

PUMPKIN (*Cucurbita pepo* 'Warty Goblin')
 Powdery mildew; *Podosphaera xanthii*
 Plectosporium blight; *Plectosporium tabacinum*

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Evaluation of organic fungicides for management of pumpkin diseases, 2016.

The trial took place at a commercial farm in Rockville, VA. The soil was a Cecil fine sandy loam. Herbicide and fertilizer were applied according to Virginia Cooperative Extension recommendations. Additional hand-weeding was performed weekly as needed. Five rows of cultivar Warty Goblin were planted on 1 Jul, with intra-row spacing of 4 ft and inter-row spacing of 9 ft. To ensure 100% stand, plots were planted at a higher-than-normal population density. Every 4 ft within each row there were two pumpkin plants, instead of one; although different from commercial recommendations, this method of over-seeding to ensure 100% stand is common practice for the farm on which research was performed. A randomized complete block design was used with four replicates of each treatment. Chemical applications were made using a backpack sprayer with a handheld 4-nozzle spray boom configuration with Teejet 8002VS tips spaced at 18 in. All chemicals were applied using a carrier rate of 20 gal of water per acre at 35 psi. Treatments were applied 5 Aug, 12 Aug, 19 Aug, 16 Aug, 2 Sep, and 9 Sep. Presidio at 4 oz/A was applied to all treatments (including the control) on 19 Aug to control downy mildew. Nordox 75WG was mistakenly applied at a higher than labeled rate (1.5 lb/A rather than 1.25 lb/A) due to a misunderstanding about the formulation involved. Disease severity on leaves, stems and fruit of the four centrally located pumpkin plants in each plot was rated weekly starting on 12 Aug. Individual disease ratings showed distinct relationships between means and standard deviations, and no single transformation performed best with respect to homogenizing variances. Areas under the disease progress curve (AUDPC) were calculated for the last 3 weeks by summing disease ratings for each plot, and equality of variance was tested. JMP 13's Fit Y by X platform was used to fit a generalized linear model using a Poisson distribution. Since the data were somewhat over-dispersed, the overdispersion factor was used to adjust the test statistics, and the Holm-Bonferroni correction was applied to adjust the overall error rate. Precipitation was slightly above normal for July (5.46 in. average of four Weather Underground stations located 4-17 miles from the trial site in different directions) but below normal for August (2.72 in.) and the first half of September (0.41 in.).

Low levels of powdery mildew were observed on 19 and 26 Aug. As disease progressed in subsequent weeks, powdery mildew control was most effective with the conventional treatment. Plots treated with Nordox and Kaligreen showed significantly less powdery mildew than the control (water) but these treatments were less effective than the conventional treatment. Regalia provided no significant control. Plectosporium control, too, was most effective with the conventional treatment. Nordox provided statistically equivalent control, Regalia provided slight disease control, significantly better than water, whereas Kaligreen provided no control. Marginal chlorosis and subsequent foliar necrosis developed in the plots treated with the above-label rate of Nordox 75WG, and was estimated as comprising about 25% of the leaf surface at the ratings on 2 Sep through 15 Sep.

Treatment	Powdery mildew severity, %				Plectosporium blight severity, %			
	2 Sep	9 Sep	15 Sep	AUDPC ^x	2 Sep	9 Sep	15 Sep	AUDPC ^x
Water	8	11	14	33 a	21	33	54	108 a
Kaligreen 2.5 lb/A	2	3	6	11 b	26	36	45	108 a
Regalia 32 oz/A	4	8	14	25 a	16	24	29	69 b
Nordox 75WG 1.5 lb/A ^y	0	3	4	8 b	9	9	11	28 c
Conventional ^z	0	0	0	0 c	6	6	6	19 c

^x Area Under the Disease Progress Curve, analyzed as a general linear model assuming a Poisson distribution with Holm-Bonferroni correction; means in same column followed by the same letter are not significantly different at $\alpha=0.05$ (Tukey's HSD).

^y Higher than the 1.25 lb/A maximum label rate

^z Bravo Weather Stik 32 oz/A + Quintec 4 oz/A (12 Aug, 19 Aug, 2 Sep, 15 Sep), Bravo Weather Stik 32 oz/A + Proline 5.7 oz/A (26 Aug, 9 Sep)