

Evaluation of Three Rates of RyzUp SmartGrass® on Smooth Brome Growth and Yield, Butler County, NE 2012

Michael D. Rethwisch, Kent R. Clymer, and Garrett Tooker

ABSTRACT

Smooth brome (Bromus inermis) was treated with three rates of RyzUp SmartGrass® (active ingredient = GA₃; Valent USA) via a tractor mounted sprayer when new growth was approximately 4.5 inches tall in April 2012. Increased grass growth was noted by 15 days post treatment. As level of RyzUp SmartGrass® increased, plant height increased. Tallest smooth brome was noted in tractor wheel tracks, indicating that spray angle and/or amount of stem/plant intercepting spray is of consequence and needs future consideration. Comparative forage yields were not obtained due to 2012 drought conditions.

INTRODUCTION

Local forage production is of greater importance than in recent years, due to higher prices, grazing acres being changed to row crops and resulting reduction of available forage/hay, and high livestock populations. This increased pressure on area grazing/haying acres in turn has increased cash rents and value for such, while also intensifying the need to economically increase forage production on these acres.

Local experimentation early in 2012 had noted that RyzUp SmartGrass® (active ingredient = GA₃; Valent USA) substantially increased early growth of smooth brome (*Bromus inermis*) and to a lesser extent bluegrass from a late March application. While this product is fairly economical (expected price at 0.3 oz./acre = \$7 + application cost), there are questions about smooth brome sensitivity and growth responses to various product rates due to lack of experimental data, with no known data existing examining rate responses for Nebraska production conditions.

This experiment was initiated to document the growth response of smooth brome to three rates of RyzUp SmartGrass® when applied with fertilizer, as well as to determine the economics of such treatments and resultant yields.

METHODS and MATERIALS

An established smooth brome hay field (30+ years of production) was located north of Garrison, Nebraska. This field has a history of fairly high hay yields, partially due to fertilization

with 100 lbs./acre of 32-0-0 on an every other year basis in recent years. This field was most recently fertilized in April 2011.

RyzUp SmartGrass[®] (Valent USA) is a naturally occurring plant growth regulator (giberellic acid 3) that promotes growth, and is thought to maintain quality and improve forage yields when cool temperatures limit natural plant growth. This product is also OMRI listed. Valent USA representatives have indicated that no experimental data for this product in association with smooth brome were known to exist prior to 2012.

Applications were made the early afternoon (noon - 2 p.m.) of April 10, 2012, with a tractor mounted sprayer. Conditions were fairly warm (about 80°F.), sunny, and breezy when treatments were applied. The sprayer was equipped with 12 T-Jet XR-8002VS nozzles spaced 12 inches apart, and was calibrated to deliver 20.4 gallons/acre at 40. The resultant spray pattern was a fine mist in a flat fan pattern. This application, combined with the weather conditions, resulted in fairly rapid evaporation after spray deposition to top of foliage.

Treatments consisted of three rates of RyzUp SmartGrass[®] (0.3, 0.6 and 0.9 oz./acre). Each treatment also included 3.5 lbs./acre of ProSol 20-20-20 fertilizer (Frit Industries, Inc., Ozark, AL), and the organosilicone surfactant ABG-7011 (Valent BioSciences) at the rate of 0.025% (3.2 oz./100 gallons).

ProSol 20-20-20 (Frit Industries, Ozark, AL) is a water soluble fertilizer that contains 20% nitrogen (3.9% ammoniacal, 5.8% nitrate, and 10.3% urea), 20% P₂O₅, 20% K₂O, 0.02% boron, 0.05% copper, 0.1% iron, 0.05% manganese, 0.0005% molybdenum and 1% chlorine. This product was applied at the rate of 3 lbs./acre.

Plots were 12 foot wide x 315 foot long, with experimental design being a randomized complete block design utilizing four replicates. Smooth brome averaged 4.6 inches tall when treated. The 0.9 oz./acre rate of RyzUp SmartGrass[®] was achieved by first treating the block with the 0.3 oz./acre rate, and then traveling in the opposite direction to apply the 0.6 oz./acre rate.

AgriSolutions[™] Gradual-N (30-0-0, 10.4 lbs./gallon, manufactured by Winfield Solutions, LLC, St. Paul, MN) was also included in the treatments. This product contains 12% urea nitrogen and 18% slowly available nitrogen from methylene urea. Treatments included this product at the rate of 0.67 gallons/acre.

Combined with the 20-20-20 fertilizer, applications resulted in 2.76 lbs./acre of nitrogen, 0.68 lbs/acre P₂O₅ and 0.68 lbs./acre of K₂O for the 0.3 and 0.6 oz./acre rates of RyzUp SmartGrass[®], and 5.52 lbs./acre of nitrogen, 1.36 lbs/acre P₂O₅ and 1.36 lbs./acre of K₂O for the 0.9 oz./acre rate. As faster growth was expected from the higher rate of RyzUp SmartGrass[®], it was thought necessary to also provide higher levels of readily available nutrients to enable full growth expression.

Sampling Procedures

Plots were sampled on April 17, 25, May 3, 11 and 18 (7, 15, 23, 31 and 38 days post treatment). Samples consisted of measuring plant height in five (5) locations in each plot to the nearest 1/2 inch of height which growth had surpassed, and recording the data.

As visible differences in height were noted in wheel tracks, data were also collected from these area on April 26 using the previously stated techniques. Samples from adjacent non-wheel track samples (2 feet away) were also obtained to accurately document height differences between track/non-track areas due to height variances noted across plots.

Extended leaf heights

While plant height was used for most measurements, it was felt that a more definitive measurement may be that of extended leaf heights. This was partially due to winds during many of the sample dates as well as noting that the natural plant height (top of leaf arch) may be providing a different result in growth measurement than visually noted for certain treatment effects resulting in much longer leaves in addition to stem growth increases.

Extended leaf heights data were collected on April 26 and for both wheel track and non-wheel track areas for only the treated plots. Five plants/plot were sampled by taking a plant, lifting leaves and recording distance from soil line to tip of uppermost extended leaf (nearest 1/4 inch of growth). Non-wheel track samples were taken 2 feet away from the sampling spot within the wheel track, thus greatly reducing potential variances associated from random locations within the plots.

RESULTS and DISCUSSION

Although difference in plant heights were not readily noted at 7 days post treatment (potentially due to strong winds present on many sample dates), highly significant differences in smooth brome growth due to RyzUp SmartGrass[®] were noted at 15 days post treatment (Table 1). As level of RyzUp SmartGrass[®] increased, plant height also increased. (Fig. 1).

Because fertilizer was also included in the RyzUp SmartGrass[®] treatments, but was not used as individual treatments, it is not possible to fully elucidate the individual component effects of the treatment combinations. An accompanying experiment in the same field that included fertilizer treatments by themselves resulted in very little growth from the same fertilizer component, indicating that increased growth in this experiment is mostly due to the RyzUp SmartGrass[®] component.

Differences due to RyzUp SmartGrass[®] treatment rates were most pronounced on May 3 (23 days post treatment) when significant smooth brome height differences existed between the 0.3 and 0.9 oz./acre treatments. After this sample date heights decreased in all plots due to lack of moisture associated with the 2012 drought, and full season forage yields were thus not obtained in this experiment.

One oddity noted in this experiment was that taller smooth brome was observed in wheel tracks than non-wheel traffic plot areas, with growth differences being as much as 2.2 inches on April 26 (Table 2), with differences increasing as rate of RyzUp SmartGrass® increased. The opposite result (reduced growth in wheel tracks) had been expected due to potential crushing, compression, etc.

These observations indicate that spray angle and/or amount of stem/plant intercepting spray is of consequence and needs future consideration. This also indicates that results may differ when application method is changed (aerial vs. ground, differing nozzles, angle of application, spray volume, etc.). Additional work is necessary to evaluate the effects of differing application methods and resultant smooth brome growth responses.

MEAN SMOOTH BROME NATURAL HEIGHT FOLLOWING APPLICATION ON APRIL 10, 2012, GARRISON, NE

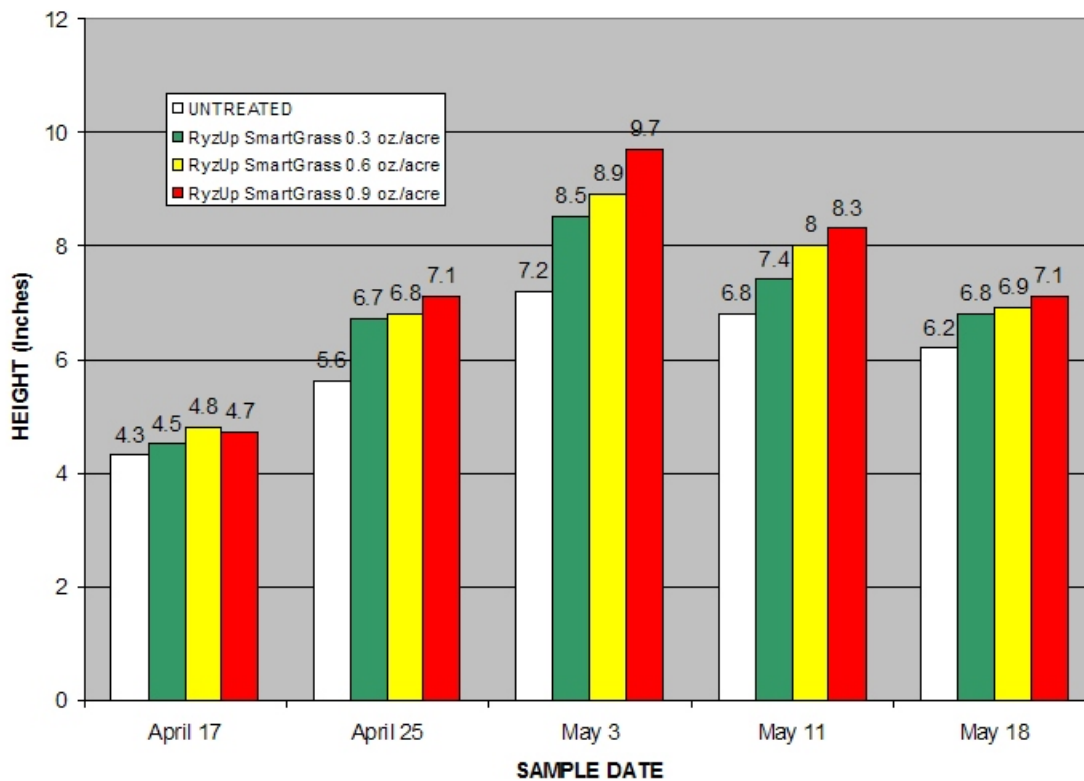


Table 1. Smooth brome plant natural heights (inches) following application of three differing rates of RyzUp SmartGrass[®] plus fertilizer on April 10, 2012, Garrison, NE.

Treatment	Rate/acre	Sample Date				
		April 17	April 25	May 3	May 11	May 18
RyzUp SmartGrass [®] + ProSol 20-20-20 + Gradual-N 30-0-0	0.9 oz 7.0 lbs. 1.33 gal.	4.7a	7.1a	9.7a	8.3a	7.1a
RyzUp SmartGrass [®] + ProSol 20-20-20 + Gradual-N 30-0-0	0.6 oz 3.5 lbs. 0.67 gal.	4.8a	6.8a	8.9ab	8.0ab	6.9a
RyzUp SmartGrass [®] + ProSol 20-20-20 + Gradual-N 30-0-0	0.3 oz 3.5 lbs. 0.67 gal.	4.5a	6.7a	8.5 b	7.4 bc	6.8a
Untreated check	-----	4.3a	5.6 b	7.2 c	6.8 c	6.2a
	<i>P value</i>	0.06	0.0005	<0.0001	0.0003	0.06

Means in columns followed by the same letter are not statistically different at the $p \leq 0.05$ level (Tukey-Kramer HSD test, JMP 8.0.2).

Table 2. Mean smooth brome extended leaf heights (inches) comparisons between wheel track and normal areas following application of three differing rates of RyzUp SmartGrass® plus fertilizer on April 10, 2012, Garrison, NE.

Sample Date = April 26				
Treatment	Rate/acre	Normal	Wheel track	Difference
RyzUp SmartGrass® + ProSol 20-20-20 + Gradual-N 30-0-0	0.9 oz 7.0 lbs. 1.33 gal.	8.6a	10.8a	2.2a
RyzUp SmartGrass® + ProSol 20-20-20 + Gradual-N 30-0-0	0.6 oz 3.5 lbs. 0.67 gal.	7.6 b	9.6 b	2.0a
RyzUp SmartGrass® + ProSol 20-20-20 + Gradual-N 30-0-0	0.3 oz 3.5 lbs. 0.67 gal.	8.2ab	8.9 b	0.8 b

	<i>P value</i>	0.04	0.0003	0.02

Means in columns followed by the same letter are not statistically different at the $p \leq 0.05$ level (Tukey-Kramer HSD test, JMP 8.0.2).



Figure 2. Taller smooth brome was noted in wheel-tracks, Garrison, NE, 2012