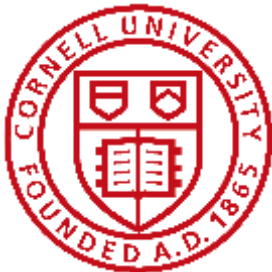


# Sorghum Nitrogen Rate and Time of Harvest Study: 2016 Set-Up Protocol

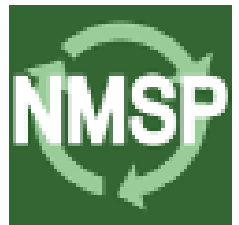
Sarah Lyons, Greg Godwin, Chutao Liu, Quirine Ketterings  
Cornell Nutrient Management Spear Program (NMSP)



[sel248@cornell.edu](mailto:sel248@cornell.edu)

[gmk2@cornell.edu](mailto:gmk2@cornell.edu) – [gsg6@cornell.edu](mailto:gsg6@cornell.edu)

Main phone contact number (Sarah): 828-290-3584



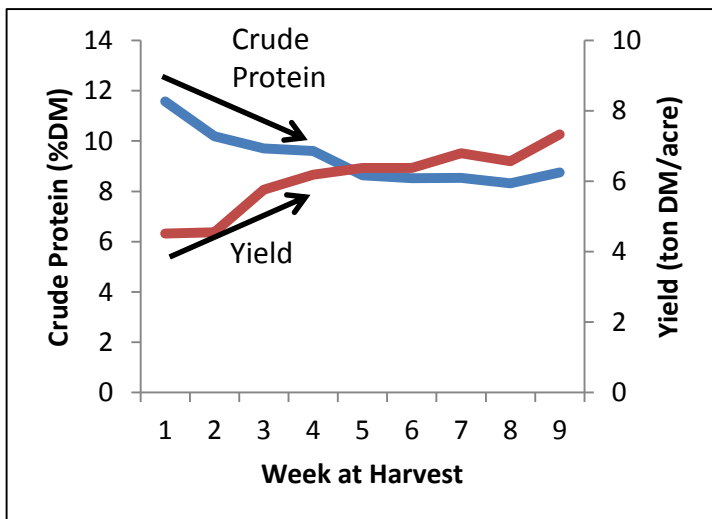
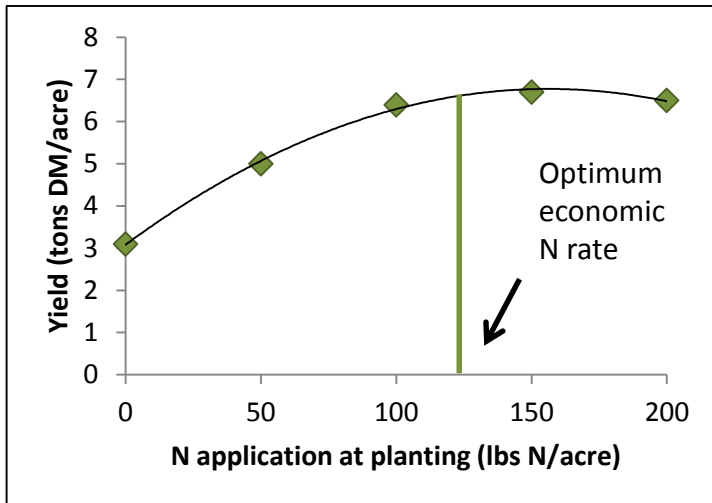
# Introduction

---

- Brown midrib (BMR) brachytic dwarf forage sorghum is a potential alternative to corn silage, especially when corn planting is delayed due to wet soil conditions or harvest of a 1<sup>st</sup> cutting of hay or a winter cereal grown for forage (double crop harvest).
- BMR forage sorghum has the potential to fit better in a shorter growing season than some corn varieties.
- Nitrogen fertilizer and harvest guidelines need to be developed for New York.



# Project Objectives



- To determine the nitrogen (N) rate of sorghum as part of a double cropping rotation with winter cereals
- To determine the ideal time of harvest to optimize both yield and forage quality
- Sites with 4 replications of 5 N rates:
  - 0 lbs of N/acre
  - 50 lbs of N/acre
  - 100 lbs of N/acre
  - 150 lbs of N/acre
  - 200 lbs of N/acre

# Timeline

---

- Plant in mid May – mid June.
- Weekly harvests from mid-September through mid-October (5 weeks total).
- Weekly harvests are ONLY 100 and 200 lbs N/acre treatments.
- Nitrogen rate trial harvest will include all treatments and be done when the 100 lbs/acre treatment is at the soft dough stage (all treatments harvested that day).
- See harvest materials for a description of the growth stages.



# Set-Up Supplies

---

- Plot map
- 300 ft measuring tape
- 1 striped anchoring pin
- 4 orange driveway markers
- 16 white step-in posts
- 80 flags
  - 16 blue (0 lbs N/ac)
  - 16 green (50 lbs N/ac)
  - 16 yellow (100 lbs/ac)
  - 16 pink (150 lbs N/ac)
  - 16 red (200 lbs N/ac)
  - 16 white (perimeter)
- Soil probe, scarper and bucket
- 4 soil sample labels
- 8 soil bags (4 composites, double bagged)
- Drop spreader for applying fertilizer
- Cooler or shipping container with ice packs
- Camera (if available)
- GPS (if available)

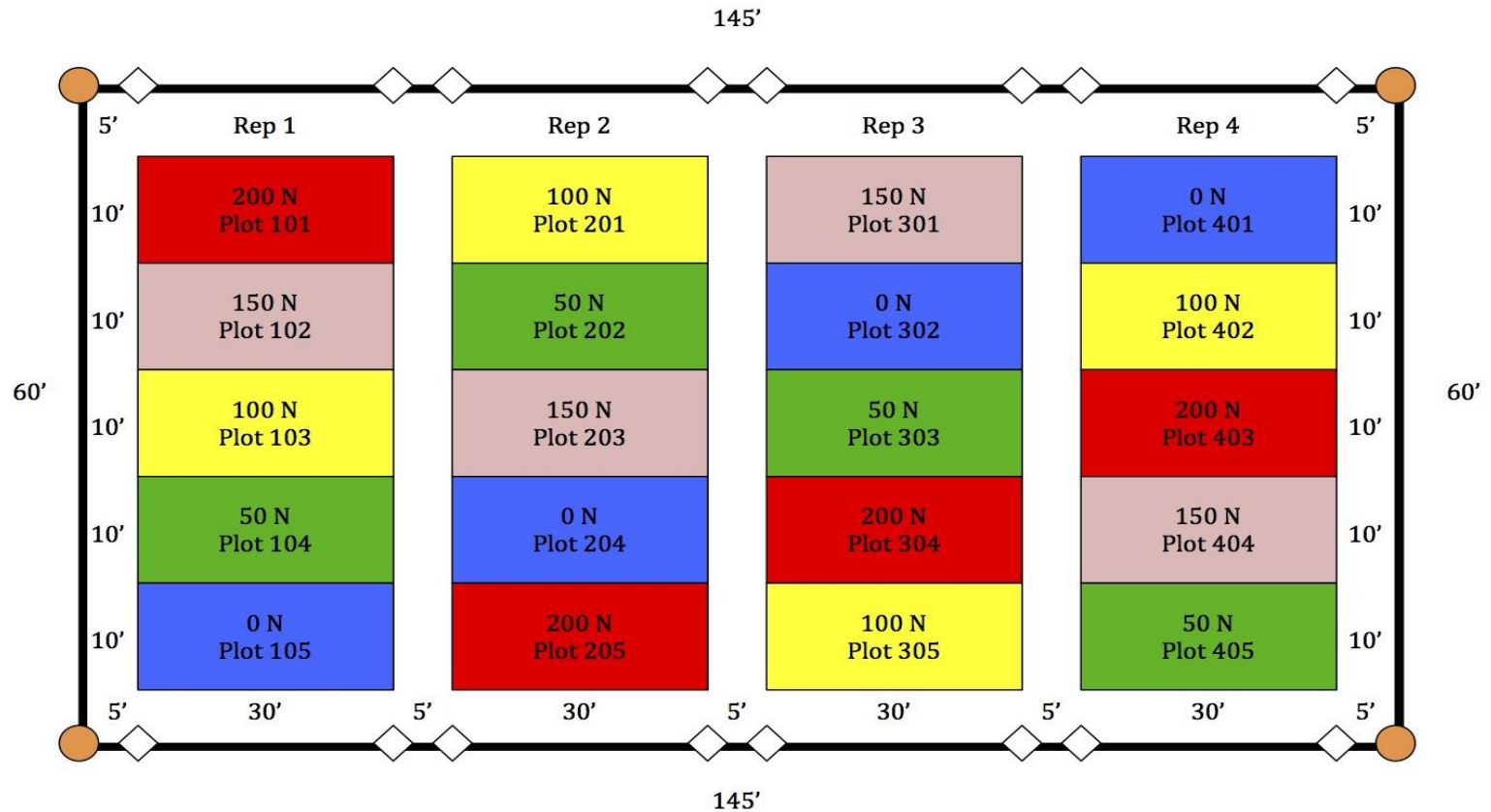


# Set-Up Supplies

---



# Plot map




\*5 ft buffer strips can be widened if necessary

\*10 ft plot widths can be adjusted according to planter width

# Prior to Setup

- Complete the field history information for the field being used.
- This information is needed to compare results for different sites in the study

Field History Data Collection Sheet – Nutrient Management Spear Program --- Sorghum Project 2016  
Cornell University Department of Animal Science 

Date: \_\_\_\_\_

Farm Name: \_\_\_\_\_

Farm Address: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_

Crop Year:

Questions? Contact: Duhrine Galbraith, qmk2@cornell.edu, 607-255-3261

---

**Field History Survey**

1) Field ID	<input type="text"/>	2) Field Size	<input type="text"/>	acres
2) County	<input type="text"/>	4) Soil Type	<input type="text"/>	
5) Drained or <del>Unirrigated</del>	<input type="text"/>	6) 2015 Corn Crop Variety	<input type="text"/>	
7) 2015 Corn Planting Date	<input type="text"/>	8) BMR Corn in 2015? Y / N	<input type="text"/>	
9) 2015 Corn Harvest Date	<input type="text"/>	10) 30" -36", 15", or Twin Rows?	<input type="text"/>	
11) 2016 Sorghum Info:	<input type="text"/>	12) Mucuna cover or double crop grown 2015/16?	<input type="text"/>	
Seeding Date	<input type="text"/>	13) If cover/double crop, what type:	<input type="text"/>	
Seeding Rate	<input type="text"/>			
Variety	<input type="text"/>			
Seeding Method	<input type="text"/>	Row spacing if drilled:	<input type="text"/>	inches
Harvest Date?	<input type="text"/>			
Harvest Method?	<input type="text"/>			



# Site Setup

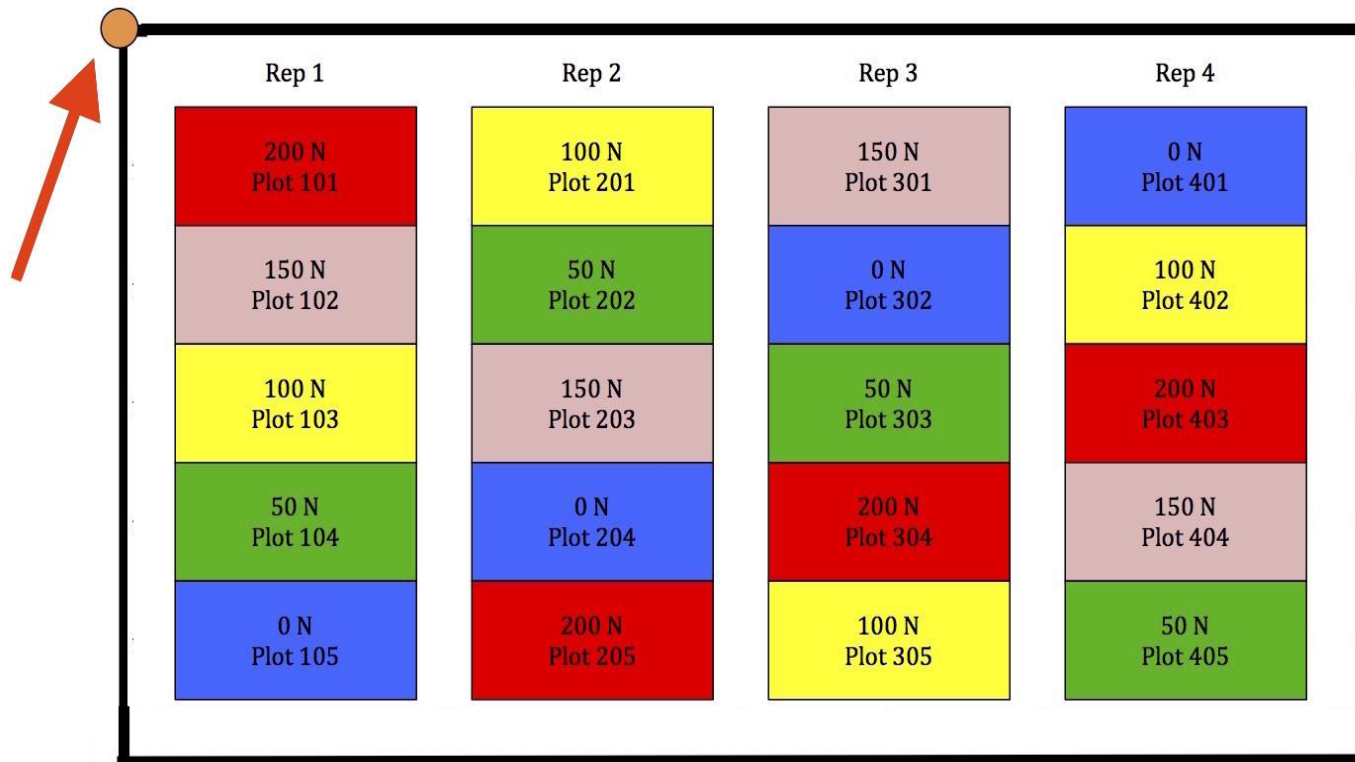
---

1. Plant the entire trial area with sorghum at recommending seeding rate (likely close to 15 lbs/acre).



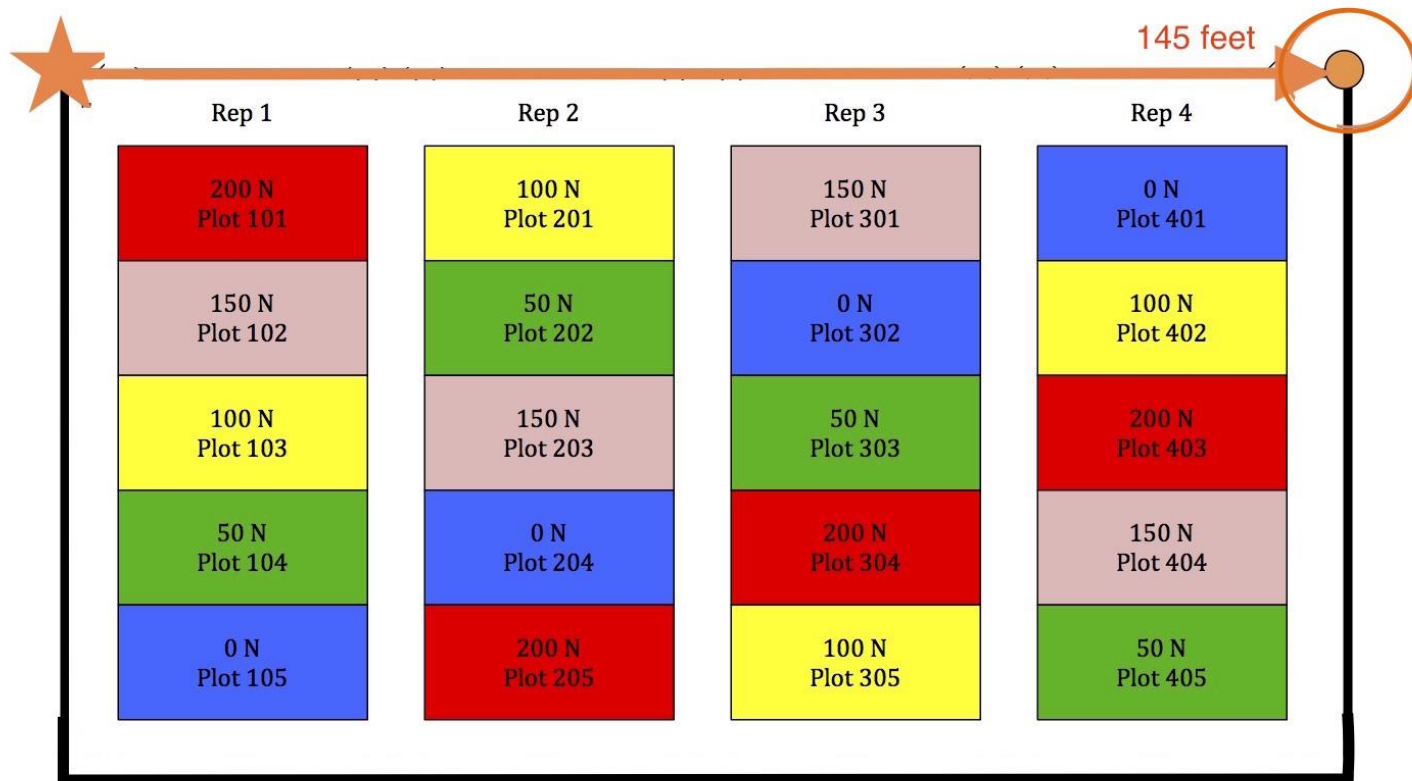
# Site Setup

2. Place one orange driveway marker on the front left corner of the site.



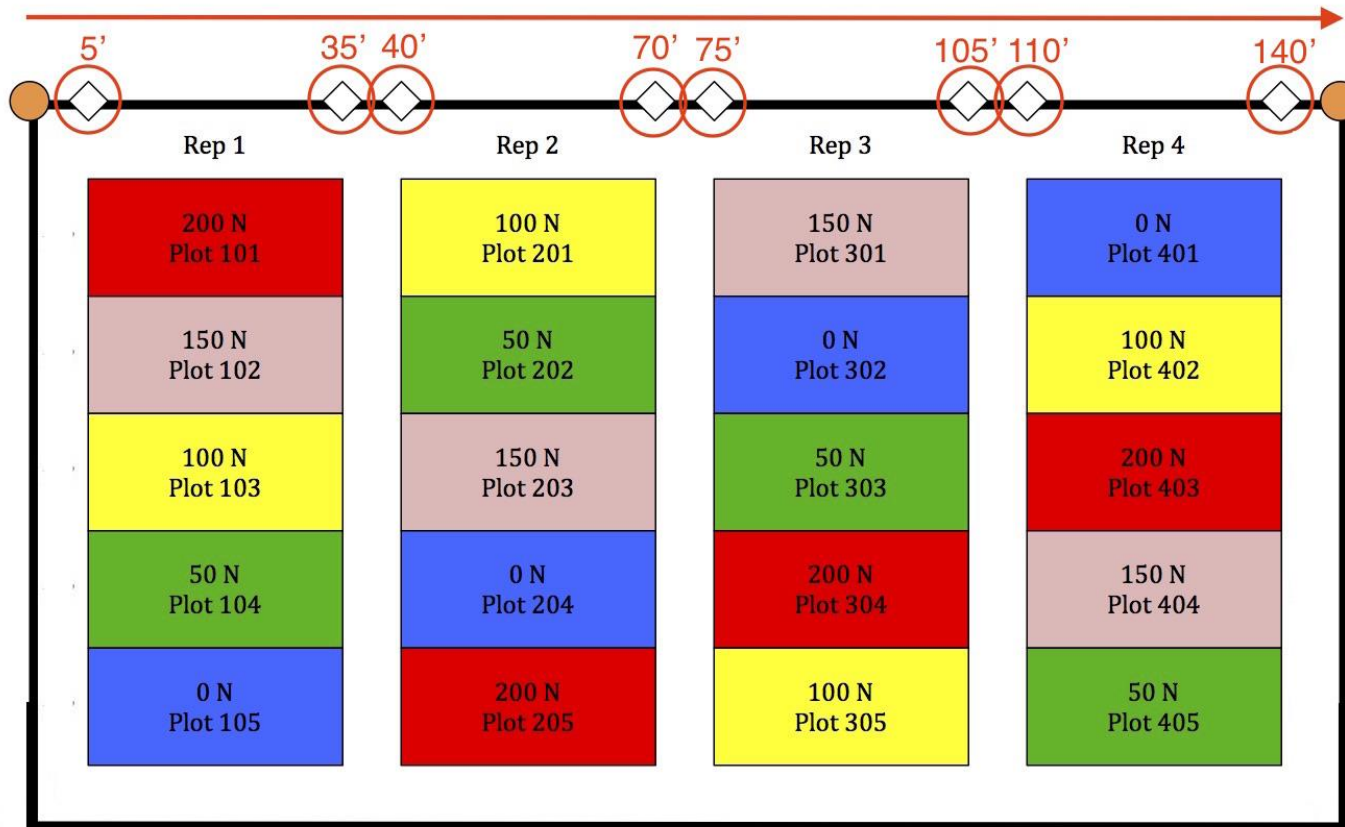
# Site Setup

- Anchor one end of the measuring tape on the front left corner of the site and stretch 145 ft to the front right corner, place another orange driveway marker there.



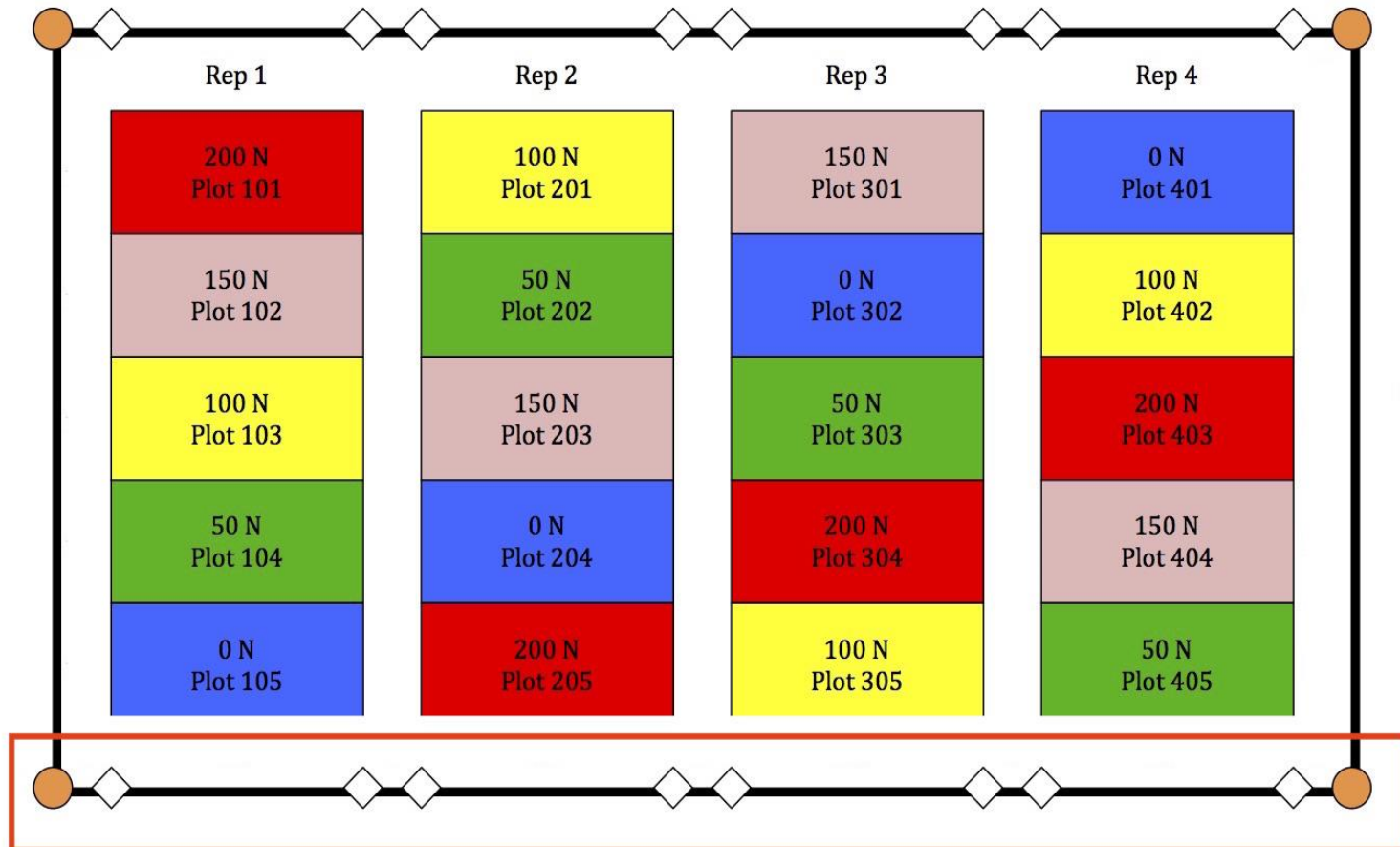
# Site Setup

- Starting at the front left corner, walk along the tape and place step-in posts at the 5', 35', 40', 70', 75', 105', 110', 140' tape marks.



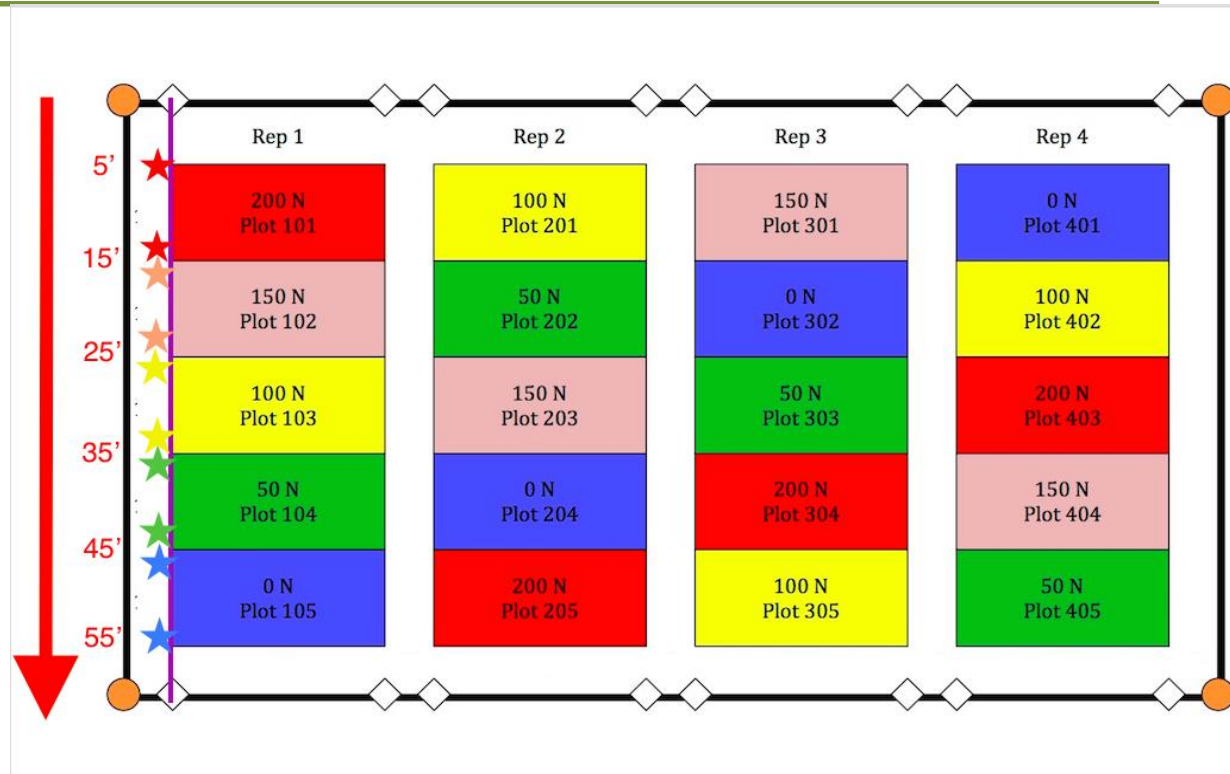
# Site Setup

- Repeat steps 2-4 on the back side of the field.



# Plot Setup

1. Anchor the tape at the first step-in post on the front left corner, stretch tape to the first step-in post on the back left corner.

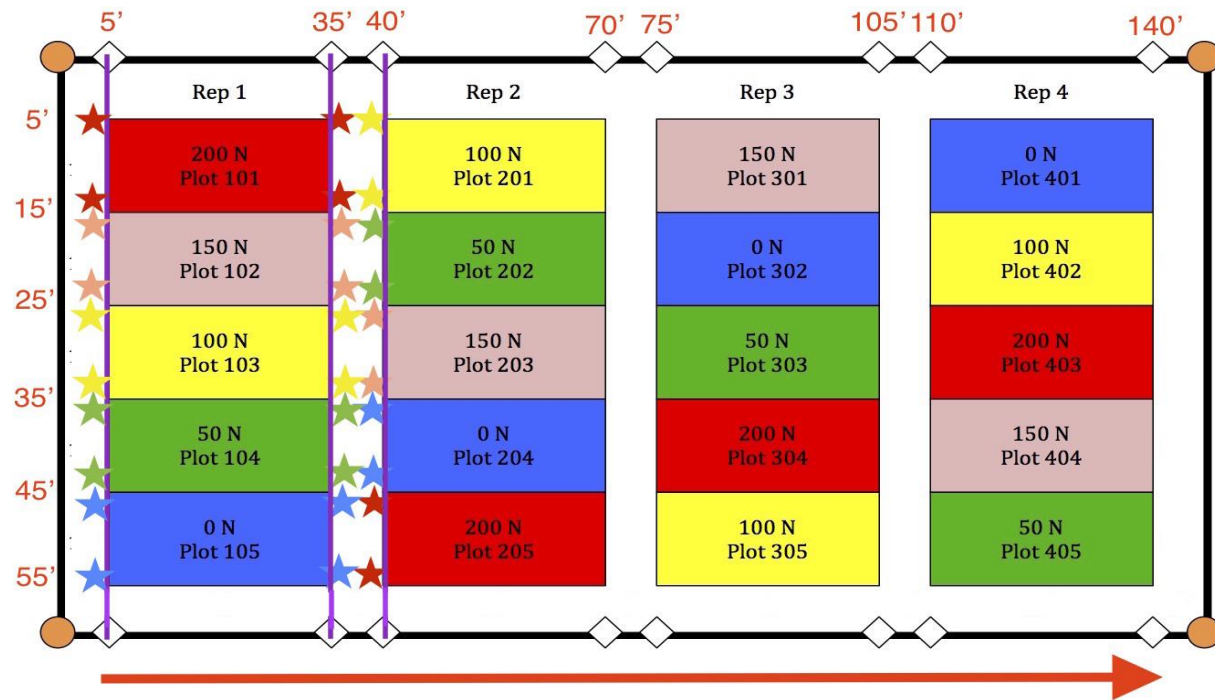


Starting at the 5ft tape mark (to include the 5ft buffer), place two flags with corresponding treatment colors every 10 feet to mark the plots (the ends will only have one flag). So flags will be placed at the 5', 15', 25', 35', 45' and 55' tape marks.



# Plot Setup

2. Move the tape from the left to the right side of the site. Flags of corresponding treatment colors will be placed parallel to those white step-in posts on the



front and back sides of the site (at the 5', 15', 25', 35', 45' and 55' tape marks). Repeat this for each set of flags.

# Site Setup

---



# Soil Sampling

---

1. Place the first soil bag in the bucket and place the soil label inside, face down, at the bottom. Then place the second bag inside the first (to avoid label getting wet).



# Soil Sampling

2. Using the soil probe, take a total of ten, 0-8 inch-deep soil cores around the inside of each replication (~ 2 cores per treatment plot). Make sure the two spots are randomly chosen in each plot. Scrape the cores into plastic bags in the bucket.





# Soil Sampling

---

3. After all cores have been take for a replication, know the bag loosely to allow for easy unpacking.
4. Place the soil sample bags in a cooler/shipping container with ice packs for transport to the NMSP lab as soon as possible for processing and analysis. Call Sarah when completed so we can arrange for pickup.
5. Store in a fridge if there will be a delay in transporting back to the lab.



# Fertilizer Application

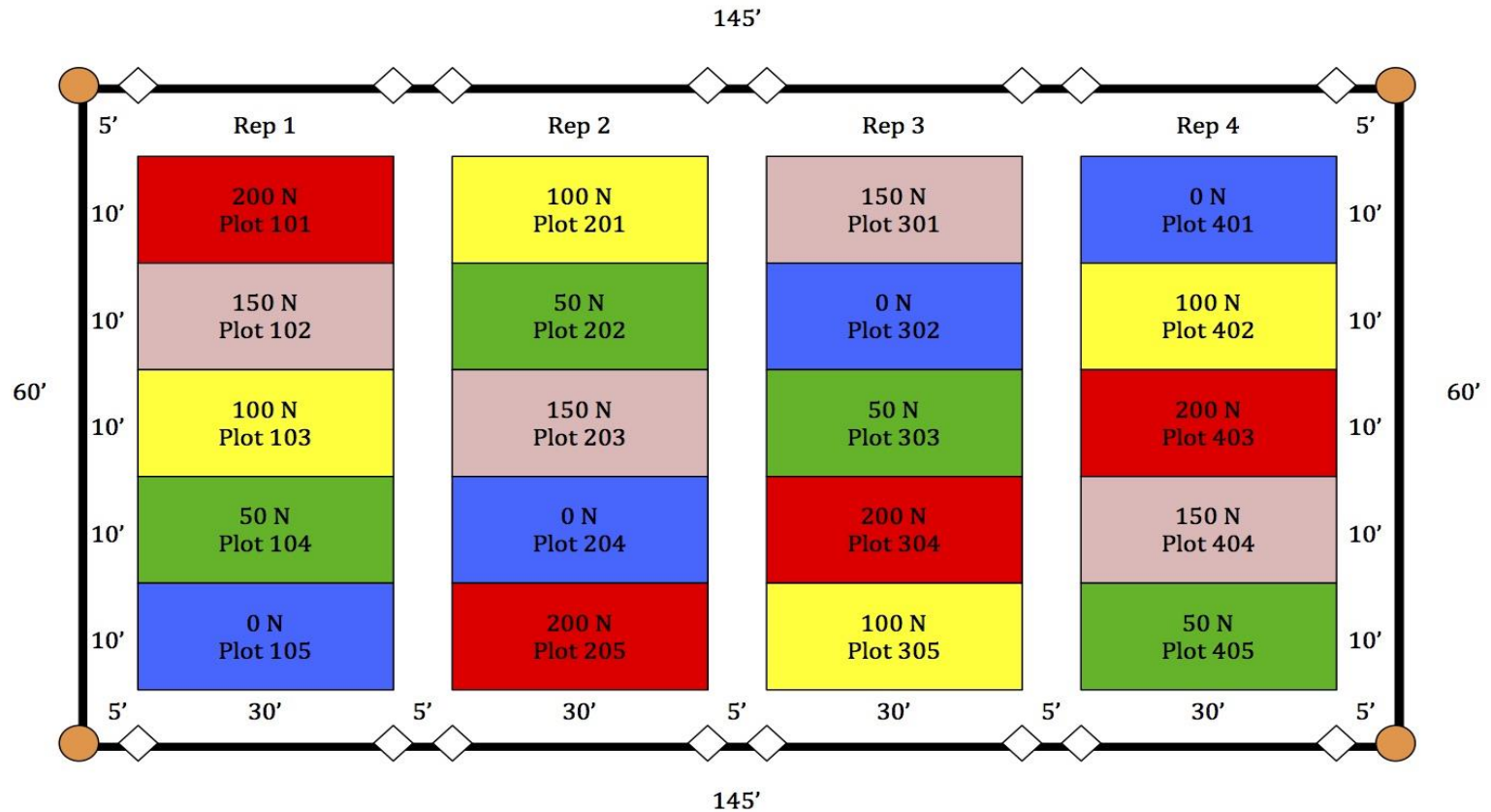
---

1. Ensure that all soil samples have been taken prior to fertilizer application.
2. Once soil sampling is completed, fertilizer can be applied. Be careful to apply the correct rate of fertilizer in the corresponding plot using the drop spreader.





# Plot map



\*5 ft buffer strips can be widened if necessary

\*10 ft plot widths can be adjusted according to planter width

# Step-in posts

---

- After fertilizer is applied, place white step-in posts (or orange driveway markers) where the white flags are on the perimeter of the plots. This will help identify the plot boundaries when the sorghum grows taller than the flags.





# Contact Information

---

## **Sarah Lyons**

318 Morrison Hall, Cornell

Ithaca NY, 14853

Phone: 828-290-3584

Email: [sel248@cornell.edu](mailto:sel248@cornell.edu)

## **Greg Godwin**

330 Morrison Hall, Cornell

Ithaca NY, 14853

Phone: 607-279-4627

Email: [gsg6@cornell.edu](mailto:gsg6@cornell.edu)

## **Quirine Ketterings**

323 Morrison Hall, Cornell

Ithaca NY, 14853

Phone: 607-255-3061

Email: [qmk2@cornell.edu](mailto:qmk2@cornell.edu)

## **Chutao Liu**

319 Morrison Hall, Cornell

Ithaca NY, 14853

Phone: 607-379-8576

Email: [cl2298@cornell.edu](mailto:cl2298@cornell.edu)

# New York On-Farm Research Partnership

---

<http://nmsp.cals.cornell.edu/NYOnFarmResearchPartnership/>

There is great power from research information when field data are generated through well designed, repeated and widely implemented trials, with proper data collection and statistically valid analyses.

Consider being an on-farm research partner!

Relevant Questions and Sound Science for Agricultural Profitability and Protection of the Environment