

2016 BMR Sorghum N Rate and Stage of Harvest Study Set-up Protocol

Contact: Sarah Lyons (Phone: 828-290-3584)

Nutrient Management Spear Program

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

Overview

Double cropping with winter cereals for forage in NY has shown to be beneficial in increasing full season yield through providing, on average, 1.6 tons DM/acre for cereal rye and 2.2 tons/acre of triticale. However, harvesting winter cereals in time for planting corn silage can be challenging, especially in extreme weather scenarios. An alternative summer annual that has a short growing season and high yields, such as brown midrib (BMR) sorghum, could be a better fit for double cropping rotations. There are two primary goals of this project. One is to determine the optimal nitrogen rate needed by BMR sorghum seeded after a winter cereal and harvested for forage prior to winter cereal planting in the fall. The second is to determine the tradeoff between timing of harvest and the yield and quality. In homogenous looking areas of fields seeded to BMR sorghum in summer 2016, sites that are 60 by 145 ft will be set up. These sites have 4 replications of 5 different N rates: 0, 50, 100, 150, 200 lbs N/acre applied at planting (see attached field map). Soil samples will be taken prior to fertilizer application to determine the initial fertility (one sample of ten cores per replication). Weekly harvests (5 times) of the 100 and 200 N rate plots will begin in mid September to cover growth stages 5 through 9. Harvest for the N rate trial, including all plots and N rates, will occur when the BMR sorghum reaches soft dough stage (Stage 7).

2016 Initial site set-up

Supplies

Plot map

300 ft measuring tape

1 striped anchoring pin

4 orange driveway markers

12 white step-in posts

80 flags

- 16 blue (control)
- 16 green (50 lbs N/ac)
- 16 yellow (100 lbs N/ac)
- 16 pink (150 lbs N/ac)
- 16 red (200 lbs N/ac)

Soil probe, scraper, and bucket (1-quart container)

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)

Prior to set-up

1. Complete the field history information for the field being used

Site set-up

1. Plant the entire trial area (145' x 60') with sorghum at recommending seeding rate, should be close to 15 lbs/acre.
2. Place one orange driveway marker on the front corner of the field area of choice.
3. Anchor one end of the measuring tape on that front right corner of the field and stretch 145 ft to the front left corner, place another orange driveway marker here.
4. Starting at one of these corners, walk along the tape and place step in posts at the 5', 35', 40', 70', 75', 105', 110', 140' tape marks (See map for a visual of post placements).
5. Repeat steps 2-4 on the back side of the field (back right – back left).
6. Next, anchor the tape where you placed the first white post on the front right corner (5 feet away from the driveway marker). Stretch the tape to the first white post on the back right corner of the field. Starting at the 5 ft tape mark (to include the 5 ft buffer) place two flags with the 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. **If your planter width is different from 10 feet, adjust the width of the plots accordingly.
7. Repeat step 6 on the left side of the field.
8. Next, stretch tape between flags placed on the right and left sides of the field to mark the corners of the treatment areas. Flags of corresponding treatment colors will be placed parallel to those white step-in posts on the front and back sides of the plot (at the 30', 35', 65', 70', 100', 105', 135' marks). Repeat this for each set of flags. Refer to the map for a visual.

Soil sampling

For each replication:

Use a soil probe to take ten 0-8 inch-deep cores for one composite soil sample per replication following the steps below.

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 the label getting wet)
2. Using the soil probe, take a total of ten, 0-8 inch deep soil cores around the inside perimeter of each replication. Scrape the cores into the plastic bags in the bucket. Make sure you randomly select two spots to sample in each plot.
3. After all cores have been taken for a replication, twist the inner bag and knot the outer one in order 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.

Fertilizer application

1. **Ensure that all soil samples have been taken prior to fertilizer application!**

2. Be careful to apply the correct rate of fertilizer in the corresponding plot using the drop spreader.

Finishing set-up

1. Please note on the plot map the orientation of the site within the field for reference (locate any landmarks, which direction is north, etc.)
2. If possible, please include the GPS coordinates of the location and the closest address.
3. Take pictures of the site once set up.
4. **If you haven't done so already, please provide a copy of the field history with the samples when you send them to NMSP.**
5. Fill out field activity sheet and send back with samples to NMSP.
6. Send or transport samples back to NMSP: **Sarah Lyons, 318 Morrison Hall, Dept. of Animal Science, Cornell University, Ithaca, NY 14853.**

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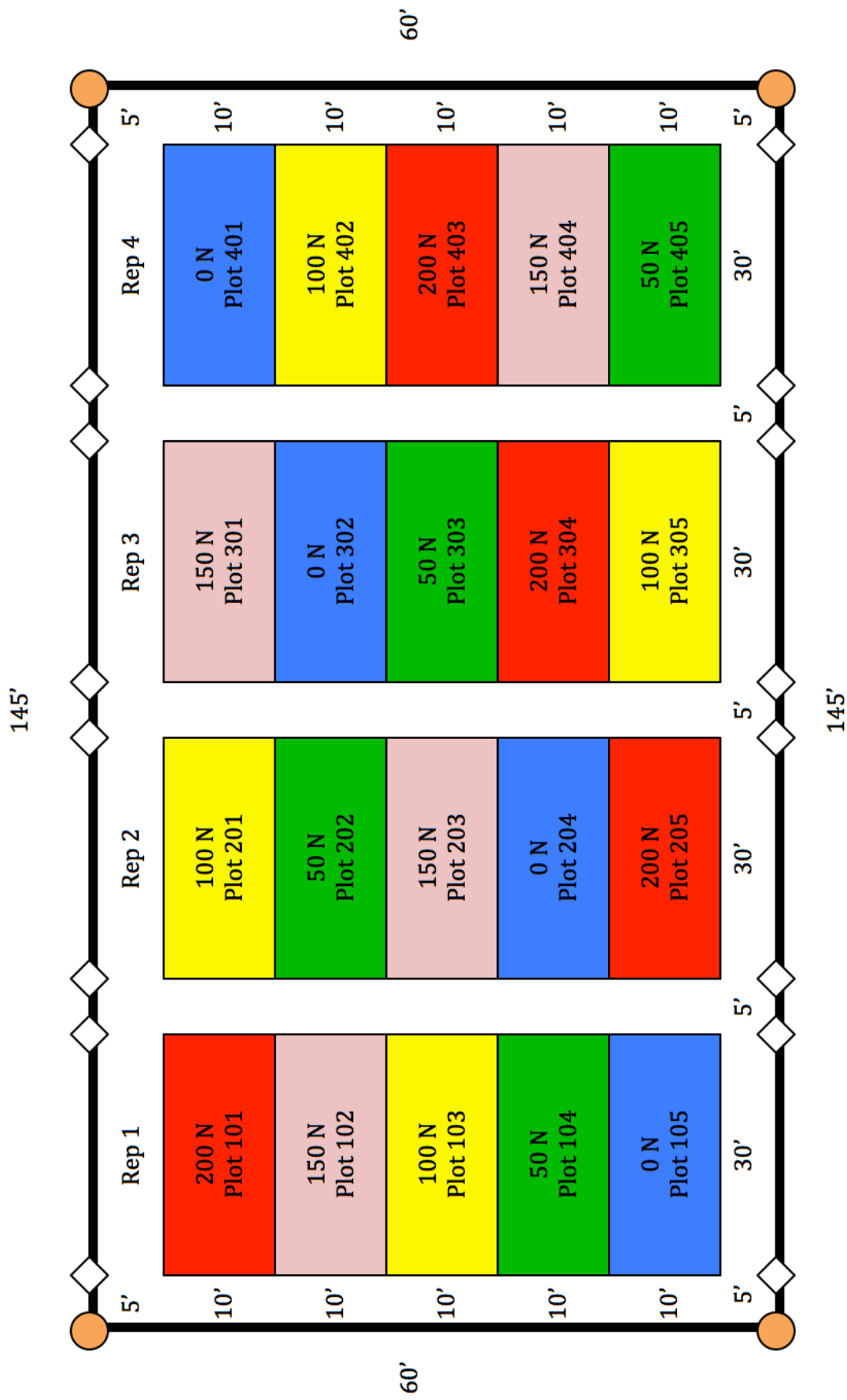


Figure 1: Plot set-up. Fertilizer rates (lbs N/acre) are noted inside the plots and color coded for flagging. Orange circles represent driveway posts, and white diamonds represent white step-in posts.

2016 Sorghum N Rate and Time of Harvest Study – Site Map

Date: _____ Collaborator: _____

Farm Name: _____

Field ID: _____

Location: _____

GPS Location (center of each rep)

Rep	Latitude	Longitude
1		
2		
3		
4		

Map with key reference points and distances between points: