

Use of Fire in Bermudagrass Management

Annual burning of bermudagrass fields has been a recommended practice for many years. Burning offers some advantages for bermudagrass pastures, but it is particularly valuable in hayfields. Although it sounds easy, safe and effective burning of a field requires more planning and effort than you might expect. This publication provides information you should consider before using fire as a management tool. **Note:** Highly stoloniferous varieties with few rhizomes (Tifton 85, Tifton 78, and Coastcross) may be damaged by fire, especially a backfire. It is safest to avoid burning such varieties.

Definitions

Backfire: A fire that burns into or against the wind. A backfire is much slower moving and burns hotter than a headfire. It is typically easier to control or direct than a headfire. Even though a backfire moves against the wind, it will travel faster at higher wind speeds because the wind supplies more oxygen.

Bridge (Fire Bridge): When plant or other flammable material allows a fire to cross a fire lane or other area that a fire is not supposed to cross.

Drip Torch: A canister with a pilot light that dribbles a small amount of fuel, usually kerosene or diesel fuel, that is used to set a fire. Typically, a drip torch is used to set a prescribed fire.

Fine Fuel: Plant material that will burn readily; typically dormant grass. Woody plants in a forage setting, even if dormant, will seldom carry a fire on their own. For

example, large clumps of dewberry briars by themselves are difficult to set on fire, but if they are in a mixture with dormant grass (fine fuel) the grass can carry the fire and may ignite the briars.

Fire Lane: A border that separates the area which is to be burned from the area not to be burned. Usually it consists of a plowed or tilled strip which surrounds a field. Its purpose is to stop the fire at the field border. A road, an area of green plant growth, or a stream can also serve as a fire lane in some situations.

Headfire: A fire that travels in the same direction the wind is blowing. It moves more rapidly than a backfire, and the faster the wind speed, the faster the fire front will move. A headfire is typically harder to control and may cross wider fire lanes than a backfire.

Infiltration Rate: The rate at which water moves or soaks into the soil surface. *Permeability* is a related term which refers to the rate at which water moves through the soil once it has infiltrated the surface.

Mulch: For the purpose of this publication, this is newly deposited plant material, either dead or dormant. Typically, mulch refers to the portion of the previous season's growth left on the field during the winter.

Prescribed Fire or Prescribed Burn: A fire intentionally set as part of an overall management plan to accomplish a specific objective, as opposed to a wildfire or a fire set accidentally.

Thatch: As opposed to mulch, thatch is plant material that has accumulated at ground level; it has generally lost its identity as a result of partial decomposition.

Benefits of Burning

Bermudagrass fields, especially hayfields, which are not burned can eventually develop substantial thatch accumulation. This buildup is a result of forage left on a field during winter as well as cut forage that the rake and baler did not pick up.

Burning provides the benefit of removing thatch.

- Thatch and mulch tie up nutrients. Once a field is burned, most of the nutrients are deposited on the soil surface in a form readily available for uptake by the bermudagrass. (A small quantity of nitrogen and sulfur is lost through volatilization when burning occurs, but this is only a minor loss.)

- The blackened field surface which remains after a burn absorbs more light energy, causing the soil to warm faster.

- In burned fields, the first hay cutting will normally be quite clean after the mulch has been completely removed by fire. This can be especially important to producers who sell to specialty markets such as horse producers.

- Burning also provides other benefits, including reduction of leafspot disease and, of particular importance, control of spittlebugs. In addition, leaving 4 or 5 inches of growth (usually about 1,000 pounds of dry matter per acre) will suppress many winter annual weeds (such as henbit and chick-

weed and to a lesser extent wild onion and wild garlic) while helping guard against winter injury to the bermudagrass.

Mulch Can Decrease Production

Mulch has beneficial effects but can also create problems. Over time a substantial thatch accumulation can decrease production.

- A thick thatch layer “smothers” the bermudagrass (shades young tillers), thus inhibiting growth.

- If the thatch is not thick enough to inhibit growth, it may insulate the soil enough in the spring to delay initiation of bermudagrass growth by as much as 2 weeks.

- A thick thatch layer can reduce infiltration of water into the soil. Water that hits a thatch-covered soil surface may run off rather than soak in. In some cases a substantial percentage of the rainfall from a quick thunderstorm can run off the field under these conditions and greatly reduce the amount of water retained by the soil for subsequent use by plants.

- When a field which is never burned is overseeded, a thick thatch layer can inhibit seed germination or the establishment of winter annual forages, thereby reducing stands. This is particularly true with small-seeded clovers when they are broadcast seeded. Even if they root in the thatch, they may die with the first dry period because the roots are not in the soil. All the benefits associated with mulch, especially the weed control aspect, depend on the uniform distribution of mulch over the field.

Special Considerations

Some amount of organic material on the soil surface is benefi-

cial. It intercepts raindrops and helps protect the soil from erosion, and it helps hold moisture and nutrients. Depending on the variety of bermudagrass, level of fertilization, and other factors, some bermudagrass fields (particularly pastures) may not need to be burned every year.

On the other hand, there is no evidence that properly managed burning is detrimental to a bermudagrass stand even if it is burned annually for many years. Therefore, fields should be burned as frequently as needed.

The amount of thatch that protects the soil without limiting forage production varies from year to year. Fire is a tool which can be used to regulate the amount of thatch present.

As a management practice, burning has some costs associated with it. It requires time and labor to properly execute a burn, and the cost of forage left in the field as a mulch should also be considered. Burning a pasture or hayfield incorrectly may be particularly costly if fences, vehicles, or even buildings need to be replaced.

Steps for a Prescribed Burn

Prepare ahead of time for a safe and efficient prescribed fire. If a prescribed fire is a legal option, then develop a fire plan. A fire plan should list all the steps involved in conducting a burn including who is in charge, the location and duties of each helper, and emergency phone numbers or emergency actions.

Find Out About Permits and Restrictions

When considering and/or planning a prescribed burn you must:

- determine if there are county (or other) ordinances against burning. If so, they may be total bans or just seasonal bans.

- find out if other restrictions apply. In some areas you can conduct a burn only at certain times of the day. Contact a local fire tower or fire department for information regarding restrictions.

- obtain and carefully study a written copy of any rules and regulations you will need to observe.

- obtain a burning permit. (This is true only in some areas.) It may be possible obtain a permit number with a phone call.

Prepare Ahead of Time

In the fall, arrange the last cutting of hay or grazedown so that some growth will accumulate before the bermudagrass goes dormant. This will provide enough fine fuel to carry a good fire. For the optimal burn, a uniform 4- to 6-inch layer of grass should remain at the end of the growing season.

Select Fire Boss

Select one person to be in charge. This person is sometimes referred to as a fire boss. The crew that helps conduct a burn needs to know who is in charge and must agree to follow the instructions provided.

Decide When to Burn

The timing of a burn is quite important. If a field is burned too early, weeds and/or insects may reinfest the field before bermudagrass growth begins in the spring. On the other hand, burning too late may temporarily suppress bermudagrass growth and reduce season-long yield.

The optimum time to burn is immediately before spring green up. This ensures that the soil surface will be bare for only a short period of time minimizing the risk of soil erosion. However, spring green up is difficult to predict accurately. Even if it could be predicted, there is no guarantee of proper weather conditions for burning just prior to that date.

In general, being ready to burn by the first of March allows enough time to wait for the right weather conditions before green up. Fortunately, bermudagrass with a little green leaf material showing will not be harmed by most fires.

Establish and Inspect Fire Lanes

1. Plow fire lanes at least 6 feet wide around the field to be burned. Plow a 10- to 12-foot fire lane around fields of 5 to 10 acres or larger.

2. Cut fire lanes around utility poles or outbuildings in the field to be burned.

3. Exercise caution near wooded areas adjacent to the field to be burned. Even if the wooded area is not actively growing, leaf mulch can carry a fire, and a vigorous fire can ignite the lower, dormant limbs of trees.

4. A paved or gravel road makes an excellent fire lane. A rutted road may also serve this purpose, but you'll need to inspect it closely for possible fire-bridge sites. For example, a tall clump of dead plant material such as broomsedge may ignite and fall across a rut, setting fire to other materials, and in this manner form a fire bridge.

5. Also, check plowed fire lanes for fire bridges. A plowed area can have places where a fire could creep across from one piece of plant material to another. In some cases a small amount of dry plant material can carry a fire.

When a fire is in progress, you may not notice a small fire bridge until it is on the other side of the fire lane and spreading. Double plowing fire lanes is a good practice in most cases.

6. You can use the fire itself to build a wider fire lane. For example, if a small rutted road runs along the edge of a wooded area, and if the wind is blowing toward the woods, you can light a small, slow-moving backfire along the rutted road. This small backfire will burn out away from the woods. Then when you set the headfire and the fire moves toward the woods, the headfire should die when it reaches the area which has already burned.

Use this same principle when burning out from a structure. Start the fire near a wooden outbuilding so that it burns away from the building as it gains in intensity. In this way, the burned area becomes an effective and increasingly wider fire lane as the backfire burns.

7. Don't assume anything when dealing with fire. Just because a tall fescue field is green doesn't mean it will make a good fire lane or buffer. Some green fields will burn surprisingly well, especially during periods of little rainfall. On the other hand, a cow path within the field which is $\frac{1}{10}$ the width of the fire lane may stop a fire. **Take no chances when dealing with fire!**

Wait for the Right Weather Conditions

Once the fire plan has been carefully prepared and double-checked, and the fire lanes are in place and have been inspected for potential bridge points, then you must wait for proper weather conditions. You need to pay attention to wind speed, wind direction, and moisture. Listen to the local weather forecast for the possibility of high winds before you set a fire. As a general rule, don't con-

duct a burn if wind speed exceeds 10 to 12 mph.

Wind direction may dictate how you'll conduct a burn. If a well-traveled road is near the field to be burned, you should avoid burning at a time when the wind will blow smoke across the road. If you can't avoid this situation, place two people on the road to warn motorists of reduced vision due to smoke. If you notify them in advance, some law enforcement agencies will help in these situations.

If you know prevailing wind directions and how the winds change throughout the day, you'll have a greater chance of conducting a safe prescribed burn. Generally, wind speed is lower in the morning than in the afternoon, and morning winds tend to be more predictable and less gusty.

Another factor that can affect how you'll conduct a burn is moisture. If dews are fairly heavy in the morning, you'll need to wait until the dew dries off. You need to be ready to burn, but you also need to be patient and wait for the right set of conditions.

Burning Strategies

Different combinations of moisture, wind speed, and wind direction will require different burning strategies. For example, a highly stoloniferous bermudagrass variety, which does not produce an extensive root system (such as Tifton 78), should be burned with a headfire rather than a backfire if possible. The greater heat of a backfire is much more likely to damage the stolons. But what if the prevailing wind and/or the presence of a road or structure dictates that a backfire be used with such a variety? If a backfire must be used, then burning fairly early in the morning before the dew has completely lifted, or shortly after a rain when the soil is still moist, will help produce a cooler fire and will provide some protection to the bermudagrass

stolons. Under these conditions, however, the burn will not be as clean.

Another example would be a Coastal bermudagrass field (a variety which is more rhizomatous than stoloniferous) that has an extremely thick thatch layer causing a decrease in production. This field may need to be burned with a backfire. Setting such a fire well after the dew has lifted and at a time when there is an 8 to 10 mph wind should provide a relatively slow moving but hot fire which will offer the best removal of thatch.

On the Day of the Burn

Once conditions are right, you can set the fire, but keep several points in mind.

1. On the day of the burn, notify the fire tower and the local law enforcement agency (or agencies). Also, notify the local fire department in case they want to place a truck near the burn site as a precaution. Otherwise, the phone number of the fire department should be close-at-hand for use if necessary.

2. Follow the fire plan.

3. Make sure that everyone involved knows who the fire boss is and has an assigned job.

4. If possible, set the fire as a fire line, rather than as a single point or a few points. It's best to use a drip torch to set the fire for a prescribed burn, but you can obtain the same effect by tying

a length of wire to a burlap bag, soaking it in kerosene, setting the sack on fire, and pulling it along the edge of a field. A third alternative would be to drop a newly struck match every 5 to 10 feet along the edge of the field. (You would need two or three boxes of wooden matches.)

5. If you use both a backfire and a headfire, set the backfire first and allow it to burn well into the field to increase the width of the fire lane before setting the headfire. During the burn, closely monitor the field for any flammable material that may become airborne during the burn. Such material can start fires several hundred feet away from the field being burned, well over and beyond the fire lane.

6. To get a uniform burn over the field, you may need to go back to the field after the fire is out and set fire to a few small areas that did not burn with the first attempt. If the original fire is still burning in some areas of the field, use extreme caution when entering the field, because a change in wind direction could create danger.

7. Check the newly-burned area carefully before everyone leaves in order to make absolutely certain the fire is completely out. Sometimes manure piles or heavy thatch areas, particularly if they were a little damp, can smolder for hours. Identify these areas and extinguish the fire. (Remember the statement, "Where there's smoke, there's fire.")

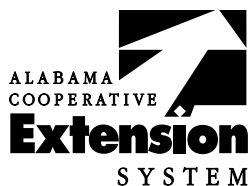
8. If a smoldering area is in the middle of the burned field it probably cannot start a fire in the field; however, if wind speed increases, burning material could be blown into an adjacent unburned area and ignite it. Make the final check by walking the field near or after dark when smoldering embers are much easier to see.

Follow-Up

The fire lanes created around the field border will probably become somewhat weedy due to the plowing and may need to be treated with a herbicide. In hayfields, the fire lanes may also require smoothing to allow for easy operation of haying equipment.

Summary

Periodic or even annual burning of forage bermudagrass fields is a desirable practice. **However, in view of the danger which fire presents, use this tool with extreme caution.** When conducting a prescribed burn, you should never take shortcuts or compromise safety. A track record of safe burns in the past does not guarantee a safe burn in the future.



Your Experts for Life

ANR-989

Don Ball, *Extension Agronomist*, Alumni Professor, Agronomy and Soils, Auburn University, and **Bruce Pinkerton**, *Extension Agronomist*, Associate Professor, Clemson University

For more information, call your county Extension office. Look in your telephone directory under your county's name to find the number.

Issued in furtherance of Cooperative Extension work in agriculture and home economics, Acts of May 8 and June 30, 1914, and other related acts, in cooperation with the U.S. Department of Agriculture. The Alabama Cooperative Extension System (Alabama A&M University and Auburn University) offers educational programs, materials, and equal opportunity employment to all people without regard to race, color, national origin, religion, sex, age, veteran status, or disability.

4M, Revised July 2005, ANR-989