

Evaluation of products for the control of Phytophthora crown rot in annual strawberry, 2017-2018.

The experiment was initiated on 17 Oct by setting bare root strawberry plants from Canadian into plastic-mulched beds previously fumigated with Telone C-35 (300 lb/A). The beds were 32-in. wide at the base on 4-ft centers. Each bed held two staggered rows of plants spaced 12 in. apart between and within rows. Treatments were arranged in a randomized complete block design with four blocks in adjacent beds. Plots consisted of 20 plants in 9 ft of bed separated by 3- to 4-ft gaps between plots. Prior to transplanting, plants in two MBI-110A treatments were briefly dipped in the biological product. Transplants in the remaining treatments were not dip treated. After transplanting, the experimental area was overhead watered during the day for 10 days to facilitate plant rooting and establishment. Plants were inoculated on 2 Nov using syringes fitted with 18 gage needles to saturate the soil around each crown with 10 ml of mixed inoculum (10^4 zoospores/ml) consisting of three *P. cactorum* isolates. Inoculated and noninoculated controls were included in the experimental design. Post-plant applications were initiated on 3 Nov and ended 9 Jan. Applications were made as drip tape chemigations or foliar sprays. Application types and intervals were treatment specific. Drip applications were made in 0.4 gal water per foot of bed (4,630 gal/A) through 10 foot-long drip tapes with 12-in. emitter spacing. Two tapes were installed per plot, one next to each plant row. Foliar sprays were made with a CO₂ back-pack sprayer at 60 PSI and 100 gal/A. The sprayer was equipped with two TeeJet® 8002 hollow-cone nozzles spaced 12 in. apart on the wand. Plots were evaluated for disease five times at 2-wk intervals from 21 Nov (7 weeks after planting) to 16 Jan (13 WAP). Plants that were dead, partially collapsed, or severely stunted were considered diseased. Fruit were harvested once or twice weekly from 11 Dec to 15 Jan (11 times) to obtain yield of marketable fruit weighing more than 10 g each. Data were analyzed by two-way ANOVA using the GLM procedure in SAS software (SAS Institute, Cary, NC).

In this experiment, the rate of disease development following inoculation was slow, and overall plant disease incidence was low, reaching only 17.5% in the inoculated control. Five percent of plants in the noninoculated control also became diseased, indicating low levels of natural inoculum in the original transplants. AUDPC calculations over the 10-wk observation period gave statistically similar results to the final set of disease incidence observations. Therefore, disease incidence is only shown for the last set of observations made 13 WAP. At this time, A21723E, A20998, and Ridomil Gold significantly reduced disease incidence from 17.5% to 3.8% or less. Two Actigard and one Helena Prophyt treatment produced disease incidences ranging from 7.7 to 10.0% that were not significantly different from the inoculated control. Neither MBI-110 treatment reduced disease incidence. The ANOVA for yield was not significant ($P = 0.4226$) with A21723E showing the highest numerical value. Low disease incidence and early termination of the experiment due to cold weather may explain this lack of significance. No phytotoxicity symptoms were observed.

Product and rate/A ^z	Treatment type	Application timing (WAP) ^y	Yield (lb/A)	DI (%) ^x 13 WAP
A21723E 13.7 fl oz	drip	2,6,10	6648	0.0 a ^w
Ridomil Gold 480SL 16 fl oz	drip	2,6,10	5549	3.8 a
A21008A 4.79 fl oz	drip	2,6,10	5431	3.8 a
Actigard 0.375 oz	foliar spray	2,3,4...10	5669	7.5 ab
Actigard 0.75 oz	drip	2,4,6,8,10	6012	9.1 abc
Helena Prophyt 2.67 pt	foliar spray	2,5,8,11	5102	10.0 abc
Helena Prophyt 4 pt	foliar spray	2,7,12	5702	16.0 bcd
Stargus (MBI-110) 1.0% v:v	plant dip	at planting		
Stargus (MBI-110) 4 qt	drip	2,5,8,11	5821	18.5 cd
Stargus (MBI-110) 0.5% v:v	plant dip	at planting		
Stargus (MBI-110) 2 qt	drip	2,5,8,11	4659	26.3 d
Non-inoculated control	na	na	6142	5.0 a
Inoculated control	na	na	5395 ns	17.5 bcd

^zRates shown are for broadcast application. For drip treatments, rates were adjusted as banded applications to the beds only which occupy 67% of an acre.

^yPlanting was done on 17 Oct 2017; numbers indicate weeks after planting (WAP).

^xDisease incidence (DI) in percent of dead, partially collapsed, or severely stunted plants 13 WAP.

^wValues in a column followed by the same letter are not significantly different by Fisher's Protected LSD ($\alpha = 0.05$).