

FINAL REPORT

PROJECT NO: BJKX60, BJKX61

TITLE: Efficacy Trials of Biostimulant Products

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ACCOMPLISHMENTS: A third and final year of research trials to test the benefits of biostimulants on winter wheat were completed at Aberdeen and Genesee. The trials were situated in the same physical space as the previous year to determine whether multiple applications to the same site will provide a cumulative benefit from the biostimulants. At planting, each trial consisted of treatments that include the biostimulant IgniteS² with and without chemical seed treatment. The chemical seed treatment (control) consisted of Cruiser Maxx in Aberdeen and Vibrance Extreme + Cruiser in Genesee. A second biostimulant product (FoliarBlend) was applied to selected plots in the spring. A control treatment consisting of a micronutrient solution that was similar in composition to the micronutrients in FoliarBlend was applied at tillering and flag leaf emergence. The micronutrient solution was Bioburst Concentrate (J.R. Simplot Company) which is comprised of 0.02% boron, 0.0005% cobalt, 0.05% copper, 0.10% iron, 0.05% manganese, 0.0005% molybdenum and 0.05% zinc. The quantity of macronutrients in the IgniteS² and FoliarBlend were very low, so additional nutrients were not added with the fungicide + Micro treatment. FoliarBlend was applied twice in the spring, once at tillering with a second application at flag leaf emergence. At each location, individual plots were 5 feet wide by 30 feet long, with six replicate plots for each treatment. A 30 foot buffer of winter wheat without biostimulant products was seeded between each plot.

Treatment Code	Seed treatment		Foliar blend protocol	
	Fungicide/ Insecticide	Ignite ^x	Tillering	Flag Leaf Emergence
1	Yes	No	-	-
2	Yes	Yes	-	-
3	Yes	No	FoliarBlend ^y	FoliarBlend
4	Yes	Yes	FoliarBlend	FoliarBlend
5	No	Yes	FoliarBlend	FoliarBlend
6	Yes	No	Micro ^z	Micro

^xIgniteS² applied at 16 oz/cwt.

^yFoliarBlend applied at a rate of 24 oz/A at tillering and flag leaf emergence.

^zBioburst Concentrate micronutrient blend from Simplot.

At Aberdeen, measurements included root length and root mass recorded in the spring, a Fusarium crown rot rating, heading date, mature plant height, yield, test weight and protein. In Genesee, a plant assessment for agronomic traits and disease was recorded on June 6. Measurements included number of tillers per plant; plant height; and disease ratings for Fusarium crown rot, Rhizoctonia root rot and take-all. At the end of the growing season, the plots were harvested to determine yield,

test weight and protein. The yield at Aberdeen was similar to previous years (129 bu/A), will the average yield at Genesee was substantially lower than the previous two years (73 bu/A). The test weight and number of tillers per plant was also low at Genesee, particularly given favorable growing conditions. Seeding conditions in the fall of 2015 were quite dry. As a result, there was not an opportunity to control volunteer wheat prior to seeding the new crop. A significant number of volunteer plants were observed during the growing season competing with the crop. There was no statistical difference among treatments. However, as observed in the previous growing season, the treatment with control + FoliarBlend had the highest yield at Genesee (79 bu/A). A similar increase in yield was not observed with the control + Ignite + FoliarBlend treatment. There were no significant differences in test weight, height or protein at either Aberdeen or Genesee.

Yield, test weight, mature plant height and protein in 2016.

Treatment ^y	Genesee				Aberdeen			
	Yield (bu/A) ^z	Test Weight (lb/bu)	Height (in)	Protein (%)	Yield (bu/A)	Test Weight (lb/bu)	Height (in)	Protein (%)
Control	75	59.4	33	8.1	125	62.8	34	9.1
Control+Ignite	72	58.9	33	7.6	126	62.4	34	10.7
Control+Foliar	79	59.2	33	7.8	130	62.3	34	10.8
Control+Ignite+Foliar	71	58.9	33	7.7	131	62.4	34	10.7
Ignite+Foliar	68	58.7	33	7.7	133	62.2	34	10.8
Control+Micro	72	58.9	33	7.6	131	62.4	33	10.6
LSD (0.05)	ns	ns	ns	ns	ns	ns	ns	ns
P-value	0.5924	0.1769	0.9834	0.6217	0.7826	0.7379	0.7958	0.3684
CV (%)	14.3	0.9	4.0	7.0	8.4	1.0	0.7	14.3

^yControl treatment was VibranceExtreme + Cruiser at Genesee and CruiserMaxx at Aberdeen.

^zBruneau was seeded at Genesee and WB456 was seeded at Aberdeen.

At Genesee, plant roots were assessed for Rhizoctonia root rot, Fusarium crown rot and take-all as well as indirectly gauging root health by measuring above ground plant vigor (number of tillers, plant height). Almost no Fusarium crown rot observed in Genesee and severity of take-all was very low. However, moderate levels of Rhizoctonia root rot were observed. The only treatment to differ significantly from the others was the Ignite + FoliarBlend treatment which had a higher severity of Rhizoctonia root rot. There were no significant differences with regard to plant height and shoot weight.

At the Aberdeen location, plants were assessed for Fusarium crown rot and plant roots were directly assessed by recording root length and fresh root weight. As observed in Genesee, the severity of Fusarium crown rot infection was quite low. Numerically the control treatment had the longest root length. Treatments with Ignite or FoliarBlend tended to have higher root mass than the control or control + Micro.

From the data collected in Aberdeen and Genesee to examine various combinations of IgniteS² and FoliarBlend, there was not a consistent measureable impact on seedling health, plant pathogen severity or yield.

Mid-season plant measurements and disease rating for Genesee.

Treatment	Tiller (no/plant)	Plant Height (cm)	Rhizoctonia Rating (0-8)	Take-all Rating (0-8)	Fusarium Rating (0-5)
VibranceCruiser	1.2	75.1	2.5 ab	0.4	0
VibranceCruiser + Ignite	1.0	75.7	2.5 ab	0.3	0
VibranceCruiser + Foliar	0.9	75.5	2.3 b	0.5	0
VibranceCruiser + Ignite + Foliar	1.2	74.5	2.4 b	0.3	0
Ignite + Foliar	1.1	75.2	2.8 a	0.3	0
VibranceCruiser + Micro	1.0	77.4	2.3 b	0.6	0.02
LSD (0.05)	ns	ns	0.3	ns	ns
P-value	0.1554	0.3680	0.0061	0.0850	0.4405
CV (%)	95.4	9.7	34.1	163.8	1868.4

Mid-season plant measurements, disease rating and heading date for Aberdeen.

Treatment	Root Length (cm)	Root Mass (g)	Fusarium Rating (1-3)	Days to Heading
CruiserMaxx	3.2	0.80	1.1	151
CruiserMaxx + Ignite	2.9	0.93	1.0	152
CruiserMaxx + Foliar	2.8	0.99	1.0	151
CruiserMaxx + Ignite + Foliar	2.9	0.94	1.0	152
Ignite + Foliar	3.0	0.93	1.0	152
CruiserMaxx + Micro	2.8	0.81	1.1	151
LSD (0.05)	ns	ns	ns	ns
P-value	0.6652	0.7782	0.0574	0.4443
CV (%)	16.5	29.8	0.7	0.7

CONCLUSIONS

In looking at the data collected over the three year course of this study, there was not a consistent response to the use of the biostimulants IgniteS² or FoliarBlend. There was not an appreciable improvement in seedling vigor or reduction in disease severity following the application of these products. Furthermore, there was never a significant yield response in winter wheat seeded at either Aberdeen or Genesee. Consecutive treatment using IgniteS² or FoliarBlend was advertised to result in a cumulative benefit to crop performance. However, there is no greater difference between treatments in the third year the study compared to the first. Under the conditions tested in this study, neither IgniteS² or FoliarBlend improve crop performance in winter wheat.

PROJECTIONS: It was anticipated that the results of this study would provide information on the feasibility of using biostimulants in wheat production. However, it is clear from the study that these biostimulants are not beneficial to winter wheat production in Idaho. Future projects to examine biostimulants in winter wheat are not currently being considered. As new products become available and if there is interest within the wheat community, additional projects may be conducted.

PUBLICATIONS: None.