

Evaluation of fungicides for control of Fusarium wilt on watermelon in Clayton, North Carolina, 2018.

This experiment was conducted at the Central Crops Research Station in Clayton, NC, in a field nursery of *Fusarium oxysporum* f. sp. *niveum* (FON). The trial site was planted with watermelon the previous year. Experimental plots were in single, raised beds on 10-ft centers covered with white plastic mulch. Plots were 16-ft long with 9-ft fallow borders on each end, with plants spaced at 1 plant per 2-ft in row. Irrigation and fertilization (4-0-8, N-P-K) were applied via drip tape. Experimental treatments were randomized in a complete block design with four replications per treatment. The commercially available cultivar 'Black Diamond' was planted as a universally susceptible cultivar to FON. Transplants were grown in a greenhouse for seven weeks and hardened for two days. On 9 May, transplants were inoculated by dipping the transplant trays in a conidial spore suspension of FON at a concentration of 10^7 conidia/mL for 20 min, immediately followed by transplanting eight plants per plot. On 16 May, a second inoculation was applied as a 50mL drench of a 10^6 conidia/mL suspension at the base of the plant. Fungicide drench treatments were applied in 100mL solution on 9 May, two hr post-inoculation. Foliar fungicide treatments were applied using a CO₂-powered backpack sprayer at 40 gal/A. Applications were made on 14-day intervals: 24 May, 7 Jun, and 21 Jun. Disease incidence was assessed as the percentage of diseased plants per plot and rated twice weekly between 14 May and 21 Jun. All plots were harvested on 3 Jul, and number of watermelons, average watermelon weight, and total harvested weight per plot were recorded. Data were analyzed in the software ARM (Gylling Data Management, Brookings, SD) using analysis of variance and the Fisher's Protected LSD test to separate means.

Low levels of Fusarium wilt were first observed on 21 May in the non-treated and all but one of the treated plots. Disease progressed throughout the trial, reaching over 75% incidence in the non-treated plots four weeks after the first inoculation date. Ratings and fungicide spray treatments continued until 21 Jun to ensure a harvestable crop, but severity was found to stabilize within plots after 11 Jun. Six out of eight fungicide programs, that included a drench treatment at transplant, performed better than programs lacking a drench treatment. Fungicide programs that used Proline as the initial drench, regardless of whether a spray treatment followed, provided the greatest reduction in the incidence of Fusarium wilt. The use of Proline only, as a drench, followed by two spray treatments resulted in the highest numerical total fruit count and numerical average fruit weight as well as numerical total fruit weight. Phytotoxicity was not observed. In the table, treatments are sorted by level of disease incidence on the last disease rating date shown (11 Jun).

Treatment and rate of product per acre	Spray Application ^y	Disease incidence (%) ^z					Total fruit count	Total fruit weight (lbs.)	Avg. fruit weight (lbs.)
		21 May	29 May	4 Jun	11 Jun	3 Jul			
Proline (drench) 5.7 fl oz									
Proline (spray) 5.7 fl oz	1,2	0.00 b ^x	6.25 c	6.25 d	6.25 c	8.5 a	87.81 a	10.03 a	
Proline (drench) 10.3 fl oz	N/A	3.13 b	9.38 c	9.38 d	9.38 c	7.8 abc	57.98 abc	7.50 a	
Proline (drench) 5.7 fl oz									
Adepidyn (spray) 10.3 fl oz	1,2	3.13 b	6.25 c	9.38 d	15.63 c	8.5 a	60.03 abc	7.17 a	
Proline (drench) 5.7 fl oz									
Adepidyn (spray) 10.3 fl oz	1,3								
Proline (spray) 5.7 fl oz	2	3.13 b	12.50 bc	12.50 d	15.63 c	8.3 ab	63.56 ab	7.61a	
Adepidyn (drench) 10.3 fl oz									
Proline (spray) 5.7 fl oz	1,3								
Adepidyn (spray) 10.3 fl oz	2	6.25 b	25.00 bc	40.63 c	68.75 b	5.3 cde	28.44 cd	5.62 a	
Adepidyn (drench) 10.3 fl oz									
Adepidyn (spray) 10.3 fl oz	1,2	6.25 b	34.38 b	43.75 c	71.88 b	6.3 a-d	34.61 bcd	5.47 a	
Adepidyn (drench) 10.3 fl oz									
Proline (spray) 5.7 fl oz	1,2	9.38 b	21.88 bc	53.13 bc	71.88 b	5.5 b-e	32.19 bcd	5.73 a	
Adepidyn (drench) 10.3 fl oz		3.13 b	34.38 b	59.38 abc	71.88 b	4.8 de	18.41 d	3.42 a	
Adepidyn (spray) 10.3 fl oz	1,2	16.53 ab	61.60 a	70.98 ab	74.10 ab	2.8 e	23.26 d	7.94 a	
Non-treated	N/A	6.25 b	65.63 a	78.13 a	81.25 ab	3.0 e	28.40 cd	7.67 a	
Proline (spray) 5.7 fl oz	1,2	34.38 a	65.63 a	78.13 a	87.50 a	2.8 e	15.43 d	6.46 a	

^zPercent disease incidence was calculated for each treatment based on the percentage of diseased plants per plot

^y Spray applications were made on 14-day intervals: 1=24 May, 2=7 Jun, and 3=21 Jun.

^x Means followed by the same letter(s) within a column are not statistically different (P=0.05, Fisher's Protected LSD)