

### **Evaluation of fungicides for Botrytis fruit rot management on strawberry, early season 2020.**

The trial was conducted in field 35b at the Cal Poly State University campus in San Luis Obispo, CA (35°18'20.36" N 120°40'22.19" W). Bare root transplants were transplanted into raised beds on 23 Oct 19. The experimental area consisted of 12 beds, 140 ft long. Industry standard beds were used: 64 in. between bed centers; four lines of plants spaced 12 in. between plant lines and 16 in. between plants within a line. Plots were 20 ft long (60 plants per plot), replicated four times and arranged in a randomized complete block design. A 24-in. buffer (six plants) was used on both ends of each plot. Plants were irrigated and fertilized via two lines of drip tape per bed. Treatments consisted of conventional as well as biological fungicides. Biological fungicides tested were: Stargus, Rango, Terramera Biological, Dart, Botector, and EXP 14. Treatments were applied using a backpack sprayer equipped with a custom 48-in. handheld boom (R&D Sprayers, Opelousas, LA). The boom consisted of eight nozzles (ALBUZ ATR 80 blue hollow cone) (Kisco Sales, Santa Maria, CA) spaced 12-in. apart, calibrated to deliver 150 gal/A using compressed CO<sub>2</sub> at 45 psi. The two outer nozzles were angled inward at 45 degrees and the six inner nozzles were arranged in pairs with each nozzle at opposing 45-degree angles. One day prior to the first application, all fruit were removed from the plants leaving only blooms and flower buds (25 Mar). The first application was made on 26 Mar and continued for five applications at seven-day intervals, except for the 3<sup>rd</sup> application was applied at an 8-day interval: 26 Mar, 2, 10, 17, and 24 Apr. Due to UV instability, Zivion was applied after 8 pm to avoid direct sunlight. All other applications were made prior to 9 am. There was an at harvest and postharvest evaluation of Botrytis fruit rot (BFR). The at harvest evaluation on 27 Apr (3 days after the final application) assessed BFR by harvesting all ripe fruit from each plot and recording each fruit as diseased or sound. The sound fruit were used for a postharvest evaluation consisting of 30 fully ripe, sound fruit that were stored at room temperature (72°F). In the postharvest evaluation, fruit were evaluated at 2-day intervals over a 10-day period. Fruit with visible fungal growth were recorded as decayed and discarded from the tray to avoid fruit-to-fruit spread of disease. Postharvest decay over time was used to calculate area under the disease progress curve (AUDPC). Data was subjected to analysis of variance and Fisher's LSD mean separation test.

This season consisted of below average rainfall (13.3 in. vs. average rainfall of 19 in.), and during the length of the trial (25 Mar to 27 Apr) 2.6 in. of rainfall occurred with below average max air temperature at 65°F. Despite favorable rain events and favorable temperatures during the trial, at harvest BFR incidence remained relatively low (2.7% in the non-treated) and no treatment significantly separated from the non-treated. The relatively low disease pressure could be due to reduced leaf wetness from high winds with daily average wind speeds of 8.4 mph and max wind speed at 19 mph from 25 Mar through 27 Apr. Data from 4 days after harvest (DAH) and 6 DAH are only presented from the postharvest evaluation because those evaluations offered the most separation among treatments. Treatments that had significantly less decay during the postharvest evaluation were: Tank Mix Rotation (Elevate + Kenja + Switch + Merivon + tank mixed with Captan), Miravis Prime, and Switch rotated with EXP 14. No phytotoxicity was observed in any treatment.

Treatment (amount/A)	Sequence <sup>z</sup>	Botrytis fruit rot incidence (%)					AUDPC <sup>w</sup>	
		At harvest	4 DAH <sup>y</sup> x	6 DAH				
<i>CONVENTIONAL</i>								
Non-treated	-----	2.7	25.0	a-e	57.5	ab	15.6	abc
Switch 62.5WG (14 oz)	ACE							
Captan 80WG (3 lb)	BD	0.6	10.8	def	49.2	abc	6.0	cde
Elevate 50WG (1.5 lb)	A							
Kenja 400SC (15.5 fl oz)	B							
Switch 62.5WG (14 oz)	CE							
Merivon 42.5SC (11 fl oz)	D							
Captan 80WG (3 lb)	A-E	1.0	10.0	ef	35.0	cd	6.0	de
Miravis Prime 400SC (13.4 fl oz)	A-E	1.6	7.5	f	34.2	cd	5.4	e
Kenja 400SC (15.5 fl oz)	A-E	2.2	18.3	b-f	50.8	abc	12.1	b-e
Zivion 10SC (1000 ppm natamycin)	A-E							
Brandt Zinc Oxide 10 SC (0.5% v/v)	A-E	2.2	22.5	a-f	60.8	a	13.4	a-e
Switch 62.5WG (14 oz)	ACDE							
EXP 14 (7.14 oz)	BD	0.6	7.5	f	27.5	d	4.3	e
Stargus 96.4 SC (1 qt)	A-E							
Switch 62.5WG (14 oz)	ACE							
Captan 80WG (3 lb)	BC	1.3	13.3	def	40.8	bcd	8.0	cde
Pyraziflumid 20SC (3.1 fl oz)	A-E							
Kinetic 99% (18 fl oz)	A-E	1.0	12.5	def	50.0	abc	7.3	cde
<i>BIOLOGICAL</i>								
Stargus 96.4 SC (2 qt)	A-E	2.6	33.3	ab	59.2	ab	19.4	ab
EXP 14 (3.57 oz)	A-E	2.4	20.8	a-f	55.0	ab	13.0	b-e
EXP 14 (7.14 oz)	A-E	1.9	32.5	abc	62.5	a	18.3	ab
EXP 14 (10.72 oz)	A-E	1.9	26.7	a-d	57.5	ab	15.4	a-d
Rango 70SC (160 fl oz)	A-E	2.2	17.5	b-f	51.7	abc	10.9	b-e
Terramera Biological (.8% v/v)	A-E							
Nu Film P (16 fl oz)	A-E	4.0	30.0	abc	58.3	ab	19.2	ab
Rango 70SC (230 fl oz)	AB							
Terramera Biological (.8% v/v)	CDE							
Nu Film P (16 fl oz)	A-E	4.2	35.0	a	64.2	a	22.7	a
Dart 70SC (0.3% v/v)	A-E	2.8	16.7	c-f	55.0	ab	11.1	b-e
Botector 80WP (8 oz)	A-E	2.1	25.8	a-e	66.7	a	15.1	a-d
LSD		2.8	16.5		19.2		9.6	

<sup>z</sup> Application timing sequence: A= 26 Mar, B= 2 Apr, C= 10 Apr, D= 17 Apr, E= 24 Apr.

<sup>y</sup> Numbers within a column followed by the same letter are not significantly different ( $\alpha=0.05$ ) per Fisher's LSD simultaneous comparison calculated using ARM version 2020.0 (Gylling Data Management, Brookings, SD).

<sup>x</sup> DAH = Days after harvest.

<sup>w</sup> Area Under the Disease Progress Curve calculated for percent Botrytis fruit rot using ARM version 2020.