

Seed Treatment to 'Faller' Hard Red Spring Wheat to Improve Stand, Plant Biomass, Yield and Test Weight Langdon, 2011

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MATERIALS AND METHODS

Loveland Products, Inc. provided seven treatments and rates, Table 1, to be applied to hard red spring wheat seed (HRSW) as protectants prior to planting in 2011. An untreated was included as a control. The seed treatments were individually applied with a syringe to 2 lb. lots of HRSW at Langdon with a Hege Model 11 liquid seed treater (Wintersteiger Inc., Salt Lake City, Utah). The investigator included an untested biological compound, Table 1, with an adhesive (gum arabica) and an adhesive only from the lab of Dr. Bruce Bleakley from South Dakota State University for a total of ten treatments. The biological and adhesive were applied by Dr. Bleakley to Faller HRSW from the same lot used for the entire study. Faller is the most commonly planted cultivar in northeast North Dakota. The trial site was previously cropped canola. Seed was planted at 1.5 million pure live seed per acre, determined by blotter paper germination in vitro before the seed treatment was applied. The trial design was a randomized complete block with eight replicates. . Liquid nitrogen fertilizer (N) (28-0-0) was fall and spring applied by broadcast method at N rate of 60 lb./acre each time. The plots were seven rows wide six-inch row spacing and measured 20 feet long. An Almaco double-disk drill was used to seed the plots on 16 May. Stand was determined from two 36 inch segments of row at growth stage 1.25 leaves. Plant vigor was assessed at 4 leaf growth stage. No differences were determined. Plant biomass was calculated on a root and foliage sample from 36 inches of row differentiated by the soil line at 4 leaf growth stage. Sample values are reported wet and dry. After weighing, wet samples were dried in a convection oven at 110° F until all the samples had reached equilibrium and a dry weight was recorded, Table 1. A solution of Caramba fungicide and Induce adjuvant (Helena Chemical Co.) was applied at 14 fl. oz. /acre and 0.125%v/v at early anthesis growth stage with tractor mounted sprayer. Caramba fungicide (manufactured by BASF), applied at Feekes growth stage 10.51, is recommended to reduce the effects of FHB in small grains. Plots were harvested with an Almaco SPC 20 plot combine and yield and test weight determined. Data was analyzed with the general linear model (GLM) in SAS. Fischer's protected least significant differences (LSD) were used to compare means at the 5% probability level, Table 1.

RESULTS

Stand was positively affected by the addition of Foothold Extra, Bio-Forge and LI 6194 although not always statistically. LI 6132 and the biological adhesive and the biological experimental had a negative effect on stand, Table 1. No differences in root weight were determined. Wet and dry foliage biomasses were similarly affected. The biological fungicide treatments had lower biomass than the Loveland treatments. The LI 6132 was not statistically different from the other treatments but numerically ranked last in foliage biomass weight.

Several treatments increased yield over the untreated including the Foothold Extra and Stamina treatment and Foothold Extra. Although not statistically different from the untreated, the LI 6132 and Foothold Extra and LI 6194 and Foothold Extra had yields that were statistically the same as treatments from the two greatest yields. The Bio-Forge treatment was not different from the untreated yield. The biological

treatments had a negative effect on test weight decreasing it by about 0.5 lb. / bu. from most of the other treatments.

Table 1. Plant stand, wet and dry root and foliage weight, yield and test weight by seed treatment on hard red spring wheat, Langdon 2011.

Seed Treatment	Seed Treatment Rate	Plant Stand plts/acre	Root Wt.		Foliage Wt.		Yield bu/acre	Test Weight lb/bu
			Wet g	Dry g	Wet g	Dry g		
LI 6132	4 fl oz/cwt	1,156,155	33.1	3.25	92.2	16.6	67.2	62.1
LI 6132 + Foothold Extra	4 + 5 fl oz/cwt	1,259,610	37.8	3.70	105.6	17.1	69.9	62.1
LI 6194 + water	0.4 + 3.6 fl oz/cwt	1,272,315	37.9	4.21	109.2	19.1	65.4	62.2
LI 6194 + Foothold Extra	0.4 + 5.0 fl oz/cwt	1,314,060	39.4	3.84	102.6	18.1	69.1	62.1
Bio-Forge	4.0 fl oz/cwt	1,274,130	37.4	4.94	102.3	18.7	63.1	61.8
Foothold Extra	5.0 fl oz/cwt	1,341,285	41.7	4.93	111.9	19.8	70.9	62.1
Untreated		1,248,720	40.6	3.90	104.3	17.6	63.8	62.0
Gum arabica B		1,128,930	34.6	41.8	86.5	14.4	60.7	61.5
<i>Bacillus mojavensis</i> + gum arabica A		965,580	28.3	2.90	68.6	11.2	64.6	61.4
Foothold Extra + Stamina	5.0 + 0.4 fl oz/cwt	1,232,385	34.5	3.83	99.1	17.4	72.1	62.1
LSD _(0.05)		137,472	NS	NS	4.3	4.3	6.7	0.4
% C.V.		11.3	23.8	35.7	21.6	25.3	10.1	0.7