



ADVANCED AG SYSTEMS'

Crop Soil News

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"It is the crops that feed the cows that make the milk which creates the money."

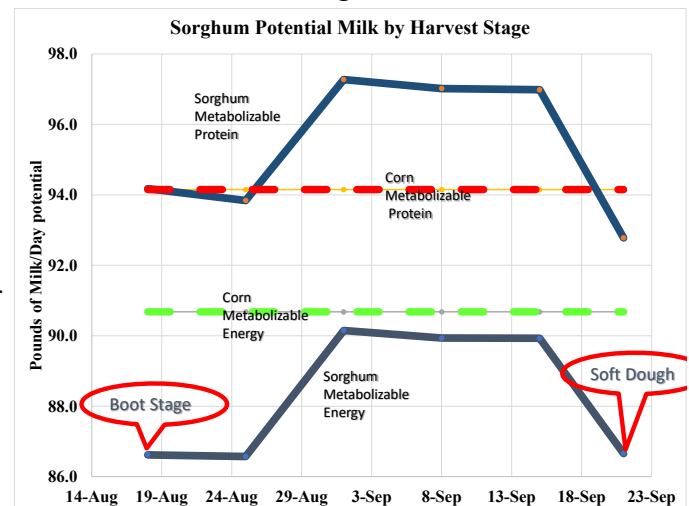
Successful Sorghum Harvest

Many farms are growing sorghum or sorghum species for the first time. Its harvest timing is very different than corn silage if you want to get it right. Sorghums can be a wetter, high sugar, low starch forage. In a properly balanced ration sorghum can produce the same milk at potentially less cost. Chopping this with a short length of cut, and worse - processing - will produce forage the consistency of applesauce or soup. This is not beneficial to good fermentation, high milk components, or preserving nutrients (lost leachate is 100% digestible). The good news is that there are steps you can take to maximize results and minimize potential problems.

Our replicated research supported by **New York Farm Viability Institute** looked at various harvest stages of BMR sorghum. The results were analyzed by Dr. Larry Chase using the Cornell Net Carbohydrate and Protein Systems model. We found (graph below) for seeded type sorghum the potential milk increased from the boot stage as the fertilized seed heads started to fill. The milk potential decreased when we went from the tip of the seed head just starting soft dough to soft dough halfway down the head (labeled soft dough on the graph) because of a significant decrease in fiber digestibility where a lot of energy is stored. This is compounded by the loss of energy in hard, undigestible seeds discussed below. Thus, waiting for matured grain can decrease milk production.

Production from sorghum is not just pulling out corn silage from the ration, and throwing in sorghum silage. That will guarantee the cows lose production. The ration must be rebalanced to a higher fiber feeding level. In general, a slight amount of additional cornmeal is added for energy and a similar amount of protein supplement can be removed as sorghum can have higher protein than corn silage. Research has found that sorghum-based rumen pH is higher which enables higher components and so less potential for subclinical acidosis.

There is no advantage to waiting for more mature grain with forage sorghum. Our research with male-sterile bmr sorghum ([January](#), [February](#)) which had no grain, proved that. In Texas and the south, they wait until the soft dough stage is halfway down the seed head (starts at the tip and works down - see picture on next page). There are major disadvantages to using this technique in the north (besides that we are Yankees!). The first is lodging,



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which increases dramatically as the seed head matures. The standard varieties were nearly all lodged. We found in our research that even the lodging resistant brachytic dwarf bmr sorghum fell down a week after the tip of the seed head moved to the soft dough stage. Second, if the seeds move to a harder dough stage, they are the size of birdshot and as indigestible – going through the cow and out the back. Processing does not help and research suggests that even broken they are still poorly if at all digested. This means the sorghum species crop is ready for harvest before it is 30 – 35% dry matter. Many times, when the tip seeds reach soft dough, it will be just reaching 30% dry matter. Our research has found that **with proper steps we can make perfect sorghum silage at dry matters as low or lower than 25% with NO butyric acid.**

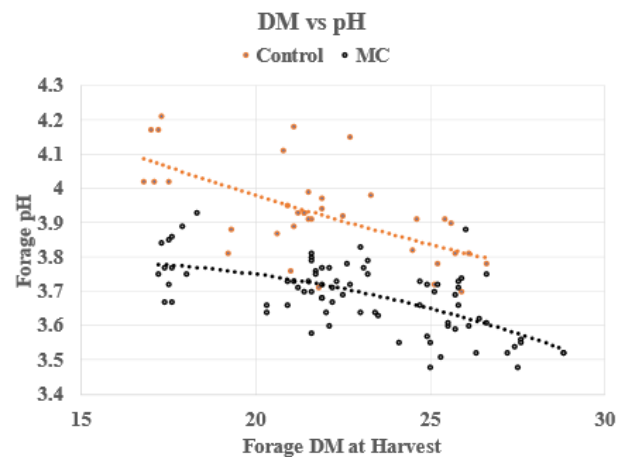
Directionless corn heads will chop sorghum very effectively especially if the plant is more than 4 feet tall. We have directly chopped sorghum, sorghum-Sudan, Sudangrass, and Pearl millet and the harvesting head needs to be down on the ground to get as much of the crop as possible as it is all highly digestible forage. The knives have to be sharp or they will simply knock it over and contribute to plugging. It is key to watch your forward speed as sorghum is so easy to chop that there is a tendency to drive faster and faster. You quickly pass the cutting speed of the head and then start leaving longer stubble in the field which is directly lost yield. The longer stubble is an immediate 10 - 15% yield loss of highly digestible forage from driving too fast. Going too fast also contributes to plugging. Plants that do not have a stem and/or head emerged and shorter than 5 feet will be all leaf and may not chop very well. These fields may need to be mowed to a windrow and chopped with a haylage head. We don't suggest trying to dry it wide swath as it is too thick to dry and impossible to ted. Farmers report the merger had to go the opposite direction that the swath was mowed for it to feed in and merge properly. The wide swath with sorghum will also mix more dirt and contaminates when you try to rake/merge to a windrow. If you are dealing with lodged material from a storm, it will stand back up again after 3 – 4 weeks. If it goes down in high winds just before harvest, then mowing directly to a windrow (**NO Conditioning**) and picking up with the haylage head with **NO raking** will recover the crop from the disaster. Sorghum has thicker stems if not over planted, and with the new male sterile genetics, has no grain at the top to pull the crop over.

For sorghum species, the **length of cut the chopper is set at is critical**. Dr. Grant et al in Miner Institute's report ([effective fiber and feed quality](#)) found that as forage quality decreases, the shorter the length of cut, the greater milk production from poorer forages. The **reverse is true for highly digestible forages** such as flag leaf triticale, and bmr sorghum species. The smaller they are chopped, the faster they are flushed out of the rumen before you get the full extent of digestion. Larger particles will stay entrained in the rumen mat until the rumen bacteria extract the majority of the nutrient components. The other problem with chopping these silages fine is it increases the number of plant cells cut open and, especially if processed, will release hundreds of gallons of leachate. Leachate, besides making a smelly mess, removes the most digestible part of the plant. Each additional cut (shorter chop length) opens more plant cells for the liquid to run out. We harvested at ½, ¾, and 1.14-inch length of cut **WITH NO PROCESSING**. As long as we did not process, we had **excessive liquid (leachate) from the ½ but not the ¾ AND 1.14 inch**. A cut length of a minimum of ¾ inch and preferably 1+ inch (see photo on right courtesy of John Winchell, Alltech) seemed to work best. Sorghum in Texas is reported to be chopped at 1.25 inch and the cows consume it all. We strongly suggest **NO PROCESSING**.



The stage we harvest at (seeds at the tip just becoming like cooked oatmeal) processing does nothing to improve feed value but increased fuel use, reduces field speed, and **increased leachate more than 5 fold.** An added benefit from not processing is that there was a significant sugar conserved through fermentation, as it reflects less cell rupture and so preserved the nutrients within intact cells of wet forage until opened by rumen digestion. If the processor is difficult to remove, then open it as wide as it will go.

People start to freak out when we talk making wet silage. Nearly all their experiences are with crops that didn't dry after being left in the field for 3 or 4 days. Respiration removed all the substrate and so even inoculant could not help. It can also occur with a forage crop harvested wet the first sunny day after an extensive cloudy stretch. The clouds keep photosynthesis production less than respiration consumption and so the plant has a negative substrate to support fermentation. It is a smelly mess that the cows don't want to eat and will perform poorly on. We are talking about a different crop: **WET, HIGH SUGAR SORGHUM.** It has a very high substrate to support complete fermentation. We have had excellent results ensiling sorghum as low as 17% dry matter with **NO butyric formation.** The critical step is to **not** try to make sorghum silage without an inoculant. Every fermentation industry uses **specific inoculants** because they give the greatest economic return. You wouldn't lime, fertilize, till, and roll a new hayfield and then let whatever grows to be your hay crop. You plant what you want to grow. The same with silage. Don't grow and harvest highly digestible forage and let whatever garbage is floating in the air that day, do the "fermentation". If the crop is below 30% dry matter, it is suggested to **NOT** use the first-generation buchneri type inoculant. A homolactic fermenter would be better. As you can see in the graph at the right, a homolactic Si-loSolve MC dropped the pH across all levels from 17% dry matter to 27% dry matter. There was **NO** butyric in any of the fermented samples. There is a next-generation inoculant with a unique buchneri strain combination that handled wetter, high sugar forages very well in our replicated sorghum research.



Sincerely,

Thomas Kilcer,
Certified Crop Advisor

172 Sunnyside Rd
Kinderhook, NY
12106

Tel: 518-421-2132

tfk1@cornell.edu

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