STRAWBERRY (*Fragaria x ananassa* 'Florida Radiance')
Crown rot and Root necrosis; *Colletotrichum acutatum*

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Evaluation of dip treatments for control of *Colletotrichum acutatum* on strawberry transplants, 2016-17.

Product effectiveness in managing root necrosis and crown rot caused by *C. acutatum* was evaluated at the Gulf Coast Research and Education Center, Wimauma, FL. Canadian bare-root transplants were inoculated on 10 Oct 16 with a mixture of four *C. acutatum* isolates, two sensitive and two resistant to Quinone-outside inhibitor (QoI) fungicides. Plants were inoculated by spraying a suspension of 10^6 conidia/ml onto plant roots using 300 ml per 100 plants. After inoculation, plants were kept at room temperature overnight and were transplanted into plastic-mulched raised beds on 11 Oct 16. Beds were 28 in. wide on 4-ft centers and contained two staggered rows of plants spaced 12 in apart within and 15 in. between rows. Fifteen treatments were arranged in a randomized complete block design with four blocks in neighboring beds. Plots were 10.5-ft long with 20 plants each, separated by a 3-ft gap without plants. Treatments consisted of submerging (dipping) four bundles of 20 plants each in a 4 gal solution or suspension of fungicide for 5 min. All treatments were dipped in the field just prior to planting in single marked plots in each replication, except one treatment of Zivion which was dipped indoors to avoid degradation by sunlight. Controls were dipped in water for 5 min before planting. To aid establishment, plants were overhead irrigated for 10 days. Further irrigation and fertilization were done via drip tapes until the end of the evaluations. K-phite, Prophyt, Prophyt + Abound, and Phostrol treatments received an additional foliar spray application 21 days after planting (DAP). Sprays were applied with a CO_2 back-pack sprayer, calibrated to deliver 100 gal/A at 60 psi through two T-Jet 8002 hollow-cone nozzles. Plant diameters of 10 staggered plants in each plot were measured 35 DAP using a ruler attached to a clear plastic sheet to push leaves down near the bed. Two perpendicular measurements were made, the first along the longest axis of the canopy. The 10% trimmed average was used to avoid outliers and estimate plant diameter per plot. Percentage of diseased plants (dead + wilted) was evaluated 42 DAP. Seven harvests were performed from 1 Dec 16 to 29 Dec 16. Yield was determined by counting and weighing marketable fruit, and expressed in lb/A. Plant diameter, plant mortality, and yield were analyzed by fitting a generalized linear mixed model in SAS. Means were separated by Fisher's Protected LSD test ($\alpha = 0.05$).

Diseased plants ranged from 0.0 (Zivion 26.6 fl oz indoor treatment) to 28.7% (Actinovate 12 oz). Switch, Topsin, and both rates of Zivion were the only treatments that reduced disease incidence compared to the non-treated control. With the exception of Zivion (dipped in the field), these same treatments as well as Captan Gold 4L significantly increased plant diameter when evaluated 35 DAP. Switch, Topsin, and Zivion (dipped in the field), were the only treatments producing higher yields than the non-treated control. The only QoI fungicide tested (Abound) did not differ from the non-treated control for any of the evaluated parameters suggesting that this group of fungicides is no longer effective when resistant isolates are present. Research on Zivion (natamycin) is based in part on trials conducted in California (Haack et al. 2017. Abstr. Phytopathology Supplemental).

Treatment (products and rates/100 gal.)	Plant diameter (in)[z]	Disease Incidence (%)[y]	Yield (lb/A)[x]
Switch 62.5WG 8 oz	6.8 a	1.2 e	3887 a[w]
Topsin 4.5FL 20 fl oz	6.5 ab	1.2 de	3202 ab
Zivion 26.6 fl oz (Dip in the field)	5.7 bcd	2.5 de	2924 abc
Captan Gold 4L 2 qt	6.5 ab	5.0 cde	2705 bcd
Zivion 26.6 fl oz (Dip indoors to avoid sunlight)	5.9 abc	0.0 e	2547 bcde
Omega 1.25 pt	4.6 cde	17.5 abc	2186 bcde
K-Phite 2 pt dip f.b. 4 pt spray, 21 DAP	5.1 bcd	12.5 abcd	2145 bcde
Prophyt 4 pt dip f.b. 4 pt spray, 21 DAP	4.4 de	11.2 bcde	2031 cde
Prophyt 2 pt dip f.b. 4 pt spray, 21 DAP	4.3 de	18.7 ab	1897 cde
Prophyt 2 pt + Abound 2.08F 8 fl oz dip f.b. Prophyt 2 pt + Abound 2.08F 8 fl oz spray 21 DAP	4.2 de	16.2 abc	1891 cde
Phostrol 2 pt dip f.b. 4 pt spray, 21 DAP	5.0 cd	13.7 abc	1802 de
Abound 2.08F 8 fl oz	4.5 de	13.7 abc	1644 de
Actinovate AG 24 oz	4.4 de	13.7 abcd	1516 e
Actinovate AG 12 oz	3.5 e	28.7 a	1488 e
Non-treated control	4.2 de	16.2 abc	1690 de

[z] Plant diameter evaluated 35 days after planting. Average of two perpendicular measurements/plant, the first along the longest axis.
[y] Percentage of disease incidence evaluated 42 days after planting.
[x] Average marketable yield in lb/A for 7 harvests from 1 Dec 16 to 29 Dec 16.
[w] Means in a column followed by the same letter are not significantly different by Fisher's Protected LSD test (a = 0.05).