

Phosphorus, nitrogen and algae**June 22, 2018**

In fall of 2015, we started an experiment to see how nitrogen fertilization during establishment impacts long term fertility requirements. Two and a half years later, there are big differences in turf performance, algae prevalence, and soil fertility.

Soil test phosphorus

The research plots only receive nitrogen fertilizer (0.1, 0.2, 0.4, and 0.6 lbs N/1000 ft² every 14 days). They are not treated with phosphorus, potassium, or micronutrient packages. This spring, a phosphorus deficiency started to develop. The turf was purple-blue (resembling drought) and slow to respond to nitrogen fertilizer. Soil test results showed that plant available phosphorus was very low, but only the high nitrogen areas (0.4 and 0.6 lbs N/1000 ft² biweekly) had very obvious deficiency symptoms.

The Mehlich-3 soil test phosphorus level on the sand green dropped to less than 5 ppm. That is only slightly above the level of pure sand (2-3 ppm) and well below university and laboratory minimum levels (21-50 ppm depending on the source). It shows that grasses are great nutrient scavengers once they are fully established. The deficiency symptoms were easily corrected with some phosphorus containing fertilizer. Symptoms were gone in a week. For more information about soil testing, download this NebGuide: <https://turf.unl.edu/NebGuides/g2265.pdf>.

Nutrient demand

The higher nitrogen treatments had more intense phosphorus deficiency symptoms because the added nitrogen fertilizer accelerated growth rate. Those grass plants needed to increase uptake of all other nutrients, like phosphorus, to sustain the increased growth rate. Once the soil was depleted of available phosphorus, the rapid growth demand lead to enhanced deficiency symptoms. The late, Dr. Wayne Kussow, called this phenomenon nitrogen-driven nutrient demand. He argued that tissue nitrogen levels are needed to accurately determine soil test levels for other nutrients. High nitrogen plants had greater soil test critical levels than low nitrogen turf plants. Here's a short video about phosphorus deficiency and nutrient demand: <https://youtu.be/LUQaZ5IEEJQ>.

Slow growth and algae

The hot and recently wet weather has caused algae to appear on this research green. It can be found on all the low nitrogen treatments (0.1 lbs N/1000 ft²). While there are fungicides that can help with the algae (i.e. chlorothalonil, mancozeb, triticonazole, and fluxapyroxad), cultural practices that maximize turf density can also be extremely effective. The 0.2 lbs N treatments have less algae than the 0.1 lb N treatments, and there was no algae on the high nitrogen fertilization treatments. More information on algae control can be found on [this must have publication](#).

Our plan is to continue this experiment for several more years. Who knows what we'll observe next. Come see it for yourself at Summer Field Day on July 18th.

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Figure 1. The wet weather conditions have led to an explosion of algae on turf that is slow growing and thin. Plots getting more nitrogen fertilizer are clear of algae.