The Affect of Various Hail Recovery Plant Nutrient Products on The Sugarbeet Crop Following a June 23, 2005 Defoliation by Hail Storm.

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In 1976 a study was conducted in the Twin Falls, Idaho area by Carter, Traveller, and Bosma which showed the effect of the interaction of hail damage and nitrogen level on growth, yield and quality of sugarbeet. This study started out as a study to determine growth characteristics and yield response to four N fertilizer rates of 0, 125, 250, and 375 lbs. N/A, each applied at the different times of pre-plant (4/12), mid June (6/16), and mid July (7/15) and mid August (8/11). A severe hail storm on August 2 caused extensive defoliation of plants , estimated to be about 75 %.

Data from their study showed that neither high soil N levels or late N additions, benefitted hail damaged beets. Leaf area recovered faster at high N levels, but sucrose concentrations decreased with no root yield benefit.

The study reported that “there was no indication from sucrose concentration or accumulation that stored sucrose was used for the regrowth of beet tops at any plant-growth stage after defoliation.

Their data indicated that if hail had damaged the beets in mid-July it would have potentially destroyed the entire maximum potential sucrose accumulation period and caused greater loss in sucrose accumulation.

It was also hypothesized, that if leaf damage had occurred in June or early July, the addition of sufficient N to replace that lost in the destroyed leaves may have been beneficial to plants that are deficient to adequately supplied with N, for maximum growth.

In this context then, when a damaging hail storm occurred on June 23, of this past year (2005), in the area south and west of Burley Idaho, it was decided that a possible testing of this assumption might be made by applying additional nitrogen to see if it would help in the regrowth or recovery of plant leaf tissue. It was also proposed to look at the response of other commonly prescribed products which are sold for hail recovery or other stressful situations. The purpose was to see if any of the various nutrient formulations which are currently being sold as hail damage aides,(most of which contain some Nitrogen) would affect recovery from the hail damage appreciably.

A field was used (a grower graciously cooperated with this effort), which was in the heart of the hail damaged area. It had sustained approximately 75-85 % defoliation. The growth stage was at an average of between 10-12 leaves. An area was selected in the field which was well in from the borders and yet accessible. A random grid of 6 replications of 5 different treatments plus a check was made, comprised of 6 rows each of 30 foot length.

Four treatments were liquid formulations of the following products:

Auxigro- Which is a product comprised of gabba aminobutyric acid 29.2% and Glactamic acid 29.2%. It was applied at the rate of 4 0z. per acre. This product is a growth regulator which is utilized in some crops to promote stress relief to enhance yield.

Land View Fertilizer Co.'s 10-10-05 (Neutral pH) product applied at the rate of 5 gals. per acre. This product contains 2-3 units of NPK each, cytokinen and humic acid.

Land View Fertilizer Co.'s NPK (acidic pH) product applied at the rate of 5 gals. per acre. This product contains 2-3 units of NPK each, cytokinen, and humic acid.

Steele Green Co.'s, A-Plus brand- True Grow product applied at the rate of 2 gals. per acre. This product contains 8-6-4-4, kelp, humic acid, micros and biologicals, and vulvic acid.

The fifth treatment was Urea, nitrogen fertilizer applied at the rate of 25 lbs. per acre.

The applications were made of June 29 between 3 and 5 pm. in the afternoon and conditions were calm and warm. The liquid materials were applied with a six nozzle (one per row), bicycle wheel plot sprayer at the rates cited above. The Urea was banded over the rows by hand with the 25 lbs. apportioned evenly over each six rows in the plots involved.

Irrigation water was applied approximately four days later, (the field was under a wheel line system). Subsequent irrigations and cultivations took place as per normal across the field and plots alike as the rest of the season progressed and each field task was accomplished.

Observations at one week, and two weeks and periodically throughout the growth season detected no outstanding differences in any of the treatments or the check.

Harvesting of the data from the plots was accomplished with a single row lifter, tractor mounted, on October 4, 2005. Two rows of the beets from each plot were topped with a sharpened shovel, lifted with the lifter, and hand collected for weighing and samples bagged for sugar determination. The beets from each two rows of plot were weighed on a digital read-out, load cell scale, tri-pod mounted, and weights recorded. Three sample bags were filled from randomly selected beets from these rows and tagged and sent to Amalgamated Sugar Co.'s Tare/Sugar Lab for analysis of sucrose content and quality.

Results from the data for both yield and quality showed no significant differences between the treatments or the check. The 25 lbs. of Urea seemed to make no additional contribution to the recovery of the plant tops when observed at one and two weeks and later during the season. It also made no difference on tonnage or additional sugar content. It could be hypothesized that with the N fertility needs of the crop already in place at the time of the hail damage, an additional amount of N was not necessary. Some had been used to grow the original tops but there was enough left to regrow additional leaves without being short or stressing the crop for N. This goes back to the original querry of whether suppling additional N if the crop were only adequately or deficiently supplied would result in an increase of yield or quality.

The Land View 10-10-5 (neutral pH) formulation had the highest sugar content at 16.19 % which was only slightly higher than the other treatments or the Check, which of course was no treatment.

The A-Plus True Grow treatment had the highest tonnage yield at 29.62 T/A but it also had the lowest sugar percent at 15.93 %.

Valuations of tonnage and sugar computed on a $ value per acre basis, based on current net sugar pricing showed the top dollar producer to be the A-Plus True Grow at $1079.55 per acre. The lowest dollar producer was the Check at $1047.40 per acre. This is a $32.15 an acre increase above the Check, however the cost of the product and the application costs must be subtracted yet. Also, a statistical comparison of the treatments showed that there were no significant differences between the treatments or the Check.

Our thanks to Craig Larsen, our grower cooperator whose field was hail damaged, and to the Land View Fertilizer Co., Emerald BioAgriculture Corporation, and

HAIL DAMAGE RECOVERY PROJECT 2005 Amalgamated Sugar Co. LLC,
conducted by: David Elison, Area Agronomist & Walt Adams, Kenyon Field Representative
grower cooperator: Craig Larson Farm

Recovery product	rate of material applied	lbs. Beets per plot	tons/acre equivalent	individaul sugar sample results, % sugar	lbs. Sugar per acre	$ value per ton	$ value per acre
Check	nothing	150.5	29.80	15.95			
		142.5	28.22	16.48			
		138.0	27.33	16.72			
		141.0	27.92	16.45			
		145.0	28.71	16.27			
		144.0	28.51	16.19			
	average	143.5	28.42	16.07			
	of replications			16.5			
				16.07			
				15.7			
				15.01			
				15.54			
				15.05			
				15.11			
				16.48			
				16.78			
				16.86			
				16.07	9555	$ 36.85	$ 1,047.40

Recovery product	rate of material applied	lbs. Beets per plot	tons/acre equivalent	individaul sugar sample results, % sugar	lbs. Sugar per acre	$ value per ton	$ value per acre
Urea	25 lbs.	167.0	33.07	16.23			
	per acre	140.0	27.72	16.78			
		136.5	27.03	16.7			
		147.0	29.11	15.88			
		145.0	28.71	16.07			
		133.5	26.44	16.62			
	average	144.8	28.68	15.54			
	of replications			15.6			
				15.95			
				16.44			
				16.27			
				15.37			
				15.7			
				16.19			
				16.01			
				16.74			
				16.29			
				16.14	9258	$ 37.06	$ 1,062.83

Recovery product	rate of material applied	lbs. Beets per plot	tons/acre equivalent	individaul sugar sample results, % sugar	lbs. Sugar per acre	$ value per ton	$ value per acre
LandView 10-10-5 neutral pH	5 gals. per acre	158.0	31.29	16.25			
		148.0	29.31	16.23			
		136.5	27.03	16.09			
		147.0	29.11	16.56			
		145.0	28.71	16.64			
		133.5	26.44	16.48			
	average of replications	144.7	28.65	16.7			
				15.6			
				16.97			
				15.76			
				15.66			
				15.62			
				15.84			
				16.21			
				16.23			
				15.76			
				16.37			
				16.38			
				16.19	9276	$ 37.20	$ 1,065.89

Recovery product	rate of material applied	lbs. Beets per plot	tons/acre equivalent	individaul sugar sample results, % sugar	lbs. Sugar per acre	$ value per ton	$ value per acre
LandView NPK acidic pH	5 gals. per acre	150.5	29.80	15.99			
		157.0	31.09	15.58			
		135.5	26.83	15.5			
		143.0	28.32	16.21			
		152.5	30.20	15.88			
		139.0	27.52	15.85			
	average of replications	146.3	28.96	16.03			
				16.17			
				15.48			
				16.9			
				15.31			
				15.93			
				16.11			
				17.25			
				16.41			
				16.44			
				15.46			
				16.33			
				16.05	9296	$ 36.80	$ 1,065.62

Recovery product	rate of material applied	lbs. Beets per plot	tons/acre equivalent	individaul sugar sample results, % sugar	lbs. Sugar per acre	$ value per acre	
Auxigro	4 oz.	145	28.71	15.76			
	per acre	146	28.91	16.12			
		171	33.86	16.21			
		140.5	27.82	16.29			
		135.5	26.83	16.04			
		130.5	25.84	15.78			
	average	144.75	28.66	15.48			
	of replications			15.8			
				15.72			
				15.8			
				15.88			
				15.46			
				15.54			
				15.58			
				15.72			
				17.07			
				16.93			
				17.72			
				16.05	9201	$ 36.80	$ 1,054.58

Recovery product	rate of material applied	lbs. Beets per plot	tons/acre equivalent	individaul sugar sample results, % sugar	lbs. Sugar per acre	$ value per ton	$ value per acre
First Amendment	2 gals.	152.5	30.20	16.12			
A-plus	per acre	162	32.08	16.27			
		163	32.28	16.74			
		135.5	26.83	16.45			
		133	26.34	16.48			
		151.5	30.00	15.5			
	average	149.58	29.62	15.56			
	of replications			16.07			
				15.8			
				15.33			
				15.39			
				15.6			
				16.38			
				16.48			
				15.84			
				15.68			
				15.29			
				15.78			
				15.93	9437	$ 36.45	$ 1,079.55