

# **2016 BMR Sorghum N Rate and Stage of Harvest Study Harvest Protocol**

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**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 sampling 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 time of greenup (see attached field map). Soil samples will be taken prior to fertilizer application to determine starting fertility of each plot and overall field. Weekly harvests of the 100 and 200 N rate plots will begin in mid September to cover growth stages 5 through 9 (boot, flowering, soft dough, hard dough, and maturity). Final harvest, including all plots, will occur when the BMR sorghum in the 100 lb/ac treatment reaches soft dough stage (Stage 7).

## **2016 Harvest**

### Supplies

1. Plot map, data sheets
2. Large scale, flat surface for the scale (wooden planks)
3. Gloves
4. Clippers
5. 5 ft pole
6. Orange frame (38.8 L x 8 W x 4 H in)
7. Chipper shredder
8. Labeled gallon ziplock bags for forage samples
9. Pens, sharpies
10. Safety goggles, ear plugs, face mask
11. Cooler with ice packs
12. Drying oven, trays
13. Small scale
14. GPS (if measurements not taken already)

### Harvest Protocol:

1. Lay the scale on an even surface (or use wooden planks). Ensure it is level.
2. Either tare the scale using your weight or record your weight on the data sheet to be subtracted from the sample weight + your weight measurement.
3. Determine harvest area
  - a. Identify plot orientation and location of all treatment plots.
  - b. Make sure you are in the plot with the correct treatment on the map!
  - c. If you are doing a weekly harvest, only harvest the 100 and 200 lbs/acre treatments. All plots will be harvested at stage 7 (week 3).
4. The area in each plot to be harvested is 5 ft long and 4 crop rows wide. Use the 5 ft pole to measure the length starting from the first stalk to be harvested.
5. Harvest the 4 middle rows within the plot. The other rows will act as buffers.
6. Use the orange frame to determine harvest height. Using gloves and shears, cut stalks frame height level for a 4" harvest height.



7. As you harvest, lay all of the stalks facing the same direction in the plot behind you.
8. When finished, carry the stalks to the scale. Holding the stalks, step on the scale and record weight (make sure you either tared the scale for your weight or recorded your weight on the data sheet to be subtracted from your weight + sample weight measurement).



9. Lay stalks on ground and randomly take 5 stalks to grind.
10. Grind stalks through chipper shredder (be sure to have a collection bag in place).
11. Mix well and place chopped sample into a labeled gallon ziplock bag. Place the bag in a cooler with ice packs.
12. \*Try to keep exposure of stalks to the sun to a minimum by keeping time between harvest, weighing and chipping as short as possible.
13. When finished with harvest, record stand count (count the number of stalks harvested, we count anything larger than a pencil). Also record gaps between stalks, within rows, in feet (approximately).



#### Percent Dry Matter Determination

1. Weigh an empty tray and record weight on data sheet (“Tray wt, g”).
2. Empty the sorghum sample into the tray and record weight (“Tray + wet, g”).
3. Place the ziplock bag on the tray with the sample and put in the oven at 55°C (131°F). Repeat for all samples.
4. Once samples are dry (~ 4 days or so), take out of oven and record the dry weight (“Tray + dry, g”).
5. Keep dried samples in bags in a cool, dry place until all samples are collected.
6. Call Sarah for pick up and transport of samples and supplies back to our laboratory if we are not out in the field with you.
7. If samples cannot be transported back once all harvest is completed please send to:

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**318 Morrison Hall**  
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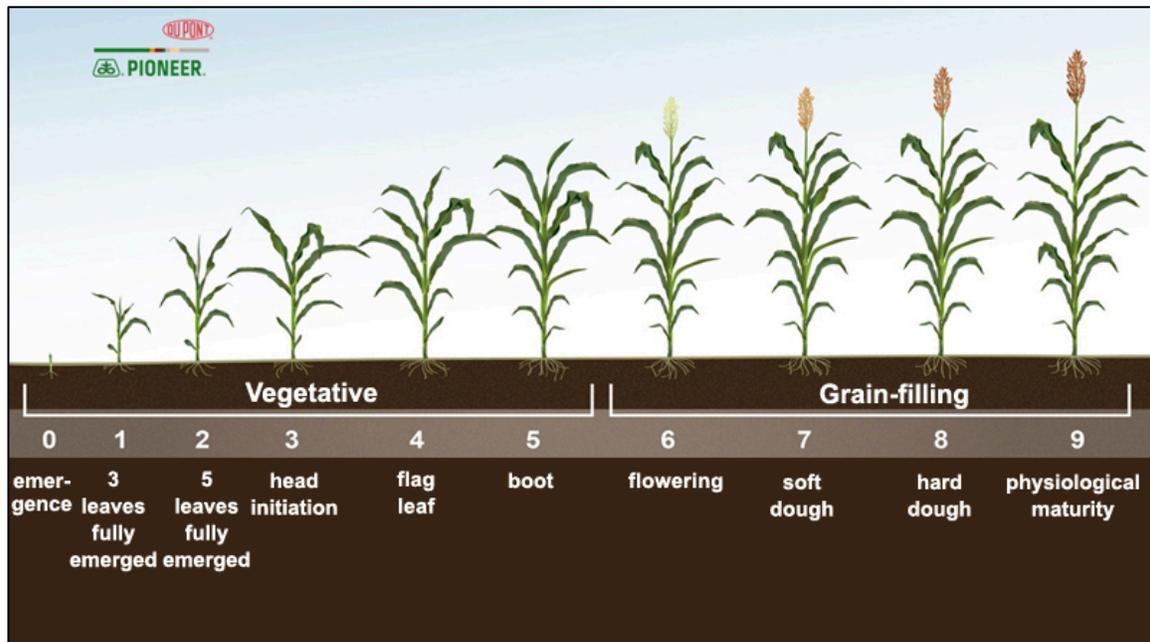


Figure 1: Sorghum stages of maturity. Weekly harvests will occur starting at stage 5, or boot stage, and will occur weekly until stage 9, or physiological maturity. Final harvest will occur at stage 7, or soft dough stage.

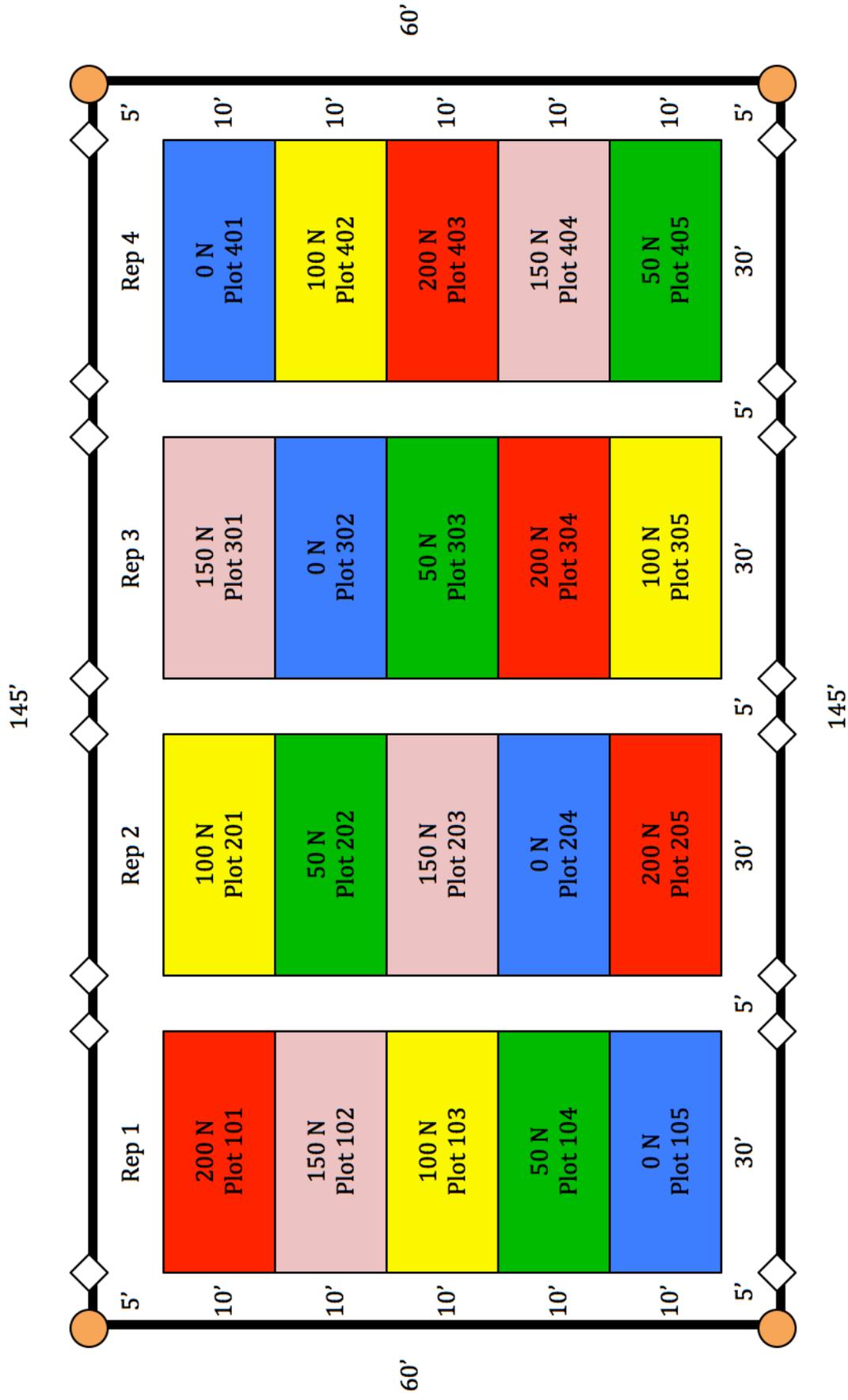


Figure 2: Plot set-up. Fertilizer rates (lbs N/acre) are noted inside the plots and color coded for flagging. Orange circles represent driveway posts, and white diamonds represent white step-in posts.

