ONION (*Allium cepa* 'Bradley')
Stemphylium leaf blight; *Stemphylium vesicarium*

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Evaluation of fungicide efficacy for the control of Stemphylium leaf blight in Onion, Hamilton 2021.

This study was conducted at a grower-cooperator's farm located in Hamilton, MI in a field of Houghton muck soil previously planted to celery. Onion seeds were sown 5 and 6 Apr on raised beds. Beds were 6 in. tall and 60 in. wide at the top and were spaced 80 in. apart at the row center. Each bed was 100 ft long and consisted of eight rows of plants spaced 6 in. apart and seeds spaced 2 in. within a row (approximately 250,000 seeds/A). Treatment plots were 20 ft long, separated by a 2-ft buffer section between replicates within a row and arranged in a randomized complete block design with four replicates. Onion thrips were managed according to an IPM threshold. Fertilization and weeds were managed to commercial production standards by the grower cooperator. Hand weeding was performed on 29 Jun to remove pepper weed not controlled by herbicide. Brox 2EC applied by grower cooperator on 11 and 14 Jun to onions resulted in phytotoxicity (approximately 10% necrotic foliar tissue). Heavy rain and high winds on 27 Jun flattened onion tops and flooding damaged onion roots. Fungicide treatments were applied as a foliar spray starting at the six leaf stage on 24 and 30 Jun; 7, 14, 21, and 28 Jul; and 4 and 10 Aug. Applications were made using a CO_2 backpack sprayer and a broadcast boom equipped with three XR8003 flat-fan nozzles spaced 18 in. apart and calibrated at 35 psi to deliver 50 gal/A. Disease developed from inoculum naturally present in the field. Premature leaf death resulting in a loss of green leaf tissue is typical of Stemphylium leaf blight and the percentage of necrotic tissue (0 to 100%) per plot was visually estimated on 23 and 30 Jul and 6 and 17 Aug. Bulbs from the 5 ft of the center four rows of the treatment plots were hand-harvested on 24 Aug. Dried bulbs were topped, sorted into small (<2 in.), medium (2-3 in.), and large (>3 in.) sizes, and weighed on 8 Oct. Statistical analysis was conducted with SAS software (v9.3) and a generalized linear mixed model; blocks were considered random effects. Some data were log-transformed to meet assumptions of normality. Back-transformed data are presented in tables. Fisher's protected least significant differences (LSD) at $P = 0.05$ were used to determine significant pair-wise comparisons among treatment means.

In an adjacent experimental plot, the first plant with *Stemphylium*-like conidia was observed on 24 Jun and the pathogen was isolated from 50 plants. Overall, Stemphylium leaf blight disease pressure was moderate to high with 74% necrotic tissue in untreated control plots. A moderate incidence of pink root rot and low incidence of anthracnose were also observed. Most fungicide treatments reduced necrotic tissue on the final rating date and the AUDPC compared to the untreated; pyraziflumid, at the three rates tested, did not differ from the untreated control. Effective fungicide treatments resulted in a low to moderate reduction in the percentage of necrotic tissue at the last rating date compared to the untreated control. The AUDPC values for fungicide programs involving two applications of Inspire Super, Luna Flex, or Luna Experience followed by six applications of Bravo WeatherStik did not differ from the grower "standard" program (three applications of Luna Tranquility alternated with Bravo WeatherStik). There were also no significant differences in AUDPC values among rotational programs consisting of two applications of either Luna Flex, Inspire Super, Luna Experience, or Luna Tranquility. The AUDPC values for Cevya were similar to the grower standard and to fungicide treatments using two applications of either Luna Flex, Inspire Super, Luna Experience. There was about 10% less necrotic tissue in Cevya treatments and significantly lower ADUPC values compared to the fungicide treatment using two applications of Luna tranquility. No lodging was observed in any of the treatment plots. There were no significant differences in total yield or yield for small and medium onion class sizes compared to the untreated control. In general, yield was low and likely negatively impacted by herbicide damage and flooding. No phytotoxicity was observed following fungicide treatments.

Treatment and rate/A, *application schedule*[z], applied at 7-day intervals	Necrotic tissue (%)[y]		Yield (t/A)[x]			
	17 Aug	AUDPC	Small	Medium	Large	Total
Untreated control	74.0 ab[w]	949.2 a	3.8 a	5.1 a	0.0	8.9 a
Cevya 5 fl oz + Activator 90 (0.25% v/v), *apps A-H*	59.3 e	706.1 c	3.7 a	5.7 a	0.1	9.5 a
Inspire Super 1 fl oz + Activator 90 (0.12% v/v), *app A* *-alt-* Inspire Super 20 fl oz + Activator 90 (0.12% v/v), *app B* *-alt-* BWS 24 fl oz, *apps C-H*	62.0 de	727.3 bc	3.8 a	5.2 a	0.0	8.9 a
Luna Flex 375.0 SC 12 fl oz + Activator 90 (0.12% v/v), *apps A,B* *-alt-* BWS 24 fl oz, *apps C-H*	61.3 de	745.9 bc	3.5 a	6.1 a	0.1	9.6 a
Luna Experience 400.0 SC 1 fl oz + Activator 90 (0.12% v/v), *app A* *-alt-* Luna Experience 400.0 SC 12.8 fl oz + Activator 90 (0.12 % v/v), *app B* *-alt-* BWS 24 fl oz, *apps C-H*	66.5 dc	778.6 bc	4.1 a	4.5 a	0.1	8.6 a
BWS 24 fl oz, *apps A,C,E,G,H* *-alt-* Luna Tranquility 22 fl oz + Activator 90 (0.12% v/v), *apps B* *-alt-* Luna Tranquility 16 fl oz + Activator 90 (0.12% v/v), *apps D,F*	67.0 dc	782.1 bc	3.8 a	5.3 a	0.0	9.1 a
Luna Tranquility 16 fl oz+ Activator 90 (0.12% v/v), *apps A,B* *-alt-* BWS 24 fl oz, *apps C-H*	69.3 bc	821.4 b	4.4 a	3.7 a	0.0	8.1 a
Pyraziflumid 20SC 1.6 fl oz + Activator 90 (0.12% v/v), *apps A-H*	76.0 a	1020.2 a	4.0 a	4.0 a	0.0	8.0 a
Pyraziflumid 20SC 2.4 fl oz + Activator 90 (0.12% v/v), *apps A-H*	73.8 ab	938.4 a	3.5 a	4.9 a	0.0	8.4 a
Pyraziflumid 20SC 3.2 fl oz + Activator 90 (0.12% v/v), *apps A-H*	74.0 ab	1000.6 a	4.6 a	4.2 a	0.0	8.8 a
ANOVA *P*-value	<0.0001	<0.0001	0.8289	0.8199	N/A	0.7402

[z] First fungicide application was 24 Jun. app(s) = application(s); -alt- = alternate; v/v = volume by volume.
[y] The percentage of necrotic tissue (0 to 100%) per plot was visually estimated. AUDPC = The area under the disease progress curve
[x] Bulb diameter = small (<2 in.), medium (2-3 in), and large (>3 in. sizes). NA = no statistical analysis applied.
[w] Column means with a letter in common are not significantly different (LSD t-test; P=0.05).