BARLEY (*Hordeum vulgare*, 'Pinnacle')
Fusarium head blight (scab); *Fusarium graminearum*
Spot blotch; *Bipolaris sorokiniana*
Net blotch; *Pyrenophora teres*
Leaf rust; *Puccinia hordei*
Powdery mildew; *Blumeria graminis* f. sp. *hordei*
Scald; *Rhynchosporium commune*

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Evaluation of foliar fungicides for control of Fusarium head blight and foliar diseases of spring malting barley in New York, 2017.

The fungicide trial was conducted at the Musgrave Research Farm in Aurora, NY in a Lima silt loam soil planted with the two-row, spring malting barley variety 'Pinnacle' sown at 100 lb/A with a no-till grain drill into a terminated hay field on 31 Apr. Nine foliar treatments (combinations of products and timings of applications) were arranged in a randomized complete block design with four replicates. Plots were 20 × 10 ft including 15 rows spaced 7.5-in. apart. The plots were fertilized at planting (200 lb/A of 10-20-20) and topdressed on 23 May (60 lb/A of urea, providing an additional 27.6 lb/A of nitrogen). Fungicides were applied on 16 Jun at Feekes growth stage (FGS 9) (ligule of flag leaf just visible), on 28 Jun at FGS 10.5 (head emergence), and on 5 Jul at FGS 10.5 + 7 days ('late'), depending on the treatment. All plots were inoculated with a conidial suspension of *Fusarium graminearum* (40,000 conidia/ml) on 28 Jun and 5 Jul, after fungicide applications were completely dried, to augment natural inoculum for initiation of Fusarium head blight (FHB). Treatments and *F. graminearum* inoculum were applied by a tractor-mounted sprayer with TJ-AI3070 nozzles, 18-in. apart, pressurized at 32 psi, and calibrated to deliver 20 gal/A. Incidence and severity (percent of symptomatic spikelets on symptomatic heads) of FHB in each plot were rated on 18 Jul. Primarily spot blotch, caused by *Bipolaris sorokiniana*, and some net blotch, caused by *Pyrenophora teres*, were rated collectively as 'leaf blights' on 18 Jul as percent disease severity on flag leaves and one leaf below the flag leaf (average rating for whole plot). Leaf rust, caused by *Puccinia hordei*, powdery mildew, caused by *Blumeria graminis* f. sp. *hordei*, and scald, caused by *Rhynchosporium commune*, were similarly rated on 18 Jul. Grain was harvested on 9 Aug from a 20 × 5 ft area in each plot using an Almaco plot combine. Grain moisture, grain yield, and test weight for individual plots were recorded and yield and test weight were recalculated to bu/A and lb/bu, respectively, at 14.5% moisture. Deoxynivalenol (DON) concentration (ppm) in grain was analyzed in the Mycotoxin Analysis Laboratory at the University of Minnesota, St. Paul, MN. Treatment means were calculated, subjected to analysis of variance, and separated by Tukey-Kramer HSD test ($P = 0.05$).

The 2017 growing season was conducive for moderately low levels of foliar diseases, FHB, and DON, with the exception of a moderately high level of leaf rust in this trial. All treatments significantly reduced powdery mildew and leaf rust, as compared to the non-treated control, but none had any effect on scald. Caramba alone at all timings was the only treatment that did not significantly reduce leaf blotches. All treatments resulted in significantly lower FHB index than the non-treated control, but only the double application of Caramba and the late application of Prosaro actually resulted in a significant reduction in DON. None of the treatments had any significant effect on yield or test weight. Overall, these results indicate that all of the fungicides evaluated are effective at reducing powdery mildew and leaf rust, and that all but Caramba effectively reduce leaf blotches. Also, under moderately low disease pressure, none of the treatments had any significant impact on yield or test weight. The DON results did not closely match the FHB index, indicating that for malting barley, visual ratings of FHB incidence and severity may not be adequate predictors of DON in the final grain. Additionally, the treatments that included the late applications of Caramba or Prosaro resulted in the lowest concentrations of DON.

Product, amount/A, Feekes growth stage at application	Powdery mildew (%)[z]	Leaf rust (%)	Scald (%)	Leaf blotch (%)	FHB Index	DON (ppm)	Test weight (lbs/bu)	Yield (bu/A)
Non-treated Control	3.3 a	45.0 a	1.1	18.3 a	3.9 a	1.7 ab	43.3	52.9
Aproach 2.08SC, 9 fl oz FGS 9, followed by Caramba 0.75EC, 17 fl oz FGS 10.5	0.1 c	9.5 bc	0.4	7.3 bc	1.3 b	2.3 a	42.7	72.1
Aproach 2.08SC, 9 fl oz and Tilt 3.6EC 2 fl oz FGS 9, followed by Caramba 0.75EC, 17 fl oz FGS 10.5	0.1 c	10.0 bc	0.3	7.3 bc	1.6 b	2.2 a	42.0	79.6
Caramba 0.75EC, 17 fl oz FGS 10.5	0.5 bc	9.3 bc	0.1	15.0 ab	1.6 b	1.5 ab	43.4	62.6
Caramba 0.75 EC, 17 fl oz 7 days after FGS 10.5	1.5 b	16.8 b	1.0	13.0 abc	1.6 b	1.1 ab	44.5	63.9
Caramba 0.75EC, 17 fl oz FGS 10.5, followed by Caramba 0.75EC, 17 fl oz 7 days later	0.9 bc	12.5 bc	0.3	9.3 abc	1.6 b	0.7 b	43.7	63.6
Proline 480SC, 2.8 fl oz FGS 9, followed by Prosaro 421SC 8.2 fl oz FGS 10.5	0.0 c	9.8 bc	0.4	5.0 c	1.0 b	2.2 a	41.9	78.1
Prosaro 421SC, 8.2 fl oz FGS 10.5	0.4 bc	6.3 bc	0.3	6.8 bc	1.1 b	2.1 ab	43.6	66.8
Prosaro 421SC, 8.2 fl oz 7 days after FGS 10.5	0.6 bc	4.0 c	0.4	4.8 c	1.4 b	0.7 b	43.7	79.6
HSD (P=0.05)	1.29	12.72	NS	9.75	1.62	1.50	NS	NS
CV (%)	132.2	94.8	108.7	60.3	64.0	50.7	3.1	26.8

[z] Column means with the same letter are not significantly different at P=0.05 as determined by Tukey-Kramer HSD