

Managing Fusarium Head Blight in Barley with Cultivar Resistance, Fungicide Chemistry and Sequential Applications

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ABSTRACT

Fungicide application to control Fusarium head blight (FHB) can effect wheat and barley yield and substantially reduce deoxynivalenol accumulation (DON) in both barley and wheat seed. Studies conducted in 2007-2009 at Langdon and Osnabrock North Dakota on 6-row spring barley showed that sequential fungicide applications at Feekes growth stage (GS) 10.5 and 10.53 reduced DON on the main stem and boot GS tillers and subsequently the whole plot compared to the untreated. Sequential fungicide treatments were applied to improve on the approximately 60% DON reduction previously reported from single fungicide applications at GS 10.5. In some locations single treatment with prothioconazole was more effective in reducing DON than tebuconazole. Tebuconazole usually was as effective in reducing DON as prothioconazole when used as the first sequential application, but not always. The studies show that the boot growth stage tillers can contribute large concentrations of DON to the overall plot and will warrant treatment in some environments. Sequential treatments of prothioconazole increased yield and both treatments increased 1000 seed weight. Untreated North Dakota State University experimental barley line 'ND20448' had less DON accumulation than untreated 'Tradition'. 'ND20448' had greater plump than 'Tradition'. Tebuconazole is desired by growers because it costs significantly less to apply than prothioconazole.



Spray Nozzles Directed Forward to Spray Barley Heads



Scab Infected Barley Heads

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Table 1. Whole plot yield and seed weight by fungicide treatment. Treatments are averaged across all cultivars and environments. GS = Growth Stage

Treatment (Feekes GS) ^a	Yield whole plot (kg/ha)	Seed weight whole plot (gm/1000)
Untreated	5020	37.2
Tebuconazole (10.5)	5171	37.2
Prothioconazole (10.5)	5026	37.6
Tebuconazole /prothioconazole (10.5+10.53)	5203	38.7
Prothioconazole /prothioconazole (10.5+10.53)	5305	38.7
LSD _(0.05)	194	0.9

Table 2. DON accumulation for whole plot and DON accumulation for tag head at boot and main stem GS by environment and fungicide treatment. Means are averaged across all cultivars.

Environment	Treatment (GS) ^a	DON whole plot (ppm)	DON boot GS (ppm)	DON main stem GS (ppm)
Lang. '07	Untreated	4.4	11.0	3.1
	Teb. (10.5)	3.8	8.3	2.4
	Pro. (10.5)	1.9	6.6	1.3
	Teb. /Pro. (10.5+10.53)	1.5	1.7	1.2
	Pro. /Pro. (10.5+10.53)	1.2	2.1	1.0
Osn. '07	Untreated	2.8	7.6	0.9
	Teb. (10.5)	2.3	6.5	0.7
	Pro. (10.5)	2.0	3.7	0.8
	Teb. /Pro. (10.5+10.53)	0.8	1.3	0.1
	Pro. /Pro. (10.5+10.53)	0.8	1.0	0.1
Lan. '08	Untreated	1.9	15.0	2.7
	Teb. (10.5)	2.6	14.7	1.9
	Pro. (10.5)	1.9	10.2	0.4
	Teb. /Pro. (10.5+10.53)	1.0	15.2	1.0
	Pro. /Pro. (10.5+10.53)	0.9	13.3	0.4
Osn. '08	Untreated	9.0	22.0	8.0
	Teb. (10.5)	7.9	14.0	5.1
	Pro. (10.5)	5.0	14.4	4.4
	Teb. /Pro. (10.5+10.53)	7.1	8.8	3.4
	Pro. /Pro. (10.5+10.53)	4.8	9.3	2.5
Lang. '09 Early Plant	Untreated	1.1	1.1	0.2
	Teb. (10.5)	0.9	1.1	0.0
	Pro. (10.5)	1.0	0.9	0.0
	Teb. /Pro. (10.5+10.53)	0.3	0.0	0.0
	Pro. /Pro. (10.5+10.53)	0.3	0.2	0.0
Lang. '09 Late Plant	Untreated	16.8	51.2	7.2
	Teb. (10.5)	14.0	56.4	4.5
	Pro. (10.5)	11.7	44.1	2.4
	Teb. /Pro. (10.5+10.53)	6.8	25.0	0.5
	Pro. /Pro. (10.5+10.53)	6.1	24.6	0.3
LSD _(0.05)		1.5	5.5	1.1

^a GS = growth stage, Teb. = tebuconazole and Pro. = prothioconazole.

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