UTILIZING LOW SALT LIQUID NPK FERTILIZERS TO ESTABLISH TRITICALE AS A COVER CROP

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ABSTRACT

The use of cover crops in sustainable agricultural systems is receiving renewed attention. New initiatives in soil health promote cover crops as amanagement tool to improve soil quality and health. Successful establishment of cover crops depends on an adequate soil fertility program. Low salt NPK liquid fertilizers can improve cover crop establishment without concern of the impact of high salt index of some conventional fertilizers. This paper presents some of the success that have been observed with the use of low salt liquid (LSL) NPK fertilizers in the establishment of no-till triticale as a fall seeded cover crop in a corn silage/triticale relay cropping system.

INTRODUCTION

J.R. Simplot Co. farming and livestock operations in southern Idaho utilize cover crops when possible to extend forage production and animal grazing. Fall planted triticale is utilized as a cover crop in in an intensive corn silage/triticale relay cropping system. Corn is planted in the spring (May) utilizing a strip-till planter. The irrigated corn produces approximately 32-35 tons (65% moisture) of silage per acre. The high quality corn silage is harvested about mid-September. Fall planted triticale can over winter in the fall and then mature in the early spring before it is time for corn to be planted. Utilizing a no-till grain drill to directly seed triticale into the corn stubble as soon as the silage is harvested results in seven months (October-April) of cover crop that has the potential to produce additional silage. Then corn can be directly in to the triticale stubble as soon as it is harvested in May utilizing the strip till planter. This intensive corn silage/ triticale relay cropping system can have a crop growing on the fields 360 days a year because there is almost no time required for tillage operation on thousands of acres.Besides the fields being covered with crops almost year round, there is a significant savings in equipment, labor and fuels. The corn silage and triticale green chop are utilized as part of the feed rations for a 120,000 head Simplot feed lot near Grand View, Idaho.

METHODS

Preplant granular fertilizer and low salt liquid NPK starter fertilizer treatments were appliedto fall planted triticale to evaluate the starter effect on the triticale cover crop. Three starter treatments were evaluated paired fields (724 total acres) during the 2013-14 growing season (see table 1). Triticale (130 lb seed per acre) was planted on paired fields during a four week period beginning September 18th and finishing by October 15th, 2013.

Table 1. Starter Fertilizer Formulations for Fall Planted Triticale (2013-2014)

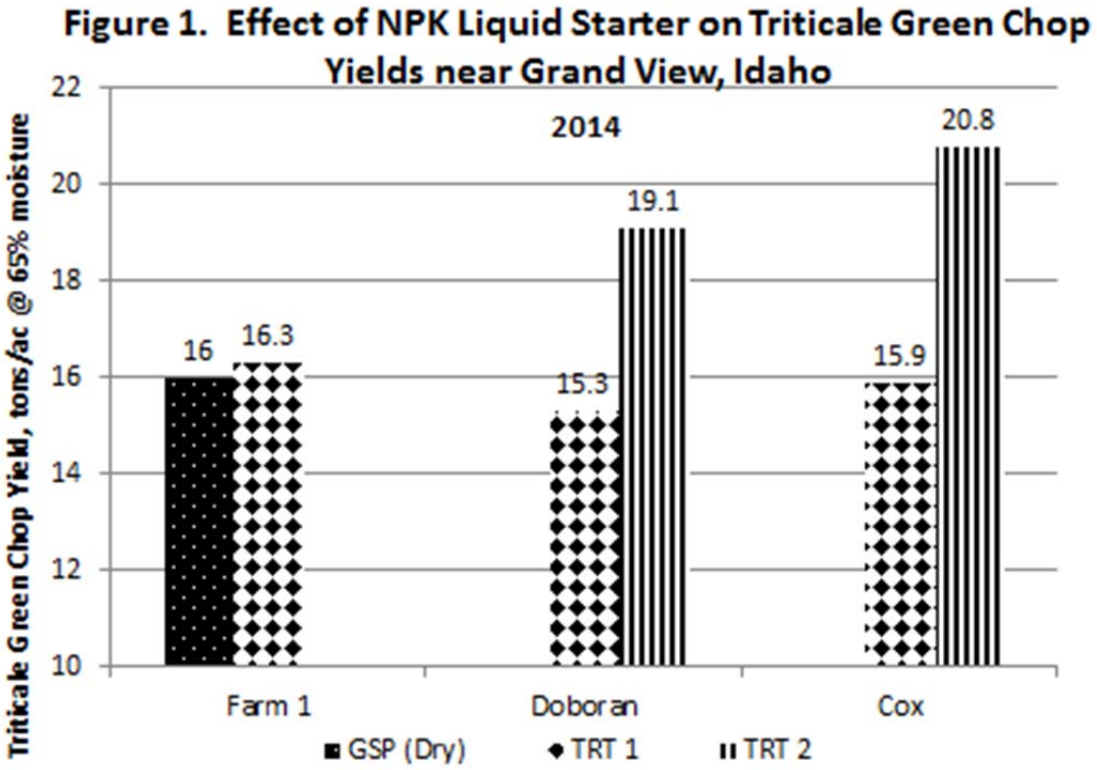
Treatment	Starter Formulation	Analysis
GSP- Granular	18 lb N/ac (urea treated with NutriSphere-Nat 2 qt/ton) 16 lb P2O5/ac (MAP treated with AVAIL at 2 qt/ton)	18 lb N/ac 16 lb P2O5/ac
Liquid TRT1	6 gpa 6-24-6 treated with AVAIL at 2 qt/100 gal 4 gpa UAN-32 treated with NutriSphere-N at 2 qt/100 gal 2 gpa water	18 lb N/ac 16 lb P2O5/ac 4 lb K2O/ac
Liquid TRT2	6 gpa 6-24-6 treated with AVAIL at 2 qt/100 gal 6 gpa water	4 lb N/ac 16 lb P2O5/ac 4 lb K2O/ac

Following seeding, all fields were managed similarly. All fields received two applications of 75 lb of N (urea treated with NutriSphere-N) one application in the fall after establishment and the other application in the early spring. Triticale cover crop was harvest for green chop starting May 12 through May 23 by a commercial harvest crew. Fields were swathed and allowed to dry down to approximately 65% moisture before chopping. Five random samples (0.5 to 0.75 acres per sample) from each field were evaluated for yield, moisture content and quality. Sample size was determined by how much area out of the field was required to fill a harvest truck and the harvest area was calculated. Each load was tracked across a commercial scale and subsampled at the silage pit. All samples were analyzed by a commercial lab for moisture determination and forage quality.

RESULTS AND DISCUSSION

Fall established triticale can be an effective cover crop when established early enough in the fall to take advantage of favorable weather conditions for seeding establishment and soil moisture for seedling germination and growth. In this minimum tillage corn silage/triticale relay cropping system, no-till fall planted triticale can be directly seeded into corn silage stubble as soon as it has been harvest to take advantage of favorable fall weather conditions and fall irrigation to get the crop off to a quick start. The use of a pop up starter fertilizer can accelerate cover crop establishment to take advantage of favorable weather before the winter sets in. A Great Plains no-till grain drill was used to establish the triticale cover crop which was outfitted with a liquid fertilizer application kit to deliver a liquid starter fertilizer in each seed row simultaneously as the seed was planted.The liquid fertilizer was applied a constant 12 gallons per acre (gpa). In the fall of 2013 we had excellent establishment of the fall planted triticale with complete establishment and field cover before the first killing frost approximately November 1st.

Triticale cover crop was mature and ready to begin harvestingon May 12th. Paired field harvest yields are presented in Figure 1. Farm 1 (200 acres) was a comparison of the dry granular fertilizer applied preplant to the Liquid TRT1 which was composed of (Low Salt Liquid) LSL 6-24-6 + UAN 32 at the same rate of N and phosphate. There was no difference in yield between the two starter fertilizers on Farm 1 (16 vs 16.3 ton/ac). Triticale green chop yields were similar for Liquid treatment (TRT1) across 3 fields (386 acres) averaging 15.8 ton/ac of green chop. A direct comparison between Liquid TRT 1 and Liquid TRT 2 (w/o UAN-32) was made on two different farms (523 acres). Liquid TRT 2 produced 28% more green chop without UAN-32 compared to Liquid TRT 1. The Salt Index of the 6-24-6 liquid NPK fertilizer is 12. The Salt Index of UAN-32 is 71. It appears that the Liquid TRT 1 did not have a beneficial effect on the Triticale cover crop because of a higher addition of salt in the seed row with UAN-32 despite the additional 14 lb of N/acre. During the growing season there were no obvious differences between Liquid TRT 1 and TRT 2.



An economic analysis of the granular and liquid NPK starter fertilizer applications is provided in Table 2. The Liquid TRT 1 was $28.35 /ac more expensive than the granular application of urea treated with NutriSphere-N and the MAP (11-52-0) treated with AVAIL with no yield advantage. Liquid TRT 2 was $17.85 more expensive than the granular application but resulted in 3.9 ton/ac increase (28%increase) in green chop yields. The increase in revenue from Liquid TRT 2 vs. the granular application resulted in a 9:1 benefit-to-cost ratio (($902-$725.25)/$17.85).

Table 2. Economic Analysis of the Effect of Liquid NPK Starters on Fall Planted Triticale

Starter Treatments for Fall Planted Triticale		Total N-P_2O_5-K_2O Lb./ac	Green chop Yield tons/ac @ 65% moisture	Gross Acre Return @ $45.33/ton	Increased Revenue/ ac (B:C)
Grower Standard Practice Granular	Urea /w NutriSphere-N + MAP /w AVAIL	18-16-0	16	$725.25	
Liquid TRT1	6 gal 6-24-6 w/ AVAIL + 4 gal UAN w/ NutriSphere-N (+$28.35)	18-16-4	15.8	$716.25	
Liquid TRT2	6 gal 6-24-6 w/ AVAIL (+$17.85)	4-16-4	19.9	$902.00	$158.90 (9:1)

All fields received two applications of 75 lb N/ac as urea w/ NutriSphere-N

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SUMMARY

Fall planted triticale cover crop has the potential to make a significant contribution in an intensive cropping system with corn silage. The use of a low salt liquid NPK starter fertilizer (6-24-6 at 6 gpa + 6 gpa water) to triticale applied in-furrow at fall planting, resulted in a remarkable 28% increase in silage yield. This was compared to the same starter fertilizer with 4 gpa of UAN-32 or a preplant granular fertilizer application of similar analysis. It appears that the high salt index of the UAN-32 impacted negatively triticale production. The use of low salt liquid NPK starter fertilizer at planting improved the performance of triticale in a corn silage/ triticale relay cropping management system in southern Idaho.

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