Forage News

Keeping Forage-Livestock Producers in Kentucky Informed
Dr. Ray Smith and Krista Lea, editors
April 2024

Upcoming Events

2024 Spring Fencing Schools—Hands on school focusing on the installation of fixed knot woven wire fence and electrified smooth high tensile fence.
April 23 in Morehead, KY; April 25 in Mayfield, KY

2024 Beginning Grazing School—Not sure where to start? This school is designed to provide you with the tools needed to establish a profitable and sustainable grazing system. April 30-May 1 in Princeton, KY

Electric Fence Troubleshooting School—This school is designed to provide students with tips on installation of new and troubleshooting of existing electric fencing. June 12 in Morgantown, KY

Go to https://forages.ca.uky.edu/events to register or for more information or contact Caroline Roper at 270-704-2254 or Caroline.Roper@uky.edu

You're in control of feed intake on pastures

At a recent KY Grazing School Dr. Jeff Lehmkuhler reminded participants forage has to be reduced to a small enough particle size to exit the animal's rumen. If it isn't reduced, then it stays in the rumen. This is what occurs when animals are forced to eat extremely mature forage. As a result, the rumen stays full, and dry matter intake drops. "This phenomenon is a big reason why energy intake is the most common limiting factor in many forage-based livestock systems," Lehmkuhler asserted.

To hit dry matter intake goals, pastures need to be kept vegetative as much as possible. Lehmkuhler suggested increasing the speed of rotations in the spring. For example, one full spring rotation may take 14 to 21 days, while a full rotation of animals grazing each paddock during mid-summer might be extended to 30 to 40 days.

During spring, Lehmkuhler recommended to start grazing when pastures have 3 to 4 inches of growth. Even then, it can be beneficial to also feed some hay, which helps ensure adequate dry matter intake. "If cows are turned out too early, they can end up walking the fat off their backs as they try to get enough to eat."

On the flip side, waiting too long to turn cows out on spring pastures can make it difficult to keep the last paddocks from getting too mature. This why some farmers make hay from those pastures the first time through in the spring and then put them back in during subsequent rotations.

In Lehmkuhler's experience, forage quantity is often more limiting than forage quality. Maximum dry matter intake for cattle occurs when pastures reach about 2,000 pounds of dry forage per acre, or roughly 10 to 12 inches of forage height. Conversely, dry matter intake becomes limiting when forage height is less than 3 to 4 inches, or below about 1,200 pounds per acre. "On the lower end, for every bite that they take, they aren't getting as much to eat," Lehmkuhler noted.

From research studies, cattle have been shown to graze about eight to 10 hours per day. "Grazing time and biting rate are relatively constant," the beef specialist said. "Bite size varies with amount of forage available, and that impacts dry matter intake."

Lehmkuhler emphasized to leave enough leaves for the plant to photosynthesize and rapidly regrow. He noted that overgrazing pastures is still the most common mistake that graziers make. This situation is both detrimental to the pasture and to animal performance.
~ excerpted from article by Mike Rankin in Oct. 2023 Hay and Forage Grower. For full article go to hayandforage.com.

Forage Timely Tips: April

- ✓ Graze cover crops using temporary fencing.
- ✓ As pasture growth begins, rotate through pastures quickly to keep up with the fast growth of spring.
- ✓ Creep-graze calves and lambs, allowing them access to highest-quality pasture.
- ✓ Finish re-seeding winter feeding sites where soil disturbance and sod damage occurred.
- ✓ As pasture growth exceeds the needs of the livestock, remove some fields from the rotation and allow growth to accumulate for hay or haylage.
- ✓ Flash graze pastures newly seeded with clovers to manage competition.

Hay Fires: Should I Be Concerned?

Each year a small number of producers lose hay and barns to hay fires, but for those that do it is devastating. A much more common occurrence though is quality losses that occur due to excessive heating of freshly harvested hay. How do heating and quality losses occur and what can you do to monitor and prevent hay fires?

Producers are challenged each year with small windows of opportunity in their efforts to bale and store hay at the proper moisture level while avoiding the risk of rain damage. Forage cut for hay must go from approximately 80% moisture to 20% moisture or less in

order to be stable in storage as baled hay. As the cut forage dries down, both plant and microbial respiration (burning of oxygen) continues in the field.

All hay baled above 15% moisture will undergo some elevation in temperature the first couple of weeks in storage. Many producers refer to this elevation in hay temperature following baling as "sweating" or "going through a heat". This rise in temperature is caused by both plant and microbial respiration. Dr. Mike Collins, retired UK professor, reported that a small amount of heating (130°F or less) does not decrease hay quality and actually serves to dry down the hay by evaporating some of the moisture content.

Baling and storing hay high in moisture content (>20%) without taking steps to reduce or control microbial activity responsible for heat of respiration may reduce nutritional quality. Soluble carbohydrates are the principal group of compounds utilized "burned off' during respiration. The decrease of soluble carbohydrates and other chemical components during microbial respiration results in an increase in acid detergent fiber (ADF) which lowers digestibility.

When hay undergoes significant heating during storage, hay color can change dramatically, for example, green to various shades of brown. The degree of color change (e.g. light brown to dark brown) is indicative of the severity of heat damage to the hay. This type of heat damage represents a chemical reaction that fuses plant sugar and amino acids into an indigestible compound and is called the Maillard reaction. This compound is also referred to as bound protein even though the sugars are rendered indigestible. The degree of heat damage can be quantified by conducting a chemical analysis for acid detergent insoluble nitrogen (ADIN).

Baling and storing hay high in moisture content can result in spontaneous combustion or a hay fire. Hay stored at moisture levels sufficient to maintain high relative humidity of the air in the hay mass allows plant and microbial respiration to generate heat and elevates hay temperatures to 158°F. The 158°F temperature may be reached within a few days or it may take several weeks if the air is drier. Above 158°F heat continues to be generated by oxidative chemical reactions.

When the temperature exceeds 175°F, the thermal death of microbes takes place. The increase in temperatures due to the oxidative chemical reactions is basically responsible for greatly increasing the potential for a rapid increase in heat to combustion temperatures of 448 to 527°F. The amount of time required for heating up to combustion may vary from four to ten weeks; however, it could be earlier or later. The moisture content of the forage, bale density, climatic and storage conditions (e.g. size of stack) are all factors that influence the time until combustion.

<u>Important Points and Recommendations</u>

- Small square bales should be baled at 20% moisture or less to keep molding and heating to a minimum.
- Since large round or rectangular bales retain internal heat, bale at less than 18% moisture.
- When baling above 20% moisture propionic acid can be applied to reduce microbial activity and subsequent heating. Check for recommended application rates.
- Round bales should usually be left in the field for a 1 to 3 weeks (depending on moisture at baling) to allow heat to dissipate. When moist hay is stacked immediately after baling, the stack concentrates the heat, temperatures rise, quality losses occur, and the stage is set for a hay fire.
- Check hay regularly. Symptoms of heating include: slight caramel odor, strong burning odor, visible vapor, strong musty smell, and hay that feels hot to the hands.
- Make a probe that can be driven or inserted into the hay mass to check the temperature. For example: take a 10’ piece of pipe or electrical conduit. Attach a pointed dowel to one end and drill 6 to 10 1/2 inch diameter holes in the tube just above the dowel. Drive the prove into the hay stack and lower a thermometer on a string into the probe. Leave thermometer for 10-15 minutes in several areas of the stack to ensure an accurate reading.
- Watch for the following temperatures:
    - 150°F * Beginning of the danger zone. Check temperature daily.
    - 160°F * Dangerous. Measure temperature every four hours.
    - At 175°F * Call the Fire Department. Wet hay down and remove it from the barn away from buildings and other dry hay.
    - At 185°F * Hot spots and pockets may be expected. Flames will likely develop when heating hay comes in contact with the air. Be extremely careful at this stage when moving hay.
    - At 212° *Critical. Temperature rises rapidly above this point. Hay will almost certainly ignite.

Take precautions and be extremely careful upon entering the barn when hay temperature are above 160° F. Pockets may have already burned out under the hay surface. Before entering a barn, place long planks on top of the hay. Do not attempt to walk on the hay mass itself. Always tie a rope around your waist and have a second person on the other end in a safe location to pull you out should the surface of the hay collapse into a fire pocket. This last recommendation may seem extreme, but precautions are essential when hay temperatures reach dangerous levels. ~ excerpted from Virginia Tech article by Dr. Ray Smith and Jerry Swisher.

Watch for Insecticide Resistance with Alfalfa Weevil

A few years ago, a bioassay of alfalfa weevil larvae collected in a Central Kentucky alfalfa field showed low levels of control by a pyrethroid compared to other insecticide modes of action. In this particular instance, pyrethorids had been exclusively used for alfalfa weevil control for well over a dozen years.

For alfalfa weevil, there are only four different modes of action registered. When pyrethroids lose their effectiveness, growers are left with only three modes of action to select from for this pest. So, growers must be careful to not over-use one mode of action such that the pest population in an area becomes tolerant, or even resistant, to that insecticide. Once a population becomes resistant to an insecticide or a group of insecticides, the population may stay resistant for a long period of time, even if the insecticide is not used.

Delaying / Preventing Pesticide Resistance

IPM strategies can be used to prevent or delay the development of resistance. One key IPM strategy is to not use an insecticide unless the

pest population exceeds the economic injury level on the average across an entire proposed treatment area. This means the area needs to be monitored regularly (weekly) such that samples are taken to represent the entire field. Often, with alfalfa weevil, there are pockets within a field that exceed economic thresholds, but the entire field is not above the threshold. In this instance, either the person scouting should wait and resample to determine if the threshold is crossed at a later time, or spot spray those 'hot' spot areas. By delaying sprays or only spraying portions of a field, natural enemies are preserved, and there is an increased opportunity for natural control.

Proper pesticide management can also help prevent or delay resistance. If and when insecticide sprays are needed, it is important to rotate among different modes of action. Repeated consecutive use of the same mode of action favors development of resistance to that mode of action. Rotating among products within the same mode of action does not help and will also favor resistance. It is recommended growers rotate modes of action with each new generation of the target pest. Since alfalfa weevil has one generation per year, this means that each year, growers should rotate to a different mode of action than what was used the previous year. It is best to use 3 or more modes of action in rotation to fight the development of resistance. ~ Ric Bessin, Entomology Extension Specialist, KY Pest News

Getting paid for grazing rotationally

In my first posting in forage extension, a grazing guru was making a big splash in the popular press touting that rotational grazing will let you double your stocking rate. The logical conclusion is that a grazier could double their income by dividing pastures. To me, this was completely illogical because adding fence changed nothing about the productivity of a pasture. Or does it? Even the wildest claims can have a grain of truth in them. I now know that whether rotational grazing pays depends on many factors, such as stocking rate, soil fertility status, grass/forage base, and even the size of the grazing animals.

Let's start with stocking rate. Rotational grazing may allow you to increase your stocking rate if you are severely understocked. It may be difficult to visualize how a field will yield more when rotationally grazing compared to set stocking at very low stocking rate, but research has shown that it can. One study compared the annual productivity of grass at five different grazing intensities from zero to 80%. The plots allowed to grow all season with no defoliation yielded less than those defoliated at 20 or 40%. Non-defoliated plots yielded less because shading caused by the old growth inhibited the emergence and growth of new grass. So depending on the initial stocking rate, rotational grazing may allow a doubling of stocking rate, at least for a while.

Another reason rotational grazing pays is related to the stocking rate effect. When you move from a set stocked pasture to a sub-divided system, you prevent the shading that limits yield. The forage stays in an active growth stage for more of the year, and that fresh growth is green, leafy and very high in quality. Forage quality is therefore nearly always greater under rotational grazing. Rotational grazing lets you eat more of what you grow. Early in the evolution of our understanding of intensive grazing, there was a tendency to graze too close and too often because of this new ability to subdivide pastures. Over time, graziers have learned that high utilization can be overdone. This evolution of understanding has led to the general recommendation of 'take half and leave half' as a guide for grazing intensity for grasses. Another guide is to always leave some green leaf area on defoliated forage grasses.

Regrowth in grasses will be faster when there is green leaf tissue left after grazing. This principle is especially true for the more erect grasses like orchardgrass and the native grasses. When defoliation results in bare ground, weeds can encroach and soil temperatures are elevated. This heating is especially detrimental to cool season grasses. Rotational grazing pays because we can incorporate high yielding legumes like red clover and alfalfa into the sward. Rotational grazing allows you to manage for a 30 day period of rest between defoliations which is the key to legume persistence. This 30 day rest is the length of time needed to recharge the carbohydrate reserves in the taproot. This carbohydrate reserve is what drives the new legume growth after defoliation.~ excerpted from article by Dr. Jimmy Henning for Farmers Pride.

Pub. of the Month—The Great Debate of Annual vs. Perennial Forages

Perennial cool-season pastures are the predominant forage source for ruminants in the transition zone of the United States, as they often provide the most economical systems for pasture. Cool-season forage systems are characterized by high yields in spring and early summer and low summer production with variable fall regrowth depending on species and weather. Providing grazing year-round can be challenging due to fluctuating weather patterns and differences in seasonal growth distribution of pastured forages.

One way to fill in the gaps between peaks in forage production in cool-season systems is to utilize both summer and winter annuals. These provide alternative forage sources when cool-season pastures are less productive or dormant. Annual forages also tend to have greater nutritive value than perennials but are a more expensive source of nutrients due to high and recurring establishment costs..

To gain more information on the economics of various forage systems for organic dairies in the Mid-South, the University of Tennessee led a large collaborative study funded by a USDA National Institute of Food and Agriculture Organic Agriculture Research and Extension Initiative grant. One of the goals of the study was to compare the on-farm yield and nutritive value of summer and winter annual forage mixtures to a multi-species perennial pasture mixture with the goal of extending for both spring and summer grazing. Five farms in Kentucky and Tennessee were chosen to participate in this project, and on-farm results will be presented from two of the farms in Kentucky that had similar grazing systems and consistent forage stands. Read about this study by looking under publications on the Grazing Tab of the UK Forage Website or directly at— http://www2.ca.uky.edu/agcomm/pubs/ID/ID277/ID277.pdf

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Forage News

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Upcoming Events (see Forage website for details and to register, click on EVENTS)

April 11 - Horse Farm Management Field day, Harrodsburg, KY.
April 23 - KY Fencing School, Morehead
April 25 - KY Fencing School, Mayfield
April 30-May 1—KY Beginning Grazing School. Princeton, KY.
June 12—Electric Fence Troubleshooting School, Butler County.
Sept. 25-26—Intermediate Grazing School, Versailles, KY.
Oct. 15—Pasture Ecology Workshop, Elizabethtown, KY.
Oct. 15-16—Heart of America Grazing Conference, Elizabethtown, KY.
Oct 17—Regenerative Pasture Walk with Greg Brann, Adolphus, KY.