

Confirm Potassium Levels with Tissue Testing

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The turf Twitter-verse has been a buzz of weather to soil or tissue test for potassium (K). I've attached an article written by Dr. Doug Soldat on the matter. His argument to use tissue testing instead of soil testing for potassium are sound and are rooted in current science. Follow him on Twitter at @djsoldat.

-Bill Kreuser

Over the past several years, the picture of how to best manage potassium has come into focus. In the early 2000s, researchers (notably Drs. Wayne Kussow and Frank Rossi) showed that soil test potassium requirements for growing healthy turf were much lower than previously thought. Potassium has been labeled a stress nutrient, a fitting label given that plants low in potassium will often show a stress response long before a general decline in color or growth will occur. For example, low potassium in annual bluegrass has been shown to lead to increased winterkill and anthracnose. Interestingly, snow mold damage (pink and gray) is worse when potassium levels are high.

There are two ways to measure the potassium status of your turf: soil tests and tissue tests. Soil tests are meant to approximate the plant availability for good growth over a season or even multiple seasons. In general, the current research shows that if you soil levels of potassium (as measured by the Mehlich-3 method) are above 40 ppm then adding potassium is not required to achieve a healthy turf. However, the picture painted by turfgrass researchers is showing that potassium fertility is more complicated and I feel strongly that tissue testing for potassium is now the best course of action for optimum results.

For most situations, experts recommend soil testing over tissue testing because tissue nutrient levels will fluctuate while soil levels remain fairly stable. However, it is for precisely this reason that I recommend you tissue test – we want to control and manage the fluctuations within the year. Conveniently, annual bluegrass and creeping bentgrass have different requirements for potassium, allowing you to customize your potassium program to manage for the grass you want to keep.

Maintaining Healthy Bentgrass at the Expense of

Annual Bluegrass: If you have a majority bent stand, you can take one of two approaches. The first would be to maintain your tissue levels around 1.5% year round. These levels can be achieved when soil test potassium levels are relatively low

(~50 ppm) and you add no extra potassium during the year. Bentgrass has shown to have good quality and performance at 1.5% tissue levels of



Figure 1. Bottom plots of bentgrass were fertilized heavily with potassium and top plots were not fertilized with potassium.

potassium, where annual bluegrass will suffer from anthracnose and low temperature kill at these levels. If this approach scares you a bit, you can add potassium in a 1:1 ratio with N in the spring and summer, and then take the potassium away in August so the levels can drop before winter, leaving the annual bluegrass more susceptible to winter injury.

Maintaining Healthy Annual Bluegrass

If your surfaces have significant *Poa* populations, the research indicates that you want to keep your potassium tissue levels above 2% for the entire year. This will help ward off anthracnose in the summer and minimize low temperature kill over winter. You may find that your soil levels are high enough that you can get tissue levels of 2% without adding more potassium. However, if your tissue levels are lower than 2%, Dr. Kussow's research shows that the best way to get potassium into the leaf is to add nitrogen at the same time. I like to spoon feed potassium along with nitrogen in about a 1: 1 ratio.



Figure 2. Tissue potassium levels below 2% have been linked to increased anthracnose and reduced cold-hardiness. Dead areas were not treated with potassium for several years prior. Photo: Schmid et al., 2016.

How to Test Your Tissue for Potassium

Sampling once in the spring, summer, and fall will be sufficient to check on and adjust (if necessary) your potassium level of your turf. Having a very clean sample is key for ensuring accurate results. Just a few sand grains included in your tissue can really throw off the analysis. For this reason, it's important that you put your clipping sample in a bucket of water and gently stir. The sand and other debris will sink to the bottom and the clippings will remain on the surface. Take a handful of the clippings out of the bucket and squeeze dry them before spreading them thinly over a newspaper or paper towel to dry for 24 hours or so. If the clippings remain wet, they will continue to decay and your nutrient analysis may be erroneous. Put the dried clippings in a paper bag marked with the appropriate label (F1 for #1 fairway, G5 for #5 green, etc.). The bagged clippings should be sealed well by folding the paper bag over and stapling it shut or by rolling the excess bag around the sample and securing the bag with a rubber band. The samples can be shipped to your preferred analytical laboratory for analysis.

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