Successfully Growing Brown Midrib Sorghum Sudangrass as a High Energy Grass for Dairy Cows in the North East
What we have learned over the past 6+ years

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Introduction
Brown Midrib Sorghum Sudangrass (BMR SxS) could be a valuable crop for forage production and feeding on dairy farms, both from production and environmental standpoints. Potential benefits of BMR SxS include:

1. High quality forage, which when properly built into higher forage rations, promotes healthy rumens and reduces nitrogen and phosphorus imports via purchased feeds.
2. Potentially comparable yields to corn silage, especially on less productive corn grounds and/or where corn planting is delayed due to wet soil conditions.
3. Reduced soil erosion due to increased soil cover throughout the year.
4. Compatible, not conflicting, with other spring field work due to early June planting.
5. Low requirement for pesticides (usually none) due to high seeding rates and low insect/disease pressure.
6. A 2- or 3-cut system allows manure applications during the summer when chances for runoff and leaching are significantly reduced.
7. Yield and quality doesn’t depend on a good grain fill, so it is less susceptible to July-August drought conditions than corn silage.
8. Opportunities to double crop with winter rye/triticale.
9. Compatible with rotational grazing, because BMR SxS provides forage during the July-August “summer slump”.
10. Compatible with existing hay equipment.

Planting date: The seeds do not like cold soils. Soil temperature must be over 60 degrees for rapid emergence and growth. This usually occurs after 1st cut grass/alfalfa haylage, or about June 1 in Albany, NY. BMR SxS planted as late as July 15th can still produce one cutting. However little or no regrowth can be expected with late planting dates, especially when the first cutting is taken after September 1st.

Seeding rate: 65-70 lbs/acre of seed will give 2.5–3 tons more yield than lower seeding rates and shade the ground sooner to control weeds (graph at right).

Growth: Under warm and moist conditions, seedlings should emerge within one week. Dry conditions after planting may delay emergence 10-14 days, and/or result in uneven germination. Plant growth is generally slow up until approximately 8 inches tall, after which growth rates increase dramatically. From emergence until 24 inches, BMR SxS could grow 1-2 inches per day. After that point, under warm and moist conditions, the plants are more likely to grow 3-4 inches per day. BMR SxS growth will decrease dramatically when nights become cool, as is commonly the case in September in upstate NY.

Weed control: Under proper growing conditions BMR SxS will beat the weeds and not need herbicide. A stale seedbed system (tilling the field 10 days before planting, letting small weeds emerge, and then harrowing before planting) will kill most weeds. Minor weed infestations are corrected by harvesting. If annual grasses get started, they will destroy the BMR crop. Broadleaf weeds can be controlled by herbicide if needed.

Planting depth: SHALLOW, ½-¾ inch deep for the Northeast. Deeper seed placement has resulted in significant stand loss and complete stand failure. Drills set to plant shallow will do an excellent job. Cultipacker seeders leave excessive seed on top. Broadcast with fertilizer gives uneven stands. Premixing fertilizer with seed, even for a short time, could be toxic and has resulted in 90% stand loss. “Air truck seeding” can work if the roller has corrugations of less than 2 inches. Older rollers with 3-4 inch corrugations will bury the seed too deeply. Rolling with teeth down or light disking incorporation has resulted in stand failure.

Fertilizer: Apply P and K similar to corn silage (based on soil test levels). For nitrogen, we have six BMR SxS N rate studies across NYS this summer to confirm the guidelines. In the meantime, BMR SxS should be fertilized more like an intensively managed perennial grass than a corn crop. If no manure is applied, add 100-135 lbs N/acre at planting.
with the same amount top-dressed immediately after each cutting. This investment in N fertilizer is returned through higher yield and protein. Fertilizer rates need to be decreased when manure is in the system. Assume that similar amounts of N from manure will become available to BMR SxS as with corn.

Stand height at harvest: For double the protein of corn silage, and energy levels equal to corn silage, harvest at 36–48 inch stand height. **At this stage, and with sufficient nitrogen, crude protein is usually 15–16%**. Yields increase, energy holds at modest levels and protein drops at taller heights, but moisture removal becomes much more of a challenge (see harvest management #1 and the graph to the right). If the crop is light yellow – indicative of nitrogen deficiency – harvest at 30 inch height, then correct the yield limitations with proper N fertilization. If grazing or green chopping any sorghum sudangrass, wait until plants reach a minimum of 24 inches in height. Do not graze new regrowth that has developed after a frost or period of dry weather. Do not graze horses on sorghum sudangrass, as it can cause cystitis syndrome. Green plants that are frosted should be completely dried before grazing or ensiled several weeks before feeding. If BMR SxS is properly fermented, prussic acid from any harvest is not a problem. If in doubt, run an inexpensive forage nitrate test.

Harvest interval: It will take approximately 40 days to reach re-growth level for the next harvest. The crop needs to be watched closely. Under optimum conditions it has grown 12 inches in 3–4 days for harvest in 3–4 weeks.

**Harvest management #1**: Set mower to >3 inches high when mowing each cut. A stubble height of at least 3 inches is necessary for maximum regrowth potential. When cut the crop is similar to first cut alfalfa ~ 83% water. The high yield of dry matter tons/acre/cutting creates the problem. At 3 ft. tall you have 6.2 tons of water/acre to remove; at 4 ft. you have to remove 10.2 tons of water/acre from normal yield. It must be dried to <70% moisture for proper fermentation. Wet silage will continue to ferment causing energy levels to drop. Wet feeds can decrease dry matter intake and potential milk production. Harvesting at a height of 36–48 inches keeps moisture removal manageable. **FULL WIDTH SWATH (like hay)** until dried to correct moisture and then put in windrows with a merger or properly adjusted rotary rake (to avoid stones) has proven to be an excellent system for high-energy forage.

**Harvest management #2**: Most of the plant water is in the stem. Intermeshing conditioning rolls fully crush the stems for rapid drying. Flail conditioners are difficult to set to break open the stems without turning the crop into coleslaw. Wide swathing and then merging/raising is vital for drying and harvest (Harvest management #1). Newer, wide-throat mergers do a better job than a rake. The low lignin makes it a breeze to mow, condition, and chop. BMR SxS needs to be watched closely, the crop can dry deceptively fast in good conditions. Set chopper length at ¾-1 inch for bunk silo and tumble mixer. Up-rights, baggers, and auger mixers need slightly longer cut to maintain effective fiber. BMR SxS can be successfully made into round bale silage (baleage), although dry down issues are still a problem at taller plant heights. BMR SxS can also be grazed (subject to the grazing restriction discussed earlier) at any height. Strip grazing using portable fencing works well.

Feeding management: Analyze BMR SxS using wet chemistry with IN-VITRO digestibility analysis. Standard NIR analysis will underestimate the energy level by 13 to 15 points. This could result in over feeding grain. **BMR SxS is best used in a high forage diet.** In a typical low forage (50% forage) diet, feeding the highly digestible BMR SxS forage as the major component without consideration of effective fiber levels could result in acidosis. Increased forage consumption can help maintain effective fiber levels. Check effective fiber by screening the fermented silage. Reducing dietary Non Fiber Carbohydrates (NFC) levels to 36-40% of DM by reducing grain feeding rates can also help prevent acidosis. Caution should be taken to maintain NFC levels however when using BMR SxS to replace corn silage in diets. Properly balanced rations with BMR SxS equaled corn silage in milk production during on farm feeding trials.

For additional information on BMR SxS, contact:
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- Rensselaer County Cornell Cooperative Extension site: [http://www.cce.cornell.edu/rensselaer/agriculture](http://www.cce.cornell.edu/rensselaer/agriculture)
- Nutrient Management Spear Program site at Cornell: [http://nmsp.css.cornell.edu/projects/bmr.as](http://nmsp.css.cornell.edu/projects/bmr.as)