

On-Farm Research Partnership

BMR Forage Sorghum Nitrogen Needs and Yield and Quality Tradeoffs for Different Timings of Harvest

Trial Layout and Measurements

-----2016 Trials-----

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 2016, 7 on-farm trials were completed.

Goal:

- Determine the nitrogen need of BMR forage sorghum planted after double crop harvest.
- Determine the tradeoffs between yield and quality when harvested at different growth stages in the fall.

Approach:

- Identify homogeneous looking areas of 60 by 145 feet in fields that are to be seeded to BMR forage sorghum.
- Let us know once a site is confirmed. We will distribute trial supplies.
- Document the field history (seeding rate, method and date, previous manure and/or fertilizer use on the field, soil type, past soil tests, etc.)
- For each selected field, implement N rate studies in four reps using the map on page 4 of this document. Fertilized plots are 10 ft by 30 ft with a 5 ft buffer between plots and the surrounding field. Each trial should have a control treatment where no N fertilizer is added, plus four additional N rates: 50, 100, 150, and 200 lbs N/acre.

Measurements

- **After planting (late May/early June)**
 1. Mark out the trial using the design on page 4 of this document. The final implementation should have 20 plots.

2. For each REP, take soil samples (0-8 inch depth; *prior to fertilizer application*):15 cores per rep (approximately 3 cores per plot, combined). We will analyze the soil samples for standard fertility (Cornell Morgan) and Pre-sidedress Nitrate Test.
 3. Apply the fertilizer on the 10 x 30 ft plots according to the design on page 4
 4. Clearly mark the full 60 by 145 ft area to indicate that no additional fertilizer or manure should be spread on the trial area. Use poles and rope to mark the outside boundaries of the whole location. Ensure the farmer knows where the trial area is and understands that no fertilizer or manure should be applied to this area.
 5. Avoid using metal flags... plastic works just as well and is less risky with field equipment.
- **Harvesting in Fall 2016**
 1. Take pictures so we have a record of visual differences or the lack thereof.
 2. Weekly harvests of the 100 and 200 lb N/acre plots will begin in mid September to cover growth stages 5 through 9 (boot, flowering, soft dough, hard dough, and full maturity). Base the growth stage status on the 100 lb N/acre plot.
 3. Harvest for the N rate trial (ALL plots) will occur when the 100 lb N/acre plot is at soft dough stage (stage 7).
 4. The sample area for each harvest will be 5 ft by 4 rows. Use a 5 ft pole lengthwise in the plot to determine the harvest area length. Use a 4 inch tall frame to determine the height at which to harvest. Use clippers (and gloves) to hand – harvest the sorghum in this 5 ft x 4 row (at 4 inch height) harvest area.
 5. Bring all stalks to a scale in the field to record the total weight of the harvested area.
 6. Using a chipper shredder, grind 5 randomly selected stalks into a collection bag. After mixing, randomly take a few handfuls of the chopped sorghum and place into a labeled ziplock bag. Place the sample in a cooler with ice packs.
 7. Bagged samples and data sheets go to NMSP at Cornell for processing and analysis: Sarah Lyons (318 Morrison Hall, Department of Animal Science, Cornell University, Ithaca, NY 14853).
 8. After the last harvest, remove all flags and poles.

If you have a farm and field identified, please let us know so we can get your fertilizer, flags, poles, and sampling containers/bags for the soil sampling rounds and the forage quality samples.

No samples can be processed without a completed field history form.

Each farm/collaborator will receive an individual report for his/her/their site, as well as a summary report for all trials to be conducted in 2016.

Quirine Ketterings at qmk2@cornell.edu or 607 255 3061 (office) or 607 229 0120 (cell)

Sarah Lyons at sel248@cornell.edu or 828 290 3584 (cell)

BY BEING AN ON-FARM RESEARCH PARTNER, YOUR FARM DATA BECOME PART OF A STATEWIDE DATASET THAT BENEFITS THE AGRICULTURAL INDUSTRY. SUCH A DATASET IS ESSENTIAL FOR FINE TUNING OF OUR LAND GRANT UNIVERSITY GUIDELINES.

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](http://nmsp.cals.cornell.edu/NYOnFarmResearchPartnership)

For further information or questions:

On-Farm Research Partnership

c/o Quirine M. Ketterings

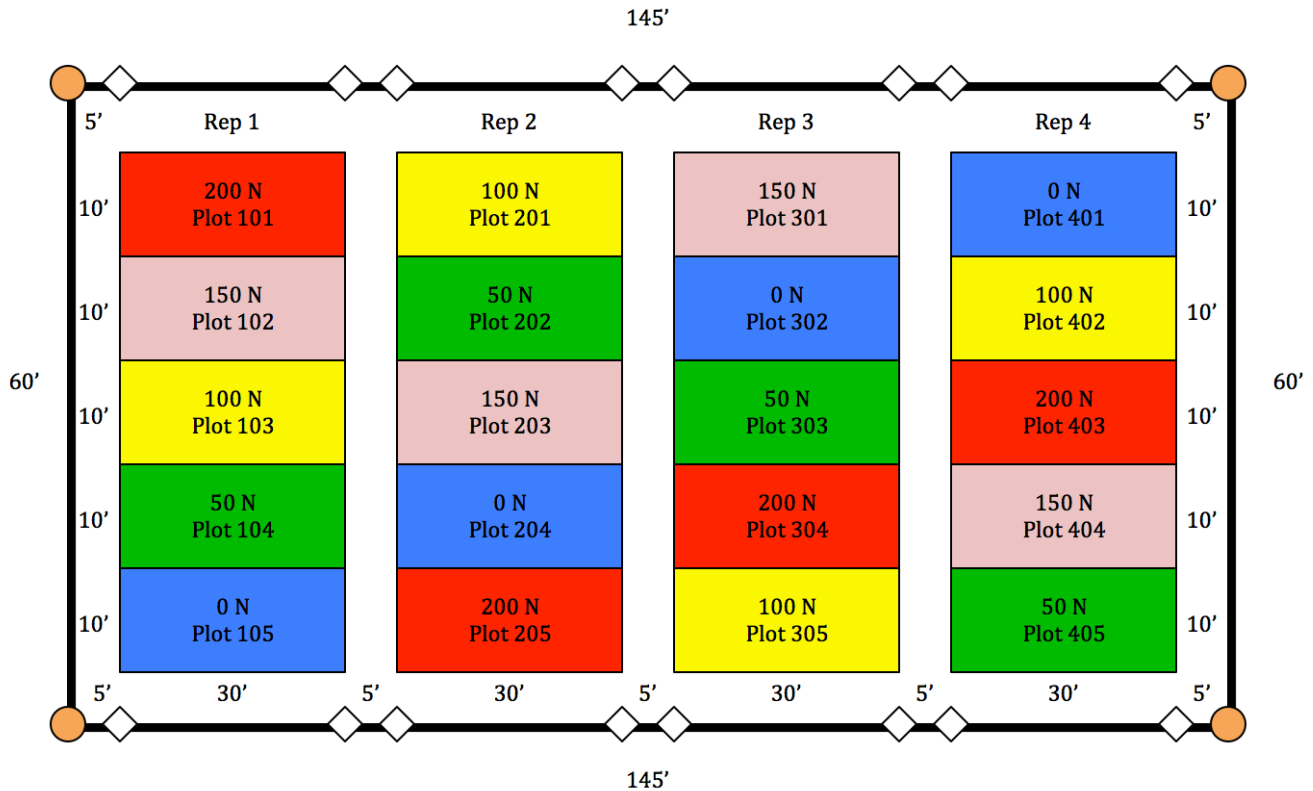
323 Morrison Hall, Cornell University, Ithaca, NY 14853

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

Email: qmk2@cornell.edu

Nitrogen Rate and Timing of Harvest Study for BMR Forage Sorghum

Five N rates in four replications: Each plot is 10 ft x 30 ft —80 flags per field, plus 20 poles (white diamonds and orange circles).



Mark the 4 corners of the entire trial with poles (orange circles). Put poles indicating the corners of each rep (white diamonds) and flags on all the corners of each 10'x30' plot as shown on the diagram above.

Width: Poles at 0 and 60 feet

Plot corner flags at 5, 15, 25, 35, 45, and 55 feet

Length: Pole at 0 and 145 feet

Plot corner flags at 5, 35, 40, 70, 75, 105, 110, and 140 feet

Nutrient Management Spear Program
Nitrogen Rate and Timing of Harvest for BMR Forage
Sorghum
General Information Page
2016

Collaborator: _____

Name _____

Address _____

Home Phone () _____

Cell Phone () _____

Email _____

Producer: _____

Name _____

Company _____

Address _____

Phone () _____

Email _____

Field Activities Record

2016

Location:

Experiment:

**NMSP N Rate and Timing of Harvest
for BMR Forage Sorghum**

Date

Activity/Notes