STRAWBERRY (*Fragaria* x *ananassa* 'Florida Beauty')
Anthracnose fruit rot; *Colletotrichum acutatum*

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Evaluation of products for anthracnose fruit rot control in strawberry, 2019-2020.

On 9 Oct 2019, bare-root strawberry plants from Canada were transplanted into plastic-mulched raised beds previously fumigated with Telone C-35 (300 lb/A). The beds were 28 in. wide on 4-ft centers. The experiment was arranged in a randomized complete block design with four adjacent beds serving as blocks and 19 treatments. Plots were 8.8 ft long separated by 30-in. gaps and contained 14 plants in two staggered rows of 7 plants each. Plant spacing was 15 in. within rows and 12 in. between rows. Transplants were irrigated by overhead sprinklers for 10 days to aid establishment, then irrigated and fertilized through a central drip tape. Fungicides were applied at weekly intervals from 26 Nov 19 to 28 Feb 20 using a CO_2 backpack sprayer calibrated to deliver 100 gal/A at 60 psi through two TeeJet 8002 hollow cone nozzles spaced 12 in. apart on the wand. Some products were applied weekly during that interval, for a total of 14 applications. Other products were applied when weather conditions favored disease development as indicated by the Strawberry Advisory System StAS (http://agroclimate.org/tools/sas/). StAS "alert" applications were made on 26 Nov 19, 13 Dec 19, 3 Jan 20, and 14 Feb 20, corresponding to weeks 1, 3, 6, and 12 of the 14-week spray period. Most StAS directed treatments received maintenance applications of Captan Gold 80WDG between alerts. Ripe and diseased fruit were harvested 23 times from 9 Dec 19 to 2 Mar 20, usually at 3- to 4-day intervals. Healthy fruit weighing more than 1/3 oz were counted and weighed to determine marketable yield. Fruit weighing less than 1/3 oz, diseased fruit, and other unmarketable fruit were also enumerated. Fruit rot incidence was expressed as a percentage of the total number of marketable and unmarketable fruit harvested throughout the season. Data were analyzed by ANOVA using the proc GLM procedure in SAS. Multiple means comparisons were made by the Fisher Protected LSD test ($\alpha = 0.05$).

During the 12 wk harvest period, overall incidence of anthracnose fruit rot (AFR) was moderate. AFR peaked during the last four harvests made from 20 Feb to 2 Mar during the main harvest period. This outbreak corresponded to an alert given by StAS on 14 Feb, followed by relatively mild weather. AFR incidence was reduced by every treatment tested. Over half of the treatments markedly reduced AFR incidence; others were less efficacious. The most effective treatments included StAS-directed applications of Miravis Prime, Miravis Prime + Actigard, Switch, and Abound followed by applications of Captan, Captan + Actigard, Captan, or Captan + Thiram during non-alert weeks, as well as weekly applications of Captan, Captan + NanoPro, Omega, Thiram, and Thiram + Captan. Marketable yields were increased 50 to 80% by the more efficacious treatments which included weekly applications of Captan + NanoPro, Omega, Thiram, and Thiram + Captan. Yield was similarly increased by StAS-directed treatments featuring Abound, Miravis Prime, and Miravis Prime + Actigard. Although all treatments significantly reduced AFR, not all treatments significantly increased marketable yield. Yields produced by BerryCare, Abound/Captan supplemented with NanoPro, and certain treatments with EXP 14 and EXP 22 were not statistically higher than the non-treated control. No obvious symptoms of phytotoxicity were observed.

Treatments (products, rates/A)	Application timing (wk)[z]	Yield (lb/A)[y]	AFR disease incidence (%)[y]
Thiram SC 1.5 qt + Captan Gold 4L 1.5 qt	1-14	18078 a	3.9 a[z]
Captan Gold 80WDG 2.5 lb + NanoPro (4 oz)	1-14	17265 abc	5.1 ab
Omega 500F 1.25 pt	1-14	17928 ab	5.1 ab
Miravis Prime 13.4 fl oz + Actigard 50WG 0.5 oz	1, 3, 6, 12		
Captan Gold 80WDG 2.5 lb + Actigard 50WG 0.5 oz	all others	17633 ab	5.5 abc
Switch 62.5WG 14 oz	1, 3, 6, 12		
Captan Gold 80WDG 2.5 lb	all others	15168 cde	5.9 a-d
Thiram SC 2.5 qt	1-14	17373 abc	6.9 a-d
Captan Gold 80WDG 2.5 lb	1-14	15690 bcd	7.0 a-d
Miravis Prime 13.4 fl oz	1, 3, 6, 12		
Captan Gold 80WDG 2.5 lb	all others	17352 abc	7.9 a-d
Abound 15 fl oz	1, 3, 6, 12		
Thiram SC 1.5 qt + Captan Gold 4L 1.5 qt	all others	16021 a-d	8.6 a-e
EXP 22 8 fl oz	1, 3, 6, 12		
Captan Gold 80WDG 2.5 lb	all others	14217 def	9.0 b-e
Abound 15 fl oz	1, 3, 6, 12		
Captan Gold 4L 1.5 qt	all others	13130 efg	10.1 cde
Fontelis 24 fl oz	1, 3, 6, 12		
Captan 80WDG 2.5 lb	all others	14426 def	10.5 de
EXP 22 10 fl oz + Induce 16 fl oz	1, 3, 6, 12		
Captan Gold 80WDG 2.5 lb	all others	12806 e-h	13.0 e
Abound 15 fl oz + NanoPro (4 oz)	1, 3, 6, 12		
Captan Gold 4L 1.5 qt + NanoPro (4 oz)	all others	12167 fgh	13.2 e
Exp 14 3.85 lb	1-14	13768 def	18.6 f
Exp 14 2.56 lb	1-14	11287 gh	20.6 f
BerryCare 1.4% + Cohere 12 fl oz	1, 3, 6-14		
Captan Gold 80WDG	2, 4, 5	12648 fgh	21.0 f
Exp 14 2.56 lb + Induce 16 fl oz weekly	1-14	11129 gh	21.2 f
Non-treated control	n.a.	10542 h	29.4 g

[z] Weekly applications were made for 14 wk from 26 Nov 19 to 28 Feb 20. Application week is indicated by the numbers 1 – 14.
[y] Incidence of anthracnose fruit rot (AFR) and marketable yields are cumulative totals for the whole season (23 harvests).
[x] Means in a column followed by the same letter are not significantly different by Fisher's protected LSD test ($\alpha = 0.05$).