

# Pasture Weed Management and Drought

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Pasture weed management always presents a challenge. There are dynamic, complex interactions between desirable forages, grazing animals, encroaching weeds, soil types, nutrient levels, climate and human management decisions. When drought occurs, weed management decisions become even more important due to increased difficulty controlling weeds, competition for limited water resources and sensitivity to lost forage production. Drought is a normal climate variable that we have no way to influence unless irrigation is available. Even when irrigation is available, it is rarely capable of meeting all water requirements in an economical manner. When forage grasses in pastures are damaged by drought and the all too common subsequent overgrazing, grass stands will be thin and bare spots will develop. These thin stands and bare spots give weeds an ideal opportunity for establishment whenever favorable conditions return. Whether in pastures, hay fields, small grains or row crops, one of the basic tenets of weed management is that weeds will invade and colonize bare areas. It has been said that nature abhors a vacuum and will find something to fill it. In most cases, it will fill that vacuum in pastures with weeds.

## Causes of Weed Infestation

Perennial pasture grasses, such as bermudagrass, old world bluestem and tall fescue will usually not have significant weed problems under ideal conditions because they develop and maintain a dense cover. However, factors such as low nutrient levels, improper soil pH, insect infestations, ►



*A severely overgrazed pasture where weeds are likely to develop into a problem*



*Pastures managed to prevent overgrazing will recover more quickly when rain comes and, with fewer spots of exposed soil, will be less likely to sprout weeds.*

disease outbreaks, overgrazing and poor haying management can result in thin or bare spots that allow weeds to gain a foothold. The good news is that we have some control over each of these factors. Unfortunately, drought, as well as other adverse climatic conditions, can exacerbate the impacts of these factors.

Soil nutrient levels and pH can be readily determined by an inexpensive soil test. Acid soils can be corrected by applying the proper amounts of lime. Lime requires water and time to neutralize soil acidity, so it must be applied prior to drought conditions or be activated by irrigation to be effective. Proper soil nutrients, particularly phosphorus and potassium, are necessary for optimal plant growth. Deficiencies can be readily corrected with commercial fertilizers, poultry litter or other amendments. If these factors are not limiting when drought conditions develop, the forages will use available moisture more efficiently and be less likely to develop thin or bare spots where weed problems can start.

Insect and disease pressure have the potential to lower production and thin out forage stands. Insects are a much more common problem in pastures and hay fields in the Southern Great Plains than diseases. Regular field scouting and, when necessary, treatment with appropriate insecticides can protect pastures from significant insect damage. Some insects, such as grasshoppers, tend to be more common and damaging during drought conditions. This is due in part to grasshoppers' preference to lay eggs in bare soil areas near weeds and grasses where newly hatched larvae have a nearby food source. By controlling weed outbreaks early, a pasture is less attractive to grasshopper infestation. Likewise, by controlling grasshoppers, pasture thinning



*A sacrifice pasture is on the left where cattle are being maintained on hay. A deferred pasture is on the right where the bermudagrass is being allowed to recover.*

and bare spots are reduced and the likelihood of weed establishment is lessened. In many ways, weed and insect management are closely inter-related, even more so during drought.

Poor grazing management may be the most common cause of the thin or bare spots that encourage weed infestations. As previously stated, a thick stand of grass is often sufficient to prevent weeds from developing into a significant problem. During drought, forage production is limited, and poor grazing management that might normally go unnoticed will be plainly evident. Desirable pasture plants will be heavily overgrazed and either die or become less competitive with establishing weeds. Many times, a producer's first impulse is to open all the gates and allow cattle to find any forage available. This usually results in all pastures being overgrazed at the same time and equally susceptible to weed establishment. One option to avoid this situation is to place cattle in a "sacri-

fice pasture," preferably a bermudagrass pasture, where they can be maintained on hay or supplemental feeds. This leaves only one pasture that will be heavily overgrazed, be susceptible to weed infestations and suffer significant damage to the forage base. The remaining pastures will maintain a thicker forage base, recover more quickly when rains resume and be less prone to weed encroachment.

Although all the above factors are important every year, drought conditions make them more important. They can be more efficiently addressed before drought sets in. Of course, the problem lies in forecasting drought before these conditions occur and taking a proactive approach to weed management. Long-term weather prediction has always been imprecise at best, but with a better understanding of the causes of weather conditions, the ability to predict regional weather patterns has improved. One tool is

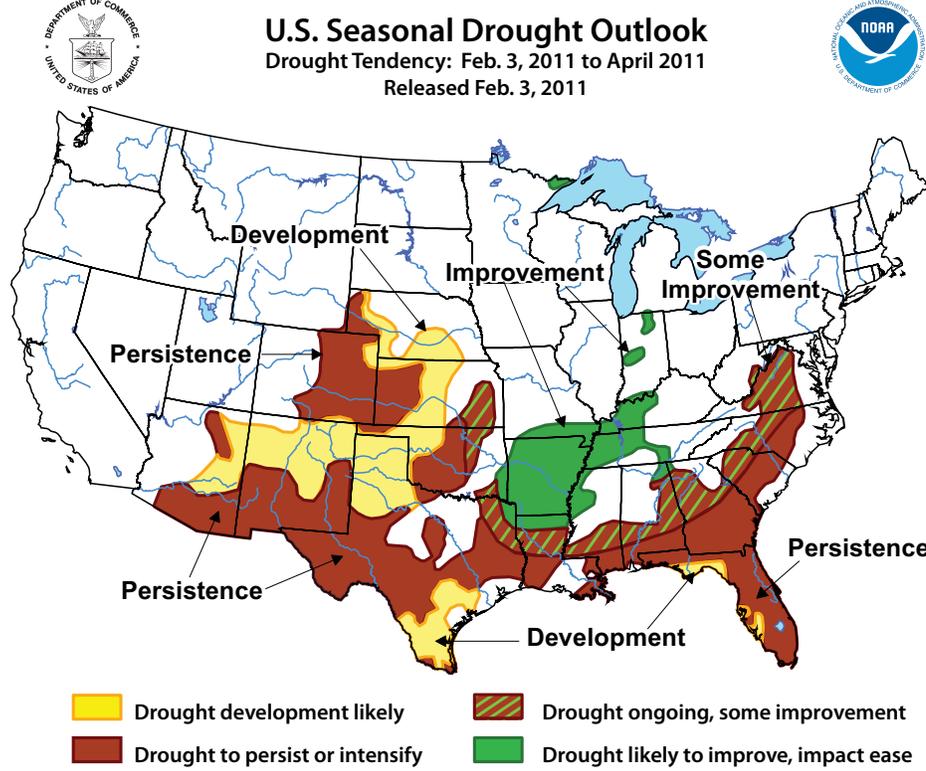


Figure 1. U.S. Seasonal Drought Outlook February 3, 2011 – April 2011

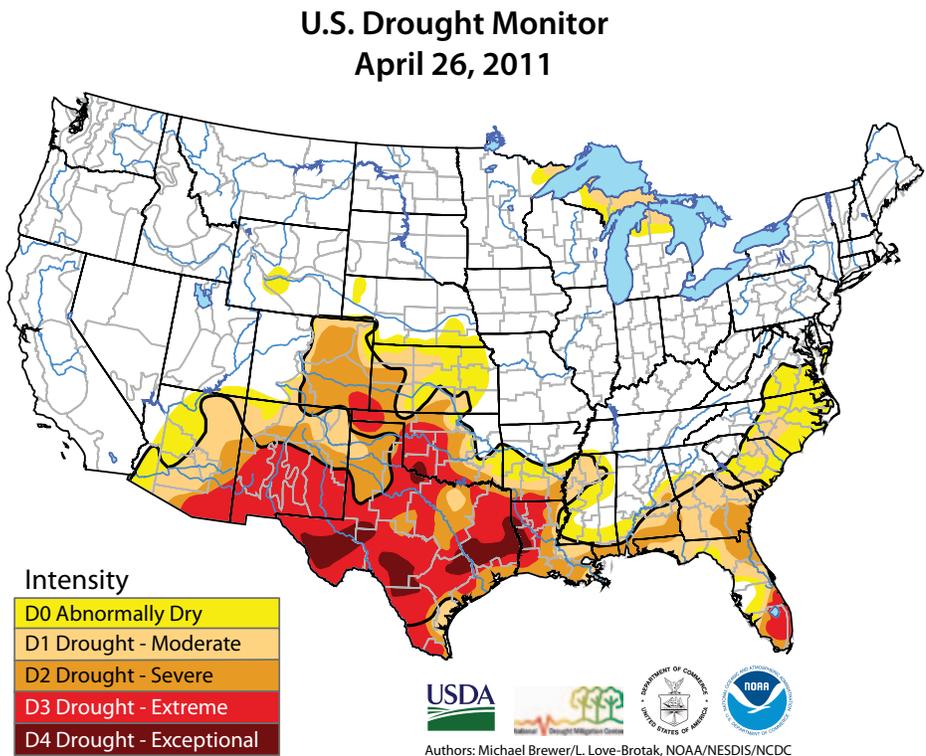


Figure 2. U.S. Drought Monitor April 26, 2011

the National Weather Service Climate Prediction Center website at [www.cpc.ncep.noaa.gov](http://www.cpc.ncep.noaa.gov). By referring to this website periodically, a producer can evaluate whether drought development is likely in the area. Refer to Figure 1 for the drought predictions from February of 2011 and compare to Figure 2 for the actual drought conditions in April 2011. If a producer had monitored these maps in the early months of 2011, he or she could have chosen to implement more proactive weed management, as well as other drought mitigation strategies, and limited the adverse impacts from the severe drought that later developed.

### Managing Weeds During Drought

Once weeds are already established, and drought conditions develop, many management options are either no longer available or may achieve only limited success. The first option that many producers consider is using post-emergence herbicides to control established weeds. Unfortunately, weeds under drought stress are usually much more difficult to control. Drought-stressed weeds usually develop a thick, waxy cuticle on their leaves to help conserve moisture. This thick, waxy cuticle acts as a physical barrier and reduces the amount of herbicide absorbed into the leaves. In addition, many herbicides' site of activity is at the growing points or in actively growing tissues. Weeds under drought stress are generally not actively growing so control is often significantly reduced.

If a producer feels weeds are causing, or will cause, sufficient production loss that the possibility of herbicide failure is an acceptable risk, there are steps that can be taken to decrease the risk. Accurate weed identification is critical to determine what herbicides are labeled to control

those plants. If the target weed species is susceptible to a contact herbicide (examples: paraquat, carfentrazone, etc.), and the herbicide is labeled for this use, it may be more effective on drought-stressed weeds. Systemic herbicides (2,4-D, dicamba, glyphosate, metsulfuron methyl, etc.) may not be as effective because they must be translocated throughout the plant. When plants are drought stressed, movement of water through the transpiration stream is limited; thereby, the movement of the herbicide is also limited. Use the maximum labeled herbicide rate for the target weed applied in the minimum application volume that provides adequate coverage. By using the maximum herbicide rate in the minimum spray volume that provides coverage, the herbicide concentration in an individual spray droplet is higher and more herbicide may penetrate the leaf cuticle. Note that when using a contact herbicide, it will not translocate within the plant, so good coverage is essential. Additionally, using a high quality, nonionic surfactant crop oil concentrate or N-based additive (like sprayable ammonium sulfate) may improve herbicide absorption. Finally, spraying either late in the evening or very early in the morning may improve herbicide activity. During these time periods, turgor pressure in the plants is higher and stomata may be open, which can increase herbicide absorp-

tion and translocation.

Accurate sprayer calibration is critically important for spraying herbicides on drought-stressed plants. Since the maximum herbicide rates and expensive adjuvants or additives are being used, it is vital to avoid overapplication. Overapplication will not only waste money, but may result in excessive crop injury or illegal pesticide residues. Additional information on calibration can be found at [www.noble.org/Ag/Research/Soils.htm](http://www.noble.org/Ag/Research/Soils.htm), and sprayer calibration calculators can be found at [www.noble.org/Tools](http://www.noble.org/Tools).

Another option many producers employ is the use of a rotary mower or brush hog to cut weeds down. This may be somewhat effective on annual weeds that have prematurely completed their life cycle and on some perennial weeds that may already be severely stressed, but usually only provides an aesthetic benefit. A definite downside to mowing is that forage, already in short supply, will be cut down along with the weeds.

### Recovery After Drought

Once drought conditions subside, proper weed management becomes critical again for the recovery of desirable forage grasses. If a pasture needs to be completely re-established, many common pasture herbicides are not labeled for use during establishment. Use of these herbicides before the desirable forage plants reach

adequate size may result in slower establishment or even complete failure.

A producer must consider any herbicides that were applied prior to or during the drought. Many herbicides break down more slowly in the soil under dry conditions due to reduced microbial activity. This slower breakdown must be considered before overseeding or considering rotating the pasture to another crop. Although rotational intervals are listed on herbicide labels, they are intended for normal conditions. Bioassays may be necessary to determine when it is safe to plant sensitive crops.

### Summary

Weed management is just one critical component of pasture management and is best addressed well before drought becomes severe. If management practices are delayed until after weeds are well established, and drought conditions are entrenched, weed management activities will be expensive to implement and may have reduced efficacy. Finally, unless weed management practices are used in conjunction with good grazing or harvest management, proper soil nutrition and insect management, they will be of little benefit. For additional information on management strategies before, during and after drought, refer to the Noble Foundation publication *Drought Management*, available at [www.noble.org/Ag/Forage/drought-management](http://www.noble.org/Ag/Forage/drought-management). ■

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