

# Large-Scale Evaluations of In-Season Liquid NPK Applications to Push Alfalfa Production

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## Introduction:

The demand for North American forage crops is growing in the U.S. and Canada as well as abroad. Alfalfa leads the forage market for high-quality dairy feed. While acreage devoted to alfalfa has not increased substantially, its market price has grown by 200% during the past 10 years. This has led to an increased interest in creating nutrition programs that will increase crop production and improve the health of the livestock it feeds.

## Challenge:

Alfalfa is capable of enduring the stress of multiple harvests during a season—and of swift greenery growth all through the growing season. These special characteristics require special management by growers. With its fast leaf production and summer-long growth, alfalfa needs access to nutrients early and late in the growing season. A lack of adequate nutrition is the most common factor that limits plant production in irrigated alfalfa fields.

## Research:

Simplot Farm Manager Matthew Clements ran a two-year field trial during 2012 and 2013 on fields near Idaho's Snake River to determine the results of foliar applications of 3-18-18 throughout the growing season.

## Methodology:

### 2012

The researchers divided an established alfalfa field into 15 two-acre treatment areas, which received either growers standard practice (GSP) of no in-season applications; 1.25, 2.5, or 5.0 gallons/acre of 3-18-18; or 2.5 gallons/acre of 3-18-18 with a surfactant. Applications were made between each cutting. Each treatment was randomly replicated twice.

When plants were at 20% bloom, commercial swathers cut and windrowed the alfalfa, which was green-chopped and blown into trucks. Trucks were weighed, then samples were analyzed for moisture, nitrogen, phosphorus, potassium, and relative feed value.

### 2013

Three adjacent Idaho alfalfa fields under pivot irrigation were selected for the next year's expanded follow-up trial. Monitoring only the first wheel track in each pivot provided 114 acres per treatment while eliminating marginal land and irrigation anomalies. Treatments included a check (GSP with no in-season applications); foliar application of 3-18-18 at 3, 5, and 5 gallons/acre; and water-run application of 6-24-6 at 3, 5, and 5 gallons/acre through the pivot.

Fields were harvested at >10% bloom, cut, windrowed, green-chopped, and blown into trucks. Samples were collected to determine moisture content, nitrogen, phosphorus, potassium, and relative feed value.

### Results:

#### 2012

Total yield for all cuttings increased from 12.2 tons/acre for GSP to 14.6 tons/acre for 10 gallons/acre of 3-18-18.

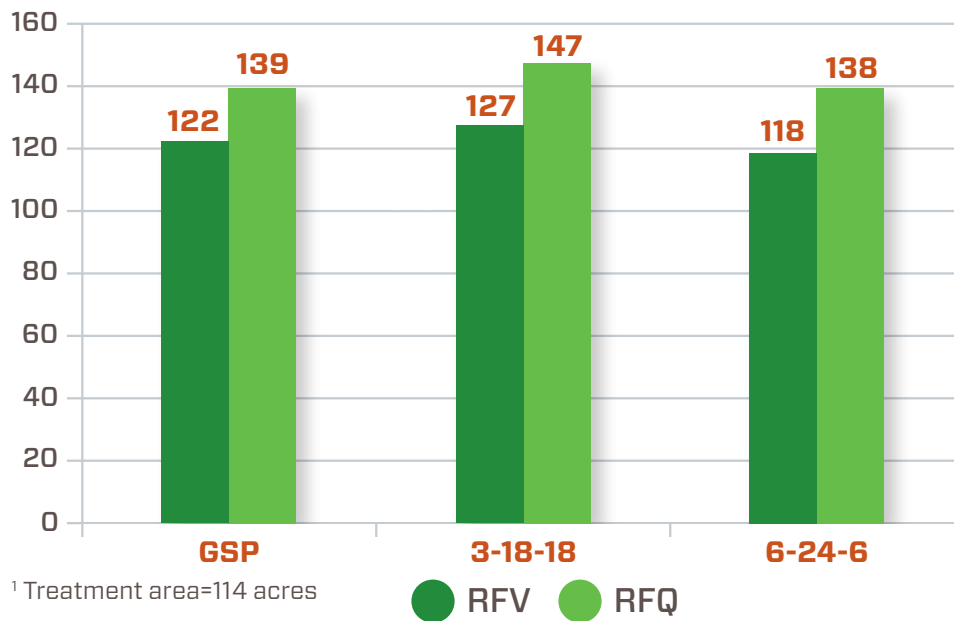
#### 2013

Both foliar and water-run treatments increased plant production, with in-pivot applications of 6-24-6 creating the most increase. Total yield from all cuttings with GSP was 20.5 tons/acre; total yield with 3-18-18 was 21.5 tons/acre; total yield with 6-24-6 was 23.3 tons/acre. Relative feed value and relative forage quality increased with foliar applications but not with water-run treatments, possibly due to increased K uptake with foliar applications.

### Practical Applications:

Delivering additional nutrients to alfalfa during the growing season created financial benefits for the grower. Both foliar and water-run treatments increased yield, but further study is needed to determine the best balance between increasing yield and improving nutritive value. The overall benefit-to-cost ratio for in-season treatments was approximately 2:1.

**Effect of in-season NPK liquid applications on mean alfalfa relative feed value and relative forage quality.<sup>1</sup> Grand View, Idaho, 2013.**



Relative feed value for alfalfa with in-season NPK liquid fertilizers produced on Simplot Farm Four. These values are made up of acid detergent fiber and neutral detergent fiber and reflect production values for livestock.