

USING LARGER ALFALFA FIELDS FOR REALISTIC IMPROVEMENTS IN YIELD AND QUALTY OF IN-SEASON  
APPLICATIONS OF LOW SALT NPK LIQUIDS

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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 1 or 2 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 producers attention and ask the questions regarding increase production strategies.

Yield of all crops including alfalfa will always be dependent on amount and quality of irrigation water in the desert areas of this geography, however proper nutrition related to available fertility becomes of primary importance. This is especially true for P fertilizer use as growers push for high yields. *“Phosphorus (P) is the most common fertilizer input for alfalfa across the Western U.S. It is essential for optimum alfalfa production”* said 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 similar to P fertilizer. In the authors experience 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 adequate there may very well be factors that limit the ability to access these primary nutrients in a timely matter to maximize yield as well as influence alfalfa quality. This study explores the potential of addressing in-season applications of NPK delivered to alfalfa within a growing season. Many times growers and researchers only focus on dosage or rate of nutrients applied when other parts of nutrient management criteria should also be explored. This is namely: timing and form of nutrient delivery.

Foliar applications of low salt NPK fertilizers were applied to established irrigated alfalfa during the 2012 and 2013 growing season. These applications were made when the regrowth was about 6 to 8 inches tall. In 2012 applications were made with a commercial sprayer and made between the 2<sup>nd</sup> and 3<sup>rd</sup> cuttings. The NPK liquid applications at this time were 3-18-18. Rates of applications included a total of 0, 2.5, or 5.0 gallons/acre for each cutting. Irrigation was allowed to be stopped for 24 hours to assure adequate drying on the foliage of the alfalfa. Each treatment was laid out with anticipation of harvest and determining yields.



**Foliar applications of liquid NPK in-season alfalfa trials**



**Harvest of NPK liquid during the 2013 season.**

Applications 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 who is the Farm Manager for this area for Simplot said *“it looks like these applications is something we should be pursuing. However, the system needs changing for ease of applications”*. Therefore, changes were made in 2013 to address the farmers concerns. Trials of the in-season applications were expanded to three pivots.

Each pivot was 120 acres and included treatments of 3-18-18 applied by aircraft, 6-24-6 applied through the center pivot 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 6-8 inches. Rates included: 3, 5 and 5 gallons/ac for each of the respective cuttings.



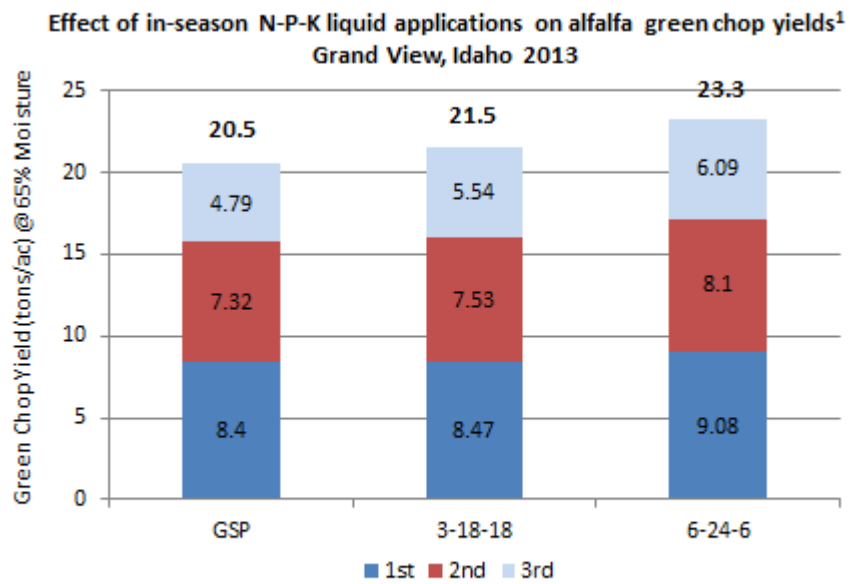
**Aerial application of 3-18-18 to alfalfa applications—2013**



**Harvest of NPK in-season**

Each pivot was harvested with commercial swathers with each truck weighed with hay quality samples removed for quality analysis. In all total there were about 600 trucks weighed and sampled providing a very good evaluation of treatment responses. The main objective of the Simplot alfalfa is for livestock feed and was all green chopped with a moisture content of 65%. The 2013 trials indicate 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, the applications applied through the center-pivot, 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. Improvements with these types of applications for both years have encouraged the Simplot Farm Managers to incorporate these applications into many of their alfalfa fields 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 a 2:1 our alfalfa production will be seeing more of these applications”* said Frisch.

The J.R. Simplot Company continues to improve on nutrient management as it applies to both new products as well as a better understanding of how to use the nutrients we have. It should also be noted that improvements in Relative Feed Quality were also positively influenced and especially with the 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 liquids is a great example of addressing the current needs for our good customers like Intermountain Farmers.



<sup>1</sup>Treatment area=114 acres

**Yield improvements with application of liquid NPK to established  
Alfalfa—Grand View ID 2013—Tindall and Mooso**