

Evaluation of fungicides for managing basil downy mildew epidemics in North Carolina, 2019.

This experiment was conducted on field-grown basil at the Central Crops Research Station in Clayton, NC. Basil was seeded into trays in a greenhouse on 23 July and seedlings were acclimated to outdoor weather conditions for up to 5-d before being transplanted into field plots on 29 Aug. Plots were established on single 14-ft long raised beds covered with white plastic mulch, on 5-ft centers with 5-ft between plots; there were 7 plants per plot and 2-ft between plants. Non-treated rows of plots planted to the same cultivar were maintained between rows of treated plots to act as a border between blocks of treatments. Irrigation and fertilization (N-P-K, 4-0-8) were applied via drip tape on a weekly basis. The study was arranged in a randomized complete block design with four replications. Fungicide treatments were applied in water equivalent to 50 gal/acre at 40 psi using a CO₂-pressurized boom sprayer with two Teejet TXVS-26 ConeJet nozzles on 7-day intervals beginning on 4 Sep and ending on 2 Oct. Downy mildew incidence was evaluated as the number of plants with active sporulation on at least one leaf divided by total plants in the plot. Downy mildew severity was determined by visually estimating the percentage symptomatic leaf area within the plot. Both assessments were made on 7- to 10-d intervals. Data differed significantly from normality and were subjected to a rank-based nonparametric analysis of variance (Kruskal-Wallis test). Ranked means were separated according to pairwise t-tests of least squares means ($P = 0.05$).

Trace amounts of downy mildew were observed on 22 Aug in a basil sentinel plot in an adjacent field and in the trial area on 12 Sep, which progressed throughout the trial. The Ranman and Orondis Opti treatments significantly reduced disease incidence when compared with the non-treated plots on 12 Sep and 19 Sep. No significant differences in incidence were observed between treatments on 30 Sep or 8 Oct. Area under the disease incidence progress curve (AUDIPC) was calculated based on weekly incidence ratings recorded from 3 Sep to 8 Oct and was reduced significantly in plots treated with Orondis Opti when compared with all other treatments. Similarly, on 12 and 19 Sep, disease severity was reduced significantly in plots treated with Ranman and Orondis Opti, compared with the non-treated plots. Orondis Opti treatment significantly reduced disease severity when compared with all other treatments on 30 Sep. Area under the disease severity progress curve (AUDSPC) was calculated based on weekly severity ratings recorded from 3 Sep to 8 Oct and was significantly reduced in plots treated with Orondis Opti when compared with all other treatments; Presidio also significantly reduced AUDSPC when compared with the non-treated. Phytotoxicity was not observed in any treatment.

Treatment and rate of product per acre ^x	Basil downy mildew incidence (%) ^w				AUDIPC ^y
	12 Sep	19 Sep	30 Sep	8 Oct	
Non-treated	33.6 a	60.7 a	81.4 a	83.3 a	1921.9 a
Ranman 400 SC 2.75 fl oz	3.6 b	7.1 b	75.7 a	90.0 a	1172.1 a
Presidio 4SC 4 fl oz	17.0 ab	35.7 a	55.4 a	69.6 a	1261.6 a
Orondis Opti (Premix) 32 fl oz	0.0 b	7.1 b	10.7 a	48.8 a	361.3 b
$P > \chi^{2z}$	0.0348	0.0253	0.0538	0.2097	0.0223

^wValues represent the average basil downy mildew incidence (%) ratings before ranking and are based on the number of plants with symptoms per plot. Means within columns followed by the same letter are not significantly different according to pairwise t-tests of least squares means ($P = 0.05$).

^xCommercial products contain a single active ingredient except for Orondis Opti (Premix), which is a premix of oxathiapiprolin and chlorothalonil.

^yArea under the disease incidence progress curve (AUDIPC) values based on ratings from 3 Sep through 8 Oct.

^z P -values based upon a Kruskal-Wallis test (rank-based nonparametric analysis of variance).

Treatment and rate of product per acre ^x	Basil downy mildew severity (%) ^w				AUDSPC ^y
	12 Sep	19 Sep	30 Sep	8 Oct	
Non-treated	3.0 a	6.3 a	21.3 a	25.0 a	382.1 a
Ranman 400 SC 2.75 fl oz	0.3 b	1.3 b	7.5 a	30.0 a	204.5 ab
Presidio 4SC 4 fl oz	1.5 ab	3.0 ab	7.5 a	14.0 a	166.3 b
Orondis Opti (Premix) 32 fl oz	0.0 b	1.0 b	0.5 b	4.3 a	30.8 c
$P > \chi^{2z}$	0.0366	0.0364	0.0292	0.1203	0.0177

^wValues represent the average basil downy mildew severity ratings before ranking and are based on a visual estimation of the percent symptomatic leaf area within the plot. Means within columns followed by the same letter are not significantly different according to pairwise t-tests of least squares means ($P = 0.05$).

^xCommercial products contain a single active ingredient except for Orondis Opti (Premix), which is a premix of oxathiapiprolin and chlorothalonil.

^yArea under the disease severity progress curve (AUDSPC) values based on ratings from 3 Sep through 8 Oct.

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