

Evaluation of products for the control of *Phytophthora* crown rot in annual strawberry, 2021-2022.

An experiment was conducted at the University of Florida Gulf Coast Research and Education Center during the 2021-22 strawberry growing season to evaluate the efficacy of products against *Phytophthora* crown rot. On 07 Oct 21, bare root strawberry transplants from a Canadian nursery were set into plots on 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. The plots were 9.5 ft long and consisted of 20 plants spacing approximately 12 in. within and between rows in two staggered rows of 10 plants each. After transplanting, the experimental area was overhead watered during the day with 15-min intermittent intervals for 10 days to promote establishment. The plants were subsequently irrigated and fertilized through a central drip tape in each bed. Treatments were arranged in a randomized complete block design with four blocks in adjacent beds. Seven days after planting (DAP) on 14 Oct, an EZ-Ject Soil Injector was used to deposit 0.6 fl oz of inoculum 2 in. from each plant at a 1.5-in. depth. The inoculum consisted of a mixed suspension of 1×10^4 zoospores/ml, produced from four isolates of *Phytophthora cactorum*. Inoculated and non-inoculated controls were included in the experiment. Treatments were applied from 20 Oct to 20 Dec 21 (13 to 75 DAP) through dedicated drip tapes with 10 emitters at 12-in. spacing. Two tapes were installed per plot, one next to each plant row, and applications were made in 0.4 gal water per foot of bed (4,350 gal/A). Disease incidence data was collected weekly from 22 Nov 21 to 24 Jan 22 (4 weeks after the last treatment application) and the data was expressed as the percentage of the total number of dead, partially collapsed, and severely stunted plants in relation to the total number of plants. Area under the disease progress curve (AUDPC) was also calculated. Throughout the trial, isolations of a few symptomatic plants were carried out to confirm *P. cactorum* as the causal agent of disease. Fruit were harvested twice weekly from 2 Dec 21 to 25 Jan 22 to obtain yield of marketable fruit weighing more than 10 g each. Data were analyzed by fitting a generalized linear mixed model using the GLIMMIX procedure in SAS (SAS Institute, Cary, NC) and means were separated by Fisher’s Protected LSD test ($\alpha = 0.05$).

Plants began developing symptoms during mid-to-late Nov, approximately 4 weeks after inoculation. Disease incidence increased rapidly in Dec but tapered off before the last evaluation on 24 Jan (102 DAP), when average disease incidence reached 35.3% in the inoculated control, which would be considered moderate for this disease. Symptomatic plants were also observed in the non-inoculated control treatment, likely due to quiescently infected transplants, but disease incidence was lower and yield was higher than in the inoculated treatment. Disease incidence in plants treated with Ridomil Gold, Orondis Gold, Revus (8 and 16 fl oz), and Revus + Previcur Flex was reduced compared to the inoculated control; however, only the first two treatments had lower AUDPC than the inoculated control. Nevertheless, Ridomil Gold, Orondis Gold, two applications of Revus at 8 fl oz, and Revus + Previcur Flex significantly increased marketable yield compared to the inoculated control treatment. No phytotoxicity was observed in this experiment.

Post-plant drip applications (product and rate/A) ^z	Timing (DAP) ^y	Yield (lb/A) ^x	Phytophthora crown rot ^w		
			Incidence (%)	AUDPC	
Ridomil Gold SL 1 pt	13, 35, 62	21633.8 a	3.8 d	20.8	e v
Orondis Gold 28 fl oz	13, 35	20720.5 a	7.6 cd	54.3	de
Revus 8 fl oz + Previcur flex 6 SL (A6261D) 19 floz	13, 35	19861.4 a	15.7 bcd	94.5	cde
Revus 16 fl oz	13	18361.9 abc	16.6 bcd	131.9	abcd
Revus 8 fl oz	13, 35	19745.0 a	17.5 bcd	103.5	bcde
Non-inoculated control		18629.6 ab	17.9 bcd	95.1	cde
Howler 3 lb + Induce 2 pt	13, 35, 62	17577.2 abc	22.5 abc	191.5	ab
Howler 2.5 lb + Theia 1.5 lb + Induce 2 pt	13, 35, 62	14251.9 c	29.4 ab	195.8	ab
Theia 3 lb + Induce 2 pt	13, 35, 62	17513.3 abc	29.8 ab	206.9	a
Inoculated control		15083.0 bc	35.3 a	177.6	abc
Probability of a greater F value		0.0361	0.0083	0.003	

^z Drip application rates were calculated as banded applications made to beds only, which occupied approximately 67% of an acre.

^y DAP = days after planting (7 Oct 21). Plants were inoculated on 14 Oct 21. Application time over 72 days from 20 Oct to 20 Dec 21.

^x Yield based on cumulative harvest data from 2 Dec 21 to 25 Jan 22 (14 harvests).

^w Phytophthora crown rot incidence data collected weekly from 22 Nov 21 to 24 Jan 22. Disease incidence based on percent dead, partially collapsed, and severely stunted plants on the last evaluation date. AUDPC = area under the disease progress curve.

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