The four articles in this issue of the Fluid Journal deal with varying crops, nutrient concentrations, and placement methods to achieve high yields with fluid fertilizers. They represent ongoing research promoted by the Fluid Fertilizer Foundation (FFF) to achieve and promote the well-advised goal of using our resources to achieve ever higher crop yields to feed an ever-growing world population. It furnishes our dealers, their grower customers, our member companies, and the vast worldwide audience we reach on our website with information they can use in the battle against world hunger.

In the leading article on improving alfalfa yields—using NPK fluid fertilizers—the responses were impressive, bringing 2:1 economic returns. Yield improvements, with 6-24-6, provided bringing 2:1 economic returns. Yield improvements with these types of applications for both years have encouraged the Cooperating Farm Managers to incorporate these applications into many of the alfalfa fields for the future.

**Summary:** Yield improvements were impressive with 6-24-6, providing over a 3-ton (+65% moisture) improvement over the grower standard practice of 20.5 tons, compared to 23.3. Improvements with these types of applications for both years have encouraged the Cooperating Farm Managers to incorporate these applications into many of the alfalfa fields for the future.

Alfalfa continues to be the world’s leading forage crop. The study assessed tissue concentrations in com, corn, soybeans, and oilseeds. The results demonstrated that placing fluid fertilizers under the row strip will achieve full potential yield improvements. The study showed that placing fluid fertilizers under the row strip will achieve full potential yield improvements.

Nutrient management criteria should also be explored: namely, timing and form of nutrient delivery.

**Foliar applications** Foliar applications of low salt NPK fertilizers were applied to established irrigated alfalfa during the 2012, 2013, and into the 2014 growing season. Applications were made when the forage growth was about 6 to 8 inches tall.

Changes made Applications of foliar nutrients applied in season increased yields during the 2012 season for each of the cuttings. These nutrient application methods were able to deliver an economic improvement for the forage being used. Kent Frisch, who is the Farm Manager for the area for Simplot, says, “Looking at these applications something we should be pursuing. However, the system needs changing for ease of applications.” Therefore, changes were made in 2013 and 2014 to address farmer concerns.
Trials for the in-season applications were expanded to three pivots. Each pivot covered 120 acres and included treatments of 3-18-18 applied by aircraft. Applications of 6-24-6 were through center pivots and each was expanded to three pivots. Each pivot was harvested with commercial swathers. Trucks were weighed with hay quality samples removed for quality analysis. In total there were about 600 trucks weighed and 2,000 square feet of samples taken from the hay cubes, providing a very good evaluation of treatment responses.

The main objective of the Simplot alfalfa is for it to be used as livestock feed. All was green-chopped with a moisture content of 65 percent. The 2013 trials indicated a very positive response to in-season NPK applications.

Improvements in nutrient content of P and K were both remarkable (Figures 1 and 2). It is interesting to note the changes in tissue concentration and removal from relatively low applications for both P and K.

Three times as much removal of these nutrients was observed compared to the application totals.

While not shown in this article, there was an improvement in relative forage quality and it could be attributed directly to increased nutrient uptake as a result of these in-season low salt NPK fluid fertilizers being applied.

Yields up

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 a 1 ton (65% moisture) improvement over the grower standard practice of 20.5 tons compared to 23.3. Improvements with these types of applications for both years have encouraged the Cooperating Farm Managers to incorporate these applications into many of their alfalfa fields for the future.

Observes Kent Frisch: “If we can consistently see these types of responses and the materials can improve our alfalfa production benefits-to-cost by at least 2:1, our alfalfa production will be seeing three times as much removal of these nutrients for both P and K. The positive nature 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 for growers and crop advisors.

Looking ahead

It should be noted that because of this very involved set of data conducted on these large fields and the positive measurable response (to meet the 2:1 economic returns) that almost 8,000 acres of alfalfa being irrigated by center pivot are currently receiving similar in-season applications of 6-24-6 being injected through pivots. We will also continue applications and measurements through 2014.

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 these responses to applications of NPK fluids is a great example of addressing the current needs for growers and crop advisors.

Going on Twenty-Two Years of Archives!

The Fluid Journal, flagship publication of the Fluid Fertilizer Foundation (FFF), makes nearly two decades of archives available on its web site. The magazine investigates and informs its readers on innovative uses of fluid fertilizers under varied cultural, pest control, and water management practices, focusing on evaluating:

- the agronomics of fluid fertilizer in the production of maximum economic crop yields
- application techniques for fluid fertilizers
- the efficiencies and conveniences of fluid fertilizer systems
- methods of controlling environmental problems with fluids.

Since its formation, the FFF has funded over $3 million in fluid fertilizer research and accumulated thousands of pages of research data. The main goal of the Fluid Journal is to transfer this technical information into easy-to-read form to its farmers and dealers.

For information on how to become a member of the FFF, contact the foundation’s office at 785/776-0273 or the foundation’s website: http://www.fluidfertilizer.com