

### **Evaluation of registered fungicides for management of onion pathogens**

A field trial was established in early June at Shiprock Farms in central WI to evaluate relative efficacy of several registered fungicides to control foliar onion pathogens. The experiment was placed in a field of Fortress onion which had been planted April 22 at approximately 5 seeds/foot. The experimental design was a randomized complete block with four replications. Each plot was 25-foot-long and consisted of two, 3-foot-wide raised beds with three rows planted in each bed. Soil type was Houghton muck. Fertilizer consisted of: 11-8-40, 300 lb/A + copper sulfate, 7 lb/A, broadcast April 20, prior to planting, 7-21-7, 20 gal/A, applied at planting, and 28% UAN, 30 gal/A applied June 17. Insects were controlled with foliar applications of Vydate, 1.0 pt/A, June 17, 22 and 29 and Warrior T, 3.8 fl oz./A on July 23. Herbicides applied for weed control were: Prowl 3.3 EC (4.5 pt/A, May 1), Goal 2XL (1.5 fl oz., May 18 and 29; 1.0 fl oz., May 31; 2.0 fl oz., June 8 and July 20; 3.0 fl oz., June 24) and Fusilade DX (0.75 pt/A, May 23). Fungicide treatments were applied with a tractor-mounted boom pressurized with an air compressor. Treatments were applied June 21, 28, July 5, 12, 19, 26, August 2 and 9, according to treatment protocol, at a rate equivalent to 70 gal water/A at 40 psi, using 9504 Even Flat Fan nozzles (4 nozzles at 18-inch spacing). Disease severity was rated for four 3-ft-long sections of each treatment plot (two rating sites in each of the two beds in each plot) on July 16, 31 and August 28 using the Horsfall-Barratt system. By August 28 the crop was mature. Since disease severity had been so low throughout the season, we believe the majority of death of leaf tissue was due to natural senescence and not Botrytis blight. On August 28, severity of symptoms was rated on remaining green tissue and overall senescence of foliage was rated separately on a Horsfall-Barratt scale of 0 (totally green) to 11 (all foliage dead). Two 5-foot-long sections were pulled from the center row of each bed (a total of 10 feet of row per plot) on August 28. Leaves were clipped off and discarded and the yield was graded by hand into four size categories (based on diameter). Rainfall recorded at this location during the growing season (inches) was: April (0.28), May (5.65), June (6.97), July (2.33) and August (3.94). Irrigation applied (inches) was: July (1.5) and August (1.0). A sample from each plot was placed in the grower's storage and will be rated for storage diseases in mid-winter.

Dry and hot weather conditions during July and early August were unfavorable for development of foliar diseases. Throughout the rating period, the severity of foliar symptoms was unusually low. At the last rating on August 28, less than 10% of the foliage exhibited symptoms in untreated plots. Among the fungicide treatments there were no significant differences in disease control. There was somewhat less natural senescence on August 28 in plots treated with the Penncozeb and Rovral program. Yields were highest in plots treated with the Penncozeb (5 sprays) and Bravo (3 sprays) and lowest in plots treated with a straight Bravo program (8 sprays). In the presence of low disease pressure, the addition of Rovral to Penncozeb or Penncozeb/Bravo programs did not increase yield over Penncozeb or Penncozeb/Bravo programs.

**Table 1. Effect of foliar fungicide treatment on disease development.**

	Treatment Chemical	Rate/Acre		Schedule Summary	Total active ingredient (ai) used during season (lb/A)	% Foliage infection <sup>1</sup>			% Senescence 8/28 <sup>2</sup>	Relative AUD PC <sup>3</sup>
		Formulation	a.i.			7/16	7/31	8/28 <sup>2</sup>		
1	Untreated				0	0.5	1.9	8.5	86.9	0.038
2	Penncozeb DF	2.0 lb	1.5 lb	Appl. 1-8	12.0	0.2	1.9	3.8	92.8	0.022
3	Bravo WS	2.0 pt	1.5 lb	Appl. 1-8	12.0	0.0	0.7	3.9	90.3	0.016
4	Penncozeb DF	2.0 lb	1.5 lb	Appl. 2,4,6-8	12.0	0.0	1.2	4.2	88.1	0.020
	Bravo WS	2.0 pt	1.5 lb	Appl. 1,3,5						
5	Penncozeb DF	2.0 lb	1.5 lb	Appl. 2,4	13.0	0.1	1.2	4.3	77.4	0.020
	+ Rovral 4F	0.5 pt	0.25 lb	Appl. 1,3, 5-8						
	Penncozeb DF	2.0 lb	1.5 lb							
6	Penncozeb DF	2.0 lb	1.5 lb	Appl. 2,4	13.0	0.0	1.2	4.6	89.7	0.021
	+ Rovral 4F	0.5 pt	0.25 lb	Appl. 1,3,5						
	Bravo WS	2.0 pt	1.5 lb							
	Penncozeb DF	2.0 lb	1.5 lb							
7	Quadris 2.08 SC	6.2 fl oz	0.1 lb	Appl. 2,4	9.2	0.1	1.4	4.2	86.8	0.021
	Penncozeb DF	2.0 lb	1.5 lb	Appl. 1,3, 5-8						
8	Quadris 2.08 SC	6.2 fl oz	0.1 lb	App. 2,4,6,8	6.4	0.0	1.1	4.5	85.4	0.020
	Penncozeb DF	2.0 lb	1.5 lb	Appl. 1,3,5,7						
Pr > F <sup>4</sup>						0.58	0.18	< 0.01	< 0.01	< 0.01
LSD <sup>4</sup>						NS	NS	1.0	6.4	0.006

1. Severity of leaf blight symptoms was rated on a Horsfall-Barratt scale of 0 (no infection) to 11 (all foliage dead). Ratings were converted to percent foliage infection.
2. By August 28 the crop was mature. Since the level of disease symptoms had been so low throughout the season, we believe the majority of death of leaf tissue was due to natural senescence and not Botrytis blight. Severity of symptoms was rated on remaining green tissue and senescence of foliage was rated separately on a Horsfall-Barratt scale of 0 (totally green) to 11 (all foliage dead). Ratings were converted to percentages.
3. Relative area under the disease progress curve. Data for each date were plotted on a graph and the area under the line was calculated for each treatment providing a measure of the relative severity of disease throughout the season. A disease rating of 100% foliage infection for the entire season would produce a value of 1.0. All relative AUDPC values are expressed as the proportion of this value. Either decreased disease severity or later disease development will contribute to lower relative areas under the disease progress curve.
4. Analysis of variance was performed on data, and Fisher's protected least significant difference (LSD) was calculated. NS = not significant at  $P=0.10$ .

**Table 2. Effect of foliar fungicide treatment on yield and size distribution.**

Trt No.	Total Yield (cwt/A)	< 1 inch diameter		1-2 inch diameter		2-2.5 inch diameter		> 2.5 inch diameter	
		% of yield	Avg. no. of onions	% of yield	Avg. no. of onions	% of yield	Avg. no. of onions	% of yield	Avg. no. of onions
1	284.2	0.1	0.3	14.8	11.8	62.1	26.3	23.0	7.0
2	279.1	0.4	0.5	14.0	11.0	67.2	27.8	18.5	5.5
3	258.5	0.1	0.3	13.7	10.5	74.9	30.5	11.3	3.3
4	323.4	0.1	0.3	10.6	8.8	47.5	22.0	41.8	13.8
5	261.0	0.3	0.8	13.9	10.8	53.5	21.0	32.3	8.8
6	294.4	0.4	0.5	12.7	9.8	62.5	28.3	24.5	8.0
7	286.8	0.4	0.8	10.2	9.0	55.6	23.3	33.8	10.0
8	302.7	0.1	0.5	9.2	8.3	60.9	26.5	29.9	9.5
Pr > F <sup>1</sup>	0.02	0.78	0.94	0.68	0.79	0.12	0.27	0.21	0.22
LSD <sup>1</sup>	34.8	NS	NS	NS	NS	NS	NS	NS	NS

1. Analysis of variance was performed on data, and Fisher's protected least significant difference (LSD) was calculated. NS = not significant at  $P=0.10$ .

