

UNDERSTANDING RYE DISEASE MANAGEMENT 2023-2024

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INTRODUCTION (Objective)

Rye as a grain crop has a potential local market with distilleries. Farmers grew rye in Kentucky until about the 1920's. Rye in Kentucky is highly susceptible to Fusarium head blight (FHB, or Head Scab). We propose to continue testing the effect of fungicide timings on various rye hybrids and populations on grain yield and grain quality.

Studies were initiated at Princeton and Lexington where rye hybrids were planted in October. The Lexington site had poor stands and was replanted in November. Studies were managed for weeds and insects according to crop scouting. Fungicide treatments included a fungicide at flag leaf, a fungicide at anthesis (flowering) and a combination of fungicides at flag leaf and anthesis all compared to a untreated control. Disease assessments were conducted by Dr. Bradley. Yields were determined with small plot combines. Yields were adjusted to 14% moisture and 56 lb/bushel test weight.

Rye yields at Princeton ranged from 52.0 to 90.6 bushels per acre (Table 1), which are excellent yields for the 2024 season. Disease ratings were lower for fungicides applied at anthesis or the combination of flag leaf and anthesis. Fungicide applied at flag leaf only usually had no effect different from the untreated control. Rye yields were highest for the fungicides applied at flag leaf and anthesis for Serafino, Tayo and H2003. Yields of those three hybrids for fungicide applied at anthesis only were not significantly different from the fungicides applied at flag leaf and anthesis. Fungicide had no effect on yield for Receptor, which was the lowest-yielding hybrid in the trial.

Rye at the Lexington location was a disaster, with yields barely registering on the combine. No disease was present, either. Rye during seed fill in Lexington experienced 15 consecutive days above 88 F and 13 days above 90 F with no measured rainfall. Seed development was extremely poor in Lexington. Rye at Princeton was physiologically mature when those temperatures hit Kentucky. The later planting date in Lexington pushed the rye into later development and the timing of that extremely hot and dry weather essentially terminated seed development. The hot, dry weather also kept disease pressure extremely low. The rye at Lexington was examined but no ratings were taken.

SUMMARY

This study confirms that rye needs a fungicide at anthesis to protect against FHB. Applying fungicides at both flag leaf and anthesis resulted in yields that were not significantly different from rye treated with fungicide at anthesis only. Rye at Lexington demonstrated once again that rye for grain needs to be planted in late September or early October.

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Table 1. Rye response to fungicide timings at Princeton, 2024.

Rye Hybrid	Fungicide Treatments†	FHB severity (%)	FHB incidence (%)	FHB index (0-100)	Leaf disease severity (%)	Grain Moisture (%)	Test weight (lb/bu)	Yield (bu/A)‡
Serafino	Untreated	33.4	91.3	30.7	28.1	17.2	44.5	59.7
Serafino	Flag leaf	24.6	95.0	23.1	23.2	17.3	45.1	63.2
Serafino	Anthesis	10.4	56.3	6.0	10.4	17.2	47.9	78.6
Serafino	Flag leaf + Anthesis	8.8β	62.5	5.6	10.0	17.2	48.1	79.0
Tayo	Untreated	35.7	97.5	34.7	26.0	16.9	42.3	44.6
Tayo	Flag leaf	26.5	92.5	24.7	20.5	17.0	42.6	45.8
Tayo	Anthesis	13.1	61.3	8.2	11.8	17.0	45.7	63.6
Tayo	Flag leaf + Anthesis	10.7	57.5	6.7	8.7	17.1	46.7	69.5
H2003	Untreated	28.7	86.3	24.8	23.6	17.1	44.8	75.6
H2003	Flag leaf	15.9	63.8	12.1	14.5	17.2	45.8	82.9
H2003	Anthesis	8.0	52.5	4.5	10.3	17.2	46.9	90.0
H2003	Flag leaf + Anthesis	8.3	33.8	2.4	7.1	17.2	47.2	90.6
Receptor	Untreated	36.6	97.5	35.7	28.8	16.9	44.6	52.8
Receptor	Flag leaf	27.9	96.3	27.0	28.1	16.8	44.7	52.0
Receptor	Anthesis	12.2	65.0	7.8	17.3	16.9	47.2	61.9
Receptor	Flag leaf + Anthesis	11.9	68.8	8.0	12.2	16.9	46.8	59.3
	<i>P > F</i>	0.0001	0.0001	0.0001	0.0001	0.0088	0.0001	0.0001
	LSD 0.05	7.8	20.9	7.7	9.1	0.3	1.1	10.2
	CV %	28.1	19.9	32.8	36.6	1.1	1.7	10.7

† Fungicide treatments included Tilt at 4 fl oz/acre at flag leaf stage and Mirivas Ace at Miravis Ace at 13.5 fl oz/acre at anthesis (flowering).

‡ Yields are adjusted to 14% grain moisture and 56 lb/bu test weight.

β Smaller values for disease ratings are preferred while larger values for test weight and yield are preferred. Within a hybrid, the lowest value for disease ratings is in bold and shaded. Other values similar to that value are in bold. For test weight and yield, the highest value in a hybrid is bold and shaded. Other values similar to the highest value are in bold.

Table 2. Rye response to fungicide timings at Lexington, 2024

Hybrid	Fungicide Treatments†	Tillers (per 0.5 m of row)	Test Weight (lb/bu)	Grain Moisture (%)	Yield (bu/A)‡
Serafino	Flag Leaf	43	43.6 -	6.9 -	1.09 -
Serafino	Flag Leaf + Anthesis	65	66.0 -	7.4 -	0.42 -
Serafino	Anthesis	51	43.6 -	7.8 -	1.18 -
Serafino	Untreated Control	54	44.0 -	5.7 -	0.80 -
Tayo	Flag Leaf	42	65.2 -	8.8 -	7.56 -
Tayo	Flag Leaf + Anthesis	47	43.8 -	6.8 -	0.59 -
Tayo	Anthesis	38	43.6 -	7.2 -	1.07 -
Tayo	Untreated Control	31	65.5 -	8.9 -	4.22 -
	LSD P=.05	33.6	53.22	7.44	7.136
	Standard Deviation	19.2	30.39	4.25	4.075
	CV	41.31	58.53	57.2	192.46

† Fungicide treatments included Tilt at 4 fl oz/acre at flag leaf stage and Mirivas Ace at Miravis Ace at 13.5 fl oz/acre at anthesis (flowering).

‡ Yields are adjusted to 14% grain moisture and 56 lb/bu test weight. Rye during seed fill in Lexington experienced 15 consecutive days above 88 F and 13 days above 90 F with no measured rainfall. Seed development was extremely poor in Lexington.