

Chemical control of *Pestalotiopsis* sp., a developing pathogen of strawberry, 2018-19.

During the 2018-19 growing season, a *Pestalotiopsis* sp. caused a new and debilitating leaf spot and fruit rot disease of strawberry in several Florida fields. According to growers, traditional strawberry fungicides failed to control the disease. To test a broad range of fungicides under field conditions, this trial was superimposed on a completed transplant drench experiment located at the University of Florida Gulf Coast Research and Education Center in Wimauma, FL. The experiment was planted on 5 Oct 2018 by setting plug plant transplants (cultivar FL-127, Sensation™) into marked plots on fumigated plastic-mulched beds. The plants were overhead irrigated during the day for 4 days to enhance plant establishment and subsequently irrigated and fertilized through a central drip tape in each bed. Standard sprays were applied to control diseases, insects, and mites, but were suspended 10 d before this trial was initiated. The experimental area was arranged in a randomized complete block design and consisted of three replicate beds on 4-ft centers. Plots initially contained 16 - 20 plants in two staggered rows spaced 15 in. apart within rows and 12 in. between rows, but were thinned to 10 -13 plants to facilitate spray coverage. On 26 Feb, treatments were applied for the first time using a CO₂ back-pack sprayer calibrated to deliver 100 gal/A at 60 psi through a wand fitted with two T-Jet 8002 hollow-cone nozzles spaced 12 in. apart. When the spray dried, six half-pieces of *Pestalotiopsis*-infected fruit were evenly distributed in the middle of each plot and an overhead irrigation system was turned on for the remainder of the day. Inoculum was produced by depositing 2.5 µL of spore suspension consisting of two fresh isolates of *Pestalotiopsis* from local farms onto large pink fruit from the experimental area, and incubating the fruit in plastic tubs on a laboratory bench for 12 d. The fruit were prepared for inoculation by removing their calyces, soaking in 0.525% sodium hypochlorite plus Tween 20 for 2 min, and rinsing in sterile water. After 26 Feb, the experimental area was overhead irrigated during the day for four consecutive weekends, followed by fungicide applications each Monday for a total of 5 weekly sprays. An additional application of Oxidate was made on Feb 28. Ripe fruit were harvested on 10, 14, 18, and 22 Mar, counted, and evaluated for disease. Fruit disease incidence was expressed as a percentage of total fruit harvested. Foliar disease was evaluated from 2 to 5 Apr by counting the number of leaves on each plant with one or more *Pestalotiopsis* lesions. Total leaf numbers were recorded for 21 plants (1 random plant per treatment) to express leaf spot incidence as a percentage. Overall disease incidence (DI) was calculated as an average of leaf spot and fruit rot DI. Data were analyzed by two-way ANOVA using the Proc GLM procedure in SAS software. Treatment means were separated by Fisher's protected LSD procedure ($\alpha = 0.05$).

Characteristic *Pestalotiopsis* lesions were found on fruit and leaves 5 d after inoculation. Since water is necessary for disease spread, overhead irrigation was applied periodically. Even with irrigation, severe symptoms like those observed on commercial farms were not induced. However, progressive and cumulative spotting of leaves and fruit was sufficient to compare fungicide effects. ANOVAs for *Pestalotiopsis* diseases were significant for leaf spot ($p = 0.0464$) but not fruit rot ($p = 0.1044$). Only Omega reduced leaf spot incidence in this three-replicate trial. However, Oxidate and Switch were not significantly different from Omega. Experimental variation was reduced by averaging leaf spot and fruit rot incidences to produce an overall parameter for *Pestalotiopsis* disease. Only Omega significantly reduced overall DI. When means were compared with alpha set to 0.10, Oxidate and Switch also significantly reduced overall DI. However, the 28 Feb application of Oxidate to compensate for transient residual activity may have inflated its efficacy data. No phytotoxicity symptoms were observed in this trial. Of the 19 products tested, only two or three look promising. Omega, a broad spectrum fungicide with the strongest efficacy profile, is not registered for use on strawberry. These results support growers' observations that traditional strawberry fungicides do not adequately control *Pestalotiopsis*.

Products and rates/A	Fungicide type ^z	Pestalotiopsis disease incidence (%)		
		Fruit rot	Leaf spot ^y	Fruit and leaf ^x
Omega 500F 20 fl oz	unclassified	6.5	5.9 ab	6.2 a ^w
Oxidate 2.0 1 gal	hydrogen dioxide	7.7	10.4 abc	9.1 abc
Switch 62.5WG 14 oz	AP + PP	9.2	10.2 abc	9.7 a-d
Tavano 13 fl oz	polyoxin	11.1	12.5 a-d	11.8 a-e
Topsin 4.5FL 20 fl oz	MBC (thiophanate type)	12.0	12.9 b-e	12.4 a-e
Protexio SC 19 fl oz	SBI (class III)	14.3	10.9 abc	12.6 a-e
Aprovia 10.5 fl oz	SDHI (pyrazole type)	13.4	12.5 a-d	12.9 a-e
Merivon 11 fl oz	SDHI + QoI	14.3	12.4 a-d	13.3 a-e
Captan Gold 4L 3 qt	multisite	12.2	15.3 cde	13.7 b-e
Mettle 125ME 5 fl oz	DMI (triazole type)	15.1	12.8 bcd	13.9 b-e
Rally 40WSP 5 oz	DMI (triazole type)	16.1	12.6 a-d	14.4 cde
Thiram SC 2.6 qt	multisite	14.8	14.0 cde	14.4 cde
Kenja 400SC 15.4 fl oz	SDHI (phenyl-oxo-ethyl)	17.0	11.9 a-d	14.4 cde
Procure 480SC 8 fl oz	DMI (imidazole type)	15.6	13.4 cde	14.5 cde
Fontelis 24 fl oz	SDHI (pyrazole type)	17.5	14.2 cde	15.9 c-f
Rhyme 7 fl oz	DMI (triazole type)	17.3	14.5 cde	15.9 c-f
Luna Tranquility 27 fl oz	SDHI (pyridinyl type)	17.6	15.8 cde	16.7 def
Elevate 50WDG 1.5 lb	SBI (class III)	18.2	18.2 de	18.2 ef
Abound Flowable 15.5 fl oz	QoI (strobilurin)	24.6	19.8 e	22.2 f
Control (non-inoculated)		8.2	5.8 a	7.0 ab
Control (inoculated)		16.0	15.7 cde	15.9 c-f
Pr >F (type III SS-treatment)		0.1044	0.0464	0.0267

^z AP = Anilopyrimidine; DMI = demethylation inhibitor; MBC = methyl benzimidazole carbamate; PP = phenylpyrrole; ; QoI = quinoline outside inhibitor; SBI = sterol biosynthesis inhibitor; SDHI = succinate dehydrogenase inhibitor.

^y Number of infected leaves expressed as a percentage of the total number of leaves per plant.

^x Average of Pestalotiopsis fruit rot and leaf spot incidences.

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