Soil Testing Tips for Alfalfa
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As New Mexico and West Texas alfalfa producers move toward Fall 2011 seedings, decisions will come regarding the number of acres to seed as allowed by irrigation capacity and/or pumping limits, whether to choose Roundup Ready seed, seedbed preparation, and implementing an adequate soil fertility program for alfalfa.

Soil testing has long been a stand-by of successful alfalfa management; however, because alfalfa ‘needs a lot’ in terms of nutrient requirement, we frequently apply fertilizer like P and potash (K) at a high level, and assume that we have done our part. But there are means to better gauge the potential nutrient needs in alfalfa, and this is best accomplished with a soil testing program. The crop value per acre of alfalfa is as high as any crop grown in the region. Alfalfa’s cost of production and the level of commitment needed to successfully grow quality hay merit investing in soil testing, particularly for phosphorus (P).

This is the first of a two-part series for NM and TX alfalfa fertility suggestions. The potential benefits of applying excess P in advance of fall seeding, when the P can be incorporated, will be discussed in a future edition of Hay Market News.

Because alfalfa has a high level of yield and quality it also has an unusually high plant nutrient requirement. Proper fertility management (both prior to planting and after establishment) is required to sustain production over the long term. Soil testing potentially offers a grower the most benefit in high-input intensive
cropping, which certainly describes alfalfa production. Collect and submit soil samples in the spring to early summer (or after last crop is removed) prior to seeding alfalfa. This will ensure plenty of time to shop for the best fertilizer prices and allow time for adequate incorporation, which is particularly important for a perennial crop, like alfalfa, where fertilizer cannot be tilled into the soil once the crop is established. We particularly emphasize soil testing prior to establishment of new alfalfa stands because the two nutrients—phosphorus and potassium—are poorly utilized from unincorporated surface applications after establishment.

If you have an established alfalfa stand but have not soil tested, we still strongly recommend soil testing at any time of year. Gauging soil fertility status at least every three years and knowing what is available should still guide possible fertilizer applications. This information also provides a realistic view of yield potential and the potential production benefit at higher levels of irrigation.

Questions to consider when implementing a soil sampling strategy, especially if someone soil samples and arranges soil test analyses for you, include:

- Do you hire someone to take soil samples for you?
- Does a fertilizer dealer perform this service as a courtesy?
- Does the soil sampling service provider do a good job of properly collecting and mixing the sample?
- Do they sample separate fields and account for areas of different soil types, crop history, and management?
- If you apply compost or manure, for example, did you tell the soil sampling service? That means the top ½” to 1” of the soil surface should be scraped off so as not to skew soil test results.
- Has your fertilizer dealer collected soil samples, had them analyzed, then provided you a recommendation?—If so, did they give you a copy of the soil test reports? If not, get them. Learn what your alfalfa soil test reports tell you over time and recognize potential problems if nutrients are in flux. Save those soil sample reports for up to 20 years for each field.

Phosphorus fertility for alfalfa itself is a major concern, and P removal is about 12 to 14 lbs. of P₂O₅ equivalent per ton of alfalfa removed. Look for our discussion of P in alfalfa nutrition in a future edition of Hay Market News.

For other nutrients here are a couple of considerations:

- Nitrogen (N). Although alfalfa requires ~50 lbs. N per ton of production, alfalfa is a legume, and when this deep-rooted crop is nodulated fairly well it can indeed provide its own nitrogen fixed by *Rhizobium* bacteria. Be skeptical of any soil test that suggests you add more than 50 lbs. of N per acre. Recognize that the alfalfa will use any applied nitrogen first and then meet the rest of its needs through microbial fixation.
- Potassium (K; or potash, K₂O) is also required for alfalfa production (50-60 lbs. K₂O equivalent per ton of production). Most soils in New Mexico are inherently high in K, and since the K is geologic (unlike P) K it is located deep into the soil profile. However, because alfalfa removes so much K over the growing season in high-yielding situations, K may become limiting over several years of production. Consequently, as already mentioned, soil testing is recommended at least every three years to monitor K levels. If a pre-plant soil test suggests K is needed, apply it before seeding and incorporate into the soil. There is reduced and delayed potential benefit from potash applied to surface once the stand is established. Also, because alfalfa is a luxury consumer of K, repeated large applications of K can lead to high concentrations of K in the hay, which is undesirable.
What about other nutrients like calcium, sulfur, iron, zinc, boron, manganese, etc.? These nutrients are not commonly found to be deficient for alfalfa, but may occur rare occasions, particularly during drought. The crop’s deep rooting can usually scavenge enough of any limited micronutrient to adequately supply the crop. In some locations micronutrients may be sufficient in the irrigation water. If a soil test highlights a possible nutrient limitation, verify the need with plant tissue analysis.

If you need assistance in soil testing advice contact your local county agricultural Extension agent or review New Mexico and Texas soil testing guidelines at [http://swatlab.nmsu.edu/](http://swatlab.nmsu.edu/) and [http://soiltesting.tamu.edu](http://soiltesting.tamu.edu)