WHEAT (*Triticum aestivum* L. 'Parshall')
Tan spot; *Pyrenophora tritici-repentis*
Septoria; *Septoria* spp.
Leaf rust: *Puccinia recondita*
Fusarium head blight; *Fusarium graminearum*

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Evaluation of Gem, Prosaro and Stratego foliar fungicide treatments for control of leaf diseases & FHB in spring wheat at the Dickinson Research Extension Center, Dickinson, ND 2008.

The experiment was conducted at the Dickinson Research Extension Center (NW ¼, Section 5, T139N, R96W – Stark County, ND) with a previous cropping history of spring wheat in 2007. A randomized complete block design with four replications was used. Plots were 10 ft wide by 24 ft long. Plots were seeded with a no-till drill 23 Apr 2008 at the rate of 1.25 million PLS/acre. A pre-emergence application of Roundup Original Max + Actamaster was made at the rate of 0.75 pt/acre was made on 29 Apr. A post emergent herbicide application of 0.5 oz/acre Harmony GTXP + 0.66 pt/acre Puma + 0.75 pt/acre MCP ester on 29 May, 2008. Fungicide applications at 5 leaf stage were made on 05 Jun, applications at flag leaf stage were made on 23 Jun and applications at heading were done on 7 Jul. All treatments were applied in 19.1 gal/A water at 30 psi using a CO_2 pressurized hand-held spray boom equipped with 8002VS flat fan nozzles. Tan spot disease evaluations were conducted on 12 Jun, leaf spot disease evaluations were done on 30 Jun and leaf rust evaluations were conducted on 17 Jul. Fusarium head blight (FHB) evaluations were done on 21 Jul. Evaluations consisted of observations made on ten consecutive plants in the center row of each plot. Incidence was recorded as the percent of plants with at least one lesion observed, and severity was recorded as the average leaf area covered by lesions for all leaves for the early season evaluation, only the top three leaves for the mid-season evaluation, and the flag leaf for the late season evaluation. Crop injury observations were made at the same time as the disease evaluations. No crop injury from the fungicide applications was observed. No visual symptoms of FHB were detected. Grain samples from the control plots were sent to NDSU for DON analysis and no DON was detected in these samples. No further testing for DON in grain samples produced from fungicide treatments was done. Precipitation at the North Dakota Agricultural Weather Network Dickinson, ND weather station in Apr, May, Jun, and Jul was 0.23 1.7, 2.04 and 1.7 inches respectively or less than 60% of normal. Moist conditions near the end of May and the beginning of Jun promoted tan spot but dry, hot weather conditions at the end of Jun and throughout Jul were not conducive for any of the leaf diseases or FHB development. Disease ratings reflect moisture conditions at the time the crop was susceptible to infection. Harvest was with a Massy Ferguson 8XP combine on 1 Aug. Grain yield, test weight, and protein were adjusted to a 12% moisture basis. All data was statistically analyzed using SAS Statistical software v 9.1 Proc ANOVA.

		12 Jun evaluation			30 Jun evaluation			17 Jul evaluation			21 Jul
Treatment	Rate	CI[1]	I[2]	S[3]	CI[1]	I[2]	S[3]	CI[1]	I[2]	S[3]	FHB
	fl oz/acre	%	%	%	%	%	%	%	%	%	%
Untreated	-	0	35	3.25	0	0	0	0	0	0	0
Stratego @ 4 - 5 leaf	4	0	0	0	0	0	0	0	0	0	0
Gem 500 SC @ 4 - 5 leaf	2	0	7.5	0.5	0	0	0	0	0	0	0
Stratego @ flag leaf	8	0	30	3	0	0	0	0	0	0	0
Prosaro 421SC + NIS @ flag	6.5 + 0.125%	0	35	2.75	0	0	0	0	0	0	0
Prosaro 421SC + NIS @ heading	6.5 + 0.125%	0	35	2.25	0	0	0	0	0	0	0
Stratego FGS2 + Prosaro 421SC + NIS @ heading	4 + 6.5 + 0.125%	0	2.5	0.25	0	0	0	0	0	0	0
Mean		0	20.7	1.7	0	0	0	0	0	0	0
CV%		-	28	35.2	-	-	-	-	-	-	-
LSD .05		-	8.6	0.9	-	-	-	-	-	-	-
SE		-	2.9039	0.3021	-	-	-	-	-	-	-
Rep F Prob		-	0.7384	0.3036	-	-	-	-	-	-	-
Trt F Prob		-	0.0001	0.0001	-	-	-	-	-	-	-

[1] CI = crop injury
[2] I = Disease incidence
[3] S = Disease severity

Treatment	Rate	----- Grain[1] ----- Test weight	Yield
	fl oz/acre	lb/bu	bu/a
Untreated	-	56.6	10.8
Stratego @ 4 - 5 leaf	4	56.9	9.7
Gem 500 SC @ 4 - 5 leaf	2	56.6	10.3
Stratego @ flag leaf	8	56.0	9.1
Prosaro 421SC + NIS @ flag	6.5 + 0.125%	56.6	10.7
Prosaro 421SC + NIS @ heading	6.5 + 0.125%	57.8	11.7
Stratego FGS2 + Prosaro 421SC + NIS @ heading	4 + 6.5 + 0.125%	56.8	9.4
Mean		56.8	10.2
CV%		1.7	16.7
LSD .05		NS	NS
SE		0.49099	0.85505
Rep F Prob		0.4960	0.0043
Trt F Prob		0.3879	0.3946

1Grain values adjusted to a 12% moisture basis.

Wheat (*Triticum aestivum* 'Parshall')
Target diseases: *Fusarium* spp.
Pythium spp.
Bipolaris sorokiniana

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Bayer CropScience HRSW seed treatment performance trial near Mott, ND, 2008.

This experiment was conducted in a field located near Mott, ND (SE ¼ Section 14, T136N, R93W, Hettinger County, ND). The previous crop was wheat in 2007. A soil sample was collected on March 26 and analyzed by the North Dakota State University Soil Testing Laboratory. Soil nutrient levels reported were N=44 lb/a, P(Olsen) = 17 ppm, K = 382 ppm, pH = 6.2. Prior to seeding, seed was treated with Raxil MD, Charter PB, Raxil MD-W, Dvidiend Extreme, or an experimental compound. Untreated seed was used as a check. Plots were seeded with a drill equipped with Cross-slot openers on 9 May 2008 at the rate of 150 pls m^{-2}. Urea at the rate of 116 lbs/a (53lbs/a N) was applied through the drill in a separate band during the seeding operation. A post emergent herbicide and foliar fungicide application of Bromac Advance (Bromoxynil Octanoate and Heptonic + MCPA Isooctyl Ester) at 1.5 pt/a, Puma (Fenoxaprop-P) at 0.66 pt/, and Tilt (Propiconizole) at 2 fl oz/a.. Plant counts were made on 15 May and 5 Jun. Initial plant evaluations were made on 1Jul and soft dough plant evaluations were made on 21-22 Jul. Root samples taken during the soft dough analysis were submitted to the NDSU Plant Diagnostic Laboratory for identification of pathogens. Fusarium head blight was not observed probably because of the hot, dry growing conditions that occurred in Jul. Harvest was with a Massy Ferguson 8 XP combine on 25 Aug. Grain yield, and test weight were adjusted to a 12% moisture basis. All data was statistically analyzed using SAS Statistical Software.

Early season plant density was significantly improved for treatments L1397-C12, Raxil MD-W and Raxil MD when compared to the untreated check. Rainfall was normal for June but below normal for May, July, and August. No significant differences or trends were observed in this trial for any of the symptoms evaluated during the initial and soft dough root and crown evaluations. Lab analysis for pathogen presence indicated that *Bipolaris sorokiniana* was present on 10% of the root/crown samples submitted. *Rhizoctonia* spp., *Phytium* spp., and *Fusarium graminearum* were not detected. No significant differences were detected for mature plant height, head density, test weight, and grain yields though grain yields tended to be greater for treated seed than for the untreated check.

		15 May		5 Jun	
Treatment	Rate	Plant density	Vigor	Plant density	Vigor
	g AI/100Kg	m^{-2}		m^{-2}	
Untreated Check		155.4	6.5	193.9	7.5
L1397-C 8	8	172.7	6.3	178.4	7.5
L1397-C 12	12	177.7	7.8	191.4	9.5
L1397-C + Poncho	55	158.1	7	191.9	9.3
Raxil MD-W	8.8	191.8	7	201.2	9.5
Dividend Extreme	15	170.8	6.3	207.3	8
Charter PB	55	161.6	5.3	201	7
Raxil MD	3.8	180.4	6.5	206.8	9.3
Mean		171	6.56	196.4	8.4
CV%		9.01	25.08	10.35	23.76
LSD .05		22.7	NS	NS	NS
SE		7.7097	0.8229	10.1628	1.0022
Rep F Prob		0.332	0.8523	0.0073	0.737
Trt F Prob		0.0447	0.6076	0.5336	0.4102

Treatment	Rate	Plant length	Stage	Tillers	Subcrown[1] internode rating	Seminal roots	Crown roots
		---------- Initial plant evaluation ----------					
	g AI/100Kg	mm	Zadoks	no/plant		no/plant	no/plant
Untreated Check		480	43.1	1.8	1.8	2.6	9.5
L1397-C 8	8	459	39.1	1.8	1.7	3.0	8.6
L1397-C 12	12	488	43.4	1.9	1.7	2.8	8.9
L1397-C + Poncho	55	467	43.8	2.0	1.6	2.6	9.4
Raxil MD-W	8.8	488	43.1	1.9	1.7	2.7	9.3
Dividend Extreme	15	506	42.4	1.8	1.8	3.7	7.6
Charter PB	55	517	44.2	1.6	1.9	3.0	9.3
Raxil MD	3.8	524	43.0	2.2	1.9	2.9	10.2
Mean		491	42.8	1.9	1.8	2.9	9.1
CV%		4.9	6.1	17.6	10.1	14.8	15.2
LSD .05		NS	NS	NS	NS	NS	NS
SE		14.0107	1.50248	0.1896	0.1028	0.248	0.7987
Rep F Prob		0.9052	0.1786	0.0059	0.3979	0.1207	0.122
Trt F Prob		0.0532	0.4118	0.6101	0.4018	0.1067	0.5101

[1] Subcrown internode rating, 1-4. 1 = less than 25% of the internode infected, 2 = 25 – 50% of the internode infected, 3 = 51-75% of the internode infected, multiple lesions, and 4 = 75-100% of the internode infected, lesions coalesced.

Treatment Name	Rate	----- Soft dough evaluation ----- Root[1] color	Root[2] mass	Subcrown[3] internode rating
	g AI/100Kg			
Untreated Check		2.09	1.96	2.10
L1397-C 8	8	1.95	1.96	2.02
L1397-C 12	12	2.02	1.93	1.79
L1397-C + Poncho	55	2.00	1.97	1.86
Raxil MD-W	8.8	2.19	1.90	1.98
Dividend Extreme	15	2.00	1.89	2.02
Charter PB	55	2.00	1.90	1.88
Raxil MD	3.8	1.92	1.92	2.02
Mean		2.02	1.93	1.96
CV%		7.37	4.46	8.87
LSD .05		NS	NS	NS
SE		0.0745	0.0429	0.0869
Rep F Prob		0.0472	0.0019	0.1118
Trt F Prob		0.291	0.77	0.2221

[1]Root color 1 – 4; 1 = white, 4 = dark.
[2]Root mass 1 – 4; 1 = few roots, 4 = many roots.
[3] Subcrown internode rating, 1-4. 1 = less than 25% of the internode infected, 2 = 25 – 50% of the internode infected, 3 = 51-75% of the internode infected, multiple lesions, and 4 = 75-100% of the internode infected, lesions coalesced.

		----- Harvest -----		----- Grain[1]-----	
Treatment Name	Rate	Plant height	Head density	Test weight	Yield
	g AI/100Kg	mm	m^{-2}	lb/bu	bu/a
Untreated Check		530	249	56.6	16.7
L1397-C 8	8	511	256	56.6	16.9
L1397-C 12	12	538	271	57.2	18.8
L1397-C + Poncho	55	507	257	56.9	17.1
Raxil MD-W	8.8	503	256	56.9	17.9
Dividend Extreme	15	519	291	57.4	19.8
Charter PB	55	531	260	57.0	17.0
Raxil MD	3.8	514	276	57.2	17.9
Mean		519	264	57.0	17.8
CV%		5.9	12.4	1.3	9.4
LSD .05		NS	NS	NS	NS
SE		15.3	16.5	0.35	0.83
Rep F Prob		0.3515	0.775	0.4369	0.0162
Trt F Prob		0.6907	0.6802	0.7395	0.1706

[1]Grain values adjusted to a 12% moisture basis.

Wheat (*Triticum aestivum* 'CDC Buteo')
Target diseases: *Telletia caries*
Ustilago spp.
Fusarium spp.
Pythium spp.
Rhizoctonia spp.
Bipolaris sorokiniana

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Vincit HRWW wheat seed treatment performance on bunt trial, New Hradic, ND, 2007- 2008.

This experiment was conducted in a field located near New Hradec, ND (NE ¼ Sec 2, T140N, R97W, Stark County, ND). The previous crop was spring wheat in 2007. Prior to seeding, seed was treated singularly or in combinations of Vincit F, Vincit FS, Vincit Minima, Thiram, Allegiance or Raxil MD. Untreated seed was used as a check. Ground bunt contaminated wheat grain was added to seed as it was planted to inoculate the trial with bunt. Plots were seeded with a drill equipped with Cross-slot openers on 2 Oct 2007 at the rate of 100 pls m^{-2}. A blended fertilizer 29-19-6 was placed in a separate band at the rate of 193 lbs/acre during the seeding operation. A post emergent herbicide and foliar fungicide application of 12oz/a Husky + 2 oz/a of Propaconizol + AMS + Surfactant was applied 4 Jun 2008. Plant counts were made on 15 and 23 May 2008. A whole plant evaluation was done at the jointing stage. Root and crown samples of this trail were submitted for analysis of soil-borne pathogens at the soft dough stage of crop development. Harvest was with a Massy Ferguson 8 XP combine on 6 Aug 2008. Grain yield, and test weight were adjusted to a 12% moisture basis. Bunted kernels were sorted from 50g grain samples and counted. All data was statistically analyzed using SAS Statistical Software.

Rainfall was well below normal for Oct through May and Jul with Jun near normal which affected winter survival and development of the crop. Plant counts were unaffected by seed treatment though rate of emergence appeared to be increased. Plant counts appear to have decreased between the first and second counts probably due to extremely dry conditions that occurred throughout the fall, winter, and early spring. Seed treatments significantly affected plant size but only tended to increase root counts and tillering when compared to the check. Seed treatments did not increase yield over the check but did reduce the number of bunted kernels and increase test weight over the check. Tissue analysis for root and crown disease pathogens indicated that 48% of the sample submitted had *Fusarium graminearum* present. *Pythium* spp, *Rhizoctonia* spp. and *Bipolaris sorokiniana* were not detected.

		Emergence[1]		15 May		23 May	
Treatment	Rate	7 DAP	14 DAP	Plant count	Vigor	Plant count	Vigor
	fl oz/cwt	%	%	m^{-2}		m^{-2}	
Untreated Check	0	0	26.3	12.8	4	11.7	3.3
Vincit Minima + Thiram 42S + Allegiance FL	3.07 + 1.92 + 0.75	0	42.5	19.7	4.8	17.9	3.5
Vincit F + Allegiance FL	3.07 + 0.75	0	48.8	23	5	21.1	4.5
Vincit FS	3.07	0	53.8	22.6	4.8	19.6	4.5
Vinict Minima + Allegiance FL	3.07 + 0.75	0	52.5	25.1	5.8	22.8	4.5
Vincit Minima + Thiram 42S	3.07 + 1.92	0	42.5	23	5.8	21.1	4.5
Raxil MD	5	0	43.8	23.8	5.3	21.9	4.5
Mean		0	44.3	21.4	5	19.4	4.2
CV%		0	11.5	21.3	22.3	20.1	18.4
LSD .05		NS	7.5	6.8	NS	5.8	NS
SE		0	2.5394	2.2841	0.56256	1.9523	0.3845
Rep F Prob		-	0.192	0.3247	0.8575	0.1768	0.0388
Trt F Prob		-	<0.0001	0.0231	0.3446	0.0139	0.1077

[1] Emergence was visually evaluated 7 days after planting and 14 days after planting.

Treatment	Rate	Length	Stage of development	Tiller	Subcrown[1] internode rating	Seminal root count	Crown root count
		---------- Plant evaluation at jointing ----------					
	fl oz/cwt	mm		no/plant		no/plant	no/plant
Untreated Check	0	433	31.5	4.0	1	2.8	16.8
Vincit Minima + Thiram 42S + Allegiance FL	3.07 + 1.92 + 0.75	469	31.8	5.3	1	3.8	20.0
Vincit F + Allegiance FL	3.07 + 0.75	462	31.8	5.3	1	3.8	19.3
Vincit FS	3.07	480	31.8	4.5	1	3.3	18.3
Vinict Minima + Allegiance FL	3.07 + 0.75	461	31.5	4.5	1	3.8	18.5
Vincit Minima + Thiram 42S	3.07 + 1.92	461	31.5	4.8	1	2.8	17.8
Raxil MD	5	497	32.0	5.0	1	3.3	19.3
Mean		466	31.7	4.8	1	3.3	18.5
CV%		4.8	1.8	20.8	0	24.9	12.1
LSD .05		33.1	NS	NS	NS	NS	NS
SE		11.1343	0.288675	0.494012	-	0.41308	1.120259
Rep F Prob		0.1727	0.3211	0.0025	-	0.0082	0.0004
Trt F Prob		0.0276	0.8503	0.5462	-	0.3572	0.4931

[1] Subcrown internode rating, 1-4. 1 = less than 25% of the internode infected, 2 = 25 – 50% of the internode infected, 3 = 51-75% of the internode infected, multiple lesions, and 4 = 75-100% of the internode infected, lesions coalesced.

Treatment	Rate	Yield	Test weight	Bunted Kernels
		----- Grain[1] -----		
	fl oz/cwt	bu/acre	lb/bu	no $50g^{-1}$
Untreated Check	0	21.4	49.1	120.5
Vincit Minima + Thiram 42S + Allegiance FL	3.07 + 1.92 + 0.75	20.0	54.2	25.0
Vincit F + Allegiance FL	3.07 + 0.75	20.7	53.6	20.5
Vincit FS	3.07	21.9	55.2	14.3
Vinict Minima + Allegiance FL	3.07 + 0.75	21.3	54.2	26.0
Vincit Minima + Thiram 42S	3.07 + 1.92	20.6	55.2	25.0
Raxil MD	5	21.3	53.0	77.0
Mean		21.0	53.5	44.0
CV%		9.5	2.5	65.0
LSD .05		NS	2.0	42.5
SE		0.9947	0.6772	14.31
Rep F Prob		0.003	0.2578	0.7626
Trt F Prob		0.8648	<0.0001	0.0003

1Grain values are adjusted to a 12% moisture basis.

Wheat (*Triticum aestivum* 'Parshall')
Target diseases: *Fusarium* spp.
Pythium spp.
Bipolaris sorokiniana

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Vincit HRSW seed treatment performance trial near Mott, ND, 2008.

This experiment was conducted in a field located near Mott, ND (SE ¼ Section 14, T136N, R93W, Hettinger County, ND). The previous crop was wheat in 2007. A soil sample was collected on March 26 and analyzed by the North Dakota State University Soil Testing Laboratory. Nutrient levels reported were N=44 lb/a, P(Olsen) = 17 ppm, K = 382 ppm, pH = 6.2. Prior to seeding, seed was treated with Vincit Minima+Thiram+Methalaxyl, Vincit F + Metalaxyl, Vincit FS, Vincit Minima + Metalaxyl, Vincit Minima+ Thiram, or Dividend XL RTA. Untreated seed was used as a check. Plots were seeded with a drill equipped with Cross-slot openers on 9 May 2008 at the rate of 150 pls m^{-2}. Urea at the rate of 116 lbs/a (53lbs/a N) was applied through the drill in a separate band during the seeding operation. A post emergent herbicide and foliar fungicide application of Bromac Advance (Bromoxynil Octanoate and Heptonic + MCPA Isooctyl Ester) at 1.5 pt/a, Puma (Fenoxaprop-P) at 0.66 pt/, and Tilt (Propiconizole) at 2 fl oz/a.. Plant counts were made on 15 May and 5 Jun. Soft dough root and crown evaluations were made on 17-18 Jul. Root samples taken during the soft dough analysis were submitted to the NDSU Plant Diagnostic Laboratory for tissue analysis and identification of pathogens. Fusarium head blight was not observed probably because of the hot, dry growing conditions that occurred in Jul. Harvest was with a Massy Ferguson 8 XP combine on 25 Aug. Grain yield, test weight, and protein were adjusted to a 12% moisture basis. All data was statistically analyzed using SAS Statistical Software.

Plant counts and vigor observed in both the initial and second counts tended to be greater than the untreated check for most seed treatments. Rainfall was normal for June but below normal for May, July, and August. No significant differences or trends were observed in this trial for color or root mass but subcrown internode ratings were significantly lower for treated seed when compared to the untreated check during the soft dough root and crown evaluations. *Fusarium graminearum* was found on 48% of the root/crown samples submitted for tissue analysis. *Rhizoctonia* spp., *Phytium* spp., and *Bipolaris sorokiniana* was not detected. No significant differences were detected for mature plant height, head density, grain test weight, yield and protein.

	15 May		5 Jun	
Treatment	Plant count	Vigor	Plant count	Vigor
	m^{-2}		m^{-2}	
Untreated Check	141	5	278	5.0
Vincit Minima + Thiram + Metalaxyl	150	5	277	5.8
Vincit F + Metalaxyl	132	5.3	291	6.0
Vincit FS	161	6.3	284	6.0
Vincit Minima + Metalaxyl	155	5.3	289	6.0
Vincit Minima + Thiram	139	5.5	284	5.3
Dividend XL RTA	162	6.5	279	5.8
Mean	149	5.5	283	5.7
CV%	11.21	25.6	4.9	16.5
LSD.05	NS	NS	NS	NS
SE	8.3327	0.708508	6.981044	0.469295
Rep F Prob	0.937	0.7898	0.5512	0.0997
Trt F Prob	0.125	0.6364	0.7273	0.6318

Treatment	Soft dough evaluation		
	Root[1] color	Root[2] mass	Subcrown[3] internode rating
Untreated Check	2.1	1.9	2.0
Vincit Minima + Thiram + Metalaxyl	1.9	1.9	1.7
Vincit F + Metalaxyl	1.9	1.8	1.6
Vincit FS	1.8	1.7	1.7
Vincit Minima + Metalaxyl	1.8	1.9	1.6
Vincit Minima + Thiram	2.0	1.8	1.8
Dividend XL RTA	2.0	1.7	1.7
Mean	1.9	1.8	1.7
CV%	7.1	6.8	8.6
LSD.05	NS	NS	0.2
SE	0.06926	0.061189	0.0748332
Rep F Prob	0.0679	0.4174	0.0026
Trt F Prob	0.0678	0.416	0.0386

[1] Color - Root color, 1 = white, 4 = dark

[2] Root mass - 1 = few roots, 4 = many roots

[3] Subcrown internode rating, 1-4. 1 = less than 25% of the internode infected, 2 = 25 – 50% of the internode infected, 3 = 51-75% of the internode infected, multiple lesions, and 4 = 75-100% of the internode infected, lesions coalesced.

	----- Harvest -----		---------- Grain[1] ----------		
Treatment	Plant height	Head density	Test weight	Yield	Protein
	mm	m^{-2}	lb/bu	bu/acre	%
Untreated Check	556	243	54.3	23.4	17.3
Vincit Minima + Thiram + Metalaxyl	555	228	54.9	20.8	17.2
Vincit F + Metalaxyl	583	236	54.8	22.2	16.9
Vincit FS	568	244	55.1	21.5	17.4
Vincit Minima + Methalaxyl	578	236	55.3	22.2	17.3
Vinvit Minima + Thiram	569	226	54.9	23.5	17.3
Dividend XL RTA	558	226	54.9	21.3	17.2
Mean	566	234	54.9	22.1	17.2
CV%	4.9	4.9	1.36	12.7	2.97
LSD.05	NS	NS	NS	NS	NS
SE	13.9665	5.72718	0.3722	1.408459	0.255883
Rep F Prob	0.5512	<.0001	0.044	0.5735	0.8609
Trt F Prob	0.7273	0.1486	0.7089	0.7604	0.787

[1]Grain values adjusted to a 12% moisture basis.

Wheat (*Triticum aestivum* 'Parshall')
Target diseases: *Fusarium* spp.
Pythium spp.
Bipolaris sorokiniana

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Mott, ND 58646

Crusoe HRSW seed treatment performance trial near Mott, ND, 2008.

This experiment was conducted in a field located near Mott, ND (SE ¼ Section 14, T136N, R93W, Hettinger County, ND). The previous crop was wheat in 2007. A soil sample was collected on March 26 and analyzed by the North Dakota State University Soil Testing Laboratory. Nutrient levels reported were N=44 lb/a, P(Olsen) = 17 ppm, K = 382 ppm, pH = 6.2. Prior to seeding, seed was treated with Crusoe Pinnacle, Dividend XL RTA, Vitaflow 280+Metastar, Crusoe Pinnacle W, Crusoe Pinnacle AW, Enhance AW, Vitaflow 280 or one of two experimental fungicides. Untreated seed was used as a check. Plots were seeded with a drill equipped with Cross-slot openers on 9 May 2008 at the rate of 150 pls m^{-2}. Urea at the rate of 116 lbs/a (53lbs/a N) was applied through the drill in a separate band during the seeding operation. A post emergent herbicide and foliar fungicide application of Bromac Advance (Bromoxynil Octanoate and Heptonic + MCPA Isooctyl Ester) at 1.5 pt/a, Puma (Fenoxaprop-P) at 0.66 pt/, and Tilt (Propiconizole) at 2 fl oz/a.. Plant counts were made on 15 May and 5 Jun. Initial root evaluations at the six-leaf stage were completed on 25 Jun. Soft dough root and crown evaluations were made on 28-29 Jul. Root samples taken during the soft dough analysis were submitted to the NDSU Plant Diagnostic Laboratory for identification of pathogens. Fusarium head blight was not observed probably because of the hot, dry growing conditions that occurred in Jul. Harvest was with a Massy Ferguson 8 XP combine on 25 Aug. Grain yield, test weight, and protein were adjusted to a 12% moisture basis. All data was statistically analyzed using SAS Statistical Software.

Plant counts observed in initial and second counts tended to be greater than the untreated check for all seed treatments while vigor observed during the second count was significantly different compared to the untreated check for Crusoe Pinnacle, Dividend XL RTA and Crusoe Pinnacle AW. Rainfall was normal for June but below normal for May, July, and August. No significant differences or trends were observed in this trial for root mass or subcrown internode ratings but root color was significantly improved for Dividend XL RTA, and Crusoe Pinnacle AW. *Rhizoctonia* spp., *Phytium* spp., *Fusarium graminearum* and *Bipolaris sorokiniana* was not detected in tissue samples submitted from this trial for lab analysis. No significant differences were detected for mature plant height, head density, test weight, grain yields and protein.

		15 May		5 Jun	
Treatment	Rate	Plant count	Vigor	Plant count	Vigor
	ml kg^{-1}	m^{-2}		m^{-2}	
Untreated Check	-	146	5.5	149	5.5
Crusoe Pinnacle	325	159	6.5	189	7.3
Experimental 1	325	175	7.0	176	6.5
Dividend XL RTA	325	176	6.8	190	7.3
Vitaflow 280 + Metastar	325 + 6.3	150	5.8	185	6.5
Experimental 2	370	164	6.8	177	6.5
Crusoe Pinnacle W	325	143	6.0	190	6.5
Crusoe Pinnacle AW	370	173	7.3	194	7.0
Enhance AW	250	153	6.8	156	5.5
Vitaflow 280	325	153	6.0	180	6.3
Mean		159	6.4	179	6.5
CV%		11.9	15.8	12.7	11.7
LSD .05		NS	NS	NS	1.1

Treatment	Rate	Initial root evaluation: Length	Stage	Tiller	Subcrown[1] internode	Seminal root	Crown root
	ml kg^{-1}	mm		plant^{-1}		plant^{-1}	plant^{-1}
Untreated Check	-	463	36	2.25	1.5	2.5	10.25
Crusoe Pinnacle	325	459	35	2.00	1.5	1.25	9.75
Experimental 1	325	459	36	1.75	1.5	1.5	9.25
Dividend XL RTA	325	483	37	1.75	1.25	2.25	9.5
Vitaflow 280 + Metastar	325 + 6.3	489	35	2.00	1.25	3.25	8.5
Experimental 2	370	474	35	2.50	1.5	2	10.5
Crusoe Pinnacle W	325	491	37	2.00	1.25	1.5	11.5
Crusoe Pinnacle AW	370	469	35	2.25	1.25	2	10
Enhance AW	250	491	35	1.75	1.5	2.25	9.25
Vitaflow 280	325	473	35	2.25	1.25	2.25	9.75
Mean		475	35.4	2.05	1.4	2.1	9.8
CV%		6.3	3.6	23.7	24.5	29.4	15.5
LSD .05		NS	NS	NS	NS	0.89	NS

[1] Subcrown internode rating, 1-4. 1 = less than 25% of the internode infected, 2 = 25 – 50% of the internode infected, 3 = 51-75% of the internode infected, multiple lesions, and 4 = 75-100% of the internode infected, lesions coalesced.

Treatment	Rate	Soft dough root evaluation: Root[1] mass	Root[2] color	Subcrown[3] internode
	ml kg^{-1}			
Untreated Check	-	1.84	2.18	2.29
Crusoe Pinnacle	325	1.92	2.17	2.12
Experimental 1	325	1.81	2.12	2.12
Dividend XL RTA	325	1.92	1.96	2.06
Vitaflow 280 + Metastar	325 + 6.3	1.85	2.12	2.15
Experimental 2	370	1.90	2.05	2.20
Crusoe Pinnacle W	325	1.79	2.31	2.23
Crusoe Pinnacle AW	370	1.86	1.97	1.92
Enhance AW	250	1.93	2.11	2.53
Vitaflow 280	325	1.88	2.08	2.24
Mean		1.87	2.10	2.18
CV%		4.4	5.30	12.1
LSD .05		NS	0.16	NS

[1]Root mass: 1 to 4, 1 = few roots, 4 = many roots.
[2] Root color: 1to 4, 1 = white, 4 = dark.
[3] Subcrown internode rating, 1-4. 1 = less than 25% of the internode infected, 2 = 25 – 50% of the internode infected, 3 = 51-75% of the internode infected, multiple lesions, and 4 = 75-100% of the internode infected, lesions coalesced.

Treatment	Rate	Harvest		---------- Grain[1] ----------		
		Plant height	Head density	Test weight	Yield	Protein
	ml kg^{-1}	mm	m^{-2}	lb bu^{-1}	bu a^{-1}	%
Untreated Check	-	520	245	57.7	19.2	17.4
Crusoe Pinnacle	325	515	249	57.8	19.2	17.4
Experimental 1	325	534	250	57.3	18.3	17.6
Dividend XL RTA	325	519	238	57.9	19.8	17.1
Vitaflow 280 + Metastar	325 + 6.3	513	242	57.8	20.0	17.5
Experimental 2	370	503	233	58.0	18.1	17.4
Crusoe Pinnacle W	325	534	241	58.0	19.3	17.3
Crusoe Pinnacle AW	370	523	247	58.2	18.6	17.0
Enhance AW	250	503	244	57.8	18.4	17.6
Vitaflow 280	325	511	253	56.6	17.1	17.8
Mean		517	244	57.7	18.8	17.4
CV%		4.4	15.9	1.3	8.5	2.2
LSD .05		NS	NS	NS	NS	NS

[1]Grain values adjust to a 12% moisture basis.

Wheat (*Triticum aestivum* 'Parshall')
Target diseases: *Fusarium* spp.
Pythium spp.
Bipolaris sorokiniana

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NuFarm HRSW seed treatment performance trial near Mott, ND, 2008.

This experiment was conducted in a field located near Mott, ND (SE ¼ Section 14, T136N, R93W, Hettinger County, ND). The previous crop was wheat in 2007. A soil sample was collected on March 26 and analyzed by the North Dakota State University Soil Testing Laboratory. Nutrient levels reported were N=44 lb/a, P(Olsen) = 17 ppm, K = 382 ppm, pH = 6.2. Prior to seeding, seed was treated with Raxil MD or one of two experimental fungicides. Untreated seed was used as a check. Plots were seeded with a drill equipped with Cross-slot openers on 9 May 2008 at the rate of 150 pls m^{-2}. Urea at the rate of 116 lbs/a (53lbs/a N) was applied through the drill in a separate band during the seeding operation. A post emergent herbicide and foliar fungicide application of Bromac Advance (Bromoxynil Octanoate and Heptonic + MCPA Isooctyl Ester) at 1.5 pt/a, Puma (Fenoxaprop-P) at 0.66 pt/, and Tilt)Propiconizole) at 2 fl oz/a.. Plant counts were made on 15 May and 5 Jun. Soft dough plant evaluations were made on 23 Jul. Root samples taken during the soft dough analysis were submitted to the NDSU Plant Diagnostic Laboratory for identification of pathogens. Fusarium head blight was not observed probably because of the hot, dry growing conditions that occurred in Jul. Harvest was with a Massy Ferguson 8 XP combine on 25 Aug. Grain yield, and test weight were adjusted to a 12% moisture basis. All data was statistically analyzed using SAS Statistical Software.

NUP07133 tended to have lower plant counts than all other treatments in this trial though not signficantly. Rainfall was normal for June but below normal for May, July, and August. No significant differences or trends were observed in this trial for any of the symptoms evaluated during the soft dough root and crown evaluations. *Rhizoctonia* spp., *Phytium* spp., *Fusarium* spp. and *Bipolaris sorokiniana* was not detected during lab analysis of plant tissue. No significant differences were detected for mature plant height, head density, test weight, and grain yields though grain yields.

		--15 May --		-- 5 Jun --	
Treatment Name	Dose	Plant count	Vigor	Plant density	Vigor
	fl oz/cwt	no m^{-2}		no m^{-2}	
UTC (naked seed)	-	170.5	5.3	194.5	5.8
NUP 08030	5.0	174.7	7.0	198.4	7.5
NUP 07133	5.0	158.4	5.8	179.1	6.8
Raxil MD	5.0	172.4	6.3	190.9	7.0
Mean		169.0	6.1	190.7	6.8
CV%		13.1	23.7	12.8	18.8
LSD .05		NS	NS	NS	NS
SE		11.0764	0.7181	12.2124	0.6346
Rep F Prob		0.7915	0.8436	0.5465	0.7473
Trt F Prob		0.7356	0.4053	0.7115	0.3201

Treatment Name	Dose	Soft dough root evaluation		
		Root[1] color	Root[2] mass	Subcrown[3] internode
	fl oz/cwt			
UTC (naked seed)	-	2.2	1.8	2.4
NUP 08030	5.0	2.1	1.9	2.3
NUP 07133	5.0	2.1	1.8	2.3
Raxil MD	5.0	2.3	1.8	2.4
Mean		2.2	1.8	2.4
CV%		4.7	5.1	8.2
LSD .05		NS	NS	NS
SE		0.0508	0.0457	0.0972
Rep F Prob		0.0035	0.1574	0.0005
Trt F Prob		0.6487	0.5027	0.7561

[1] Color - Root color, 1 = white, 4 = dark

[2] Root mass - 1 = few roots, 4 = many roots

[3] Subcrown internode rating, 1-4. 1 = less than 25% of the internode infected, 2 = 25 – 50% of the internode infected, 3 = 51-75% of the internode infected, multiple lesions, and 4 = 75-100% of the internode infected, lesions coalesced.

Treatment Name	Dose	Harvest		---------- Grain[1] ----------		
		Plant height	Head density	Test weight	Yield	Protein
	fl oz/cwt	mm	no m^{-2}	lb/bu	bu/acre	%
UTC (naked seed)	-	547.5	259.3	56.8	20.5	17.5
NUP 08030	5.0	545.6	264.0	56.1	19.6	17.8
NUP 07133	5.0	538.8	265.8	56.3	20.3	17.8
Raxil MD	5.0	527.5	260.0	55.8	19.0	17.8
Mean		539.8	262.3	56.2	19.8	17.7
CV%		5.2	8.0	1.1	10.8	1.4
LSD .05		NS	NS	NS	NS	NS
SE		13.8040	10.4695	0.2971	1.0732	0.1259
Rep F Prob		0.0844	0.2126	0.0004	0.0900	0.0002
Trt F Prob		0.7368	0.9641	0.2152	0.7669	0.4652

[1]Grain values adjusted to 12% basis.

Wheat (*Triticum aestivum* 'Seward')
Target diseases: *Telletia caries*
Ustilago spp.
Fusarium spp.
Pythium spp.
Rhizoctonia spp.
Bipolaris sorokiniana

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NuFarm HRWW seed treatment performance on Bunt trial, New Hradic, ND, 2007- 2008.

This experiment was conducted in a field located near New Hradec, ND (NE ¼ Sec 2, T140N, R97W, Stark County, ND). The previous crop was spring wheat in 2007. Prior to seeding, seed was treated with Raxil MD, Dividend XL or one of two experimental fungicide treatments. Untreated seed was used as a check. Ground bunt contaminated wheat grain was ground and added to seed as it was planted to inoculate the trial with bunt. Plots were seeded with a drill equipped with Cross-slot openers on 2 Oct 2007 at the rate of 100 pls m^{-2}. A blended fertilizer of 29-19-6 was placed in a separate band at the rate of 193 lbs/acre was applied through the drill during the seeding operation. A post emergent herbicide and foliar fungicide application of 12oz/a Husky + 2 oz/a of Propaconizol + AMS + Surfactant was applied 4 Jun 2008. Plant counts were made on 21 Apr. Root and crown samples of this trail were submitted for analysis of soil-borne pathogens at the soft dough stage of crop development. Harvest was with a Massy Ferguson 8 XP combine on 6 Aug 2008. Grain yield, and test weight were adjusted to a 12% moisture basis. Bunted kernels were sorted from 50g grain samples and counted. All data was statistically analyzed using SAS Statistical Software.

Rainfall was well below normal for Oct through May and Jul with Jun near normal which affected winter survival and development of the crop. No significant differences were detected for grain yield, test weight, plant vigor or density. However bunted kernels were found in significantly greater numbers in the untreated check than any of the fungicide seed treatments but test weight did not appear to be affected. Tissue analysis for root and crown disease pathogens indicated that nearly half of the sample submitted had *Fusarium graminearum* present. *Pythium* spp, *Rhizoctonia* spp. and *Bipolaris sorokiniana* were not detected.

	21Apr		---------- Grain[1] ----------		
Treatment Name	Plant density	Vigor	Test weight	Yield	Bunted kernels
	no m^{-2}		lb/bu	bu/acre	no $50g^{-1}$
Check	41.5	5.8	54.9	17.4	151.8
NUP 07132 plus NUP 07267	51.8	7.3	54.9	16.8	14.8
NUP 07268 plus NUP 07267	48.6	7.3	54.2	16.8	29.0
Dividend Extreme	44.5	6.5	54.2	16.8	23.5
Raxil MD	47.0	6.8	54.9	18.5	20.5
Mean	46.7	6.7	54.7	17.7	47.9
CV%	16.1	16.0	1.6	12.7	39.9
LSD	NS	NS	NS	NS	29.4
SE	3.7678	0.5362	0.4426	1.1285	9.5461
Rep F Prob	0.0056	0.1211	0.0628	0.0893	0.5914
Trt F Prob	0.4074	0.3086	0.8035	0.5120	<0.0001

[1] Grain values adjusted to 12% moisture basis.

Wheat (*Triticum aestivum* 'Seward')
Target diseases: *Pythium* spp.
Fusarium spp.
Rhizoctonia spp.
Bipolaris sorokiniana

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NuFarm HRWW seed treatment performance on Pythium trial, New Hradic, ND, 2007- 2008.

This experiment was conducted in a field located near New Hradec, ND (NE ¼ Sec 2, T140N, R97W, Stark County, ND). The previous crop was spring wheat in 2007. Prior to seeding, seed was treated with Allegiance or three experimental fungicide treatments singularly or in various combinations and rates. Untreated seed was used for the untreated check and an untreated check treated only with dye was included. Plots were seeded with a drill equipped with Cross-slot openers on 2 Oct 2007 at the rate of 100 pls m^{-2}. A blended fertilizer of 29-19-6 was placed in a separate band at the rate of 193 lbs/acre was applied through the drill during the seeding operation. A post emergent herbicide and foliar fungicide application of 12oz/a Husky + 2 oz/a of Propaconizol + AMS + Surfactant was applied 4 Jun 2008. Emergence was visually estimated at appropriate times. Plant counts were made on 15 May 2008. Root and crowns from each plot were sampled at the soft dough stage and evaluated for root color, root mass, and lesions on the subcrown internode. In addition to the visual analysis root and crown samples of this trail were submitted to the NDSU Plant Diagnostic Laboratory, Fargo for analysis of soil-borne pathogens. Harvest was with a Massy Ferguson 8 XP combine on 6 Aug 2008. Grain yield, and test weight were adjusted to a 12% moisture basis. All data was statistically analyzed using SAS Statistical Software.

Rainfall was well below normal for Oct through May and Jul with Jun near normal which affected winter survival and development of the crop. No significant differences were detected any of the characteristics analyzed. Tissue analysis for root and crown disease pathogens indicated that over 70% of the sample submitted had *Fusarium graminearum* present. *Pythium* spp, *Rhizoctonia* spp. and *Bipolaris sorokiniana* were not detected.

	----- Emergence[1] -----			--- 15 May ---	
Treatment	9 DAP	14 DAP	21 DAP	Density	Vigor
	---------- % ----------			no m^{-2}	
UTC1 Naked Seed	0	18.8	93.8	57.6	5.0
UTC2 (CF Clear, Water)	0	18.8	91.3	62.8	6.0
NUP 07121 low rate	0	17.5	91.3	60.1	5.5
NUP 07121 medium rate	0	17.5	92.5	69.7	6.5
NUP 07121 high rate	0	18.8	91.3	65.4	6.5
NUP 07121 low + NUP 07117	0	20.0	95.0	75.2	7.3
NUP 07121 med + NUP 07117	0	17.5	91.3	66.1	6.3
NUP 07121 high + NUP 07117	0	18.8	93.8	58.9	5.3
NUP 07117 plus NUP 07267	0	17.5	93.8	65.9	6.0
NUP 07117	0	20.0	91.3	70.2	7.0
Allegiance	0	18.8	93.8	60.0	5.5
Mean	0	18.5	92.6	64.7	6.1
CV%	-	13.3	2.3	13.1	18.0
LDS .05	NS	NS	NS	NS	NS
SE	0	1.2348	1.0704	4.2306	0.5449
Rep F Prob	-	0.6263	0.0151	0.3927	0.9143
Trt F Prob	-	0.8189	0.1125	0.1301	0.1196

[1] Emergence visually evaluated 9 days after planting, 14 days after planting and 21 days after planting.

	---Soft dough root evaluation ---		
Treatment	Mass[1]	Color[2]	SCI[3]
UTC1 Naked Seed	1.9	1.8	2.1
UTC2 (CF Clear, Water)	1.9	1.8	2.8
NUP 07121 low rate	1.9	1.8	2.3
NUP 07121 medium rate	2	1.9	2.2
NUP 07121 high rate	2	1.8	2.3
NUP 07121 low + NUP 07117	2.1	1.8	2.2
NUP 07121 med + NUP 07117	2	1.8	2.2
NUP 07121 high + NUP 07117	2	1.9	2.2
NUP 07117 plus NUP 07267	2	1.8	2.1
NUP 07117	2	2.0	2.1
Allegiance	2	1.9	2.0
Mean	2	1.9	2.2
CV%	9.1	9.2	21.4
LDS .05	NS	NS	NS
SE	0.0903	0.0852	0.2375
Rep F Prob	0.0197	0.0112	0.0229
Trt F Prob	0.9366	0.5700	0.6563

[1]Root mass 1 – 4; 1 = few roots, 4 = many roots.
[2]Root color 1 – 4; 1 = white, 4 = dark.
[3]Subcrown internode rating, 1-4. 1 = less than 25% of the internode infected, 2 = 25 – 50% of the internode infected, 3 = 51-75% of the internode infected, multiple lesions, and 4 = 75-100% of the internode infected, lesions coalesced.

	----- Harvest[1] -----		---------- Grain[2] ----------		
Treatment	Height	Density	Test weight	Yield	Protein
	mm	no m^{-2}	lb/bu	bu/acre	%
UTC1 Naked Seed	667.5	184.0	53.8	15.5	19.4
UTC2 (CF Clear, Water)	671.9	377.3	54.5	17.6	18.9
NUP 07121 low rate	681.8	217.0	55.4	15.8	19.2
NUP 07121 medium rate	699.4	224.5	53.8	17.4	19.0
NUP 07121 high rate	698.8	221.0	54.0	15.1	19.2
NUP 07121 low + NUP 07117	698.8	213.3	53.6	14.9	19.5
NUP 07121 med + NUP 07117	696.3	223.5	55.4	17.8	18.8
NUP 07121 high + NUP 07117	718.8	227.5	53.8	15.2	19.5
NUP 07117 plus NUP 07267	717.5	213.8	55.1	17.4	19.0
NUP 07117	728.1	227.5	54.2	16.0	19.4
Allegiance	693.8	217.8	54.5	16.0	19.4
Mean	697.5	231.5	54.4	16.2	19.2
CV%	5.5	42.2	2.9	13.0	2.9
LDS .05	NS	NS	NS	NS	NS
SE	19.0135	48.8599	0.7785	1.0579	0.2784
Rep F Prob	0.0046	0.4067	<0.0001	0.0158	0.0018
Trt F Prob	0.4652	0.4365	0.7104	0.4121	0.5856

[1] Plant height measured from ground surface to top of head at maturity
[2] Grain yield, test weight, and protein adjusted on a 12% moisture basis.

WHEAT (*Triticum aestivum* L. 'Reeder')
Tan spot; *Pyrenophora tritici-repentis*
Septoria; *Septoria* spp.
Leaf rust: *Puccinia recondita*
Fusarium head blight; *Fusarium graminearum*
Wheat stem sawfly: *Cephus cinctus*

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Evaluation of Quilt and Tilt foliar fungicide singularly and in combination with Warrior insecticide treatments for control of leaf diseases, FHB and wheat stem sawfly in spring wheat at Mott, ND 2008.

This experiment was conducted in a field located near Mott, ND (SE ¼, Section 14, T136N, R93W – Hettinger County, ND) with a previous cropping history of spring wheat in 2007. A randomized complete block design with four replications was used. Plots were 10 ft wide by 50 ft long with a 3 ft wide winter wheat buffer between plots. A soil sample was collected on March 26 and analyzed by the North Dakota State University Soi Testing Laboratory. Soil nutrient levels reported were N = 44 lb/a, P (Olsen) = 17 ppm, K = 382 ppm, pH = 6.2. A burndown application of 0.5 ae/acre glyphosate + 1 qt Actamaster/acre was applied on 4 May. Plots were seeded with a drill equipped with Cross-slot openers on 9 May 2008 at the rate of 150 pls m^{-2}. Urea at the rate of 116 lbs/a (53 lbs/a N) was applied through the drill in a separate band during the seeding operation. A post emergent herbicide application of Bromax Advance (Bromoxynil Octanoate and Heptonic + MCPA Isococtyl Ester) at 1.5 pt/a, and Puma (Fenoxaprop-P) at 0.66 pt/a. Fungicide and fungicide/insecticide applications at 5 leaf stage were made on 11 Jun, applications at flag leaf stage were made on 2 Jul and applications at heading were done on 11 Jul. All treatments were applied in 19.1 gal/A water at 30 psi using a CO_2 pressurized hand-held spray boom equipped with 8002VS flat fan nozzles. Tan spot disease evaluations were conducted on 23 Jun, leaf spot disease evaluations were done on 10 Jul and leaf rust evaluations were conducted on 21 Jul. Evaluations consisted of observations made on ten consecutive plants in the center row of each plot. Incidence was recorded as the percent of plants with at least one lesion observed, and severity was recorded as the average leaf area covered by lesions for all leaves for the early season evaluation, only the top three leaves for the mid-season evaluation, and the flag leaf for the late season evaluation. Crop injury observations were made at the same time as the disease evaluations. White heads and lodging were used as an indication of potential stem mining by wheat stem sawfly. Plants exhibiting these symptoms were dissected and then determined to have been caused by wheat stem sawfly or some other cause. No crop injury from the fungicideinsecticide applications was observed. No visual symptoms of FHB were detected. Grain samples from the control plots were sent to NDSU for DON analysis and no DON was detected in these samples. No further testing for DON in grain samples produced from fungicide treatments was done. Precipitation at the North Dakota Agricultural Weather Network Mott, ND weather station in May, Jun, Jul, and Aug was 1.7, 2.04, 1.7, and .74 inches respectively or less than 70% of normal. Moist conditions near the end of May and the into the third week of Jun promoted tan spot but dry, hot weather conditions at the end of June and throughout July were not conducive for any of the leaf diseases or FHB development. Disease ratings reflect moisture conditions at the time the crop was susceptible to infection. Wheat stem sawfly did not have significant impact on the crop at this site. Harvest was with a Massy Ferguson 8XP combine on 25 Aug. Grain yield, test weight, and protein were adjusted to a 12% moisture basis. All data was statistically analyzed using SAS Statistical software v 9.1 Proc ANOVA.

Treatment	Rate	Crop stage/application	---------- 23 Jun evaluation ----- CI[1]	I[2]	S[3]
	acre^{-1}			---------- % ----------	
Untreated Check			0	40.0	3.00
Quilt	7oz	4 to 5 leaf	0	0.0	0.00
Warrior II / Quilt	1.28oz/7 oz	4 to 5 leaf	0	0.0	0.00
Tilt	2oz	4 to 5 leaf	0	0.0	0.00
Warrior II/ Tilt	1.28oz/2oz	4 to 5 leaf	0	0.0	0.00
Warrior II	1.28oz	4 to 5 leaf	0	42.5	2.25
Quilt	14oz	flag	0	42.5	2.50
Tilt / Quilt	2oz/14oz	4 to 5 leaf/flag	0	0.0	0.00
Warrior	1.28oz	flag	0	42.5	2.00
Warrior	1.28oz	early heading	0	40.0	2.75
Warrior II /Tilt	1.28oz/4oz	early heading	0	42.5	3.00
Warrior II/Quilt	1.28oz/14oz	flag	0	42.5	2.75
Mean			0	24.4	1.5208
CV%			-	27.2	36.534
LSD .05			NS	9.5	0.80
SE			0	3.31672	0.2778
Rep F Prob			-	0.0812	0.3445
Trt F Prob			-	<.0001	<.0001

[1] CI = crop injury.
[2]I = Disease incidence.
[3]S= Disease severity.

Treatment Name	Rate	Crop stage/application	10 Jul evaluation CI[1]	I[2]	S[3]
	acre^{-1}		---------- % ----------		
Untreated Check			0	7.5	5.00
Quilt	7oz	4 to 5 leaf	0	2.5	2.50
Warrior II / Quilt	1.28oz/7 oz	4 to 5 leaf	0	5.0	5.00
Tilt	2oz	4 to 5 leaf	0	12.5	7.50
Warrior II/ Tilt	1.28oz/2oz	4 to 5 leaf	0	5.0	5.00
Warrior II	1.28oz	4 to 5 leaf	0	5.0	5.00
Quilt	14oz	flag	0	0.0	0.00
Tilt / Quilt	2oz/14oz	4 to 5 leaf/flag	0	0.0	0.00
Warrior	1.28oz	flag	0.25	7.5	7.50
Warrior	1.28oz	early heading	0	10.0	7.50
Warrior II /Tilt	1.28oz/4oz	early heading	0	7.5	5.00
Warrior II/Quilt	1.28oz/14oz	flag	0	0.0	0.00
Mean			0.0208	5.2	0.42
CV%			693	125	117
LSD .05			NS	NS	NS
SE			0.1863	3.2592	0.2436
Rep F Prob			0.4051	0.6374	0.872
Trt F Prob			0.4671	0.1618	0.2172

[1] CI = crop injury.
[2]I = Disease incidence.
[3]S= Disease severity.

Treatment	Rate	Crop stage/application	--- 21 Jul evaluation --- CI[1]	I[2]	S[3]	1 Aug White heads	25 Aug Lodging
	acre^{-1}		---------- % ----------				
Untreated Check			0	0	0	0.00	12.50
Quilt	7oz	4 to 5 leaf	0	0	0	0.50	12.50
Warrior II / Quilt	1.28oz/7 oz	4 to 5 leaf	0	0	0	0.25	11.25
Tilt	2oz	4 to 5 leaf	0	0	0	0.50	12.50
Warrior II/ Tilt	1.28oz/2oz	4 to 5 leaf	0	0	0	0.25	13.75
Warrior II	1.28oz	4 to 5 leaf	0	0	0	0.50	10.00
Quilt	14oz	flag	0	0	0	1.00	10.00
Tilt / Quilt	2oz/14oz	4 to 5 leaf/flag	0	0	0	0.50	12.50
Warrior	1.28oz	flag	0	0	0	0.25	11.25
Warrior	1.28oz	early heading	1	0	0	0.50	13.75
Warrior II /Tilt	1.28oz/4oz	early heading	1.5	0	0	1.00	11.25
Warrior II/Quilt	1.28oz/14oz	flag	1	0	0	0.00	13.75
Mean			0.29167	0	0	0.44	12.08
CV%			128	-	-	138	23
LSD .05			0.5361	NS	NS	NS	NS
SE			0.18634	0	0	0.3018	1.3989
Rep F Prob			0.4051	-	-	0.3532	0.9109
Trt F Prob			<.0001	-	-	0.3648	0.5338

[1] CI = crop injury.
[2]I = Disease incidence.
[3]S= Disease severity.

Treatment	Rate	Crop stage/application	Grain[1] Test weight	Grain[1] Yield
	acre^{-1}		lb/bu	bu/a
Untreated Check			54.9	20.6
Quilt	7oz	4 to 5 leaf	54.7	22.3
Warrior II / Quilt	1.28oz/7 oz	4 to 5 leaf	55.5	22.1
Tilt	2oz	4 to 5 leaf	55.1	21.7
Warrior II/ Tilt	1.28oz/2oz	4 to 5 leaf	54.6	21.8
Warrior II	1.28oz	4 to 5 leaf	55.1	23.1
Quilt	14oz	flag	55.4	21.7
Tilt / Quilt	2oz/14oz	4 to 5 leaf/flag	55.7	22.2
Warrior	1.28oz	flag	55.1	20.8
Warrior	1.28oz	early heading	54.7	20.5
Warrior II /Tilt	1.28oz/4oz	early heading	54.8	22.8
Warrior II/Quilt	1.28oz/14oz	flag	55.2	23.0
Mean			55.1	21.9
CV%			1.1	8.9
LSD .05			NS	NS
SE			0.3019	0.9688
Rep F Prob			0.2236	0.43
Trt F Prob			0.2599	0.6064

1Grain values adjusted to a 12% moisture basis.