

Evaluation of 6-24-6 for Improving Yield and Quality of Hard Red Winter Wheat

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Introduction:

The long growing season of the wheat plant requires availability of NPK that is both early and long-lasting for best plant nutrition. An optimal source of phosphorus (P) would be highly soluble, readily absorbed by plants, and able to release nutrients when moisture levels make conditions favorable for uptake.

Challenge:

P must be available to plants during the entire growing season, but in many soils, orthophosphate quickly attaches to soil cations and becomes less available for plant use. Identifying fertilizer delivery methods and rates that ensure plants have adequate access to P will improve the grain's size and nutritive quality.

Research:

University of Idaho Research Professor Jeffrey Stark examined the effects of Simplot's 6-24-6 on yield, protein content, dry matter production, and nutrient uptake on hard red winter wheat. Banding and a split treatment of both banding and foliar applications were studied using moderately low applications of N to allow the research to focus on the results from the 6-24-6 treatment.

Methodology:

"Whetstone" hard red winter wheat was planted in a sandy loam soil. A randomized complete block design with five replications measured method of application, rate of application, and combinations.

The control plot received no applications of 6-24-6. The team banded 3.0, 6.0, and 9.0 gallons/acre of Simplot's 6-24-6 at a depth of 3" to 4" in the next three treatment plots respectively. The next three plots received 1.5, 3.0, and 4.5 gallons/acre of 6-24-6 in the band and two foliar applications that were each equal to half of the banded application, one at tillering and the second at early boot stage. Additional nitrogen was applied to all plots prior to planting to bring soil N to 112 lbs N/acre to meet requirements of the pre-plant soil test.

Results:

Whole-plant samples were harvested from the center of each plot. Samples were weighed and tested for protein content. Uptake of N, P, and K was higher for plants that received all nutrients in the band than for the plants with split banded and foliar applications. Protein content increased as fertilizer rates increased, but did not vary significantly due to treatment method.

Practical Applications:

Banding 6-24-6 resulted in better nutrient uptake, heavier grain, and more protein than the split banding/foliar applications. Band treatments also had slightly higher yields than split treatments, at 100.3 bu/acre compared to 97.1 bu/acre.

Whetstone winter wheat N-P-K response to 6-24-6 rate and timing, Aberdeen, Idaho, 2014-2015.

Total N	Total P	Total K	Preplant Banded gal/acre	Split Applied *Foliar gal/acre	Dry Matter				Yield bu/A	Protein %	Test Weight lb/bu
					Grams N/m ²	Grams P/m ²	Grams K/m ²	lbs/A			
----- lb/acre -----											
0	0	0	0	0	22.7	6.1	6.6	8,394	89.8	13.0	60.1
6	8	6	3	0	30.9	8.4	8.9	8,865	92.4	13.6	59.7
11	16	11	6	0	32.9	8.9	8.7	9,162	95.8	13.8	59.5
17	24	17	9	0	38.3	9.9	11.3	11,103	112.7	13.9	59.2
6	8	6	1.5	1.5*	228	6.2	6.4	7,382	88.2	13.3	59.3
11	16	11	3.0	3.0*	27.5	7.7	8.2	8,386	93.8	13.7	59.9
17	24	17	4.5	4.5*	32.8	8.2	9.4	10,366	109.4	13.9	59.5
Pr > F					0.063	0.061	0.041	0.067	0.037	0.058	0.687
LSD@0.10					3.3	0.7	0.9	947	6.3	0.6	NS

*Applied April 23 and May 12, 2015.