Guidance for Growing BMR Brachytic Dwarf Forage Sorghum

Introduction

Brown midrib (BMR) brachytic dwarf sorghum (Figure 1) is a high-quality forage species that tolerates drought and resists lodging. It has higher digestibility than conventional sorghum due to the BMR-6 gene, a naturally occurring gene mutation that reduces the lignin content compared with normal sorghum. The brachytic dwarf plant type has a shortened internode (stem) which decreases vulnerability to lodging, while maintaining the same number of leaves as taller sorghum varieties. In the Northeast, BMR brachytic dwarf forage sorghum may be used as a shorter season, single-cut forage crop, alone, or as part of a double crop system with winter forages such as triticale or cereal rye. Yield assessments in the past couple of years have shown that this forage sorghum variety has the potential to compete in yield with corn silage. This factsheet gives guidance on planting, field management, and harvest of forage sorghum.

Figure 1: Brown midrib (BMR) brachytic dwarf forage sorghum in the field.

Planting Date

As sorghum is a warm-season crop, seeds need to be planted when the soil temperature is above 60°F and increasing. In New York, this is typically around June 1. Lower temperatures during germination and emergence can depress growth by causing cold-shock and may kill the seedling.

Seeding Rate, Row Spacing and Depth

The seeding rate and row spacing depend on the planting equipment available. Grain drills work well and growers should plant 8 lbs seed per acre with 15-inch row spacing, or 8-10 lbs seed per acre with 7.5-inch row spacing. For corn planters with sorghum plates or otherwise equipped to plant sorghum, 5 lbs seed per acre with 30-inch row spacing is recommended. Consistent seed dispersal is important independent of row spacing. Use sleeved drop tubes instead of corrugated tubes in grain drills to avoid seed clumping. A higher seeding rate (>10 lbs per acre) can cause thin stems and increase vulnerability to lodging. Recommended seeding depth is 0.5-1 inch.

Fertilization

For nitrogen, preliminary research results conducted in the past four years show that 1 ton of dry matter removes about 23 lbs of nitrogen (N). Average BMR forage sorghum yields at the most economic rate of nitrogen (MERN) under New York growing conditions was 7.5 tons of dry matter per acre, with a crude protein content of 7%. Because soil organic matter will supply some N to the crop, limit applications to 100-150 lbs of N per acre and apply sod and manure credits similar to corn. Research is ongoing to determine where a response to N addition is less likely. For phosphorus (P), fertilization should be based on soil test results (Table 1). For potassium (K), soil test results and knowledge about the soil type of the field is needed to determine the best application rate (see 'Additional Resources'). Maintain soil pH above 6.0.

Table1: Phosphorus recommendations for forage sorghum.

Cornell Morgan soil test P	Recommendation
lbs P per acre	lbs P_2O_5 per acre
<1	50
1	45
2	40
3	35
4	30
5	25
6-39	20
40 or more	0

Weed Control

Available pre-emergence herbicides for sorghum include metolachlor, S-metolachlor, acetochlor, and atrazine. Read the label of these and any other approved materials for instructions for use in forage sorghum. Preplant incorporated or pre-emergence applications of metolachlor, S-metolachlor, and acetochlor require use of sorghum seed treated with a seed safener. The rapid establishment of canopy shade is critical for post-emergence grass weed control in forage sorghum as current only atrazine can be used for post-emergence grass control. Narrow row spacing can be used to accelerate canopy closure and provide early shading over weeds.

Insect Control

Army worm can cause economic damage in forage sorghum. Feeding can result in numerous ragged holes when the blades unfurl. Check in the whorl of young plants and the inside of the grain heads of mature plants.

Harvest Time

For silage production, sorghum should be harvested at the soft dough stage when plant moisture content is 68-72%. The soft dough stage can be identified when the head color changes from green to tan (see sample 4 in Figure 2). Harvesting more than three weeks prior to soft dough reduces overall yield and results in excess moisture. Ensiling wetter forage (>72% moisture) is possible but will require additional inoculant and longer length of cut to minimize or capture leachate. Late harvest (after soft dough) decreases forage quality as mature sorghum seeds become hard and indigestible.

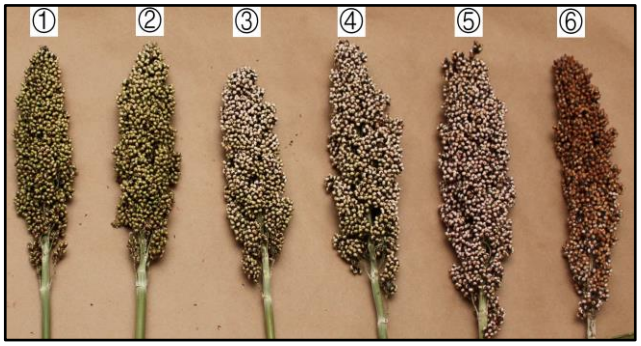

Figure 2: Six sorghum heads of different maturity are pictured in chronological order. (1) Green color indicates milk stage, too early to harvest; (2 and 3) Transition from milk to soft dough stage; (4) Tan color indicates soft dough stage, the optimal time for harvest; (5) Transition from soft dough to hard dough stage; (6) Hard dough stage, seeds are mature and almost indigestible at this time.

Harvest Equipment and Chopping

Brown midrib forage sorghum can be harvested using corn choppers. Rotary or bidirectional head type corn choppers can harvest sorghum planted in any row width. For sorghum planted in 30-inch rows a conventional row corn chopper is required. Chopping length is usually longer than for corn silage, varying from 0.75 to 1 inch or more, using sharp knives. Longer chopping length can save fuel, reduce sugar loss and leachate, and help to avoid rumen problems, but it will be more difficult to pack when the moisture content is low. If bagging, make sure that press fingers are square and not worn to reduce mashing of the forage.

Avoid Nitrate and Prussic Acid Toxicity

The fermentation process reduces the risk of nitrate and prussic acid toxicity in most cases. For green chopping, avoid harvesting within days after drought or frost to allow for decline in nitrate or prussic acid levels. Test suspect forage for nitrate content before feeding.

Summary

Brown midrib brachytic dwarf sorghum can supply farmers with a high-quality forage. It is lodging-resistant, drought-tolerant, and highly-digestible. Keys to successfully growing forage sorghum are warm temperatures at planting, proper seeding rate, spacing and depth, pre-emergence weed control, and timely harvest.

Additional Resources

- Advanced Agricultural Systems (Tom Kilcer) newsletters: advancedagsys.com/newsletters/
- Potassium guidelines for field crops in New York: nmsp.cals.cornell.edu/publications/extension/Kdoc.pdf

Disclaimer

This fact sheet reflects the current (and past) authors' best effort to interpret a complex body of scientific research, and to translate this into practical management options. Following the guidance provided in this fact sheet does not assure compliance with any applicable law, rule, regulation or standard, or the achievement of particular discharge levels from agricultural land.

For more information

Cornell University Cooperative Extension

Nutrient Management Spear Program
http://nmsp.cals.cornell.edu

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