

STRAWBERRY (*Fragaria x ananassa* 'Treasure')
Anthracnose fruit rot; *Colletotrichum acutatum*
Botrytis fruit rot; *Botrytis cinerea*
Powdery mildew; *Sphaerotheca macularis*

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Evaluation of fungicides to control anthracnose fruit rot and other diseases in annual strawberry, 2006-07.

On 4 Oct 06, 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, each in a separate bed. Individual plots contained 12 plants and were 8.1-ft long, separated by a 1.7 ft gap between plots. The experimental area was flanked on each side by an untreated bed of 'Treasure' to facilitate disease development. Transplants were irrigated by overhead sprinklers for 10 days to aid establishment, then irrigated and fertilized through drip tape. Foliar applications were made weekly from 7 Dec to 7 Mar (14 applications) using a CO₂ backpack sprayer calibrated to deliver 100 gal/A at 40 psi through a two-nozzles, 12 in. apart on the boom. Experimental products were applied throughout the season in some treatments or only later in the season in others. Late season treatments were preceded by maintenance applications of captan during the early season. Fruit were harvested twice weekly from 2 Jan through 30 Mar (26 harvests). Marketable fruit were counted and weighed to determine yield. Small fruit weighing less than 10 g, diseased fruit, and other unmarketable fruit were also enumerated. Disease incidence was expressed as a percentage of the total number of marketable and unmarketable fruit. Experimental variables were analyzed by two-way ANOVA. Percentage data were transformed by an arc sine square root expression prior to the analysis. Non-transformed means are presented.

Disease pressure was relatively low this season with only 5.9% incidence of anthracnose fruit rot in the untreated control. Most treatments that included captan significantly reduced disease incidence. However, tank mixes of experimental products with captan usually failed to significantly improve anthracnose control or yield over corresponding captan only treatments. The inability to detect additive effects may have been due to low disease incidence and patchy disease distribution. Botrytis fruit rot was reduced by many of the captan-associated treatments, as well as by Thiram. Powdery mildew growth on fruit was markedly reduced by Citrex, Evito, and MT-06, and moderately reduced by several other products. Marketable yields were strongly influenced by the combined effects of all three diseases, and generally were highest among captan-associated treatments and Thiram. However, products tested without captan, including KeyPlex (a nutritional), TM-4801 (a biological), and two rates of Citrex (an organic-approved fungicide), also moderately increased yields compared to the untreated control.

Treatment and rate/A ^z	Spray timing ^y	Marketable yield (lb/A)	AFR (%) ^y	BFR (%)	PM (%)
HM 0210 (2.0 pt) + captan (1.5 lb).....	1-14	29,400 ab ^x	0.4 a	1.5 a	3.9 c-f
captan (1.5 lb)	1-8				
captan (3.0 lb).....	9-14	29,900 ab	0.4 a	1.3 a	2.8 b-f
captan (1.5 lb)	1-8				
Abound 2.08F (15.4 fl oz)	9,11,13				
captan (3.0 lb).....	10,12,14	29,200 abc	0.6 a	1.4 a	2.2 bc
captan (1.5 lb)	1-8				
Evito 480SC (5.7 fl oz)	9,11,13				
captan (3.0 lb).....	10,12,14	30,000 a	0.7 ab	1.8 ab	1.8 ab
Citrex (1.6 pt) + captan (1.5 lb)	1-8				
Citrex (1.6 pt) + Captec 4L (1.2 qt).....	9-14	28,200 a-d	1.2 abc	1.7 ab	1.8 ab
Helena Prophyt (2 pt) + captan (1.5 lb).....	1-14	28,000 a-d	1.2 a-d	1.1 a	3.9 def
captan (1.5 lb)	1-8				
Elevate 50WDG (1.25 lb) + captan (1.5 lb)...	9-14	27,200 bcd	1.3 a-d	1.2 a	4.3 f
captan (1.5 lb)	1-8				
Procure 480SC (6.0 fl oz) + captan (1.5 lb)....	9-14	26,600 cde	1.5 a-d	1.8 ab	3.7 c-f
captan (1.5 lb)	1-8				
MT-06 (26 fl oz)	9,11,13				
captan (3.0 lb).....	10,12,14	29,700 ab	1.7 a-e	1.3 a	1.8ab
captan (1.5 lb).....	1-14	27,300 a-d	1.8 a-e	1.4 a	4.5 f
Citrex (0.4 pt).....	1-14	23,400 fg	1.8 a-e	3.0 bc	2.6 b-e
Thiram Granuflo 75WG (1.6 lb)	1-8				
Thiram Granuflo 75WG (3.2 lb).....	9-14	28,800 abc	2.2 a-e	0.9 a	3.6 c-f
KeyPlex 350DF (1 qt) + KNO ₃ (3 lb).....	1-14	23,200 fg	3.4 b-f	3.5 cd	2.3 bcd
TM 48101 (3.3 lb = 8 x 10 ⁷ cfu).....	1-14	23,500 fg	3.6 b-f	4.6 d	2.4 bcd
TM 48101 (1.66 lb = 4 x 10 ⁷ cfu).....	1-14	24,300 efg	3.9 c-f	3.7 cd	2.8 b-f
Citrex (1.6 pt).....	1-14	25,700 efg	4.2 c-f	4.0 cd	1.6 ab
Helena Prophyt (2.0 pt)	1-14	25,700 efg	4.9 def	4.7 d	3.9 ef
Citrex (0.96 pt).....	1-14	22,600 h	6.2 f	4.9 d	1.2 a
Control (non-spray).....	na	20,400 h	5.9 ef	4.0 cd	3.9 ef

^zPlus signs “+” indicate tank mixes of two or more products; the 80WDG formulation of captan was used throughout.

^yIncidence of anthracnose fruit rot (AFR), Botrytis fruit rot (BFR), and powdery mildew (PM) on fruit as a percentage of all marketable and unmarketable fruit harvested.

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