Low Salt NPK Fluids Improve Alfalfa Yields

Yields were impressive, with over a 3-ton (65% moisture) improvement over GSP averages.

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Summary: *Our 2013 study indicated a positive response to the in-season NPK fluid applications. Yield improvements were positive for both the 3-18-18 and 6-24-6 treatments. However, applications applied through center pivots tended to be higher. The 6-24-6 fluid treatment provided over a 3-ton (65% moisture) improvement over the GSP 20.5 tons.*

Alfalfa production in the inter-mountain west of Idaho, Utah, Montana, and Nevada continues to be an important crop for these growing areas. Acre numbers, while not at historical highs, are still high enough to be either the number one or two largest cropping areas in each of these states.

Forages, including alfalfa, are enjoying some of the greatest economic returns that have been observed for many years. A lot of this is related to changes in population in these areas, diets of international customers, and markets. There continues to be a growth in dairy markets, with larger and larger dairy operations looking for both high quality feed for milk production, as well as feed for livestock at feed yards. All of these contributing factors have pushed the price of alfalfa well beyond expectations from just a few years ago. These changes are bound to get the attention of producers, generating a flow of questions regarding strategies to increase alfalfa production.

Nutrition primary

Yield of all crops, including alfalfa, will always be dependent on the amount and quality of irrigation water in the desert area of this particular geography. However, proper nutrition related to available fertility becomes of primary importance. This is especially true for P fertilizer use as growers push for higher yields.

"Phosphorus (P) is the most common fertilizer input for alfalfa across the western U.S. It is essential for optimum alfalfa production," says Dr. Rich Koenig, former faculty member at Utah State University.

Potassium is also a nutrient that is heavily used by rapid-growing alfalfa, and in many growing conditions needs to be managed similarly to P fertilizer. If P and K are both limiting, the grower will need to first apply phosphorus and resolve that as a limiting nutrient and, secondly, apply potassium. In many growing environments, although P and K nutrition may test adequately, there may very well be factors that limit the ability to access these primary nutrients in a timely manner to maximize yield as well as influence alfalfa quality.

Purpose of study

This study explores the potential of addressing in-season applications of NPK delivered to alfalfa within a growing season. Many times growers and researchers focus only on dosage or rate of nutrients applied when other parts of nutrient management criteria should also be explored, namely: timing and form of nutrient delivery.

Overview

Foliar applications of low salt NPK fertilizers were applied to established irrigated alfalfa during the 2012 and 2013 growing seasons. These applications were made when the regrowth was about 6 to 8 inches tall.

Sprayers. In 2012, applications were made with a commercial sprayer and made between the 2nd and 3rd cuttings. The NPK fluid applications at this time were 3-18-18.

Rates of applications included a total of 0.25 or 5.0 gallons/A for each cutting.

Irrigation was stopped to allow fields to dry prior to applications, as well as 24 hours after application to assure adequate drying on the foliage of the alfalfa.

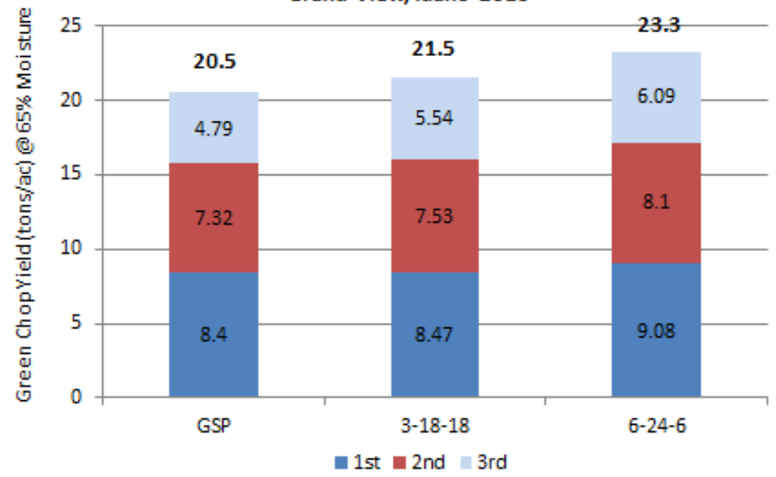
Each treatment was laid out with anticipation of harvest and determining yields.

Yield results

Application of foliar nutrients applied in-season increased yields during the 2012 season for each of the cuttings. These yield improvements were able to deliver an economic improvement for the forage being used. Kent Frisch, Simplot's farm manager for this area reports that it appears these applications are something that should be pursued, but did recommend the system needs some changing for each of the applications. Therefore, changes were made for the 2013 season to address farmer concerns. Trials of the in-season application were expanded to three pivots.

Figure.1

Effect of in-season N-P-K liquid applications on alfalfa green chop yields[1]
Grand View, Idaho 2013



[1]Treatment area =114 acres

Each pivot covered 120 acres and included treatments of 3-18-18 applied by aircraft, 6-24-6 applied through center pivots, and each compared to the grower standard practice (GSP) where no additional nutrients were applied.

Liquid NPK's were applied when the crop had a regrowth of 6 to 8 inches. Rates included 3, 5, and 5 gallons/A for each of the respective cuttings.

"Trials Show Positive Response to In-season NPK Applications."

Summing up

Harvesting. Each pivot was harvested with commercial swathers with each truck weighed with hay samples removed for quality analysis. In total there were about 600 trucks, weighed and sampled, providing a good evaluation of treatment responses.

Main objective of our alfalfa study was to produce livestock feed--all green, chopped, and with a target mixture content of 65 percent.

Yields. The 2013 trials indicated a very positive response to in-season NPK applications. Yield improvements were positive for both the 3-18-18 and the 6-24-6. However, applications through the center pivots tended to be higher. Improvements of yields were impressive, with 6-24-6 providing over a 3 ton (65% moisture) improvement over the GSP 20.5 tons compared to 23.3 (Figure 1). Improvements with these types of applications for both years have encouraged our farm managers to incorporate these applications into as many alfalfa fields as possible for the future. "If we can consistently see these types of responses and the materials can improve our alfalfa production benefits-to-costs by at least 2:1, our alfalfa production will be seeing more of these applications," predicts our farm manager, Kent Frisch.

Addressing needs

The Fluid Fertilizer Foundation (FFF) and J.R. Simplot, as a member company, continue to improve on nutrient management as it applies to fluid fertilizers and new products. The FFF supports a better understanding of how to use the nutrients our members have developed. This study also points to the improvements in Relative Feed Quality, which were also positively influenced and especially the three foliar 3-18-18 applications. This may have been related to the higher concentration of tissue K that resulted from this particular NPK low- salt foliar application.

The positive nature of improvements to alfalfa production with in-season applications of NPK fluids is a great example of addressing the current needs of our FFF members and their good customers.

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