

An evaluation of selected nonionic surfactants and fungicides, and their residual activity against powdery mildew of cantaloupe, spring 2011.

On 25 Feb 2011, plots were established at the University of Florida's Gulf Coast Research and Education Center in Balm, FL to assess the effect of fungicides and nonionic surfactants on the control of powdery mildew of cantaloupe. Plots consisted of 14 ft-long bed sections within 308 ft-long, raised beds with 4 ft center-to-center bed spacing. Beds were covered with black virtually impermeable mulch and irrigated with a drip system. Seeds were sown at 30-in spacing along beds skipping a 6-ft alley between plots and every third bed as a buffer. Fungicide and surfactant treatments were applied on 8 Apr, 19 Apr, 26 Apr, 3 May, and 11 May (corresponding with applications 1 to 5 below) with a CO₂ back pack sprayer calibrated to deliver 40 (app. 1), 60 (apps. 2,3,4), and 100 gal/A (app. 5) at 40 psi. Treatments, including a non-treated control were arranged in a completely randomized block design with each treatment repeated four times. Plots were monitored regularly for powdery mildew, and rated on 5 May, 12 May, 19 May, and 27 May after disease reached appreciable levels. Alternating applications of Previcur Flex (1.2 pt/A) and Curzate 60DF (3.2 oz/A) were applied to minimize the impact of downy mildew, especially when conducive conditions occurred in May.

Except HeadsUp, Actigard (0.25oz/A), Tween 20 and water, the other treatments significantly reduced disease severity by 14.8–99.1% in comparison to the untreated control based on the first rating. Of three nonionic surfactants tested, Induce and Tactic could significantly reduce the initial disease severity. However, the efficacy of the two surfactants decreased considerably with increasing disease pressure. Based on the last rating on 27 May, only Quintec-Procure, Procure-Torino-Induce-Quintec, Quintec-Torino-Induce-Procure, and Flint-Torino-Induce-Procure significantly lowered the final disease severity compared to the untreated control. Of these four treatments, the latter two intensive programs performed significantly better than the former two treatments, resulting in a significant decrease of 61.9% in comparison to the non-treated control. Based on the area under the disease progress curves (AUDPC), Tolfenpyrad-Induce, Fontalis, Quintec-Procure, Bravo Weatherstik, Actigard (0.75 and 1 oz/A), Procure-Torino-Induce-Quintec, Quintec-Torino-Induce-Procure, and Flint-Torino-Induce-Procure remarkably reduced disease progress by 5.30–86.7% compared to the untreated control. Application rates of Actigard between 0.25–0.50 oz/A did not significantly reduce disease epidemics. Overall, Quintec-Torino-Induce-Procure and Flint-Torino-Induce-Procure performed significantly better than the other treatments in control of powdery mildew on cantaloupe in this study.

Treatment, rate/A (application) ^z	Disease severity (%) ^y				
	7 May	12 May	19 May	27 May	AUDPC ^x
Tolfenpyrad, 21 fl oz (1–5); Induce, 0.25% (v/v) (1–5).....	61.0 ef ^w	77.6 b	98.5 a	98.5 a	1890 d
Fontalis, 24 fl oz (1–5).....	4.50 g	43.8 c	92.1 b	97.0 a	1401 e
Quintec, 6 fl oz (1,3,5); Procure 480SC, 8 fl oz (2,4).....	3.00 g	15.0 de	62.5 c	76.8 b	891 f
Bravo WeatherStik, 2 pt (1–5).....	56.3 f	93.3 a	98.5 a	98.5 a	1982 cd
BEXP 141AG, 1% (v/v) (1–5).....	67.3 def	95.5 a	98.5 a	98.5 a	2037 abc
HeadsUp, 0.13 oz/gal (1).....	86.3 ab	95.5 a	98.5 a	98.5 a	2103 a
Actigard, 0.25 oz (1–5).....	81.5 abc	95.5 a	98.5 a	98.5 a	2087 ab
Actigard, 0.50 oz (1–5).....	67.3 def	95.5 a	98.5 a	98.5 a	2037 abc
Actigard, 0.75 oz (1–5).....	61.0 ef	93.3 a	98.5 a	98.5 a	1999 bc
Actigard, 1 oz (1–5).....	56.3 f	94.4 a	98.5 a	98.5 a	1990 bc
Tween 20, 0.25% (v/v) (1–5).....	76.8 a-d	95.5 a	98.5 a	98.5 a	2070 abc
Induce, 0.25% (v/v) (1–5).....	75.5 bcd	95.5 a	98.5 a	98.5 a	2066 abc
Procure 480SC, 8 fl oz (1,2);Torino, 3.4 fl oz (3,5); Induce, 0.25% (v/v) (3,5); Quintec, 6 fl oz (4).....	1.13 g	23.3 d	32.8 d	56.3 c	637 g
Quintec, 6 fl oz (1,3); Torino, 3.4 fl oz (2,4); Induce, 0.25% (v/v) (2,4); Procure 480SC, 8 fl oz (5).....	0.75 g	2.25 f	15.0 e	37.5 d	281 h
Flint 50WP, 2 oz (1,3); Torino, 3.4 fl oz (2,4); Induce, 0.25% (v/v) (2,4); Procure 480SC, 8 fl oz (5).....	1.88 g	4.88 ef	16.1 e	37.5 d	312 h
Tactic, 0.25% (v/v) (1–5).....	72.0 cde	93.3 a	98.5 a	98.5 a	2038 abc
Water.....	86.3 ab	95.5 a	98.5 a	98.5 a	2103 a
Untreated control (no water).....	88.6 a	95.5 a	98.5 a	98.5 a	2111 a
<i>P</i> > <i>F</i>	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001

^z Listed treatment rates are on a per acre basis unless noted otherwise.

^y The severity of powdery mildew was assessed as the percentage of canopy affected. The Horsfall-Barratt scale was used for all ratings, but values were converted to mid-percentages prior to statistical analyses.

^x Area under the disease progress curves (AUDPC) was calculated using the formula: $\sum[(x_i+x_{i+1})/2](t_i-t_{i-1})$ where x_i is the rating at each evaluation time and (t_i-t_{i-1}) is the time between evaluations.

^w Values followed by the same letter are not statistically significant ($P = 0.05$) according to Fisher's LSD test.