

Evaluation of fungicides for control of Botrytis fruit rot in annual strawberry, 2005-06.

On 4 Oct 05, bare-root runner plants from Canada were transplanted into methyl-bromide:chloropicrin (67:33) fumigated soil in plastic-mulched raised beds. The beds were 28-in. wide on 4-ft centers. Each bed contained two staggered rows of plants spaced 15-in. apart within rows and 12-in. between rows. Treatments were arranged in a randomized complete block design with four blocks in separate, adjacent beds. The experimental area consisted of six beds, the four experimental beds flanked on each side by a border bed that did not receive fungicidal sprays. Individual plots were 8.1 ft long and contained 12 plants, with a 1.7-ft open space between plots. Transplants were irrigated by overhead sprinklers for 10 days to facilitate establishment, then irrigated and fertilized through drip tape. Fungicides were applied at weekly intervals from 16 Dec 05 to 1 Mar 06 (12 applications) with a CO₂ back pack sprayer calibrated to deliver 100 gal/ac at 40 psi through a two nozzle boom. The first seven applications in most treatments consisted of maintenance sprays of Captan 80WDG at 1.88 lb/A. Applications eight through 10 were made during the principal bloom period (1 Feb to 15 Feb) and usually included the products or programs to be tested. In two treatments, grower standard fungicides were applied at variable intervals determined by predictive models. A total of nine applications were made according to the Xu model consisting of Captan 80WDG (1.88 lb/A) on 22 Dec, 27 Dec, 3 Jan, 12 Jan, 18 Jan, and 23 Jan; Captevate 68WDG (4.38 lb/A) on 31 Jan and 5 Feb; and Captan 80WDG (3.0 lb/A) on 22 Feb. A total of 7 applications were made according to the Broome model consisting of Captan 80WDG (1.88 lb/A) on 22 Dec, 13 Jan, and 23 Jan; Captevate 68WDG (4.38 lb/A) on 31 Jan, 5 Feb, and 18 Feb; and Captan 80WDG (3.0 lb/A) on 22 Feb. An untreated control was included. Fruit were harvested twice weekly from 20 Dec through 10 Mar (23 times) and graded for marketable yield and the incidence of Botrytis fruit rot (number of fruit with Botrytis expressed as a percent of all marketable and unmarketable fruit). In plots with no diseased fruit, the expression (1/4n)*100, where n = number of fruit harvested from that plot, was substituted for the 0 value. Botrytis incidence data were transformed by an arcsine square root expression before statistical analysis. The variables were analyzed by two-way ANOVA and means were separated by Fisher's protected LSD ($P \leq 0.05$). Non-transformed means are reported.

Botrytis fruit rot incidence was unusually low due to dry weather during the critical infection period, i.e., the major bloom period in January and February. Disease incidence over the whole season ranged from 0.2 to 1.9%, with 1% incidence in the untreated control. Only one treatment consisting of weekly applications of Sonata tank mixed with Captan and bloom applications of Captevate significantly reduced Botrytis fruit rot. However, this treatment was not significantly different from many other programs involving frequent applications of Captan, with Captevate, Thiram, Elevate, or Valent applied during the bloom period. No treatment significantly increased or decreased yields of marketable fruit ($P = 0.05$).

Treatment and rate/A ^z	Timing ^y	Marketable yield (lb/A)	Botrytis incidence (%) ^x
Sonata (3 qt) + Biotune (2.4 pt) + Captan 80WDG (1.88 lb)	1-7		
Captevate 68WDG (4.38 lb)	8-10		
Sonata (3 qt) + Biotune (2.4 pt) + Captan 80WDG (3.0 lb).....	11,12	15,600 a-e ^w	0.2 a
Variable schedule (Xu's Model III) Captan 80 WDG (1.88 lb)	2-7		
Captevate 68WDG (4.38 lb)	8,9		
Captan 80WDG (3.0 lb).....	11	15,000 a-e	0.3 ab
Serenade max (2 lb) + Biotune (2.4 pt) + Captan 80WDG (1.88 lb)	1-7		
Captevate 68WDG (4.38 lb)	8-10		
Serenade max (2 lb) + Biotune (2.4 pt) + Captan 80WDG (3.0 lb).....	11,12	13,500 c-e	0.3 ab
Captan 80WDG (1.88 lb)	1-7		
Valent 50DF (0.5 lb)	8-10		
Captan 80WDG (3.0 lb).....	11,12	15,300 a-e	0.3 ab
Captan 80WDG (1.88 lb)	1-7		
Valent 50DF (0.75 lb)	8-10		
Captan 80WDG (3.0 lb).....	11,12	16,000 a-d	0.3 ab
Thiram Granuflo 75WDG (2.0 lb)	1-7		
Thiram Granuflo 75WDG (3.2 lb).....	8-12	15,600 a-e	0.3 ab
Product 223 (5:1 dilution) + Sea Humus (20.4 qt) whole season.....	1-12	14,200 b-e	0.3 ab
Captan 80WDG (1.88 lb)	1-7		
Valent 50DF (0.375 lb)	8-10		
Captan 80WDG (3.0 lb).....	11,12	17,500 a	0.4 ab

Serenade max (1 lb) + Biotune (2.4 pt) + Captan 80WDG (1.88 lb)	1-7		
Captevate 68WDG (4.38 lb)	8-10		
Serenade max (1 lb) + Biotune (2.4 pt) + Captan 80WDG (3.0 lb).....	11,12	15,530 a-e	0.4 ab
Captan 80WDG (1.88 lb)	1-7		
Valent 50DF (0.625 lb)	8-10		
Captan 80WDG (3.0 lb).....	11,12	16,600 ab	0.4 ab
Captan 80WDG (1.88 lb)	1-7		
Captevate 38WDG (4.38 lb)	8-10		
Captan 80WDG (3.0 lb).....	11,12	17,400 a	0.4 ab
Sonata (3 qt) + Biotune (2.4 pt).....	1-12	13,300 de	0.4 ab
Captan 80WDG (1.88 lb)	1-7		
Thiram Granuflo 75WDG (3.2 lb)	8-10		
Captan 80WDG (3.0 lb).....	11,12	17,100 a	0.5 a-c
Variable schedule (Broome model) Captan 80WDG (1.88 lb)	2,5,7		
Captevate 68WDG (4.38 lb)	8-10		
Captan 80WDG (3.0 lb).....	11	17,100 a	0.5 a-c
Captan 80WDG (1.88 lb)	1-7		
Elevate 50WDG (1.25 lb)	8-10		
Captan 80WDG (3.0 lb).....	11,12	16,300 ab	0.5 a-c
Endorse 2.5WP (1.86 lb).....	1-12	16,200 a-c	0.5 a-c
Actinovate (12 oz).....	1-12	16,100 a-d	0.6 a-c
Captan 80WDG (1.88 lb)	1-7		
Valent 50DF (1.0 lb)	8-10		
Captan 80WDG (3.0 lb).....	11,12	16,500 ab	0.6 ac
Captan 80WDG (1.88 lb)	1-7		
Captan 80WDG (3.0 lb) alt Pristine 38 WG (23 oz).....	8-12	15,600 a-e	0.6 a-c
Captan 80WDG (1.88 lb) early	1-7		
Captan 80WDG (3.0 lb) bloom & late.....	8-12	16,800 ab	b-d
Milsana (0.5% V:V = 4 pt) whole season.....	1-12	12,800 e	1.3 cd
Product 223 (5:1 pre-mix) whole season.....	1-12	12,900 e	1.4 cd
Product 223 (10:1 pre-mix) whole season.....	1-12	15,000 a-e	1.6 d
Serenade max (1 lb) + Biotune (2.4 pt) whole season.....	1-12	14,000 b-e	1.9 d
Control.....	--	14,900 a-e	1.0 b-d

^zTank mixtures are indicated by plus (+) signs; weekly alternations of products are indicated by “alt”.

^yNumbers indicate timing in a sequence of up to 12 weekly applications made from 16 Dec 05 to 1 Mar 06.

^xIncidence of Botrytis fruit rot as a percent of all marketable and cull fruit harvested.

^wValues in a column followed by the same letter are not significantly different by a Fisher’s protected LSD test ($P \leq 0.05$).