FŪSN

Fused-Safe Nutrients™

Evaluation of FŪSN™ (26-0-0-14) on Umatilla Potato Production

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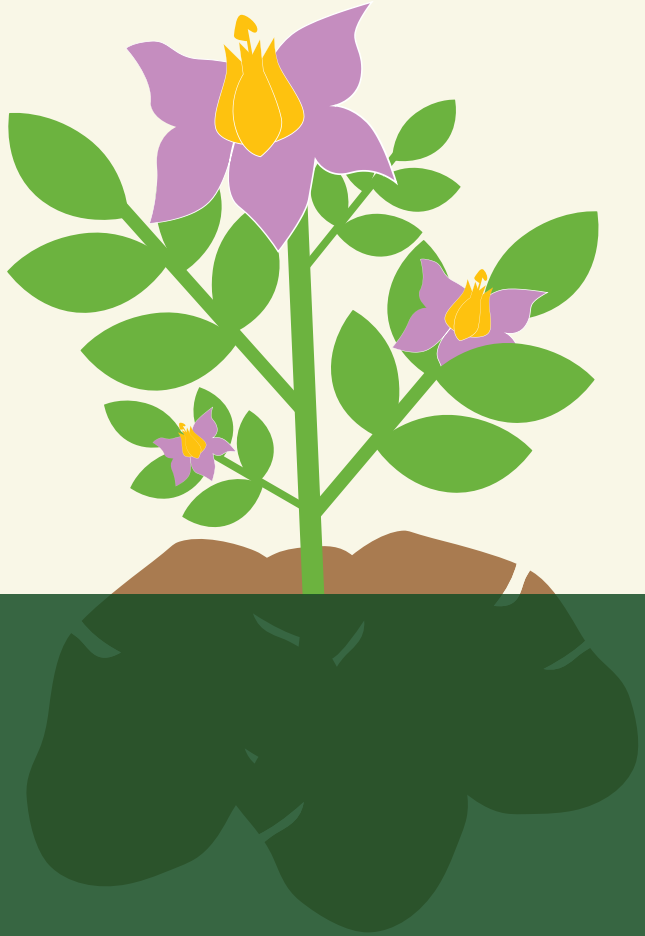
Wilder, Idaho, 2015



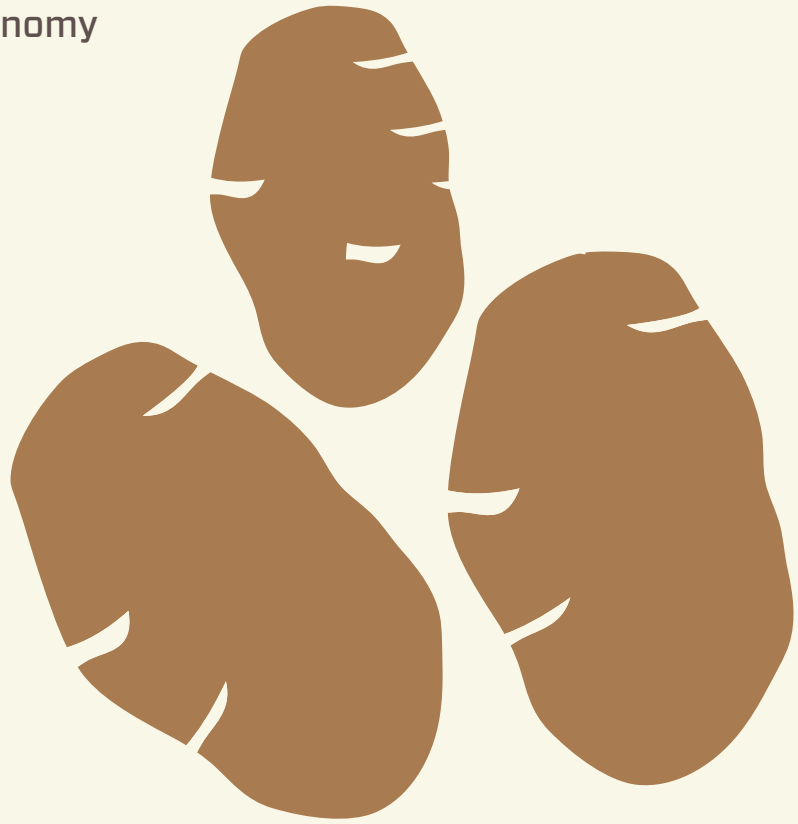


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Figure 1. Comparison of tubers from four random potato plants comparing the top-dress applications of FŪSN @ 100 lbs of N/ac (left) to ammonium sulfate @100 lbs N/ac (right). Photo taken September 23, 2015.

FŪSN (26-0-0-14) is a new ammonium-sulfate nitrate nitrogen fertilizer that is being manufactured at the Simplot Lathrop California plant. FŪSN is a 3:1 salt of ammonium to nitrate nitrogen form that has some unique characteristics such as decreased ammonia volatility. FŪSN is a safe nitrogen replacement for ammonium nitrate and it has potential for use in commercial potato production systems in Idaho. As such there is a need for evaluation of this new nitrogen (N) fertilizer in potato production and how it may affect not only potato yields but also potato quality factors.

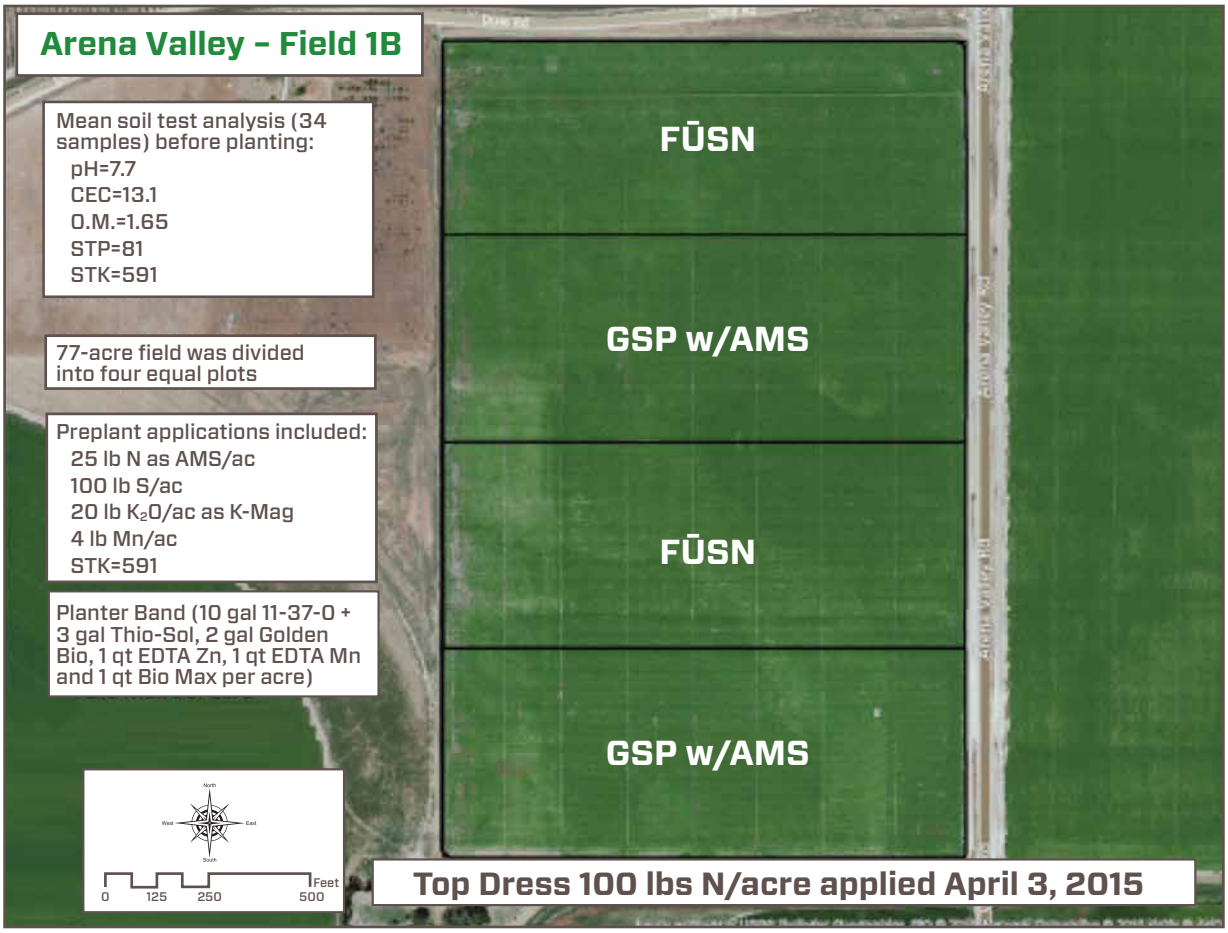

Figure 2. Arena Valley Field 1B is a 75-acre, linear-irrigated field in the Arena Valley.

Methods

The location for this study was a Simplot commercial potato production field (75 acres) in Arena Valley near Wilder, Idaho (Figure 2). The preplant fertilizer applications were exactly the same across the entire field and the starter fertilizer application was also the same as noted in Figure 2. The field was divided into four quarters; two quarters received FŪSN topdressing at 100 lbs of N/ac and the other two quarters received the grower standard practice (GSP) of 100 lbs of N/ac as ammonium sulfate (AMS=21-0-0-24) in a topdress application. Umatilla potatoes were planted on April 11 and top-dress N applications were made on April 25. The whole field was managed and irrigated as a single field. Petiole samples were taken at approximately two-week intervals starting June 5 and ending August 5 from each treatment area and then treatments were averaged. The field was commercially harvested on October 15. During commercial harvest a crossover potato digger (four rows wide) lifted four rows of potatoes and laid them on top of the ground before a second potato digger dug four rows, collected the original four rows (eight total), and then loaded the potatoes into a field truck. Five hand-harvested samples (four rows 10 feet long = 40 linear feet of row = 100 ft^2) were collected from each quarter of the field behind the crossover digger (for 20 total samples). Composite samples from each quarter were submitted to the Simplot Project Idaho plant for federal/state inspection. Information from the inspection report was applied to the Simplot 2015 Ranger Russet potato contract to establish net grower returns of the comparison of FŪSN to AMS.

Results

In-season potato petiole samples were initially higher for FŪSN top-dressed plants and then were similar later in the season (Figure 3). For the FŪSN-fertilized plants, nitrate concentrations started out at more than 25,000 ppm and decreased to less 15,000 ppm by the last sampling in August, which is ideal for potato production in Idaho. No visible differences due to nitrogen source on top-dress N application were observed during the growing season.

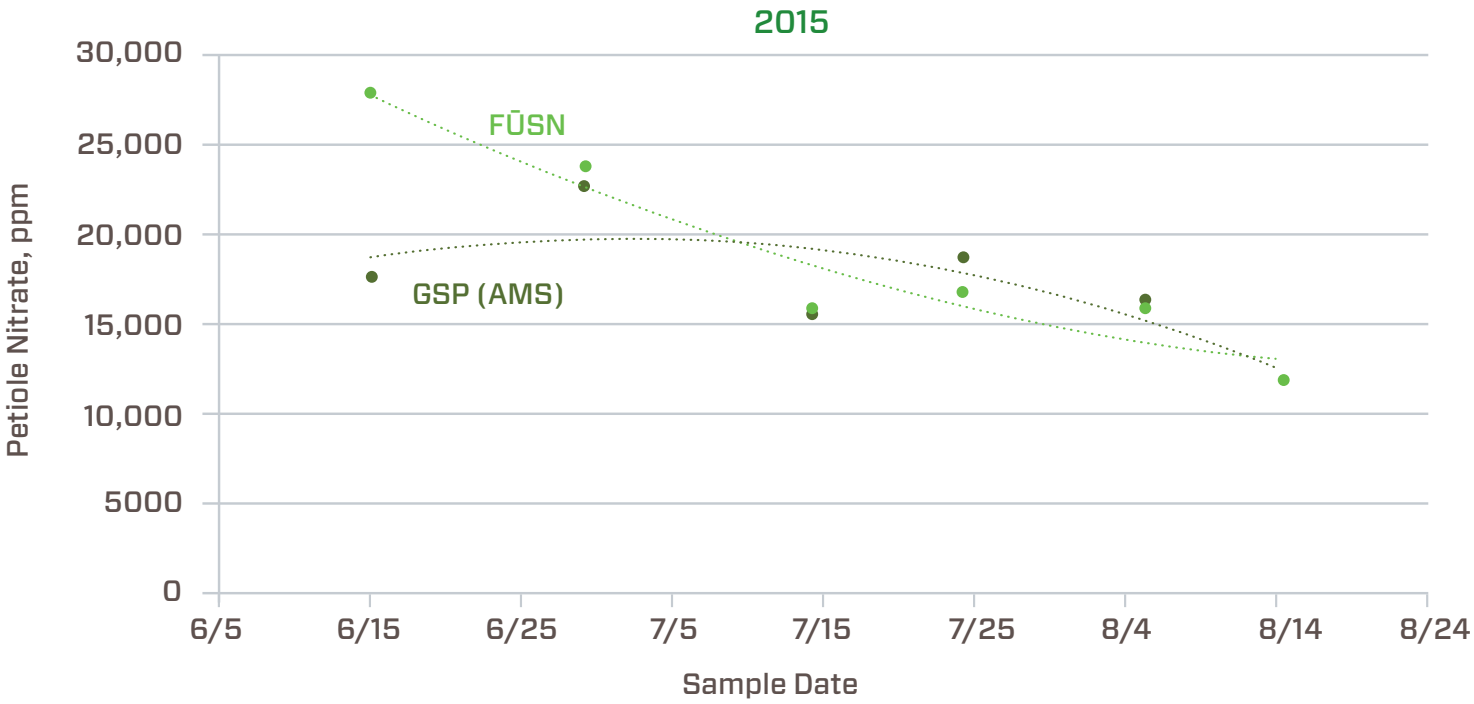

Figure 3. Effect of FŪSN on Umatilla potato petiole nitrate concentrations.

In cooperation with the Simplot SmartFarm group, Arena Valley 1B was included in a satellite flyover every two weeks during the growing season. Composite photosynthesis analysis of the field for the July 27 satellite flyover is presented in Figure 4. There was not any NDVI difference in the field that could be detected by the satellite photo analysis. The potatoes looked very good throughout the season.

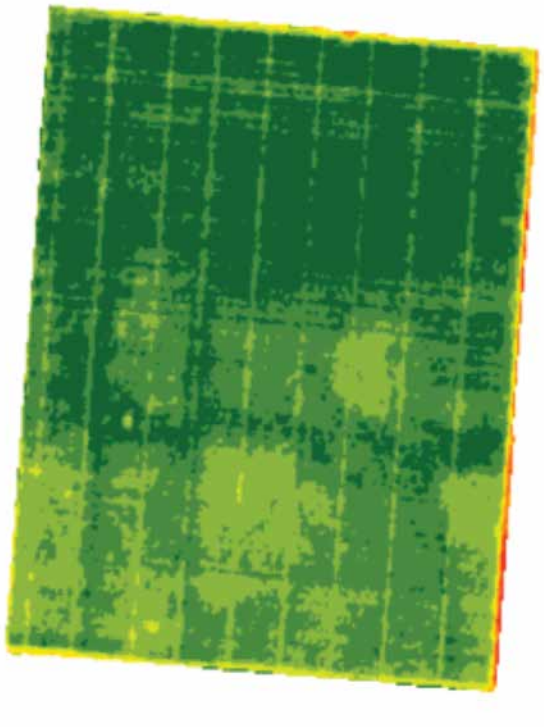

Figure 4. Arena Valley 1B composite photosynthesis taken on July 27, 2015, show that there was no observable differences in satellite NDVI readings between the grower standard practice (AMS) and FŪSN.

A 147 cwt/ac (7.35 t/ac) increase in total potato yield was observed for the 20 hand samples of Umatilla Russet potatoes top-dressed with FŪSN compared to the potatoes top-dressed with ammonium sulfate (Figure 5). There was a 52 cwt/ac increase in the yield of 6–10 oz and greater

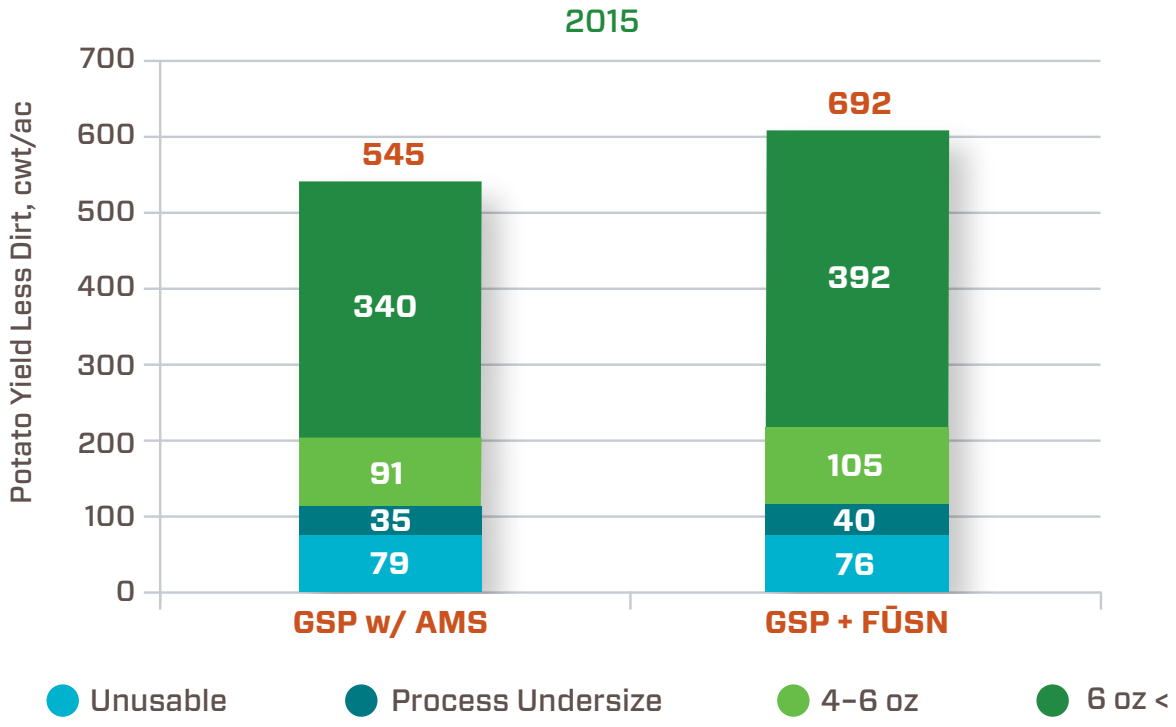

Figure 5. Payable potato yield (field weight less dirt) for Umatilla potatoes top dressed with FŪSN compare the ammonium sulfate.

than 10 oz tubers for potatoes top-dressed with FŪSN (392 versus 340 cwt). There was a 14 cwt increase in the 4–6 oz size fraction for potatoes top-dressed with FŪSN. This data suggests that the form of nitrogen applied to potatoes in-season has an effect on total yield and tuber size.

Composite samples (approximately 1,000 lbs) from each quarter of the field were retained and delivered to the Simplot potato processing plant for evaluation by the Federal/State of Idaho Inspection Service. Grower returns are based on the grade of the potatoes and the Simplot contract. Top-dressing with FŪSN increased the percentage of U.S. No. 1 grade potatoes by 17%. Results in potatoes of greater than 6 oz were similar, as were results in process undersize potatoes. The N top-dress source had no effect on fry color or specific gravity—both important potato quality traits. The other important quality parameters were similar. With the increase in payable yield and in U.S. No. 1 potatoes with the FŪSN topdressing, grower payout was increased by $1,084/acre based on the 2015 Simplot processing contract.

Evaluation of in-season FŪSN topdress applications for Umatilla potato production will continue in 2016 in cooperation with Simplot Land and Livestock in Arena Valley.

Effect of FŪSN (26-0-0-14) on Umatilla Russet Potato Quality Factors[1]

Potato Quality Traits	GSP	GSP + FŪSN
US# 1	24%	41%
6 oz. <	73%	73%
Process Undersize	7%	7%
Unusable	15%	13%
Bruise Free	n/a	n/a
Specific Gravity	1.080	1.086
Fry Color 0	100%	98%
Sugar Ends	0%	0%
Simplot Ranger Contact Return, $/ac	$2,776	$3,860

Based on random yield samples taken at harvest and then evaluated by the inspection service[1], FŪSN increased grower returns by $1,084/ac based on 2015 Simplot contract pricing.

[1]State of Idaho Federal/State Inspection Service

Figure 6. Potato quality traits and net returns for Ranger Russet potatoes as affected by top-dress N applications.

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