GUEST COLUMN

Forage Fertilization Management in a Wet Year

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Spring and summer 2018 weather events have many forage producing areas of the Upper Midwest drenched with abundant rainfall in recent months. That's made timely harvest difficult unless you were able to take advantage of early harvest windows in some areas.

Excess rainfall exceeding plant water requirements can create challenges in poorly drained soils. This article will address a few fertilization management factors impacted by our 2018 growing season rainfall so far, with some tips to realize potential production during the remaining months of the growing season.

Let's start with the upside potential of this summer's rainfall patterns. Sustained good soil moisture availability into the summer provides good potential for continuing robust plant growth and yield. This is especially true with grass species, since their roots don't reach as deep into the soil profile as alfalfa. Therefore, good topsoil moisture status can reduce the degree of 'summer slump' in cool-season grasses.

Consider topdressing nitrogen (N) and sulfur to maintain high yield potential in grass forages. Recommendations for N can vary by state, but generally range 50-60 lbs topdress N/ac. As for sulfur, the most rapid availability will be from a sulfate-containing fertilizer such as ammonium sulfate, which also provides N for grass. *When topdressing N, consider using the trip across the field as an opportunity to apply phosphorus (P) and potassium (K) as needed according to soil test or annual maintenance requirements based on crop removal.*

With robust yield comes increased nutrient uptake from soil. You can account for added P and K removal in your maintenance fertilization rates over time. Many alfalfa farmers skipped application of these nutrients following first cut in 2018, not wanting to make another compaction trip over already wet fields. If that's your situation, consider making up the missed application rate after the next cutting, especially for robust alfalfa stands you wish to keep for continued production next year.

The most immediate leaching concerns following excessive rainfall are nitrate (for grass), sulfate, and borate. These nutrients can leach below the root zone because their negative charge does not hold on to the clay minerals in the soil. Clay minerals also have a slight negative charge, so there is no attraction to hold onto these nutrients. Excess rain can leach them below the root zone even in productive, well-drained fields. When leaching occurs, it can leave a crop lagging behind its potential unless additional fertilizer is topdressed to replace leached nutrients. In addition to leaching, nitrate and sulfate losses can occur through denitrification and desulfofication in waterlogged areas of fields. Surviving crops in these areas can also be responsive to topdress fertilizer, but may recover less of their potential yield due to other issues associated with waterlogged soils.

Let's address sulfur in more detail since it is often less understood. Sulfur deficiency has become more common since coal-fired industries have nearly eliminated sulfur release into the air. Concentrated modern fertilizers tend to include less sulfur, and increased yields remove more from ag soils. Thus, chronic sulfur deficit has become more common in recent years. You run the risk of letting sulfur deficiency hold back your yields if you don't take measures to understand and manage the sulfur status of your crops.

Organic matter turnover in the soil, manure application, and fertilizer sulfur are the three main sources of sulfate availability in soils. Thus, high-organic-matter soils, and fields receiving regular manure applications, are less likely or unlikely to experience sulfur deficiency under well-drained soil conditions.

Common forage crop sulfur requirements are ~5 lbs sulfur/ton of legume hay, or 3 lbs sulfur/ton of grass hay. Just like N, sulfur is a component of amino acids and proteins. As a high-yielding, high-protein forage, alfalfa requires more sulfur than most crops. Sulfur deficiency can slow growth and reduce yield. Sulfur deficiency has a yellow appearance similar to N deficiency and can be confirmed with a plant tissue analysis. The way to rapidly correct a sulfur deficiency is to apply a sulfate-containing fertilizer.

If sulfur is needed, elemental sulfur can be a good choice as part of an annual maintenance application, but a sulfate form will be needed for more rapid availability to help correct any sulfur deficiency showing up during the growing season. Fertilizers containing sulfate include potassium sulfate and sulfate of potash-magnesia (Sul-Po-Mag). Both supply K as well as sulfur.

A common-sense approach to sulfur fertility management includes occasional plant tissue testing. If your alfalfa comes up short on sulfur, consider adding sulfur as a regular part of your maintenance fertilization program. A reasonable range of application rate of elemental sulfur is 10-20 lbs/ac, depending on crop removal and other sources.

When performing plant tissue analysis, you have the opportunity to review plant status of several micronutrients as well as the major and secondary nutrients. In general, sandy soils and low-organic-matter soils are more likely to lead to micronutrient deficiency in crops. Manure application makes micronutrient deficiency much less likely.

Plant tissue analysis should be a key step before deciding which micronutrients to apply, if any. It can be very instructive when comparing 'good' vs. 'poor' areas within a field. Consider taking soil samples from those same areas for concurrent analysis and comparison to the tissue sample analyses.

In summary, soil testing, plant analysis, maintenance fertilization, and timely topdressing when needed, are tried and true practices for top forage production from the high-producing alfalfa, grass, and other forage varieties you select. High-yield grass production requires periodic N topdressing, while high-yield grass *and* alfalfa production requires a sound fertility maintenance P and K program. Timing can be once per year, preferably immediately following a harvest to avoid excess damage to emerging crown buds. Consider adding sulfur and boron to your normal P and K maintenance fertilization for alfalfa, based on plant tissue analysis.

These best practices can help you manage soil fertility, both for current conditions and for the long term. Be prepared to produce high-yielding forage crops, and let's hope this growing season provides the opportunity to finish strong with good production of high forage quality.