

Forages



BURNING BERMUDAGRASS FIELDS

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Burning bermudagrass fields has been a recommended practice for many years, especially for spittlebug control. Although burning offers management advantages for pastures, it fits best in hay field management strategies. Safe and effective burning of a field requires more planning and effort than might be expected. This publication provides information that should be considered prior to using fire as a management tool. To avoid confusion and misinterpretation, definitions for a number of terms used in the text follow.

Fine fuel. Plant material that will burn readily, typically dormant grass. Woody plants present in a forage setting, although 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 matrix of dormant grass (fine fuel) the grass can carry the fire and may ignite the briars.

Infiltration rate. The rate at which water moves through the soil surface (i.e., soaks in). Permeability 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.

Thatch. As opposed to mulch, this is plant material that has accumulated at ground level; it has generally lost its identity by partial decomposition.

Fire lane. This is an area, usually a plowed or otherwise tilled strip, surrounding the field to be burned. Its function is to

stop the fire at the field border. A road, an area of green plant growth, a stream, etc., can also serve as a fire lane in some situations.

Headfire. A fire that travels in the direction in which 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 does not produce temperatures as high as those of a backfire. It is typically harder to control and may "jump" wider fire lanes than a backfire.

Backfire. A fire that burns into or against the wind. It is much slower moving and burns much hotter than a headfire. It is typically easier to control or direct than a headfire even though it is hotter. Even though the fire has to move into the wind, the greater the wind speed, the faster a backfire travels because the wind supplies more oxygen.

Prescribed fire/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.

Bridge (fire bridge). This refers to plant or other flammable material that allows a fire to burn across either a fire lane or an area that the fire is not supposed to cross.

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

Benefits of Burning

Burning will produce benefits in addition to spittlebug control. The first hay cutting will be very clean after the mulch has been completely removed by fire. This effect can be especially important to producers who sell to specialty markets, such as to horse producers, because the first cutting should draw a premium price. If some forage is left in the field to serve as a mulch, 1000 lbs/ac for example, it will suppress many winter annual weeds such as henbit and chickweed and, to a lesser extent, wild onion or wild garlic. Suppression of winter weeds further increases the likelihood of an exceptionally clean first cutting of hay.

All the benefits associated with mulch, especially the weed control aspect, depend on the uniform distribution of mulch over the field. Further, the timing of the burn is very important. If a field is burned too early, weeds and/or insects may reinfest the field before bermudagrass growth begins in the spring. Proper timing of prescribed fires is addressed later in this leaflet.

Mulch can have many beneficial effects; however, bermudagrass fields, especially hay fields, can develop substantial thatch accumulation. This buildup can come from forage intentionally left during winter as well as from an accumulation of cut forage that the rake and baler have not picked up. Over time such a thatch layer can decrease production.

Several factors cause a decrease in production. One is simply that the space occupied by a thick thatch layer “smothers” the bermudagrass (shades young tillers), thus inhibiting growth. Even 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 long as two weeks. This delay is due to the slow warming of the soil below the thatch. After burning, the blackened field surface absorbs more light energy, thus hastening warming of the soil.

The thatch layer may also reduce water infiltration into the soil. The thatch layer often becomes hydrophobic (meaning water-hating). In such a situation, water that hits the thatch-covered soil surface may bead-up and run off rather than soak in. A substantial percentage of the rainfall from a small storm can run off the field under these conditions and greatly reduce the amount of water retained by the soil for subsequent plant use.

Furthermore, thatch ties up nutrients. Once this material has burned, however, most of the nutrients are deposited on the soil surface in a form readily available for uptake by the bermudagrass. Some

nitrogen and sulfur are lost through volatilization (literally “up in smoke”).

Although most hay fields are not overseeded to winter annual forages, in some cases a thatch layer can inhibit winter annual seed germination, thereby reducing stands. This is particularly true with small seeded clovers when they are broadcast seeded; they may root in the thatch but die with the first dry period because the roots are not in the soil.

In the long-term management plan there is often a question of how frequently a field should be burned. 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 in the overall management plan.**

Special Considerations

Some amount of organic material on the soil surface is beneficial. It intercepts raindrops, protecting soil particles from disruption and erosion. Maintaining a balance in the amount of thatch on the soil surface, which will change over seasons and years, will protect the soil but not limit forage production.

Fire is not free. Planning and executing a prescribed fire requires time and money. As a management practice burning definitely has a cost associated with it. There is time and labor associated with the actual burning, and the cost of the forage left in the field as a mulch must be considered. A pasture or hay field burn executed incorrectly may be very costly. It may result in costs such as the replacement of fences, buildings, vehicles, or even a house (yours or your neighbors)!

Any forage-livestock operator should have an overall management plan with identified objectives. Prescribed burning of bermudagrass fields should be a component of this overall plan and should require a fire plan. This does not have to be overly formal, but should represent a thorough attempt to plan the use of fire in forage management. Not the least important is the objective for the burning. *If there is not a definite objective, **do not burn.***

Steps for a Prescribed Burn

When considering and/or planning a prescribed burn, the first thing to determine is whether your county has ordinances against burning. If so, the ordinances may be total bans or just seasonal. Also, other restrictions may apply. Some places restrict the time of day you can burn. A good place to contact is the local fire tower or fire department. It is best to obtain in writing any rules and regulations that might

have to be observed. If a prescribed fire is a legal option, the next step is to develop a fire plan.

Prescribed fires work best if planned well in advance. Arranging the last cutting of hay or grazedown in the fall so that some growth will accumulate before the bermudagrass goes dormant assures there will be enough fine fuel to carry a good fire. Optimally, a uniform four- to six-inch layer of grass should remain at the end of the growing season.

The fire plan will include obtaining a burning permit (sometimes just a permit number given over the phone) and choosing a fire boss. Designation of a fire boss may sound unimportant, but one person should be in charge when a fire is to be set! The crew that is helping needs to understand and agree to follow instructions, and lines of communication to and among the crew should be spelled out. On the day of the burn, the fire tower and the local law enforcement agency (agencies) should be notified. The local fire department should also be notified; they may desire to place a truck near the burn site on your farm. The local weather forecast should be checked for any potential storms, but mainly for the possibility of high winds. These represent the core points of a fire plan, but many other factors should be included, some of which will need to be considered several months before the fire is started!

When to burn. The optimum time to burn is immediately before spring green-up. This timing ensures that the soil surface lays bare a minimal length of time to reduce the risk of soil erosion. However, spring green-up is difficult to predict accurately; and even if you could there is no guarantee of proper weather conditions for burning on that date. In general, being ready to burn by the first of March will let you find a window with the right weather conditions before green-up. Fortunately, bermudagrass with a little green leaf material showing will not be harmed by most fires.

During the burn you should keep with you the burn permit number as well as the fire tower and fire department telephone numbers. Call these numbers immediately if a fire gets out of control.

Fire lanes at least six feet wide should be plowed around the field to be burned, although with fields over 5 to 10 acres, a 10- to 12-foot fire lane is desirable. If there is a wooded area adjacent to the field to be burned do not be fooled by the apparent lack of growth there. A vigorous fire can ignite the lower, dormant limbs of hardwood trees, and the leaf mulch can also carry a fire. A paved or gravel road can often serve as an excellent fire lane. A rutted road may also serve this purpose, but should be inspected 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 forming a fire bridge across the fire lane. Plowed fire lanes should also be checked for fire bridges. Just because an area was plowed does not mean that there are no places where a fire could creep across from one piece of plant material to another. It does not take much dry plant material to carry a fire. Furthermore, when a fire is in progress, a small fire bridge is seldom noticeable until it is on the other side of the fire lane and spreading. Double plowing fire lanes is a good practice in most cases.

If there are utility poles or out-buildings in the field to be burned, they should also have fire lanes cut around them. Wooden out-buildings require special care. Ideally, the fire should be started near them so that it burns away from the building as it gains in intensity.

The fire itself can be used 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, a small, slow-moving backfire could be lit along the rutted road, which would burn out away from the woods. Then when the headfire is set, and the fire moves toward the woods, it will come to the area which has already burned, and go out. This same principle can be used when burning out from a structure, with the burned area becoming an excellent and increasingly wider fire lane as the backfire burns.

Do not underestimate the importance of fire lanes. Be careful about using tall fescue fields as a fire lane or buffer just because they are green. Test tall fescue's ability to carry a fire by dropping a match into it, but be prepared to put it out before it has spread very far (trust the voice of experience)! Most people are very surprised at how effectively a fire can spread through the dormant common bermudagrass and crabgrass, and dead tall fescue mulch. On the other hand, a cow path in the middle of the field, which is one-tenth the width of the fire lane, will probably stop your fire. This is consistent with Pinkerton's rules of pasture burning, and should be kept in mind at all times: 1. ***if you're sure it will not burn, it will;*** 2. ***if you're sure it will burn, it will not*** (due credit is given to Murphy and his laws of nature); and 3. ***don't panic.***

Wind and Moisture Conditions

Once your fire plan has been carefully prepared and double-checked, and fire lanes are in place and have been inspected for potential bridge points, it is generally a wait-and-see-game with the weather. A properly prescribed burn is conducted within certain climatic guidelines of wind speed, wind direction, and moisture conditions.

As a general rule you should not burn with winds over 10 to 12 mph. Wind direction can be used several ways and may dictate your fire type. If a well-traveled road is near the field to be burned, you do not want to burn when wind would blow smoke across the road. If you have to burn in this situation you should have enough people helping so that two can be placed on the road to warn motorists of reduced vision due to smoke. Some law enforcement agencies will help in these situations with advanced notice, but all efforts should first be made so as not to have smoke crossing a well-traveled road. Knowledge of prevailing wind directions and typical changes through the day can greatly assist with a prescribed burn. Wind speed is generally lower in the morning than in the afternoon; further, morning winds tend to be more predictable and less gusty.

Another factor to deal with is the presence of fairly heavy dews in the early mornings. This can give rise to the situation where you are waiting for the dew to dry off, and hoping that it will before the wind comes up! This is why you should be ready to burn, but should exercise extreme patience in waiting for the right set of conditions.

However, combinations of moisture and wind speed can be used to obtain different types of results from fire.

For example:

Tifton 78 bermudagrass should not be burned with a backfire because of potential damage to stolons from the greater heat of the backfire. Normally, a cooler burning headfire will not damage Tifton 78. If the prevailing wind, along with the presence of a road or structure dictate that a backfire be utilized, 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 Tifton 78 stolons. But, the burn will not be as clean.

For another example:

If you have a field of Coastal bermudagrass that has become less productive and that has a thick thatch layer causing a decrease in production, a hot backfire, with a good 8 to 10 mph wind, set well after the dew has lifted, will provide the best removal of the thatch material. This will be a relatively slow moving fire but will be very hot.

Therefore, within reason, wind speed, wind direction, vegetation moisture, and soil moisture can be utilized to give the best fire characteristics for the forage situation at hand.

Fire Procedures

Once you are ready to start the prescribed fire there are several points to keep in mind. First, follow your fire plan. Second, make sure everyone involved knows who the fire boss is and that they will do what they are told to do. Third, if possible, set the fire as a fire line, rather than as a single point or a few points. This is best accomplished with a drip torch, which can be obtained for less than \$100. A drip torch is a good investment if you intend to burn many fields. The same effect can be obtained by tying a length of wire to a burlap bag, soaking it in kerosene, setting the sack on fire and pulling it along behind you. At the very least you should have at least two to three boxes of large wooden matches and should drop a newly struck match every 5 to 10 feet as you walk along.

Backfires should be set first and allowed to burn well into the field before the headfires are set. As stated before, this uses the slow-moving backfire to increase the size of the fire lane that the fast moving headfire will be burning toward.

You will need to be constantly aware of any flammable material that may become airborne during the burn. Such material can start fires several hundred feet away from the field you are burning, well over and beyond the fire lane. The senior author, for example, has seen a paper bag used to bring soft drinks to the crew catch fire and blow over 200 yards and set fire to another field. He has also seen dry manure piles ignite, go airborne, and start other fires. Try to explain that to your neighbor!

In some cases you may need to go back to areas of a burned field, after the fire is out, and set fire to a few small areas that did not burn with the first fire. If the original fire is still burning in some areas of the field, use extreme caution when entering the field. Make sure that a change in wind direction will not allow the fire to burn toward you.

Pickup Truck Management

1. Check the truck for gas and oil leaks.
2. Park upwind from the area to be burned.
3. Leave the keys in the truck so someone can move it if necessary.
4. Put a copy of the fire department and fire tower telephone numbers on the dashboard.
5. Roll up the windows.
6. Do not try to drive in the fire lanes.
7. Check your insurance policy to see that it covers fire damage.

Follow-up

Finally, before you leave the burned area you should make absolutely sure the fire is extinguished completely — then check again! Some heavy thatch areas, particularly if they were a little damp, can smolder for hours, as can manure piles. If such smoldering areas are in the middle of the burned field they probably cannot start a fire in the field; however, burning material from these areas might blow into adjacent unburned areas and set them on fire. Remember the saying “where there’s smoke, there’s fire.” One excellent method for the final check is to walk the area near or after dark when the smoldering embers are much easier to see.

The fire lanes will probably become somewhat weedy due to the plowing and may need to be treated

with a herbicide. In hay fields the fire lanes may also require smoothing so haying equipment can be easily operated over the area.

The first time you burn a pasture or hay field it can be very frightening, but it will also be quite educational, and you will learn a considerable amount by observation. By the time you have burned several fields, over a period of several years, you will have become an authority on the use of fire in forage management programs. But a word of caution — do not begin to take shortcuts in procedures, especially safety procedures, because no matter how much you know and no matter how many fires you have successfully set, **you could always lose the next one.**