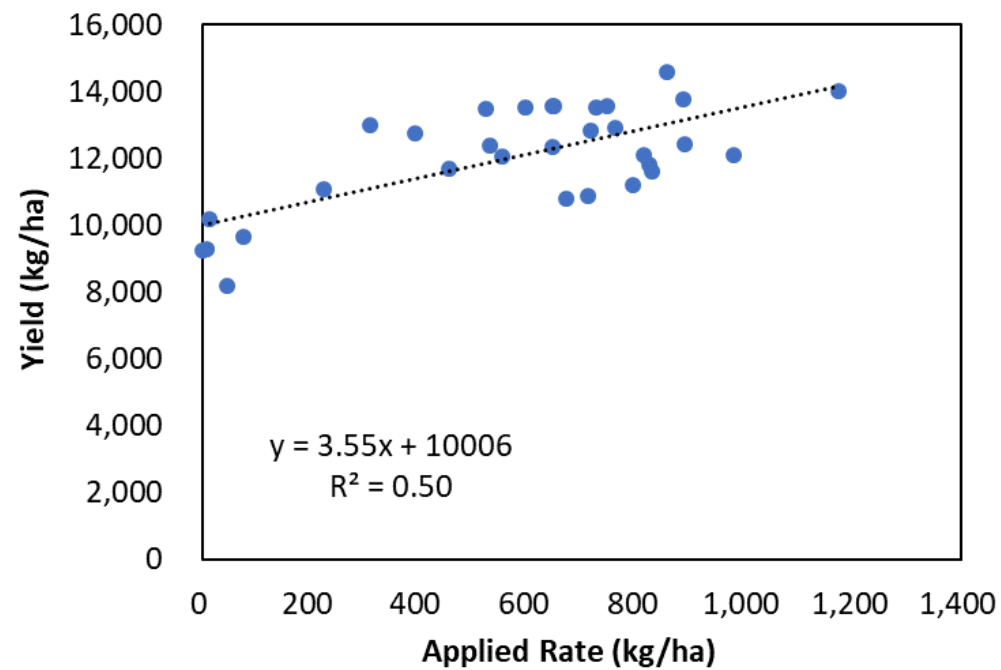
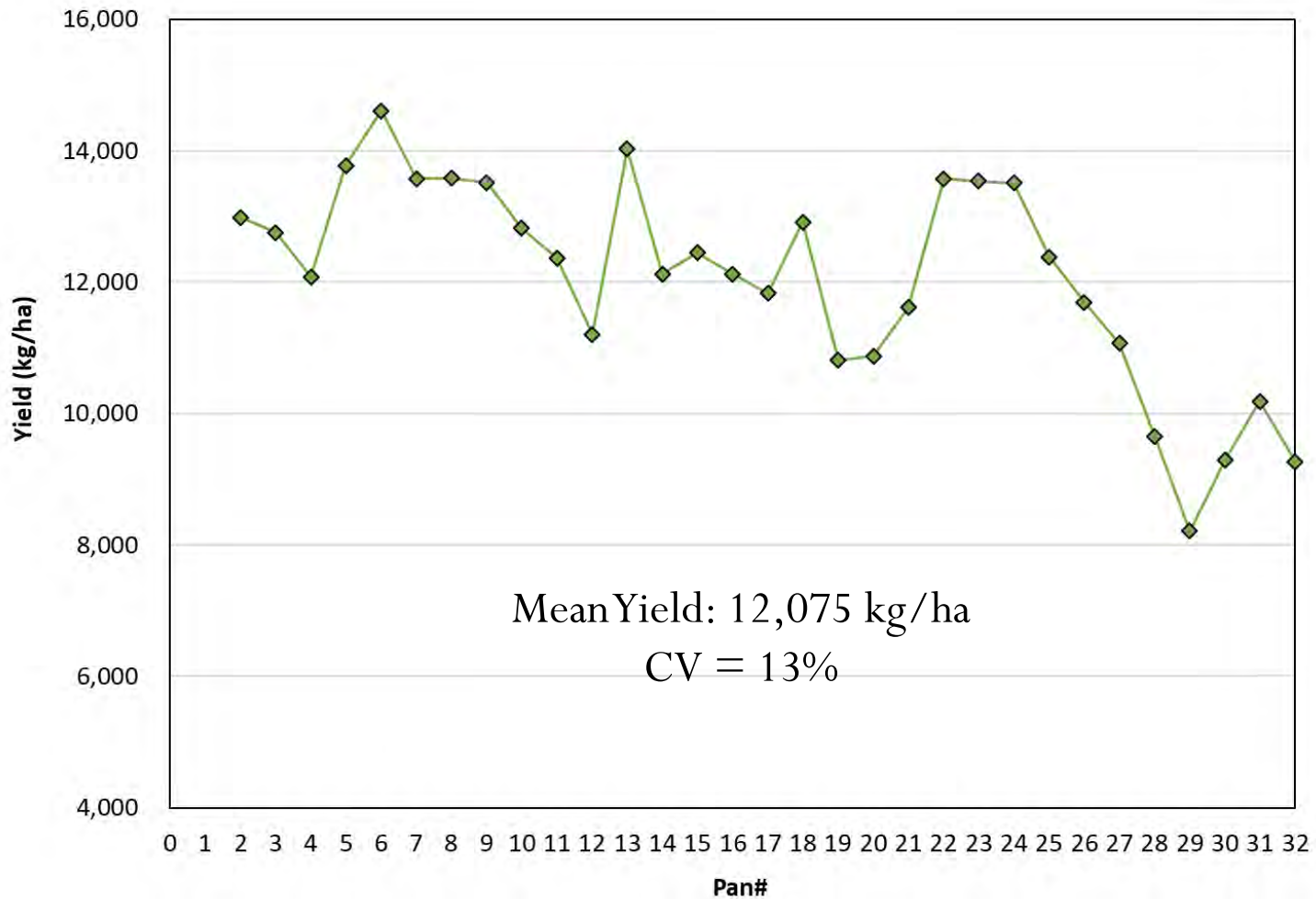


Field 2 - Midville



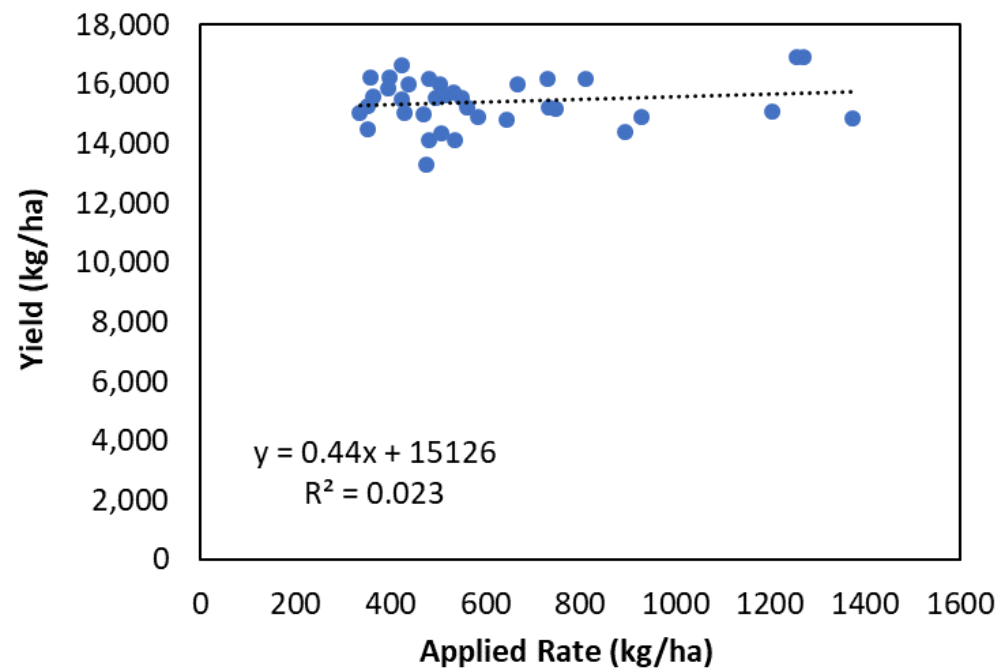
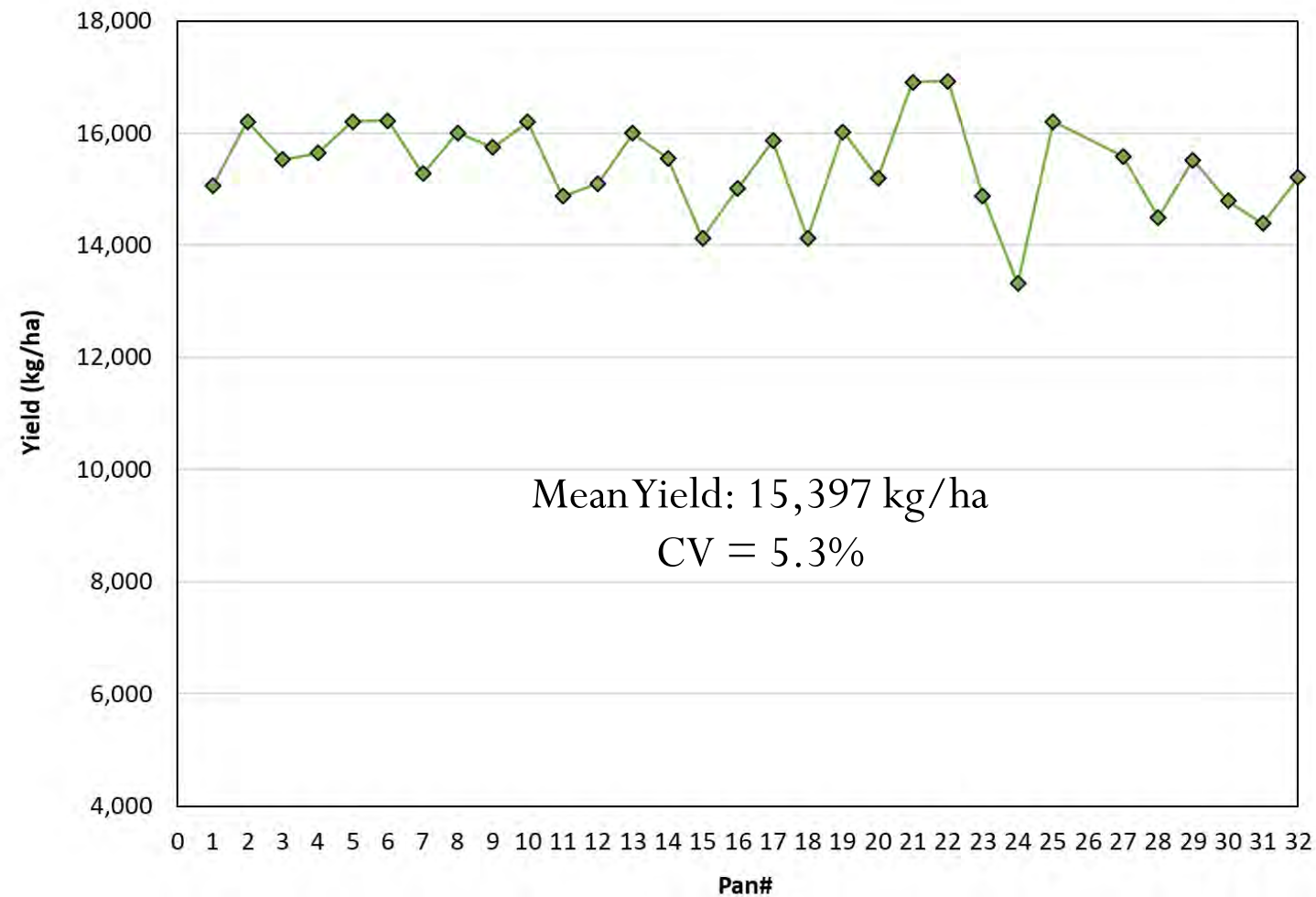
YIELD

Field 1 - Tifton



YIELD

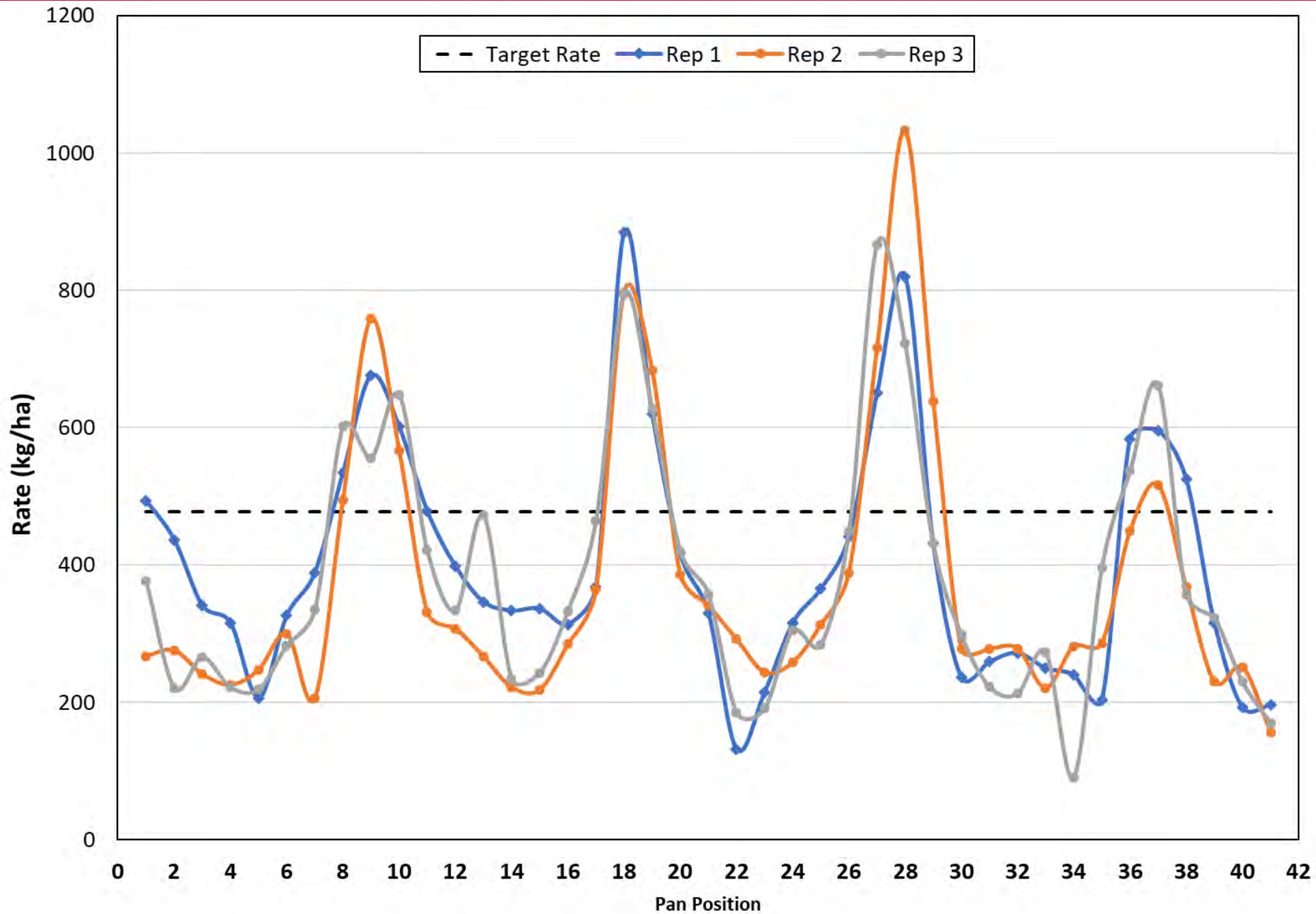
Field 2 - Midville



SUMMARY

- Considerable amount of variability in applied fertilizer rate and distribution was observed in the field at both locations.
- Plant nutrient levels differed more among the applied rates in the field in Tifton than in Midville.
- Differences in corn yield were observed in Tifton but did not follow the same trend as applied fertilizer rate.

2022 Study - Midville



Thanks!

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