Hello Northeast Ohio Counties!

We were glad to see many attend the waterhemp clinic yesterday. Remember if you suspect you have waterhemp call your local extension office and we will help you make an ID and offer control options if it is waterhemp.

Performing forage test on your forage supply is a great way to know the quality of the product you are feeding to your livestock or selling to your customer. The first article offers information on properly reading and understanding your forage test. Remember if you would like assistance looking over your forage test, or need a forage sampler, stop by the Ashtabula office.

Stay safe!
Understanding Feed and Forage Test Results
By: Steve Boyles, OSU Beef Extension Specialist
Source: http://u.osu.edu/beef/2019/08/21/understanding-feed-and-forage-test-results/

Properly interpreting a forage sample analysis report may be the most important thing you can do for your cows this winter!

Previous articles in this publication have established the critical need for forage analysis on the various timings and cuttings of forages that have been made throughout Ohio this year. Once the forage analysis report is received back from the laboratory, the information below will help with interpretation of the results.

**Dry matter (DM)** is the percentage of feed that is not water. Dry matter basis allow you to compare feeds such as hay, grain and silage. Many software packages formulate diets on the dry matter basis. Feed test results may have dry matter and “as fed” values. As fed is the nutrient content with the water included. You will note that the dry matter values are higher than the as fed values. Removing the water makes the nutrient values to be higher or more concentrated.

**Crude protein (CP)** measures both true protein and non-protein nitrogen. Crude protein is an excellent place to start but some other values or ways to evaluate protein exist. **Insoluble crude protein (ICP)**, acid detergent insoluble nitrogen (ADIN), unavailable nitrogen, and heat-damaged protein all refer to nitrogen (or CP) that has become chemically linked to carbohydrates to form an indigestible compound. The overheating that causes this reaction is most common in silage stored at less than 65 percent moisture and in hay stored above 20 percent moisture. **Available or Adjusted crude protein (ACP)** is a value corrected for heat damage. It should be used in place of crude protein.

Protein requirements are now including metabolizable protein (MP) so as to take into consideration the differences in rates of digestion and utilization of various protein sources and to account for requirements of rumen bacteria and those of the animal. This is a change over the established system of describing protein requirements as Crude Protein. While energy is the most commonly deficient nutrient in beef-cow diets, protein often represents the largest "out-of-pocket" expense. Protein can be divided into two components, **degradable intake protein (DIP)** and **undegradable intake protein (UIP)**. The DIP fraction is available to the rumen microflora and can be used for their growth and digestion of dietary fiber. Supplementing low-quality forages with DIP has been shown to increase forage digestion and intake. The UIP is not available to the rumen microflora and has no effect on forage utilization. The UIP fraction can be a direct supply of amino acids to the cow or it can go undigested and be expelled.
Oil seed byproducts (soybean meal, cottonseed meal, sunflower meal) contain a high percentage of DIP while proteins derived from animal sources contain mostly UIP. Forage-based diets should be focused on the inclusion rates of DIP in the diet.

Generally, DIP can supply CP approximately 7% of the diet. If the required CP in the diet exceeds 7% of the DM, all CP above this amount should be UIP. In other words, if the final diet is to contain 13% CP, 7 of the 13 units should be UIP, or 54% of the CP and 6 of the 13 percentage units should be DIP, or 46% of the CP.

Crude fiber (CF) is an old, well-known fiber determination. Newer fiber methods are more useful measures of nutritional value.

Neutral detergent fiber (NDF) measures the structural part of the plant, the plant cell wall. NDF gives “bulk” or “fill” to the diet. Therefore lower numbers indicate higher quality and intake potential.

Acid detergent fiber (ADF) primarily consists of cellulose, lignin, silica, insoluble crude protein and ash, which are the least digestible parts of the plant. Low ADF is preferred because if means higher energy.

Total digestible nutrients (TDN) represents the total of the digestible components of crude fiber, protein, fat, and nitrogen-free extract in the diet. It is less accurate than Net Energy (NE) for formulating diets containing both forage and grain. However, it can still be used for developing cow diets. Some older ration balancing software packages use TDN.

Net energy (NE) The net energy value of a feed depends on whether the feed is used for maintenance (NE_m), producing weight gain (NE_g), or milk production (NE_l). Beef cattle diets are developed based on net energy maintenance and gain values. Net energy lactation values are used for dairy cows/diets. Ether Extract can be of interest if you are using feeds high in fat/oils.

Many feed analysis sheet provide valuable information on minerals such as calcium, phosphorus, copper, magnesium, potassium and zinc. Typically, if you are interested in selenium, that is another test/cost.

With this analysis you can work with your local feed company representatives or university extension personnel. There are ration balancing software packages available as well. However, if you do not understand ruminant nutrition, software just gets you into trouble faster than pencil, paper and calculator.
References:
https://cpb-us-e1.wpmucdn.com/blogs.cornell.edu/dist/e/1628/files/2016/03/Forage-
Testing-requirements-for-Beef-Cattle-2m81khu.pdf
Nebguide. G89-915

Growing Season to Last Through September
By: Jim Noel
Source: https://agcrops.osu.edu/newsletter/corn-newsletter/2019-28/growing-season-
last-through-september

There is good news as it appears we will not have an early freeze in Ohio in September. Below normal temperatures will be with us to end August and possibly into the first half of September per the NOAA/Climate Prediction Center Week 2 early September temperatures, see attached image.

8-14 Day Temperature Forecast
Rainfall will likely be normal or above normal early this week but the trend will be normal to below normal to start September per the NOAA/Climate Prediction Center graphic attached.

Northeast Ohio Agriculture

Ashtabula and Trumbull Counties
8-14 Day Precipitation Forecast
Even though we will favor below normal temperatures into the first half of September we will see bursts of warm weather too. The September outlook calls for below normal temperatures first half switching to above normal second half of the month. This will help support no early freeze. Rainfall will switch from below normal first half of September to above normal second half.

The probability of a freeze through September 10 from the North American Ensemble Model is 0%.

Chance of Frost
You can keep up with the two week freeze risk at:
https://www.weather.gc.ca/ensemble/naefs/produits_e.html

You need to select the minimum temperature for 0C and push your end date 16 days into the future.

Looking further ahead, models continue to support a switch to wetter weather in harvest season. It is not clear whether that occurs in October or November, but like last year the timing could challenge later harvested crops. Since crops went in late, harvest season could become a challenge. We will update this as we get closer.

https://www.cpc.ncep.noaa.gov/products/predictions/long_range/lead01/off01_prcp.gif

**Back-to-school means different laws apply to youth farm workers**

By: Peggy Kirk Hall, Associate Professor, Agricultural & Resource Law

Source: https://farmoffice.osu.edu/blog/mon-08262019-909am/ohio-ag-law-blog%E2%80%94back-school-means-different-laws-apply-youth-farm-workers

When kids head back-to-school, it's time for farmers to do some homework and recall the rules that apply to youth working on farms during the school year. Once school is in session, Ohio labor laws place restrictions on the times of day and number of hours that youth under the age of 18 can work on a farm. The laws don’t apply to parents, grandparents, or legal guardians, however. For other farm employers, be aware that the laws vary according to the age of the minor and some require written parental consent. Here’s a quick refresher:

**16 and 17 year olds**

- Cannot work before 7:00 a.m. on school days, with the exception that they can work starting at 6:00 a.m. if they were not working past 8:00 p.m. the night before.
- Cannot work after 11:00 p.m. on a school night, which means a night when the minor has school the next day.
- No daily or weekly limits on the number of hours the youth can work.

**14 and 15 year olds**

- Cannot work during school hours while school is in session.
- Cannot work before 7:00 a.m. or after 7:00 p.m., but can work until 9:00 p.m. from June 1 to September 1 or during any school holiday or break lasting more than 5 weekdays.
• Cannot work more than 3 hours during a school day or more than 8 hours during a non-school day.
• Cannot work more than 18 hours in a week while school is in session, unless the job is part of a work education program such as vocational training or work study.

12 and 13 year olds

• The same time restrictions and daily and weekly hour limits for 14 and 15 year olds (above) apply to 12 and 13 year olds, but there is no exception to the 18 hour weekly limit for vocational training or work study programs.
• Employer must obtain written parental consent for the youth to be working, unless the youth’s parent or legal guardian also works on the same farm.

Under 12 years old

• Can only work on a farm where employees are exempt from the federal minimum wage, which includes a farms of an immediate family member or a “small farm” that used fewer than 500 “man days” of agricultural labor in any calendar quarter the preceding year. A “man day” is a day during which an employee performs agricultural work for at least one hour.
• Exception to the above: local youths 10 and 11 may hand harvest short-season crops outside school hours for no more than 8 weeks between June 1 and October 15 if their employers have obtained special waivers from the U.S. Secretary of Labor.
• The same daily time restrictions and daily and weekly hour limits for 14 and 15 year olds (above) apply to youth under 12 years old, but there is no exception to the 18 hour weekly limit for vocational training or work study programs.
• Employer must obtain written parental consent for the youth to be working.

The other labor laws that typically apply to youth doing agricultural work on a farm continue to apply throughout the school year. For example, employers must maintain records for youth employees, provide a written agreement of compensation and a statement of earnings on payday, and a 30 minute rest period if the youth works more than five consecutive hours. An employer can’t assign any youth under the age of 16 with a “hazardous” job or task unless the youth is 14 or 15 and has a certificate of completion for tractor or machine operation. Further information about these and other laws that apply to youth under 18 working on a farm is in our new Law Bulletin, Youth Labor on the Farm: Laws Farmers Need to Know, available here.
August turned out to be a very busy month for food law. We’re again reading headlines about the definition of meat and debates over cage-free egg laws. We’ve also come across some interesting criminal actions involving organic labeling fraud and undocumented workers at poultry processing plants. And yet again we have a Roundup update, but fortunately for Bayer, the target of the latest lawsuits are Home Depot and Lowe’s. So without further ado, here’s our latest gathering of agricultural law news you may want to know:

Tofurkey cries foul against state definitions of meat.
The maker of edible vegetarian products designed to replicate the taste and texture of meats is fighting back against state labeling and advertising laws that require products labeled as “meat” to be made of meat. Tofurky filed a lawsuit in federal court in Arkansas to stop the state from enforcing such laws, which is similar to a lawsuit it filed in Missouri and yet another company filed in Mississippi. Livestock advocacy groups succeeded in having 12 states pass laws restricting the ability of food producers to refer to their products as meats if those products contain no meat. Livestock advocacy groups argue that the labeling practices are confusing and misleading to consumers, while companies like Tofurky argue that they have a constitutional right to describe their products with meat terminology. On its website, Tofurky lists beer brats, jumbo hot dogs, “slow roasted chick’n,” “ham style roast,” and more. None of the products contain meat.

Organic food fraud puts farmers in jail.
A federal judge sentenced a 60-year-old Missouri farmer to serve 10 years and 2 months in prison after being convicted of wire fraud, which is the federal crime of committing financial fraud through the use of a telecommunications wire across state lines. This includes placing a phone call, sending an email, or advertising online in the furtherance of the fraudulent scheme. Another three farmers were also sentenced to prison for terms ranging from 3 months to 2 years for their participation. The fraud involved a decade-long scheme to mix traditional corn and soybeans with a small amount of organic grains and then label everything as certified organic. The grains were mostly sold as animal feed to producers and companies selling organic meat. Organic products generally are sold at a high premium, and the volume of goods in this scheme resulted in the farmers receiving millions of dollars from consumers that was fraudulently obtained. The lengthy prison sentences reflect the farmers’ intentional misrepresentation and mislabeling. In other words, it was not an accident.
Oregon joins California and Washington to make the west coast cage-free. States continue to battle over whether eggs should come from cage-free hens or caged hens. When we last discussed the topic HERE in May, the governor of the state of Washington had just signed his state’s cage-free requirement into law. Iowa, the nation’s leading egg producing state, has gone the other way in trying to limit cage-free egg production. Now, Oregon is set to ban the purchase or sale of eggs and egg products from caged hens starting in 2024. However, Oregon’s law exempts eggs and egg products from caged hens if the sale occurs at a federally inspected plant under the Egg Products Inspection Act or if the caged hens were at a commercial farm with a flock of fewer than 3,000 hens. You can read the text of the bill HERE.

Immigration and Customs Enforcement raids poultry processing plants. Federal immigration officials have alleged that managers at five Mississippi poultry processing plants knowingly hired undocumented aliens who are not authorized to work in the United States. Fines for individuals or companies proven to have actual knowledge that they hired undocumented workers can reach up to $3,000 per undocumented worker. Individuals may also face prison time. According to news reports, ICE arrested 680 possibly undocumented workers during its August 7th raids in Mississippi. In their applications for the search warrants, the investigators alleged that the companies hired undocumented workers who were wearing GPS ankle monitors as they await deportation hearings, reported Social Security numbers of deceased persons, and used different names at different times.

Latest Roundup lawsuit targets retailers Home Depot and Lowe’s. You’ve heard us talk before about the thousands of lawsuits against Monsanto (now owned by Bayer) based on the allegation that the glyphosate in products like Roundup has caused cancer. If you’d like a refresher, you can review our last post HERE. Now, instead of going after the manufacturer, a new plaintiff is going after retailers. Plaintiff James Weeks filed two class action complaints in federal court in California against Home Depot and Lowe’s, alleging that the home improvement giants failed to adequately warn customers about the safety risks posed by using the popular weed killer. Mr. Weeks argues that the labeling leaves the average consumer with the impression that the greatest risk of harm is eye irritation, when in fact the retailers know of the product’s potential carcinogenic properties. As these complaints are class action complaints, Mr. Weeks seeks to claim representative status over all consumers who purchased Roundup products from these retailers, and thereby lead the case against the retailers. It will be interesting to see whether the court certifies these cases as class actions, or if this strategy falls short for the plaintiff. You can read the complaint against Home Depot HERE.

Food giants seek silence from U.S. Commodity Futures Trading Commission. In 2015, the U.S. Commodity Futures Tradition Commission initiated a lawsuit against Mondelez International Inc. and Kraft Heinz Co. for allegedly manipulating the wheat
futures market. All parties recently agreed to an undisclosed settlement, and entered into a consent order with the court to close the matter. The agreement apparently included a provision that all parties would refrain from publically commenting about the settlement. However, the federal agency ended up commenting on the settlement by the end of the week in which the agreement was finalized. Mondelez and Kraft Heinz believe that such statements violated the terms of the consent order, although the federal agency contests the allegation. Nonetheless, the confidentiality restrictions make it difficult to know the full details of the settlement. All we know for certain is that there was one.

Federal courts report that Chapter 12 family farm bankruptcies are on the rise. The federal court system releases data every quarter on the number of bankruptcies filed each month in that quarter. The latest numbers for April to June 2019 showed a slight increase in the number of Chapter 12 bankruptcies filed when compared to the same time period in 2018. Nationwide, there were 164 new filings, compared to 135 in the second quarter of 2018. The numbers show a gradual increase in the use of Chapter 12 bankruptcy since 2013, but the numbers are starting to tick up to levels not seen since the Great Recession. Chapter 12 bankruptcy is a special form of bankruptcy that can only be used by family farmers and family fishermen whose total debts do not exceed a certain dollar limit. The current dollar limit is $4.4 million, but there is legislation awaiting President Trump’s signature to increase the limit to $10 million. In large part because of these restrictions, Chapter 12 is one of the least commonly used forms of bankruptcy.

**Frequently Asked Questions about Harmful Algal Blooms (HABs) in Farm Ponds used to Water Livestock**

By: Michelle Arnold, DVM-Ruminant Extension Veterinarian (UKVDL)


Water is the most essential nutrient in the diet of cattle and during hot and dry weather, it is especially important to monitor water quality if using farm ponds for livestock. What is a "harmful algae bloom" or “HAB”? 

During periods of hot and dry weather, rapid growth of algae to extreme numbers may result in a “bloom”, which is a build-up of algae that creates a green, blue-green, white, or brown coloring on the surface of the water, like a floating layer of paint (see Figure 1). Blooms are designated “harmful” because some algal species produce toxins (poisons) when stressed or when they die. The majority of HABs are caused by blue-green algae, a type of bacteria called “cyanobacteria” that exist naturally in water and wet
environments. These microorganisms prefer warm, stagnant, nutrient-rich water and are found most often in ponds, lakes, and slow moving creeks. Farm ponds contaminated with fertilizer run-off, septic tank overflow or direct manure and urine contamination are prime places for algae to thrive. Although blooms can occur at any time of year, they happen most often in the warmer months between June and September when temperatures reach 75 degrees or higher and ponds begin to stagnate. HABs can reduce water quality and intake, but more importantly, they can be deadly when ingested by livestock. Windy conditions can push algal blooms along water edges, increasing the risk for livestock to ingest algae when they drink.

Are all algal blooms poisonous to cattle?

Of the more than 2000 species of blue-green algae identified, at least 80 are known to produce toxins (poisons) that can affect animals and humans (see Table 1 for the most common toxins). Blue-green algae toxins are released when algal cells are damaged and die in the water (for instance, after water is treated with an algaecide such as copper sulfate), or when ingested water reaches the animal’s digestive tract and algal cells are disrupted, releasing the toxins. The most common species of blue-green algae in North America associated with livestock poisoning are Anabaena (also known as Dolichospermum), Aphanizomenon, Oscillatoria, and Microcystis. Microcystis is the most common bloom-forming genus, and blooms are typically a greenish, thick, paint-like (sometimes granular) material that accumulates along shores. If an algal bloom is noticed, testing of water samples with the algae is recommended because it is impossible to tell visually if a water source contains blue-green algae or not, or to determine which specific species is present without laboratory identification. Be aware that just having a blue-green algae bloom present in a pond does not automatically mean toxins are being produced but it is best to assume the water could be dangerous if used for livestock drinking water.
What are the most common signs of poisoning in cattle from blue-green algae?

Livestock are most at risk when drinking contaminated water or licking algae from their hair coat. Most cattle exposed to blue-green algae toxins die quickly and are often found dead very near the water source. Cyanobacterial toxins ("cyanotoxins") primarily harm the liver and/or nervous system and have been implicated in both human and animal illnesses and deaths worldwide. Some algae produce potent neurotoxins (toxins affecting the nervous system), most often the toxin Anatoxin-A, that may cause cattle to exhibit muscle tremors, difficulty breathing, wobbly gait, seizures, profuse slobbering, diarrhea, and rapid death within minutes to hours. Other algae types produce hepatotoxins (toxins affecting the liver), most commonly the microcystin toxin, that can cause sudden death or a more delayed onset of death after signs of liver failure develop, including lethargy, diarrhea, and weakness. Cattle that survive the acute stages of liver damage may develop photosensitization, a skin condition in which white (light or non-pigmented) areas of skin along the back, face, sides of udders, muzzle, underside of tongue, lips, eyelids, and ears will become red and swollen then will become crusty and peel. The only treatment for exposure to any cyanotoxin is supportive care and medications to alleviate the symptoms.

Are humans affected by these toxins, too?

Human poisoning associated with cyanotoxins most commonly occur after exposure through drinking contaminated water or after participating in water recreational activities. Exposure can result in a number of symptoms in people including skin rashes; eye, nose, mouth, or throat irritation; allergic reactions; headache and malaise; and gastrointestinal upset including abdominal pain, nausea, vomiting, and diarrhea. In humans, it is believed the toxin must be ingested for fatalities to occur. For protection of human health from exposure to the algae and any of the toxins, many states use the World Health Organization (WHO) guideline level of 100,000 algal cells/ml water or a microcystin toxin level of 6 parts per billion (ppb) for a Recreation Advisory and beaches will be closed if the microcystin toxin level reaches 20 ppb. For more information, visit the EPA website to view "A Water Utility Manager’s Guide to Cyanotoxins" at https://www.epa.gov/sites/production/files/2016-06/documents/water-utility-managers-guide-cyanotoxins.pdf
How do I test water for blue-green algae toxins?

Unfortunately, testing water for the actual toxin is problematic because toxins are not uniformly distributed in the water source, testing can be quite expensive, and there are many blue-green algae toxins for which no diagnostic tests exist. The Kansas State Veterinary Diagnostic Laboratory accepts water samples for blue-green algae identification by microscopy and will also test for the amount of microcystin, the most common toxin. When sampling water, make sure to wear gloves and collect at least 500 ml (16 ounces) of water approximately one inch below the water surface. Samples should be refrigerated before and during shipping but do not freeze. Please visit their website http://ksvdnl.org and search under “algae” for further information regarding sampling, shipping and pricing. The Indiana Department of Environmental Management released a “Blue-Green Algae Sampling Resource List” in 2014 of companies that provide blue-green algae sampling and analysis services. The list can be found at http://www.in.gov/idem/algae/files/bluegreen_sampling_services.pdf. Many algal blooms in Kentucky are composed of harmless green algae which may look like underwater moss, stringy mats or floating scum. There are a couple of simple field tests a pond owner can do to quickly assess the likelihood of blue-green algae in the water. The instructions from the Kansas Department of Health and Environment for the “Jar and Stick Tests” may be found at http://www.kdheks.gov/algae-illness/download/Jar_Test.pdf. Remember these field tests are not even close to 100% accurate so follow-up testing is recommended to definitively determine what algae species are present.

![Diagram](image)

Figure 1: Cattle contribute excess nutrients to surface water by urinating and defecating in or around ponds and streams. Excess nutrients can also enter waterways as runoff from fertilized fields or manure laden pastures. Figure by Donnie Stamper, Biosystems and Agriculture Engineering, University of Kentucky.
How do I prevent poisoning from Blue-Green Algae for livestock and pets:
1. Always assume that a blue-green algal bloom is toxic.
2. Provide constant access to clean, clear fresh water and fence off or otherwise prevent access to stagnant, scum-covered ponds. Fencing off surface water sources and providing alternative clean water sources is the best option for healthy cattle for many reasons, not just HABs.
3. Do not allow animals to contaminate the water with feces and urine. Prevent fertilizer or manure runoff from entering water sources. Phosphorous is particularly important in fueling cyanobacteria growth (see Figure 2).
4. If a water source is treated with an algaecide such as copper sulfate, prevent animal access to the water for at least a week or longer to allow degradation of any released toxins in the water. It is best to wait until the pond is no longer stagnant and test the water before allowing animals to drink from it.
5. Creating and maintaining natural buffers such as grass strips, trees and shrubs between farmland, housing developments and waterways can help filter out excess nitrogen and phosphorus before they reach the water.

How do I prevent poisoning from Blue-Green Algae for Humans:
1. Do not swim or allow children or pets to swim in water with scum layers or blooms. Avoid jet-skiing, windsurfing, tubing, or water-skiing over scum or blooms.
2. Do not use untreated water for drinking, cleaning food, or washing camping gear.
3. Do not boil water to remove blue-green algae; this will not remove algal toxins.
4. If you come into contact with a bloom, wash your skin and hair thoroughly. If your pet comes into contact with a bloom, wash it thoroughly with clean water to prevent blue-green algae ingestion when your animal licks itself.
5. Do not eat fish or shellfish caught or harvested in a bloom area.
6. Respect any water body closures by public health authorities.

Northeast Ohio Agriculture

Ohio State University Extension
Ashtabula and Trumbull Counties
Harvest Management of Sorghum Forages
By: Mark Sulc, Bill Weiss

Many producers in Ohio have planted summer annual grasses this year to increase their low forage inventories. These include sudangrass, sorghum-sudangrass, forage sorghum, pearl millet, and teff grass. When should these grasses be harvested or grazed?

The general guidelines for harvesting or grazing these summer annual grasses as listed in the Ohio Agronomy Guide are shown in the table below.

Table 7-12: Harvest Information for Summer-Annual Grasses.

<table>
<thead>
<tr>
<th>Crop</th>
<th>Silage</th>
<th>When to Graze</th>
<th>When to Terminate Grazing</th>
<th>When to Graze</th>
<th>Height After Grazing</th>
<th>Between Grazings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sudangrass</td>
<td>Late boot to early bloom</td>
<td>18-24 in. tall</td>
<td>At frost, may resume 5-7 days after killing frost.</td>
<td>18-24 in. tall</td>
<td>6-8 in. tall</td>
<td>2-3 weeks</td>
</tr>
<tr>
<td>Sorghum x Sudangrass</td>
<td>Late boot to early bloom</td>
<td>30+ in. tall</td>
<td>At frost, may resume 5-7 days after killing frost.</td>
<td>30+ in. tall</td>
<td>6-8 in. tall</td>
<td>2-3 weeks</td>
</tr>
<tr>
<td>Pearl millet</td>
<td>Late boot to early bloom</td>
<td>18-24 in. tall</td>
<td>When utilized.</td>
<td>18-24 in. tall</td>
<td>6-8 in. tall</td>
<td>3-4 weeks</td>
</tr>
<tr>
<td>Forage sorghum</td>
<td>Soft dough to medium dough</td>
<td>Not recommended for pasture</td>
<td>Not recommended for pasture</td>
<td>Not recommended for pasture</td>
<td>Not recommended for pasture</td>
<td>Not recommended for pasture</td>
</tr>
<tr>
<td>Teff</td>
<td>Pre-boot to early boot</td>
<td>16-24 in. tall</td>
<td>When utilized.</td>
<td>16-24 in. tall</td>
<td>4 in. tall</td>
<td>3-4 weeks</td>
</tr>
</tbody>
</table>

Forage Table

A recent research study sheds more light on these general recommendations, particularly in relation to mid-summer planting of the sorghum grasses. We planted a trail on July 19, 2019 near South Charleston, OH to evaluate the yield and fiber quality of a conventional sudangrass variety (hereafter designated “Normal”) and a sorghum-sudangrass hybrid carrying the BMR-6 gene for reduced lignin (hereafter designated “BMR”). Forage yield, neutral detergent fiber (NDF) concentration and NDF digestibility (NDFD) were measured on four dates after planting, with the forage being cut to a 4-
inch stubble height at each harvest. The NDFD was measured after 30-hours of \textit{in vitro} fermentation in rumen fluid plus buffer, followed by removal of microbial contaminants with neutral detergent solution.

The results were not surprising in that yield and NDF increased while NDFD decreased fairly sharply as the plants grew and matured (see figures below). There was a distinct advantage for the BMR hybrid over the non-BMR sudangrass variety (“Normal”) in terms of NDFD.

In general, diets can be formulated for different classes of livestock based on the fiber quality of the forage. For lactating cows using these forages, the amount of forage that can be fed will be limited by the NDF level. For example, if harvest was delayed in order to obtain highest forage yield, the NDF level was near 70%. At 70% NDF, the forage would probably have to be limited to 10% of the total diet of lactating dairy cows, on a dry matter basis.

For lactating cows, forage with NDFD levels of 50% are usually acceptable, and levels as low as 40% NDFD could probably work if necessary. However, higher producing herd or groups within herds are more sensitive to NDFD and require NDFD values greater than 50%. Based on these parameters, these grasses provided acceptable forage for lactating cow diets when harvested between 40 to 60 days after planting (30 to 50 inches tall). Heifer cow diets could utilize this forage harvested at about 60 days (50 inches tall).

Harvest of the BMR hybrid provided a longer window of acceptable forage. In this case, the forage could have been harvested almost to 80 days after planting (67 inches tall) and still be acceptable in a lactating or heifer cow diets. This provides opportunity for significantly greater forage yields.

Dry matter yield and total fiber (NDF) and 30-hour fiber digestibility (NDFD) of two varieties of summer annual grasses planted on July 19, 2013 near South Charleston, OH.

\begin{figure}
\centering
\includegraphics[width=\textwidth]{Dry_Matter_Yield.png}
\caption{Dry Matter Yield}
\end{figure}
Forage having NDFD levels as low as 35 to 40% with high NDF levels are acceptable for dry cows or beef cattle provided they are part of a balanced diet and their mineral concentrations are not excessive relative to requirements. Based on the results shown above, the forage harvested from 60 to 80 days after planting (50 to 67 inches tall) would have been acceptable for dry cows or beef cattle.

The results from the experiment shown here agree fairly well with a study conducted by researchers at Cornell University (Kilcer et al., 2005), who concluded that BMR sorghum-sudangrass has a relatively large harvest window to produce forage for lactating cow diets. However, they recommended that BMR sorghum-sudangrass be harvested for lactating cows when stand heights are about 50 inches (2-cuts possible with early June planting) because this will occur before the shift from vegetative to reproductive growth that lowers quality and it also reduces the amount of water that must be evaporated as yields increase. They did state, however, that with delayed planting into July, a second harvest may not be feasible, and delaying harvest to heights greater than 50 inches may be advantageous if extra forage is needed on the farm and the extra moisture can be dealt with.

In our study, we also investigated whether a 2-harvest system could provide similar forage yields with higher forage nutritive value compared with a single harvest after a mid-July planting date. The only combination of harvest dates that provided reasonable forage yields occurred when the first harvest was made at an 8-inch stubble height (to encourage faster regrowth) at 35 days after planting and the second harvest was made at a 4-inch stubble 48 days later (83 days after planting). That 2-harvest combination produced a total dry matter yield of 3813 lbs/acre for the BMR and 4870 lbs/acre for the normal variety, with an average NDF concentration of 65% and 48% NDFD for the BMR and 45% NDFD for the normal variety. Therefore, we concluded the 2-harvest system showed no significant advantage over harvesting once at 60 days when planting in mid-July.

In summary, non-BMR sudangrass and sorghum-sudangrass planted in mid-July should be harvested between 40 to 60 days (30 to 50 inches tall) for lactating dairy cows, at about 60 days after planting (50 inches tall) for feeding heifers, and 60 to 80 days after planting (50 to 67 inches tall) for beef cattle or dry cows. The BMR hybrid provided a wider harvest window for lactating cows, with acceptable forage harvested nearly 80 days after planting.
Keep in mind that the sorghum grasses should be harvested or grazed prior to a frost, which can produce toxic levels of prussic acid in the forage. Details of this risk are available at https://agcrops.osu.edu/newsletter/corn-newsletter/2018-35/avoid-forage-toxicities-after-frosts.

Reference:
Extended Forecast from NOAA, Weather.gov

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Danae Wolfe is a digital engagement and educational technology specialist with Ohio State University Extension. She has over 10 years’ experience designing and facilitating learning opportunities that span natural resources, horticulture, digital engagement, leadership, and her personal passion of photography. She was invited to speak at TEDxColumbus 2018 on the power of photography in fostering appreciation and conservation of insects and spiders. Her current work focuses on improving digital engagement strategies and fostering innovation throughout Extension.

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