

Evaluation of fungicide products to control Botrytis fruit rot in annual strawberry, 2017-18.

A field experiment was conducted on a commercial strawberry farm in Plant City, FL to evaluate the efficacy of fungicide treatments for the management of Botrytis fruit rot (BFR). On 27 Sep 17, bare-root strawberry transplants from North Carolina were transplanted into compacted raised beds measuring 28 in. wide on 4-ft centers. Beds were treated with Pic-Clor 60 (200 lb/A) before covering with black plastic mulch and plants were arranged in two staggered rows per bed with 15-in. between rows. The plants were overhead irrigated during the day for the first 10 d to facilitate plant establishment. Drip irrigation was used to provide water and fertilizers for the remainder of the season. The experiment consisted of twenty treatments arranged in a randomized complete block design with 4 replications. Plots measured approximately 9.4 ft-long and were composed of 12 plants each. Test products were applied with a CO₂ back-pack sprayer calibrated to deliver 100 gal/A at 60 psi through a boom fitted with two T-Jet 8002 hollow-cone nozzles. Treatments were applied weekly from 1 Dec 2017 to 20 Feb 2018 (12 applications), but the majority of single site fungicides were applied according to Strawberry Advisory System (StAS, <http://agroclimate.org/tools/sas/>) alerts, which were based on conducive weather conditions for infection (17 to 25°C and ≥ 12 h leaf wetness). In total, four StAS based applications were made on 8 and 20 Dec 2017, and 23 and 30 Jan 2018. For evaluation of yield and BFR incidence, fruit were harvested twice a week from 5 Dec 2017 to 27 Feb 2018 (23 harvests). Marketable fruit were weighed to determine yield in pounds per acre. BFR incidence was calculated as the percentage of infected fruit relative to the total number of fruit harvested. BFR incidence data was transformed to achieve homogeneity of variance prior to analysis; back-transformed data is presented. Data were analyzed by fitting a generalized linear mixed model in SAS, and means were separated according to Fisher's Protected LSD test ($\alpha = 0.05$).

According to StAS, a high risk for BFR development occurred during four days of the 2017-18 growing season. However, moderate risk with conducive conditions was present during several additional days. BFR incidence was analyzed during the peak production period from 23 Jan to 27 Feb, during nine selected harvests when disease incidence exceeded 10% in the non-treated control, and over the entire season with averages of 15.3, 22.9, and 10.1%, respectively. Overall, fourteen treatments reduced BFR incidence compared to the non-treated control. Nine treatments containing the primary products Switch 62.5WG rotated with Captan, A21825, A20560, Thiram SC, Omega, Kenja, and KX1 reduced disease incidence during the production peak, BFR incidence peak, and the entire season. Switch 62.5WG alone or in combination with TX Control reduced BFR incidence only during the peak production period, whereas Captan, Switch 62.5WG, Merivon, and Thiram SC + TX Control had the same effect during BFR incidence peak. The only treatments that increased yield compared to the non-treated control were A19648 and A20560.

Treatment (products and rates/A)	Application timing ^z	Yield (lb/A) ^y	BFR incidence (%) ^x		
			Production Peak	Disease Peak	Whole season
Omega 20 fl oz	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12	26875 abcd ^w	5.2 h	6.0 e	2.8 e
KX1 15.5 fl oz + VBS 0.25% v/v	2, 4, 8, 9				
Captan Gold 80WDG 1.9 lb	1, 3, 5, 6, 7, 10, 11, 12	23285 d	7.4 fgh	7.6 de	4.0 cde
Kenja 400SC 13.5 fl oz	2, 4, 8, 9				
Captan Gold 80WDG 1.9 lb	1, 3, 5, 6, 7, 10, 11, 12	24688 cd	6.1 h	7.9 de	4.1 de
A21825 15.5 fl oz	2, 4, 8, 9				
Captan Gold 80WDG 1.9 lb	1, 3, 5, 6, 7, 10, 11, 12	25872 bcd	8.6 defgh	8.4 cde	4.4 bcde
KX1 15.5 fl oz	2, 4, 8, 9				
Captan Gold 80WDG 1.9 lb	1, 3, 5, 6, 7, 10, 11, 12	24299 cd	8.7 defgh	8.7 cde	4.8 bcde
Thiram SC 2.0 qt/A	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12	25468 dc	7.8 efgh	9.0 cde	4.8 bcde
Thiram SC 1.5 qt/A	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12	28629 abc	8.1 efgh	10.0 cde	4.9 bcde
A20560 11.4 fl oz	2, 4, 8, 9				
Captan Gold 80WDG 1.9 lb	1, 3, 5, 6, 7, 10, 11, 12	31959 a	10.1 def	10.1 cde	5.2 bcde
Switch 62.5WG 14 oz	2, 4, 8, 9				
Captan Gold 80WDG 1.9 lb	1, 3, 5, 6, 7, 10, 11, 12	28650 abc	7.3 fgh	11.7 cde	5.4 bcde
Thiram SC 2.6 qt + TX Control 1 qt	2, 4, 8, 9				
TX Control 1 qt + TX Guardian 1 qt	1, 3, 5, 6, 7, 10, 11, 12	23610 cd	12.3 abcde	13.4 bcd	6.4 abcd
Switch 62.5WG 14 oz	2, 4, 8, 9				
Stargus (MBI-110AF5) 64 fl oz	1, 3, 5, 6, 7, 10, 11, 12	26766 bcd	9.9 defg	12.1 cde	6.5 abcd
Merivon 11 fl oz	2, 4, 8, 9				
Captan Gold 80WDG 1.9 lb	1, 3, 5, 6, 7, 10, 11, 12	26475 bcd	10.9 bcdef	13.5 bcd	6.8 abcd
Captan Gold 4L 2.0 qt/A	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12	24075 cd	10.3 cdef	13.6 bcd	7.0 abcd
A19649 8.55 fl oz	2, 4, 8, 9				
Captan Gold 80WDG 1.9 lb	1, 3, 5, 6, 7, 10, 11, 12	31037 ab	10.8 bcdef	15.0 abc	7.3 abc
Pyraziflumid 1.54 fl oz + Kinetic 0.25% v:v	2, 4, 8, 9				
Captan Gold 80WDG 1.9 lb	1, 3, 5, 6, 7, 10, 11, 12	26087 bcd	12.7 abcd	15.9 abc	7.3 abc
Pyraziflumid 2.31 fl oz + Kinetic 0.25% v:v	2, 4, 8, 9				
Captan Gold 80WDG 1.9 lb	1, 3, 5, 6, 7, 10, 11, 12	24020 cd	10.3 cdef	14.6 abcd	7.4 ab
Switch 14 oz + TX Control 1 qt	2, 4, 8, 9				
TX Control 1 qt + TX Guardian 1 qt	1, 3, 5, 6, 7, 10, 11, 12	25754 cd	9.5 defg	16.5 abc	7.7 abcd
Luna Tranquility 20 fl oz	2, 4, 8, 9				
Captan Gold 80WDG 1.9 lb	1, 3, 5, 6, 7, 10, 11, 12	23594 cd	15.7 ab	21.3 ab	9.8 a
Pyraziflumid 3.08 fl oz + Kinetic 0.25% v:v	2, 4, 8, 9				
Captan Gold 80WDG 1.9 lb	1, 3, 5, 6, 7, 10, 11, 12	24656 cd	16.6 a	19.9 ab	10.1 a
Non-treated control	-	23783 cd	15.3 abc	22.9 a	10.1 a
<i>Probability of greater F value</i>		0.0439	<0.0001	<0.0012	<0.0006

^z Week of application of products from 1 Dec 2017 to 20 Feb 2018 (12 weeks).

^y Yield from 23 harvests made during the 5 Dec 2017 to 27 Feb 2018 (whole season) period.

^x Average BFR incidence during three periods: production peak (23 Jan 2018 to 27 Feb 2018), BFR incidence peaks (incidence >10% on the non-treated control), and the entire season.

^w Columns with the same letter are not significantly different based on least significant difference (LSD) test ($\alpha = 0.05$).