Dairy & Livestock

Don't deprive alfalfa of potassium

By **JOE BOLLMAN**

FIELD FODDER

SOIL potassium takes years to build up, but it only takes a few growing seasons to become depleted when growing alfalfa. Fertilizer prices have increased steadily over the past decade, but when they reached record highs prior to the 2008 growing season, farmers started looking for ways to reduce fertilizer expenses. Every farm seemed to have a different strategy, but many significantly reduced potassium applications to alfalfa, corn and soybeans.

Evidence of this reduction of potassium application rates the past couple of growing seasons has been showing up at the University of Wisconsin Soil and Plant Analysis Labs. From 2008 to 2009, alfalfa samples that tested deficient in potassium increased about 25%. In 2009, more than 40% of all alfalfa samples submitted for analysis were potassium deficient. Corn samples with potassium deficiency also increased during this same time period, but not nearly as much as alfalfa.

Yield affected

Reduced application rates can lead to two problems. The first and more easily measurable problem is yield loss. Rather than thinking about how many pounds of potassium are needed to increase alfalfa yield by 1 ton per acre, let's look at crop removal.

For each dry-matter ton of alfalfa removed, 60 pounds of potassium are removed. That means a yield of 4 tons of dry matter per acre will remove 240 pounds of potassium annually. Or the well-managed alfalfa field that yields 8 tons of dry matter per acre will remove 480 pounds of potassium annually. If a plant is not being supplemented with the proper amount of potassium, then growth (yield) will decline over time.

The second problem that can occur from reduced potassium application rates is an increased potential for winterkill. While soil movement through frost heaving breaks off roots and often is the major factor in contributing to winterkill, low soil-test potassium levels also can play a significant role in winterkill.

After an alfalfa plant is cut (harvested), it uses carbohydrates from the roots to supply the remaining aboveground portion with the energy needed to continue growing. After a period of time where the roots support the aboveground portion of the plant, the flow of nutrients "changes" direction. Once the aboveground portion can supply energy to the plant via photosynthesis, alfalfa plants then begin to store carbohydrates in their roots for winter reserves or for regrowth after a cutting.

This flow of nutrients is why it is risky to harvest alfalfa in September. The roots supply the aboveground portion with the carbohydrates to grow; however, the aboveground portion of the plant may or may not produce enough carbohydrates to get the entire plant through winter. But, if cut late enough (after Oct. 15), typically the plant has limited regrowth (i.e. transfer of carbohydrates to the aboveground portion), which leaves the carbohydrates required to get through winter in the roots where they are needed.

Paying the price

Reduced potassium application rates over the past couple of growing seasons are catching up with alfalfa producers throughout much of Wisconsin. Declining yields and reduced stand longevity are the prices farmers are paying for cutting back on potash. Managing fields with proper potassium applications will maximize yield potential while increasing the stand's longevity.

For a complete listing of potassium rate recommendations based on soil-test levels, see University of Wisconsin Extension publication A2809, available online at *www.soils.wisc.edu/extension/pubs/A2809.pdf.*

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