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What has caused my bermudagrass to thin and be less productive?

Dennis W. Hancock,
Extension Forage Agronomist,
Crop and Soil Sciences Department

The past few years have been incredibly stressful on our perennial forages. Prolonged and extreme drought in successive seasons, late spring freezes, uncontrolled weed problems; you name it, and we've seen it. As a result, many of our forage stands have thinned considerably. One of the most common reports that I have received is of bermudagrass stands that have gone from a solid stand to less than a 50% stand "just in the last year or so."

This problem is broadly called "bermudagrass decline." The reason this term is so broad is because this problem is often linked to several causes. Often several factors will occur simultaneously, so it is quite difficult to pinpoint what actually caused the problem. However, there are some causes that are most likely the cause and then there are other factors that make things worse. This article will present the primary causes of bermudagrass decline, but will also briefly list some secondary factors that exacerbate the problem.

Primary Causes

Low Potassium Fertility: Of the list of suspected contributors to bermudagrass decline, poor potassium (K) fertility is at the top. A deficiency in K will result in poor stress tolerance, reduced winterhardiness, decreased disease resistance, and diminished rhizome and stolon production. Thus, K deficiency is the first on the list of likely suspects.

To determine if K deficiency is causing the problem, take a representative soil sample from the affected areas and another from areas nearby that are unaffected or less affected. Submit these samples for soil testing and compare the results. It is also highly recommended that plant tissue samples (clippings from the top 6 inches of 3 to 4-week-old growth) also be collected from the affected and unaffected areas.

When these tests are compared, the affected and unaffected areas will usually be substantially or even subtly different from one another. If they are, then K is likely the cause of the decline. In a plant tissue analysis, the K concentration should be above 2.2% for optimal production and levels less than 1.8% can result in rapid declines in yield and stands. Similarly, soil test K levels should ideally be in the high category. If the soil test levels are low or even on the low side of the medium range, K deficiency may occur during periods of water stress. The plant absorbs K from the soil by drawing in water from the soil that contains K. During drought stress, K absorption may be decreased. Thus, even if the soil test indicates an adequate level of soil test K, a drought effectively reduces the amount of K available to the plant.

Even if one has been following soil test-based recommendations, K deficiency can eventually occur in a field. It is important to recall two of the fundamental precepts of soil test-based recommendations: the recommendations are 1) NOT meant to result in a build-up of nutrients in the soil over the long-term and 2) based on average conditions (our conditions lately have been anything but average).

Low Soil pH: In my experience, it is just as likely for low soil pH to be the cause as it is for low K to be the cause of bermudagrass decline. In fact, in about 75% of the cases of bermudagrass decline that I have been consulted on, both soil pH and K were low. Low soil pH causes a problem in several ways. First, toxic levels of

soluble Al can occur in soils where the pH has dropped too low. This effectively burns back the fine root hairs and prevents root growth. Low soil pH also reduces the availability of many of the other nutrients, such as P, K, Mg, Ca, and others. In effect, low soil pH starves the plant of water and other nutrients. This starvation stress is what ultimately contributes to bermudagrass decline. As you might imagine, when low soil pH is coupled with low K, the rate of bermudagrass decline is even more rapid.

Secondary Factors

There are several factors that exacerbate the problem of bermudagrass decline. By themselves, these secondary factors are not likely to result in severe declines in bermudagrass yields and stands.

Leaf Spot: Outbreaks of Helminthosporium leaf spot (Bipolaris spp.) are commonly associated with bermudagrass decline. Often, this disease is mistakenly blamed for the decline. Helminthosporium leaf spot commonly attacks bermudagrass stands where K levels are low. Thus, leaf spot problems should be considered a symptom rather than a cause.

Soil Compaction: With the frequent use of heavy machinery in hayfields, excessive animal foot traffic in pastures, and our soil types (particularly in the Piedmont) that are low in organic matter and predisposed to compaction, we often find that we are dealing with compacted soils. Believe it or not, however, soil compaction can also be a problem when fields have not been limed as recommended. Lime has a positive effect on soil tilth, aeration, and drainage. We may see that the soil is compacted and assume that this is causing the bermudagrass decline, when in reality it is very likely that it is a low soil pH and the lack of lime that has caused the problem. Thus, if attempts are made to renovate the bermudagrass stand and the soil pH problem is not addressed with lime, one is likely to find the renovation will correct the problem over the long-term. In fact, it is in those instances where the problem could be made even worse (i.e., additional stress caused by an aerator, gaps that are made that grant weeds an opportunity to compete with the crop, etc.). (For more on aeration, see this FAQ on aerators .)

Ryegrass: In years like this year, where we had a rather good “ryegrass year” and an exceptionally dry start to summer, ryegrass will remain productive well into the time in which the bermudagrass begins to emerge from winter dormancy. At that stressful time of the year, the bermudagrass is struggling to comeback from the winter dormancy period, but it is forced to compete with the ryegrass for water, nutrients, and light. Furthermore, heavy growth of ryegrass during the spring can remove a tremendous amount of K from the soil, thus effectively reducing the amount of K available to the bermudagrass. To avoid this problem, be sure to avoid late applications of N to ryegrass stands and remove (graze or cut) the ryegrass at a time (usually late March in south Georgia and late April in north Georgia) that avoids interfering with bermudagrass greenup. The use of herbicides may also be necessary in preventing ryegrass from suppressing the bermudagrass.

Herbicide Injury: One of the most common suggestions that I get from producers is that they feel that a routine herbicide application that they made brought about their bermudagrass decline. Certainly, some of the herbicides that we routinely use can slow down and stress bermudagrass. Although herbicide injury may stunt the bermudagrass and may have even exacerbated the problem, it is likely that soil K and pH may be at the root of the problem.

Drought: Certainly, drought stress is extremely hard on any plant, including bermudagrass. However, bermudagrass is quite drought tolerant. By itself, drought will not kill bermudagrass. When combined with other severe stressors, especially K and pH stress, drought can be the “last nail in the coffin.”

Soil-Borne Insect Injury: Grubs (larvae of either the Japanese Beetle or Green June Beetle) and other soil-borne insects can feed on the roots of the bermudagrass plant and cause severe stunting. Like herbicide injury and drought, soil-borne insects are unlikely to kill bermudagrass unless the damage is combined with other stressors. Nonetheless, producers should scout their fields and use proper control measures when treatment is

warranted (for more information on insect control in bermudagrass, see the Georgia Pest Management Handbook at http://www.ent.uga.edu/pmh/).

Summary

Certainly, “bermudagrass decline” is a broad term, but it is important to understand that there are a number of severe stressors that can participate in this decline. As with most crop productivity issues, however, it often comes back to a soil fertility issue. In this case, maintaining your soil K and pH levels in optimum ranges will minimize the effect that these stressors have on your bermudagrass stands and will help you to prevent bermudagrass decline. For more information on this and other forage management subjects, check out our website at www.georgiaforages.com or contact your local University of Georgia Cooperative Extension office at 1-800-ASK-UGA1.

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