

# Mountains-To-Bay Grazing Alliance

## Newsletter, July 2021



## Take a Pasture At Home

by Jeff Semler, University of Maryland Extension

Summer is the time to access your pastures and determine which ones need to be renovated and which need some TLC. Hopefully, you practice some degree of rotational grazing, so while you are moving your stock, take time to look down and take inventory.

Fall is the best time to renovate or rejuvenate your pastures and waiting until the last minute is not a great plan.

If you don't have a recent soil sample (>3 years), it is time to take one. I usually recommend soil samples be taken in the fall, which can still be done after seeding. Whether you take a sample in August or October, be consistent and continue to take samples every three years in the same season.

Next, it is essential to get an accurate idea of what the stands are like in each pasture you are considering. We find the "point step" approach beneficial for this evaluation.

To do a point step, take a clipboard with a paper record form. Randomly walk the pasture like you would take a soil sample, and every so often (20 to 30 steps depending on the size of the pasture), look down at your shoe tip and put a mark for whatever plant (or bare ground) your shoe tip touches. It is a little humbling to do this as it requires you to identify most of the plants out there.

Now, interpret the results. Do you have at least 50 percent in desirable species and few very undesirable weeds?

If so, then an herbicide, fertility, and rest strategy might be all that is called for. You might consider overseeding the pasture with desired species and varieties or frost seeding clovers.

If less than half the points are desirable, we suggest killing the existing stand and planting an improved variety of species that will complement your forage system. You may choose native warm-season grass, novel endophyte tall fescue, or some other niche forage. There are many options, and the renovation process is a chance to upgrade your forage system to use new and improved genetics.

If you decide to fully renovate, study the species you want to plant and establish them at the recommended time. Since most producers are not blessed with unlimited land resources, it is recommended to stage your renovations, first by terminating the current stand with herbicides, tillage, or a combination. The timing should be between August 1 and September 15, depending where you are located.

Second, plant a winter annual to both provide forage and weed suppression. Depending on

your forage needs, wheat, barley, triticale, or rye alone or in combination with annual ryegrass, crimson clover, rape, or another brassica are good choices. If you need fall forage, consider adding forage oats to your mix and harvest or graze early November. Apply lime during this winter according to your soil test results.

Follow the spring harvest or grazing with weed control, if still needed, and summer annuals. You can choose forage sorghum, sorghum/sudan, sudangrass, or pearl millet, depending on your needs.

After your second harvest, burn down the regrowth with a herbicide and plant your new perennial grass mixture. Fall is also the time to apply your phosphorus and potash as directed by your soil test. You should apply nitrogen or manure to meet the needs of the annual crops per soil test results.

Moving forward, avoid overgrazing, and if haying, leave at least four inches of stubble. Haybines should not be so low as to scalp your fields. Please keep in mind grass stores its energy reserves in its lower stem, not its roots.

For further information, contact your local extension office regarding forage species adapted to your area, soil testing, and herbicide and fertilizer recommendations.

# To Mow or Not to Mow

by Amanda Grev, University of Maryland Extension

When it comes to something like mowing or clipping pastures, there are certainly two sides to the fence: Those who think mowing or clipping pastures is just something that has to be done, and those who think it is a waste of time and fuel and offers little benefit.

In truth, the reality is that both sides are right—the need to mow or clip is usually site and time specific and will depend on several factors. Sometimes the decision is easy, and sometimes the decision is less clear, so what are the arguments for or against mowing or clipping?

## Eliminating Seed Heads

Mowing pastures is a strategy often used to eliminate seed heads in an effort to keep forages in a vegetative state and promote additional growth.

As plants mature to a reproductive stage, they become less palatable to livestock and forage quality quickly decreases. Removing the stem and seed head through clipping or mowing encourages the plants to divert energy away from reproductive growth back to vegetative growth and the production of new leaf material, which will be higher in quality for livestock and will continue to capture sunlight and provide energy for the plant.

Keeping plants in a vegetative state not only maximizes forage quality but also maintains a higher growth rate and stimulates tillering and root growth, promoting a denser stand.

One caution with this strategy—if eliminating seed heads is your main goal for mowing, be sure that there are enough seed heads present to validate this.

Looking at a field from a “windshield” view often gives off the appearance that there are a lot more seed heads present than there really are, so be sure to go through the field and look at the seed head density from above. You may find that there are fewer seed heads present than you initially thought.

## Promoting Even Grazing

This concept goes along with removing the seed heads and resetting the forages back to vegetative growth, as doing so can also promote a more even grazing distribution by livestock.

Particularly if livestock have already been grazing selectively, mowing or clipping can eliminate forages that are heading and lower in quality, and prevent the underutilized areas from becoming overly mature.

By evening out the pasture, promoting uniform regrowth, and keeping the forage in a vegetative growth state, you can help minimize selection by livestock. This is especially true for continuously grazed pasture where livestock have the ability to be more selective.

For rotational grazing systems with frequent rotations, you may find this less necessary. With smaller paddocks and more frequent moves, livestock will already be less selective about what they eat and paddocks are more likely to be grazed more evenly.

Although this requires additional management, the return on this is less clipping and less fuel and time spent doing so.

So is the mowing worth it? In the long run, improving your management with rotation, adequate rest, and appropriate stocking rates will likely be more viable than continuously clipping underutilized areas.

## Providing Weed Control

Mowing is often listed as a cheap, easy way to control weeds. Recognizing that there is a huge range in tolerance for weeds, particularly in pasture, most producers can probably still agree that certain weeds are more problematic than others and that some do have a negative impact on forage production and can lower the ability of the pasture to meet the nutritional needs of livestock.

Mowing pastures is a form of mechanical weed control, and there are times when mowing or clipping can be useful, particularly if you have pastures with heavy weed pressure.



PHOTO: CHESAPEAKE BAY PROGRAM

In these cases, mowing can help eliminate competing vegetation and open up the canopy to favor the growth of desirable forages.

Although mowing itself will not immediately control weeds or brush, it can prevent weeds from going to seed and help control their growth over time.

Of course the type of weeds present is an important consideration. Weed response to mowing will vary based on the time of clipping and the weed species present.

Consider a pasture with an abundance of annual weeds. While mowing might help with their control in the short term, the presence of these weeds might be indicative of poor cover, providing an opportunity for these species to fill in, in which case maintaining better cover would be a better focus for more success long term.

For those harder-to-eliminate perennial weeds, although mowing may not be killing them outright, every time the plant is mowed it has to use additional energy for regrowth, draining its energy reserves and weakening the plant over time.

On the flip side, when considering mowing as a weed control strategy, be sure not to overlook the hidden costs. Factoring in time, along with fuel, maintenance, depreciation,

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and storage of equipment, most agricultural economists place a minimum cost of \$15 per acre on mowing. That's not all that cheap, especially when the results may be more temporary.

It's not that mowing can't help control weeds, it's that the number of mowings and the timeliness of each mowing are critical for long-term control.

Effective control may require mowing two to three times each season over two or more years in order to fully prevent seed production and exhaust plant energy reserves. If we use the \$15 per acre minimum, then we've spent \$60 to \$90 or more per acre for weed control.

In addition to the cost, recognize that mowing also removes some desired forage.

Depending on the forage species and density, each inch of forage that is cut may remove 75 to 400 pounds of grazeable dry matter per acre.

While mowing forage stands that have slowed or stopped growing can promote new, high-

quality regrowth, mowing repeatedly over the season to suppress weeds will also reduce total available forage to some extent.

### **Controlling Pink Eye**

Mowing or clipping can be a strategy to help control pink eye in cattle. While forage seed heads themselves do not necessarily cause pink eye, they can definitely be an irritant and aggravate the situation.

However, you may have a hard time justifying mowing for this reason unless you have an active pink eye problem.

If pink eye is presently an issue, keeping seed heads under control using clipping or mowing could be justified to reduce possible eye irritations. However, that is usually only the case with high amounts of seed heads present and controlling flies should be the first priority.

### **Maintaining Aesthetics**

If aesthetics is your primary reason for mowing or clipping, the reality is you might be better off leaving it alone.

Taller forages produce more live roots, which can provide some drought resilience. They can also help keep the canopy closed, shading

out some weeds and keeping soil surface temperatures cooler and wetter, which can promote more growth from cool-season forages. They also have the added benefit of providing some wildlife habitat, especially for certain pollinator species.

Pastures were never meant to look like mowed lawns and keeping them as such is an added cost that has to be paid for by the enterprise.

All things considered, what is your primary reason for mowing? If your reason is to improve or maintain quality or to get on top of some persistent weed issues, then you may find it useful.

Mowing or clipping is one of the many tools we have for pasture management and it can have benefits, so there is a time and a place for it.

However, those benefits must be weighed against the costs that are associated with mowing pastures to determine if it is a practical expense economically. In some cases, mowing will have a low return on investment, and you may be better off focusing on other things and reducing the time and money spent mowing.

## **Horse Hay “Whoas!”**

by Donna Foulk, former Penn State Extension Educator

Be kind to your hay producer. Saying that making hay in Pennsylvania is challenging is a huge understatement due to all the rain and high humidity that the state usually experiences.

In addition to adverse weather conditions, producers must also contend with a variety of weeds and insects that are frequently encountered in hayfields. So be sure to thank your farmer when he delivers that beautiful, bright green hay to your barn.

### **Feeding Freshly Baled Hay**

According to noted equine nutritionist, Kathleen Crandall, if hay is baled with a low moisture content, less than 12%, it can be fed right away, and horses should not have any problem with it.

Two to four weeks of curing time might be important if the hay was too wet when it was baled. Wet hay typically goes through a fermentative state and it would not be good for horses to consume the hay when it is

fermenting. Hay that has developed mold should not be fed to horses.

### **Mold**

Rain and poor drying weather can cause hay to be baled wetter than desired and can contribute to mold growth.

With high humidity, normal drying in storage may not occur and hay can retain elevated levels of moisture allowing mold growth. Mold and bacteria will grow on hay (without

PHOTO: CBF STAFF



preservative added) at moisture levels above 14% to 15%.

The mold growth produces heat, carbon dioxide and water, which further damages the hay. Moldy hay can result in dry matter and nutrient loss and produce spores and dust.

Drying of stored hay is enhanced by increasing ventilation, creating air spaces between bales, reducing stack size, and stacking in alternating directions.

Since moisture tends to move up and out of the top of a stack of bales, ample headspace should be provided above a stack in a barn, allowing moisture to evaporate.

Molds commonly found in hay include *Alteraria*, *Aspergillus*, *Cladosporium*, *Fusarium*, *Mucor*, *Penicillium*, and *Rhizopus*. These molds can produce spores and, under some conditions, will produce mycotoxins.

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Horses are particularly sensitive to dust from mold spores and can develop a respiratory disease similar to asthma in humans called Recurrent Airway Obstruction (RAO), commonly referred to as heaves.

A horse with RAO will have a normal temperature and a good appetite, but will often have decreased exercise tolerance, coughing, and nasal discharge. Labored breathing occurs during exercise and, in some cases, while at rest. Some horses are highly allergic to certain mold spores while others seem to be minimally affected.

Strategies to reduce dust exposure are as follows:

- Do not feed dusty and moldy hay and grains.
- Keep horses outside as much as possible.
- Place feed at a lower level so particles are not inhaled through the nostrils.
- Feed hay outside to minimize dust problems.
- In severe cases, hay cubes may replace hay.
- Soak dusty hay for 5 to 30 minutes before feeding it.
- Store hay away from the horse as much as possible and ensure any hay in the vicinity is kept dry to reduce mold.
- If the horse is housed indoors, ensure that there is good, draft-free ventilation.

Table 1 contains classification of risks at various mold spore counts. While most molds do not produce mycotoxins, the presence of mold indicates the possibility of mycotoxin presence and animals being fed moldy hay should be watched carefully for mycotoxin symptoms.

### Mycotoxins

High moisture hay can also lead to the growth of bacteria, molds, and fungus that can produce mycotoxins that are dangerous to horses and other livestock species. Horses are particularly susceptible to mycotoxin toxicity. Although the effects of mycotoxins on horses are not well documented in scientific literature, mycotoxin toxicity on farms is frequently reported and appears to be significant.

Mycotoxins can cause a variety of health problems including colic, neurological disorders, paralysis, hypersensitivity, and brain lesions. Feeding low levels of

mycotoxins may also contribute to a gradual deterioration of the liver and other organs.

Symptoms of mycotoxins in forages include:

- Feed refusal.
- Reduced nutrient absorption and impaired metabolism, diarrhea, intestinal irritation, lower fertility, abortions, and lethargy.
- Alterations in the endocrine and exocrine systems.
- Cellular death causing organ damage.
- Suppression of the immune system, which predisposes horses to many diseases.

Many forage laboratories provide an analysis of the nutritional value of hay and offer packages that test for basic nutrients such as protein, carbohydrates, fiber, vitamins, and minerals. Some forage laboratories will also test for the presence of mold and mycotoxins.

### Hay Preservatives

Some hay growers apply preservatives (organic acids, yeast cultures, enzymes, etc.) to prevent the growth of the bacteria and fungi that sometimes cause heat, musty odor, and mold in inadequately dried hay.

Most preservatives applied to hay contain organic acids that are the same as those found in the horse's gastrointestinal tract.

Propionic, citric, and acetic acids, the most common organic acids in hay preservatives, are produced naturally in the cecum and colon of the horse. These organic acids can be used as mold inhibitors and applied when hay is not yet dry enough to bale safely, but rain is coming and the crop may be lost if not baled early.

Studies have shown a decrease in the heating and molding of hay during storage with the use of preservatives.

A study conducted at the University of Illinois found that yearlings receiving hay treated with a mixture of propionic and acetic acids consumed just as much hay and gained just as much weight over a one-month feeding trial as yearling's consuming untreated hay. The horses were not affected by consumption of preservative-treated hay, indicating that the hay had no negative effects on the horses.

A study conducted at Cornell University showed that when given a choice, horses preferred untreated alfalfa to alfalfa that was

Table 1: Feeding Risks* at Various Mold Spore Counts	
*Risks refer primarily to effect of mold without regard to possible mycotoxin content. Dust may also reduce feed consumption.	
Data from Richard S. Adams, Kenneth B. Kephart, Virginia A. Ishler, Lawrence J. Hutchinson, and Gregory W. Roth, 1993. Mold and mycotoxin problems in livestock feeding. The Pennsylvania State University.	
Mold Spore Count (per gram)	Feeding Risk and Cautions
Under 500,000	Relatively low risk
0.5 to 1 million	Relatively safe
1 to 2 million	Relatively safe
2 to 3 million	Dilute with other feeds
3 to 5 million	Dilute with other feeds
More than 5 million	Discontinue feeding

treated with a mixture of propionic and acetic acid. However, when only given the choice of acid treated hay, the horses readily consumed it.

However, caution should be used when feeding hay that was baled at very high moisture levels, using higher levels of propionic acid.

It is important to let that hay cure for several weeks so that the acid has time to dissipate and the hay has a chance to cure. This is especially true when feeding large round and square bales. There have been suspected cases of colic when horses were fed hay baled at very high moisture levels (29%) containing high levels of acid.

Hay that is baled at high moisture levels should not be stored beneath or next to hay that was baled at appropriate moisture levels without the addition of an acid preservative. The moisture dissipating from the acid treated hay can move into the dry hay and cause it to mold.

### Article Contributors

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# Plants Toxic to Horses

by Donna Foulk, Penn State Extension Educator

## Alsike Clover

### Distribution

Alsike clover is a high quality legume that is frequently planted as forage for livestock. It is not commonly found in high concentrations in most pastures, unless the pasture had been previously seeded with a mix containing this species.

Since horses find alsike clover to be palatable, and will not avoid eating it like other toxic plants, even low concentrations may pose a risk.

Alsike clover is an annual or biennial clover that is best adapted to cool temperatures and moist soil.

### Description

Alsike clover has erect stems like red clover, but the stems are fine and tend to lodge. Flowers are produced along the entire length of the stem rather than at the tip like red clover.

The flower is very similar to white clover, but is dark pink on the bottom and white on the top. White clover flowers are white and may be tinged with a pale pink color.

Unlike alsike clover that produces upright stems, white clover stems are prostrate and run along the surface of the ground. The leaflets lack the white "V" that is found on white clover.

### Toxic Properties

Two disease syndromes in horses have been associated with grazing alsike clover: photosensitization and liver disease, which is less common. The specific toxin in the clover that causes the disease is unknown.

### Symptoms

Liver disease is rare and may occur if the horses are feeding on large amounts of alsike clover. Symptoms include weight loss, jaundice,



Alsike clover.

depression, and neurological abnormalities.

Symptoms of photosensitization include destruction of skin cells in unpigmented parts of the horse's body when the skin is exposed to light. Affected skin will blister and eventually slough off.

### Management

Liver disease is irreversible. Horses should not be allowed to graze pastures that contain significant concentrations of alsike clover.

Alsike clover can be reduced by applying nitrogen fertilizer to pastures to enhance grass forage production. Broad-leaf herbicides can also be used to reduce clover concentrations in pastures.

## Rhizoctonia Fungus on White and Red Clover

### Distribution

White clover is a very common legume that is frequently found in pastures. White clover can grow if soil fertility is poor and will survive close grazing. It is a short lived perennial, and it is a prolific seed producer. Although individual plants do not live very long, new plants are constantly being produced from seed.

Red clover is also a common pasture legume. Since it does not tolerate continuous grazing, it is not normally found in overgrazed pastures.

### Description

White clover is a short lived perennial with a prostrate growth habit. It has no upright stems and spreads by stolons. Stolons are stems that run along the surface of the ground and produce new plants.

The plant has compound leaves with three leaflets, and a white "V" on each leaflet. Flowers are white in color.

Red clover is a short lived perennial that has an erect growth habit. The plant has reddish purple flowers at the end of each stem. Stems are hairy.

### Toxic Properties

The clover plant itself is not toxic. The toxin, slaframine, is produced by Rhizoctonia fungus

which grows on clover and alfalfa during periods of stress (high humidity, drought, and continuous grazing).

Hay made from contaminated forages is also suspect and the slaframine can remain in hay for several years.

### Symptoms

The slaframine stimulates the salivary glands and causes horses to drool. Although this is a nuisance, horses rarely suffer any health effects from grazing infected clover.

Occasionally, when environmental and/or management conditions contribute to increased production and exposure to slaframine, more serious symptoms can occur including tearing, skin lesions, difficulty breathing, increased urination, and feed refusal.

It is not uncommon for some horses in a pasture to be more effected than others since horses vary in their preference for clover and sensitivity to the toxin.

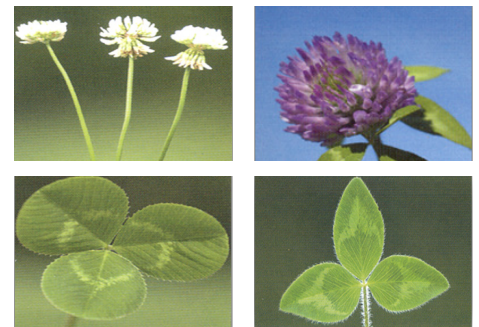
### Management

There are several strategies to reduce drooling caused by Rhizoctonia:

- Remove horses from infected pastures.
- Mow pastures until the brown fungal spots are no longer present on the leaves.
- Increase the concentration of grass by overseeding pastures and applying nitrogen fertilizer in spring and fall.
- Rest and rotate pastures to allow the grass to remain tall and competitive with the clover.
- Broad leaf herbicides, labeled for pasture use, can be used to remove existing clover plants from pastures.



Symptoms of photosensitization include destruction of skin cells.



Clockwise from top left: white clover, red clover, red clover leaves, and white clover leaves.



# Johnsongrass Remains an Enigma

by Jeff Semler, University of Maryland Extension

Growing up a kid in the 1970s, I witnessed first-hand the arrival and disdain for Johnsongrass.

This forage grass was introduced into the Southern U. S. as a perennial warm-season crop. Its persistence and vigor endeared it to graziers, but its ability to spread seemingly at will caused it to be loathed by row crop farmers.

The seed migrated north on used machinery, contaminated grain, and by unwitting folks looking for a warm-season forage with staying power. Glyphosate arrived on the market in 1974 and so began the battle to eradicate this nemesis.

Before we go too much farther, Johnsongrass is considered a noxious weed in Pennsylvania, Maryland, Delaware, West Virginia, and several others across the country.

While I am not familiar with every state's regulations, in Maryland, Johnsongrass must be controlled. The language does not say it must be eradicated.

Herein lies the problem: many graziers do not mind Johnsongrass in their pastures. Why, because the cows love it and it is a decent

forage during the dog days of summer. It does have some desirable forage characteristics.

For example, in grazing and palatability studies at the Noble Research Institute in Ardmore, Oklahoma, Johnsongrass was a preferred species by grazing yearling steers.

The forage quality of vegetative Johnsongrass ranges from 10% to 14% crude protein and 55% to 60% total digestible nutrients. These levels compete favorably with other warm-season species such as bermudagrass.

Glyphosate-resistant Johnsongrass has been verified in many states, primarily in row-crop systems.

These days, many livestock producers try to keep it to a manageable level through intensive rotational grazing and even value it as a forage resource.

The livestock typically eats it, so it never has a chance to seed, and thus the spread occurs much slower through its rhizomes. Eliminating the species is difficult, if not impossible.

Graziers that use continuous grazing practices will have little or no problem with

Johnsongrass because the stock will eat it continuously until it starves the plant to death.

However, row crop farmers continue to battle this nemesis because of escapes in fence rows, field edges, and corners where spray rigs don't reach.

Given a choice, most livestock producers would prefer not to deal with Johnsongrass because of its competitive nature.

Thus Johnsongrass finds itself in the company of another maligned forage grass, KY31 fescue: Loved by some and hated by others.

Regrettably, eradication has become increasingly more difficult, and, for this reason, many producers choose to adopt it like a stray dog that won't leave the farm.

Grazing strategies, pasture renovation, herbicides, and mechanical clipping can all be effective tools to keep plant populations in check.

(Disclaimer: I am in no way advocating planting Johnsongrass as a forage but instead help you learn to manage the invaders already on your farm.)

## Pennsylvania NRCS Staff Benefit from Two Technical Trainings

by Susan Parry and Peter Hoagland, NRCS

Two technical trainings were held in June for selected NRCS planners and affiliates to gain Ecological Sciences Job Approval Authority (ESJAA) for field level support.

The first training was the Prescribed Burning Awareness Training, which was conducted virtually with the support of the Pennsylvania Prescribed Fire Council (PPFC).

Forty-three NRCS participants joined to learn about policy, legal aspects, ecological principles, and logistical requirements to plan and implement safe and effective prescribed burning on private lands in Pennsylvania.

The training was the result of collaboration across several agencies and organizations involved in the PPFC and featured presentations by NRCS, The Nature Conservancy, PGC, PA DCNR, PSU, and Longwood Gardens.

The training will increase NRCS capacity to support private landowners in the adoption of prescribed burning as a conservation practice.

In the second training held onsite in Blairsville, Pennsylvania, twenty NRCS technical specialists and planners attended a PA NRCS Level IV (all fence types, all terrain) ESJAA Fencing School, hosted by Kencove Farm and Fence Supplies.

The first morning was spent in the classroom, learning about various fence types and installation methods; in the afternoon, the students went to a demo site to get hands-on training about fencing installation by building it themselves.

On the second day, attendees received instruction on various aspects of fence design, installation, and planning. The group then



went back out to the demo site at Kencove, received a tour of the manufacturing facilities, then had discussions about inspection/certification of fencing installation. Thanks to NRCS grazing specialists JB Harrold and Suzette Truax for their help in planning and delivering this training.

The intent of both trainings was to assist in gaining technical skills to provide field team level support for the planning and certification of the Prescribed Burning (338) and Fence (382) conservation practices.

# What Am I Giving Up? Tree Shade and Forage Production

by Austin Unruh, Crow and Berry Land Management

If you plant trees in a pasture, you can kiss your sweet, lush, beautiful forages goodbye.

Or so the fear goes.

When talking about trees and pastures (which I tend to do a lot), there is one main hesitation that comes up again and again: “Won’t that hurt my forage production?”

If you’ve read anything on silvopasture (the intentional management of livestock, forages, and trees), you may have had the same question.

For a grass farmer who relies on forage production to feed their animals (and hence, their family), maintaining high rates of forage production is a top priority. Anything that would interfere with that is justifiably questioned.

As I’ll share, not only can trees add significant amounts of feed for your livestock, both during the summer and winter when cool-season forages aren’t growing, but when managed correctly, they can increase the growth of your grasses, forbs, and legumes.

One of the major challenges in adding trees to your pastures is the utter lack of good examples to follow. There are examples out there all right, but most are crappy.

Two scenarios are common. In one scenario, one lone tree is supposed to provide shade for the whole herd, so that all summer long, you can find cattle bunched up underneath that tree, concentrating all of their manure and impact in a tiny fraction of the pasture. To add insult to injury, with that kind of chronic impact, the tree usually dies within the decade.

The second scenario we’re all familiar with is that of cattle ‘grazing’ in the woods. Now, the woods are a great place to find relief from the hot summer sun, but unless there’s been a good thinning, there’s very little to be eaten. While the cattle may be cool, you’ll likely end up feeding them hay, not the most profitable chore in the world. For good reason, you’re not looking to replicate deep forest conditions throughout your farm.

The phrase, “It’s not the cow, but the how” has



become a useful shorthand for pointing out the difference between raising livestock in a poor way (overgrazing, never rotating, etc.) and livestock managed well. Perhaps when it comes to trees, the phrase should be, “It’s not the tree, it’s me.”

In the end, you have control over how to use trees on the farm. You could, of course, create a deep, dark forest if you so desired. But assuming you don’t, you could just as well create a tree system that fits your needs just right, reducing heat stress for your livestock and cool-season forages, adding fertility to the soil, dropping high-energy feed as winter stockpile, etc. And as we’ll see, you don’t have to lose any forage production.

Rather than take my word for it, let’s look at what researchers have found when they have studied forage yields under shade.

The best work on the topic of shade in pastures has most likely been done by the folks at Virginia Tech, where silvopasture systems have been researched for several decades.

Now, in the interest of not putting you to sleep, I won’t go into all the detail here. If you’re like me and reading about this stuff actually keeps you awake at night, you can find links to the original papers below. There’s plenty there to dive into, but way too much to cover in this article.

The first study we’ll look at was simple: Make some big frames with slats to produce shade at different levels (30%, 50%, and 70%), put

them in a pasture, and measure the forage production under them.

What they found likely won’t surprise you. At 70% and 50% shade, forages didn’t grow as well as in the control (no shade). However, at 30% shade levels, the annual forage production was the same as for forages out in the open. No yield reduction, despite less sunlight available to the forages.

Interestingly, in the 30% shade treatment, the researchers measured somewhat lower yields in spring and fall compared to the open plots, but higher yields during the summer. Said another way, they saw more steady forage growth throughout the year, with fewer peaks and slumps in production.

The second study we’ll look at is even more useful, since it looks at an actually silvopasture system with trees, as opposed to an artificial system created by using shade structures. This means there were more real-world factors at play, like competition for water, tree-induced microclimate, etc.

The setup was as follows: Forages were regularly harvested from designated plots in a seven-year-old silvopasture system, where trees had been planted at high, moderate, and low densities.

While no precise values were given for exactly how much shade was being cast in each treatment (say 30% versus 50%), the ‘low’ shade treatment had very few trees and was

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very similar to an open pasture. The forage grown in each of the treatments was harvested and measured over the course of two growing seasons, then compared to one another.

These results might well surprise you. Forage production actually increased under moderate levels of shade and not by a tiny amount.

Across both years of the study, yields were 16% greater at medium density (6130 kg/ha) compared to forage yields at low shade density (5280 kg/ha).

It turns out it's not only livestock that suffer from heat stress, but forages do as well. The researchers believe that high temperatures were what hurt production in plots with too little shade, while the deep shade meant nice temperatures, but too little light. Right in the middle, they found a happy Goldilocks zone.

This may not seem intuitive if you were taught that plants are all just ruthlessly

competing for resources. But nature is complex and there's a lot going on.

Besides cooling the ground, shade also reduces evaporation from the soil, meaning water is retained for longer. Dew stays on plants longer under shade, giving some access to water even when the rains don't come.

While some of a tree's roots do indeed compete with the roots of grasses for water, a good deal of their root system is deeper than grass roots.

Then there is the process of hydraulic lift, whereby trees can transfer water from deep and moist soil horizons to shallow soil in drought times, where forages can tap into the water. The trees don't do this out of altruism, but because if the soil around their fine roots at the soil surface was bone-dry, those roots would shrivel and die. Yet whether through altruism or self-interest, the result is that more water is kept in those upper soil horizons, allowing forages to hold on longer into droughts.

I hope this idea, of trees and forages

coexisting and even complementing one another, becomes more intuitive in the years to come, and that graziers successfully learn to skillfully use trees and shrubs as just more tools in their toolboxes.

You already know that using a mixture of grasses, forbs, and legumes will give your farm better results than using only one grass or one legume everywhere.

You know that cattle, sheep, goats, and chickens will all use different parts of a pasture, and that running them all would allow you to raise more animals per acre than if they were all separate.

And you know a farm business runs best when someone is good with animals and someone with forages, someone is good with numbers and someone is good with tractors.

By learning to use the whole range of plant tools that nature has to offer us, including grasses, forbs, legumes, trees, and shrubs, you are creating powerful and profitable synergies that will get better, and better, and better, year over year over year.

## Conservation Partners Launch 4 The Soil Awareness Initiative

Soil is much more than the dirt below your feet. This critical, finite resource naturally stores carbon and water, provides habitat for billions of organisms and is the foundation of all food production.

Virginia Tech, Virginia Cooperative Extension, and USDA's Natural Resources Conservation Service (NRCS) are teaming up with the Virginia Soil Health Coalition to raise awareness for soil health and show more Virginians why they should be "4 the Soil."

4theSoil will emphasize four soil health principles that NRCS and state partners have promoted to conservation and farming communities for nearly 10 years. Those are:

1. Keep soil covered
2. Minimize soil disturbance
3. Maximize living roots
4. Energize with diversity.

4theSoil organizers will use a new website and digital media to heighten general soil health awareness and encourage Virginia farmers and residents to adopt the four principles. Website visitors can pledge their support for soil health and these fundamental practices.



This partnership effort will also highlight what Virginians are doing to care for soil and other critical resources with a goal of nurturing a stewardship ethic that will produce an overall win-win-win for Virginia's agriculture, communities and the environment.

It's no coincidence that these partners decided to kick off 4theSoil on National Soil Health Day, Wednesday, June 23. This celebration recognizes soil professionals, farmers, and growers who are focused not only on conservation but also on feeding and

enhancing our global soil health. Receive more updates by following 4theSoil on Twitter, Instagram, and Facebook.

The following agencies and organizations, along with many other statewide partners, have also signed on to support this effort: Virginia Department of Conservation and Recreation (DCR), Virginia Association of Soil and Water Conservation Districts, Sustainable Agriculture Research and Education (SARE), Virginia Tech's Center for Food Systems and Community Transformation, Virginia State University's Small Farm Outreach Program, Virginia Farm Bureau Federation, Virginia Association for Biological Farming, Virginia Forage and Grassland Council, Virginia No-Till Alliance, and Common Grain Alliance.

The National Fish and Wildlife Foundation and the Agua Fund have generously provided funding for this campaign.

Learn more about 4TheSoil at [4thesoil.org](http://4thesoil.org). Contact Eric Bendfeldt at (540) 232-6006/ebendfel@vt.edu or Mary Sketch at (919) 402-7241/msketch2@vt.edu with questions about this initiative and how you can participate in this effort.



# Double Crop Beans, Not So Fast

by Jeff Semler, University of Maryland Extension

With barley harvest behind us and wheat harvest in full swing, our thoughts move to planting double-crop soybeans.

This might be a prudent decision in many cases, but if you need forage, it may be a short-sighted choice. I suggest you look into your toolbox and consider forage sorghum, millet, or even grain sorghum.

Members of the sorghum family can be a profitable alternative crop, provided that it is managed well and used in the right situations.

For instance, forage sorghum is cheaper to produce, has comparable yields, but has slightly lower forage quality when compared to corn for silage. This crop has a lot of potential in forage/livestock systems used on many farms.

These crops are best adapted to warm regions and are known for their drought tolerance compared to corn. They have higher temperature requirements than corn.

For example, the minimum temperature for sorghum growth is about 60°F, and the highest yields occur when the mean temperatures during the growing season are between 75°F and 80°F.

Forage sorghums have even been grown successfully in short-season areas of the mid-Atlantic, where 95-day corn is considered full season.

Forage sorghum growth can range from 5- to 15-feet tall, depending on the hybrid. Hybrids can be fertile and produce grain yields comparable to grain sorghum, or they can be sterile and produce no grain.

Forage sorghum usually does not regrow following harvest; unlike sorghum-sudangrass, sudangrass, or pearl millet, forage sorghum is best adapted to a single-cut harvest for silage.

Forage sorghum silage is usually slightly lower in energy than corn silage and is similar in protein.

Yields of forage sorghums are comparable to corn and range from 15- to 30-ton per acre depending on the soil, weather, and



the hybrid. Both grain sorghum and forage sorghum have more resistance to deer damage than corn. Consequently, they are also adapted to fields where deer damage makes corn production unprofitable.

When planted in early July, sorghum-sudangrasses can produce several tons by mid-September, where millet will likely produce slightly less per acre. However, there are improved varieties of pearl millet that can produce similar forage yields.

Sorghum-sudangrass, because of its large stems, is best used for silage or balage. Pearl millet has slightly smaller stems which makes it the better choice for dry hay. Also, using a higher seeding rate may help to reduce stem size when the goal is making dry hay.

The forage quality will depend on the stage of maturity at harvest. A good balance between yield and quality is to cut sorghum-sudangrass or pearl millet hay during the boot stage.

Forage quality can range from 55 to 65% total digestible nutrients (TDN) and 6 to 10% crude protein when the plant is between the dough and boot stage.

Sudangrass may be best suited for grazing. Sudangrass usually has less yield potential than sorghum-sudangrass. It has smaller stems and will regrow after the initial grazing, resulting in equal or better yields in a grazing situation. Sudangrass also has less risk of prussic acid poisoning than sorghum-sudan.

Pearl millet can also be used for grazing, and unlike sudangrass and sorghum-sudangrass, it does not produce prussic acid, which means that it can be grazed during the initial frost period.

To avoid prussic acid poisoning when grazing sudangrass or sorghum-sudan, cattle should be removed before the first frost and can start grazing again seven days after the killing frost.

Grazing can begin when sudangrass and pearl millet reach 15 to 20 inches in height, but cattle should be moved when stubble height reaches 6 to 8 inches to allow for regrowth. Do not start grazing sudangrass before it reaches 15 inches as there is a risk of prussic acid poisoning.

If the growth is greater than 36 inches tall, harvesting as hay or silage may be best since grazing cattle will trample the forage and result in both waste and slow regrowth.

Thus, if the goal is for late summer grazing, it may be advantageous to delay planting until mid- to-late July to ensure that the plants are at the desired stage for grazing.

Weed control could be minimal after small grain if your cereal crop were relatively clean. No-till or vertical tillage can be used to establish the crop.

If you need forage, one of these members of the sorghum family may be a better choice. Feed is one of the highest costs in livestock production; these crops are a cost-effective alternative for dairy heifers and beef cattle.

## Training and Support for New or Growing Dairy Grazing Operations

Pasa Sustainable Agriculture is assembling a regional cohort of dairy farmers who are planning to start or expand their grazing practices. Participants will receive support in their transition to grazing through peer-to-peer meetings, trainings facilitated by experienced graziers, and one-on-one technical assistance. At the end of this two-year project, all participants will be eligible to receive a \$5,000 grant to support their farm's new or expanded grazing practices.

Visit [pasafarming.org/transition-to-grazing](http://pasafarming.org/transition-to-grazing) to learn more and apply.

*This project is being funded by an initiative from the Northeast Dairy Business Innovation Center and is being administered in partnership with the Cornell Cooperative Extension.*

## Autumn Course on Pasture and Forage Management

Graze 300 and Virginia Cooperative Extension are inviting technical service providers and extension agents and specialists for a short-course this fall on pasture and forage management.

This course is designed to improve understanding of pasture management and design through four 2-hour virtual modules that must be completed by all workshop participants. Each presentation will be available for viewing in Canvas on an as-needed basis for flexible scheduling. These modules will each be followed by a one-hour live Zoom meeting for an opportunity to interact with all of the presenters within the module. Participants will then select one of four in-person workshops that will take place across Virginia.

Register for FREE by emailing Gabriel Pent at [gpent@vt.edu](mailto:gpent@vt.edu).

*This course has been approved for credit hours for DCR Certified Conservation Planners, DCR Nutrient Management Planners, and Certified Forage and Grassland Professionals.*

*This project is funded in part with an integrated internal competitive grant from the College of Agriculture and Life Sciences at Virginia Tech and through USDA Southern SARE, award ES19-146.*

## UPCOMING EVENTS

### Maryland Beef Webinar Series

August 5, 7:30 p.m.

Join University of Maryland Extension for this new monthly beef cattle webinar series on the first Thursday of each month. During this session, we will discuss some things you can be doing this fall to enhance your pasture system. The event is free, but registration is required. Visit [go.umd.edu/beef-webinar-fall-pasture](http://go.umd.edu/beef-webinar-fall-pasture) to register.

### Small Ruminant and Pasture Field Day

August 12, 4:00–7:00 p.m.

Western Maryland Research & Education Center  
Keedysville, MD

Topics at this in-person field day include rotational grazing, forage species decision, managing seasonal fluctuations in pasture quality, and an update on ongoing small ruminant pasture research. The event is free but registration is required by visiting University of Maryland Extension's website at [go.umd.edu/2021feldday](http://go.umd.edu/2021feldday).

### Forage & Forest: Tour a Third-Year Silvopasture

August 27, 9:00 a.m.–1:00 p.m.

Fiddle Creek Dairy

97 Loop Road, Quarryville, PA

Learn how trees can benefit your grazing herd. Join PASA to visit Fiddle Creek's silvopasture, now in its third year. Farmers Tim and Frances Crowhill Sauder will discuss the progress they've made, the lessons they've learned, and what lies ahead. After their presentation, tour the pasture then have lunch at the farm (meals are included with registration). Register by visiting PASA's website at [pasafarming.org/event](http://pasafarming.org/event).

### Maryland Grazing School: September 23 and 24

Maryland Advanced Grazing School: October 14 and 15

Save the dates for the next Maryland Extension grazing schools. Details and registration coming soon at [go.umd.edu/forageevents](http://go.umd.edu/forageevents).

### Maryland Beef Producers Short Course Series III:

Pasture Development and Management

4 Dates at 4 Locations: October 1, October 29,

November 5, and November 19

Details and registration coming soon at [ansc.umd.edu/extension/beef-extension/educational-courses](http://ansc.umd.edu/extension/beef-extension/educational-courses).

## Mountains-to-Bay Grazing Alliance



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