Forage Management: Preparing for 2008

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Most of Virginia experienced drought this summer. Some regions were harder hit than others, like far southwest Virginia, but practically all of the state was abnormally dry. Many pastures were severely stressed for moisture almost all summer. Forage yield was virtually nothing until October when we finally received some significant rainfall. Many graziers have posed questions about the best way to manage drought stressed pastures for the upcoming 2008 season. Will a grazing stress in the spring on top of drought stress damage pasture productivity? When is the best time to start grazing a pasture that is recovering from drought to reduce this risk? Should I “go easy” on my pastures this spring coming out of a drought? These questions will be the main focus of my talk.

Although it may not excite too many folks at first mention, my focus will be on the plant. In my mind, the best way to understand pasture management after drought really starts at the plant level. If you know how the plant works, management becomes easy – well, maybe not easy, but it should at least make sense. As is the case in most summertime droughts, late summer and fall rains provided some late-season forage growth in many regions of Virginia. The question now is how to make to most of this moisture in order to sustain productivity into the following growing season.

The figure below shows how a typical forage plant responds to moisture stress ranging from drought to flooding (Volenc and Nelson 2003). The diagram essentially deals with photosynthesis, which is when plants capture sunlight with their leaves and use water from their roots to make sugars, or energy. Sugars made from photosynthesis are then used for growth and maintenance of the plant.
Let’s start by looking at the aboveground shoots. We will focus on the left side of the diagram that deals with drought. Keep in mind though that excessive moisture can also stress pasture plants, but it may not be as noticeable as drought stress. First, notice that shoot growth declines rapidly (moving right to left) with even moderate drought. That is mainly because shoot tissues can only grow if they have enough water to expand cell walls. Shoot tissues are sensitive to drought stress so symptoms show quickly. Note that photosynthesis does not decline as rapidly — really until leaf temperatures start to rise. This is critical because it means that plant can still make sugars even tough it is not growing. That response is shown in the lower part of the diagram. During drought, above ground shoots stop growing so do not need sugars to support growth. As long as there is leaf area, and the plant isn’t too stressed, then sugars will accumulate. Roots are less sensitive to water stress than shoots. They will continue to grow to search deeper water during drought. In some cases, short-term drought can help create stronger root systems.

So what does all of this have to do with pasture management? In essence, it means that if pastures are beginning to experience drought stress, it is best to graze them lightly — or not at all. Leaving some leaf area (3-4 inches for most species, 1-2 inches for bluegrass) during drought will allow plants to store up sugars, and this may help pastures recover more rapidly once rains return. If plants have low sugar reserves coming out of drought, re growth will likely be delayed until the plants can generate more leaf area. Resting pastures will also help support root growth, which is critical for the plant to access deeper soil moisture. Ideally, resting drought-stressed pastures until mid to late October, will allow plants to continue photosynthesis and make sugars sometimes when it is too cold for the plants to grow. Also, during the fall grasses will develop new tiller buds necessary for spring growth. If drought stressed pastures are over grazed in fall, the growth potential next spring will be reduced. To reduce chance of this happening, grazing should be delayed for a week or two later in spring to allow pasture to reach 6-8 inches. This growth aboveground should help to restore their energy supplies and help sustain growth later into the growing season.

After the plant’s energy reserves are restored and tiller buds formed, pastures can be grazed to use available shoot growth without damaging the plant severely or reducing spring growth. Orchardgrass and smooth bromegrass are particularly sensitive to short grazing, and it is recommended to leave at least a 4-inch stubble. In these species, new growth in the spring comes from the energy reserves the lower part of the stem so it is important not to remove too much of it. Bluegrass has energy reserves in below-ground stems, or rhizomes, and can survive closer fall grazing.

In summary, how we manage drought stressed pasture in 2008 really comes down to how those pastures were managed in 2007. If pastures were grazed too hard in summer and especially fall last year - some additional rest this spring may be warranted before starting up again in 2008. Remember, a little knowledge about how plants work should go a long way to help manage pasture better during and, after, drought and ensure sustainable pasture productivity.

References