EVALUATION OF FUNGICIDES FOR CONTROL OF FOLIAR DISEASES AND FUSARIUM HEAD BLIGHT OF WINTER WHEAT IN KENTUCKY, 2010.

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The soft red winter wheat cultivar 'Cumberland' was planted with a no-till planter following corn harvest on 19 Oct 09 on the Kevil Tract of the University of Kentucky Research and Education Center in Princeton, KY. Wheat strips (4.3 ft-wide) were planted at a rate that would achieve a final stand of approximately 36 plants ft^2 and consisted of seven rows on 7-in. spacing. Warrior insecticide was applied (3.5 fl oz/A) on 21 Nov 09 and again on 23 Mar 10 at crop green-up to reduce the potential for barley yellow dwarf. Liquid nitrogen (28-0-0) was applied in a February/April split application at a rate of approximately 40 and 80 lbs/A on 20 Feb 10 and 1 Apr 10, respectively. Weeds were controlled by applying Harmony Extra herbicide (0.5 fl oz/A) on 23 Mar 10. On 2 Apr 10, wheat passes were subdivided into 20-ft plots by application of Round-up herbicide. The experimental design was a randomized complete block with four replications. Fungicide treatments were applied with a hand-held CO_2-powered backpack boom sprayer equipped with two Teejet 8002VS nozzles at 40 psi and delivering approximately 20 gpa of spray solution. Treatments were applied on 23 Mar, 15 Apr, 28 Apr, 2 May and 3 May corresponding to Feeke's (F) growth stages 4-5 (pseudostem erection), F8 (flag leaf just visible), F10.1-3 (first spikelet of inflorescence visible to ½ emerged), F10.5 (emergence of inflorescence complete) and F10.51 (beginning anthesis), respectively. Plots were rated for Stagonospora blotch and leaf rust at the at late-milk-early dough stage (F11.1-2) on 27 May. Foliar ratings were made by visually estimating the percentage leaf surface area diseased for flag and flag-1 leaves of 10 arbitrarily-selected plants per plot. Fusarium head blight (FHB) incidence was based on visual estimation of infected spikelets on a total of 50 spikes per plot at late-milk (F11.1) on 26 May. FHB severity was visually estimated as a percentage of surface area affected on 5 total spikes per plot at late milk (F11.1) on 26 May. Plots were harvested on 15 Jun 10 using a Wintersteiger small-plot combine. Yields were adjusted to 13.5% moisture and 60 lb/bu. A hand-cleaned, 25-g grain sample from each plot was assessed for kernel health by counting the number of shriveled kernels (SK) per 100 kernel sample and submitted to the University of Minnesota, DON Analysis Laboratory, St. Paul, MN for deoxynivalenol (DON) analysis. Percentage data were arcsine-transformed prior to analysis using ANOVA and Student-Newman-Keuls test ($P \leq 0.05$). Although statistics provided are based on transformed data, arithmetic means are presented in order to provide a better indication of the level of disease control

provided by each treatment, as well as the overall disease pressure in the trial.

Conditions supported moderate levels of leaf rust and Stagonospora blotch throughout much of May (i.e., grain fill period). Hot and dry weather during the two weeks before harvest resulted in rapid crop dry-down and greatly limited further development of late-season diseases. Single treatments applied at F4-5 were ineffective for reducing disease levels of leaf rust and Stagonospora blotch (flag, f-1 leaves) compared to the non-treated control. All treatments applied at F8 and F10.1-3 lowered the level of leaf rust and lessoned the severity of Stagonospora blotch on the flag leaves compared to the non-treated control; however these differences were not significant. Six of the F8 treatments (including Stratego Pro applied F4-5 and F8) and all but one of the F10.1-3 treatments significantly reduced Stagonospora blotch on the f-1 leaves (by as much as 50-75%); only Quilt applied at F10.1-3 provided significant control of both diseases on flag and f-1 leaves. Treatments applied at F10.5-10.51 were the most effective and provided nearly 100% control of leaf rust and Stagonospora blotch on the flag leaves and several treatments (Q8Y78, Q8X63, LEM17+Folicur, Prosaro and Caramba) significantly reduced the level of Stagonospora blotch on f-1 leaves compared to the other treatments. FHB pressure was low with mean FHB incidence only reaching 15.5%. Similarly, DON levels and SK percentages were low with means ranging from 0.3-0.8 ppm and 7.8-15%, respectively. Light take-all was scattered throughout the test and accounted for some of the observed shriveled kernels. No significant differences were observed among the different treatments and non-treated control for DON and SK ($P \leq 0.05$) (data not shown). FHB levels (incidence, severity and index) were not significantly reduced by any of the treatments compared to the non-treated control and no significant differences were observed among the different treatments for FHB severity. No significant differences were observed among the different treatments and non-treated control for yield and test weight regardless of the level of disease control. No phytotoxicity was noted in the test.

Treatment, rate/A	Feeke's stage applied[z]	Leaf rust[y] Flag (%)	Stagonospora blotch[x] Flag (%)	Stagonospora blotch[x] F-1 (%)	Fusarium head blight (FHB) Inc.[w] (%)	Fusarium head blight (FHB) Sev.[v] (%)	Fusarium head blight (FHB) Index[u] (%)	Yield[t] (bu/A)	Test weight (lb/bu)
Non-treated[s].....		14.1a-c[o]	13.4a-d	75.5a-c	11.8ab	25.3NS[n]	2.8ab	99.0a-c[m]	61.4ab
YT669 2.08 SC 3 fl oz[r]……	4-5	14.1ab	15.2ab	87.1a	12.5ab	37.4	4.7a	105.4a-c	60.3ab
LEM17 EC 10 fl oz[r]……	4-5	16.8a	16.5a-c	72.9a-c	12.5ab	32.2	4.2ab	100.0a-c	60.5ab
Tilt 3.6 SL 2 fl oz[r]……..	4-5	13.4a-c	16.0a	79.2ab	7.5ab	23.2	1.4ab	100.1a-c	60.1ab
Stratego Pro 2 fl oz fb[q] Stratego Pro 4 fl oz[p]….....	4-5, 8	5.8bc	4.2b-h	18.3e-i	13.5ab	31.6	4.0ab	102.9a-c	62.8ab
Stratego Pro 2 fl oz fb Prosaro 6.5 fl oz[p].....	4-5, 10.51	0.0d	0.3f-h	1.2ij	7.0ab	22.9	1.4ab	106.4a-c	62.6ab
LEM17 EC 10 fl oz[r].....	8	11.4a-c	7.7a-e	59.1b-d	9.5ab	27.7	2.5ab	108.4a-c	60.0ab
LEM17 EC 24 fl oz[r]……	8	12.0a-c	5.4a-g	50.9c-e	10.0ab	28.2	2.8ab	102.8a-c	59.1b
LEM 17 EC 24 fl oz……	8	5.0c	3.2d-h	37.7d-g	11.5ab	27.2	3.3ab	95.3bc	62.8ab
Q8X63 SC 9.6 fl oz[r]……	8	10.9a-c	7.3a-e	53.3cd	12.0ab	28.5	3.5ab	103.8a-c	59.6b
Q8X63 SC 19.2 fl oz[r].....	8	10.4a-c	6.1a-f	38.0d-g	12.5ab	23.2	2.8ab	113.4a-c	59.8b
Q8Y78 SC 12 fl oz[r]…….	8	12.3a-c	6.7a-e	37.2d-g	8.5ab	25.7	2.1ab	109.5a-c	59.8b
Q8Y78 SC 18 fl oz[r]…….	8	9.0a-c	3.9c-h	29.6d-h	10.0ab	36.2	2.5ab	94.3c	61.1ab
Headline 2.09 EC 6 fl oz[r]……...	8	9.0a-c	5.6a-f	30.6d-h	9.5ab	22.2	2.0ab	101.1a-c	60.0ab
Topguard 1.04 SC 7 fl oz……	8	10.2a-c	7.5a-e	51.0c-e	13.0ab	25.8	3.2ab	108.3a-c	59.9b
Topguard 1.04 SC 10 fl oz……..	8	10.4a-c	8.2a-e	57.1b-d	10.0ab	19.8	2.0ab	112.4a-c	60.1ab
Topguard 1.04 SC 14 fl oz……..	8	8.9a-c	7.1a-e	49.7c-e	11.5ab	21.8	2.6ab	122.8a	61.3ab
Topguard 1.04 SC 7 fl oz……	8, 10.1-3	8.8a-c	5.0a-g	30.1d-h	13.0ab	27.2	3.4ab	105.4a-c	60.5ab
Topguard 1.04 SC 7 fl oz……	10.1-3	8.8a-c	5.5a-f	46.3c-f	8.0ab	26.9	2.2ab	96.5bc	60.9ab
Topguard 1.04 SC 10 fl oz……..	10.1-3	8.9a-c	5.1a-g	30.5d-h	10.5ab	21.0	2.1ab	109.9a-c	59.5b
Topguard 1.04 SC 14 fl oz……..	10.1-3	7.5a-c	5.1a-g	33.3d-h	14.5ab	23.4	3.3ab	119.5ab	60.1ab
Quilt 14 fl oz……	10.1-3	1.1d	0.2gh	4.8ij	15.0a	25.8	3.9ab	101.7a-c	61.5ab
Q8Y78 SC 18 fl oz[r]…….....	10.5	0.0d	0.4f-h	2.8ij	5.0ab	26.2	1.3ab	117.5a-c	62.6ab
Q8X63 SC 19.2 fl oz[r]……..	10.5	0.0d	0.3f-h	5.2ij	7.0ab	21.7	1.5ab	107.2a-c	62.2ab
Headline 6 fl oz[r]……..…	10.5	0.0d	0.4f-h	6.8h-j	7.5ab	27.7	2.1ab	114.3a-c	62.8ab
LEM 17 EC 16 fl oz[r]……...	10.5	0.1d	1.1e-h	17.6f-j	9.5ab	28.7	2.7ab	102.4a-c	62.2ab
LEM 17 EC 24 fl oz[r]……...	10.51	0.1d	0.6f-h	12.1g-j	11.5ab	27.0	2.5ab	102.1a-c	61.1ab
LEM 17 EC 12 fl oz + Folicur 3.6 SC 4 fl oz[r].....	10.51	0.0d	0.3gh	1.4ij	7.5ab	26.8	2.2ab	97.9bc	62.6ab
Prosaro 6.5 fl oz[p]…….	10.51	0.0d	0.1h	0.5j	4.5b	25.5	1.1b	104.4a-c	62.5ab
Caramba 14 fl oz[p]……	10.51	0.0d	0.6f-h	0.7ij	7.0ab	22.3	1.5ab	101.2a-c	63.7a
P-value of F statistic		<.0001	<.0001	<.0001	0.0031	0.9456	0.0040	0.0009	<.0001
CV (%)		27.1	39.4	26.2	20.6	22.3	25.2	7.3	2.3

[z]Feeke's growth stage (F); Fungicide applications were made 23 Mar, 15 Apr, 28 Apr, 2 May and 3 May corresponding to F4-5, 8, 10.1-3, 10.5 and 10.51 respectively.

[y]Leaf rust, *P. triticina* was visually estimated on flag leaves of 10 plants per plot at late-milk-early dough stage (F11.1-2) on 27 May.

[x]Percentage of Stagonospora blotch, primarily *S. nodorum*, was visually estimated on flag and flag-1 leaves of 10 plants per plot at late-milk-early dough stage (F11.1-2) on 27 May.

[w]FHB incidence was based on visual estimation of infected spikelets on a total of 50 spikes per plot at late-milk (F11.1) on 26 May.

[v]FHB severity was visually estimated as a percentage of surface area affected on 5 total spikes per plot at late milk (F11.1) on 26 May.

[u]FHB index = (% incidence x % severity)/100.

[t]Based on 13.5% moisture and 60 lbs/bu.

[s]Data are the mean of 8 replications.

[r]Induce was added to treatments at 0.25% v/v.

[q]Fb = followed by.

[p]Induce was added to treatments at 0.125% v/v.

[o]Column numbers followed by the same letter are not significantly different, Student-Newman-Keuls test ($P \leq 0.05$).

[n]NS = no significant differences with the column of data ($P \leq 0.05$).

[m]Data are the mean of 3 replications.