STRAWBERRY (*Fragaria x ananassa* 'Florida Radiance')
Botrytis fruit rot; *Botrytis cinerea*

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Evaluation of biorational products for control of Botrytis fruit rot in annual strawberry, 2017-18.

Biorational products and two conventional fungicide treatments were evaluated for the management of Botrytis fruit rot (BFR) on a commercial farm in Plant City, FL. Bare-root transplants from a North Carolinian nursery were planted on 27 Sep 17 on raised beds pre-fumigated with Pic-Clor 60 (200 lb/A) and covered with black plastic-mulch. Beds were 28 in. wide on 4-ft centers and contained two staggered rows of plants, which were spaced 15 in. within and between rows. To aid plant establishment, plants were overhead irrigated for 10 days after planting. Water and nutrients were applied by drip tape for the remainder of the season. Nineteen fungicide treatments and a non-treated control were arranged in a randomized complete block design with four blocks in neighboring beds. Plots containing 12 plants each were separated by 3-ft long gaps without plants. Treatments were applied with a CO_2 back-pack sprayer calibrated to deliver 100 gal/A at 60 psi through a boom mounted with two hollow-cone T-Jet 8002 nozzles. Treatments containing biorational materials were applied 13 times on a weekly schedule from 24 Nov 17 to 20 Feb 18. Treatments with the conventional fungicides Switch 62.5WG or Thiram SC were applied during weeks of conducive weather for infection, and maintenance applications of Captan 80WDG were applied during the other weeks. Infection risk was assessed using the Strawberry Advisory System (StAS) (http://agroclimate.org/tools/sas/). Four weather-triggered applications were made (8 and 20 Dec 17, and 23 and 30 Jan 18). Fruit were harvested twice a week from 5 Dec 17 to 27 Feb 18 (23 harvests) to estimate yield and BFR incidence. Yield was expressed in pounds of marketable fruit per acre, and BFR incidence was expressed as a percentage of diseased fruit relative to total number of fruit. Data were analyzed by fitting a generalized linear mixed model. BFR incidence data were subjected to angular transformation to deal with homogeneity of variance, and means were separated according to Fisher's Protected LSD test ($\alpha = 0.05$) using the statistical software SAS.

During the experiment, there were three days in which the environmental conditions were highly favorable for *B. cinerea* infection according to the StAS. Even though the conditions were not highly favorable for longer periods, there were many days of moderately conducive conditions. Thus, average BFR incidence in the non-treated control reached 17.3% during the peak production period (23 Jan 18 to 27 Feb 18) and 27.8% during nine harvests in which BFR incidence in the non-treated control was greater than 10% (disease incidence peaks), and 11.8% over the entire harvest period. During the peak production period, the only treatments that reduced BFR incidence compared to the non-treated control were the two conventional treatments with Switch 62.5WG and Thiram SC, and both rates of Milstop. These same treatments also reduced BFR incidence during disease incidence peaks, together with Botector, calcium chloride (1000 ppm) + Kinetic, BotryStop, Actinovate AG (6 oz), and SA-0650003 (17.5 fl oz) + SA-0670001 (40 oz). These same treatments, except BotryStop, and Actinovate AG (6 oz) reduced BFR during the overall season. None of the treatments increased marketable yields, and one treatment with BBL03-04 significantly reduced yield, suggesting possible phytotoxicity.

Treatment (products and rates/100 gal.)	Application timing[w]	Yield (lb/A)[x]	BFR incidence (%)[y]		
			Production peak	Disease peak	Season
Switch 62.5 WG 14 oz Captan Gold 80WDG 1.9 lb	2, 4, 9, and 10 All other weeks	26130.4 ab	4.3 e	5.4 g	2.5 f
Thiram SC (2.6 qt) alerts, Captan Gold 80WDG 1.9 lb	2, 4, 9, and 10 All other weeks	26928.3 a	5.2 de	7.7 fg	3.5 ef
Milstop 3.75 lb	weekly	21472.0 cde	9.8 bcd	12.2 ef	6.3 de
Milstop 2.0 lb	weekly	22712.2 bcde	9.2 cd	13.5 def	6.6 d
Botector 7 oz	weekly	23718.4 abcd	11.6 abc	14.2 cdef	6.9 cd
SA-0650003 17.5 fl oz + SA-0670001 40 oz	weekly	24969.5 abc	12.7 abc	15.1 cde	6.9 cd
Calcium chloride 1000 ppm + Kinetic 12 fl oz	weekly	23812.0 abcd	13.5 abc	17.6 bcde	7.8 bcd
Actinovate AG 6 oz	weekly	24969.5 abcd	14.5 abc	16.9 bcde	8.1 abcd
BotryStop 3 lb	weekly	24480.3 abcd	13.1 abc	18.4 bcde	8.4 abcd
MBI-110 128 fl oz	weekly	24535.5 abcd	15.3 ab	19.1 abcde	8.5 abcd
Serenade Opti 1 lb	weekly	22631.9 bcde	13.5 abc	21.6 abc	9.2 abcd
SA-0670001 80 oz + Kinetic 12 fl oz	weekly	21979.9 cde	14.3 abc	21.9 abc	9.3 abcd
Calcium chloride 2000 ppm + Kinetic 12 fl oz	weekly	24359.4 abcd	15.2 ab	21.3 abc	9.4 abcd
Actinovate AG 12 oz	weekly	24497.8 abcd	17.1 a	20.5 abcd	9.6 abcd
SA-0650003 35 fl oz	weekly	21158.3 de	12.8 abc	18.9 abcde	9.7 abcd
Regalia 12 52 fl oz	weekly	21510.6 cde	15.8 a	23.7 ab	10.4 abc
BBL03-04 44 g/ gallon	weekly	19278.5 e	14.6 abc	25.0 ab	10.7 ab
Non-treated control	-	23818.8 abcd	17.3 a	27.8 a	11.8 a
Probability of greater F value		0.0237	<.0001	<.0001	<.0001

[z] Means in a column followed by the same letter are not significantly different according to Fisher's Protected LSD test (α= 0.05).
[y] Incidence of Botrytis fruit rot (BFR) during the production peak period, corresponding to harvests from 23 Jan 18 to 27 Feb 18, disease incidence peak period, which corresponded to harvests in which BFR incidence in the non-treated control was higher than 10%, and overall season.
[x] Sum of yield in pounds per acre evaluated from 5 Dec 17 to 27 Feb 18, total of 23 harvests.
[w] Week of application over 13 weeks from 24 Nov 17 to 20 Feb 18.