STRAWBERRY (*Fragaria* x *ananassa* 'Camarosa')
Powdery mildew; *Podosphaera aphanis*

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**Evaluation of fungicides to control powdery mildew on annual strawberry, 2007-08.**

On 18 Oct 07, bare root plants from Canada were transplanted into methyl bromide:chloropicrin (98:2) fumigated soil in plastic mulched, raised beds in an area of the field covered by a high plastic tunnel. The beds were 28 in. wide on 4-ft centers. Each bed contained two staggered rows of plants. Plant spacing was 15 in. within rows and 11 in. between rows. Treatments were arranged in a randomized complete block design with four blocks located on two beds separated by an unplanted spacer bed. Plots were 8.1 ft long and contained 12 plants. Transplants were irrigated by overhead sprinkler for 10 days to facilitate establishment, then irrigated and fertilized through drip tape. Treatments were applied on 7- or 14-d intervals from 28 Nov to 20 Feb using a $CO_2$ backpack sprayer delivering 100 gal/A at 40 psi through two TeeJet hollow-cone nozzles, 12 in. apart on the boom. On 28 Jan and 28 Feb, the eight middle plants in each plot were rated individually for foliar disease severity. Symptoms were evaluated on a 0 - 4 scale, i.e., 0 = healthy; 1 = 1-10%, 2 = 11-30%, 3 = 31-70%, 4 > 70% of leaves cupped, spotted, and/or showing visible fungal growth. Average disease severity ratings were used to calculate percent disease control relative to the nontreated control. Fruit were harvested twice weekly from 18 Dec to 29 Feb (20 harvests). Marketable fruit were counted and weighed. Fruit with visible powdery mildew on more than 25% of the achenes and other unmarketable fruit were also enumerated. Fruit disease incidence was expressed as a percentage of all marketable and unmarketable fruit. Experimental variables were analyzed by two-way ANOVAs. Percentages were transformed to arcsine square roots prior to analysis.

Microclimatic conditions in the high tunnel favored disease development, especially on the fruit. Leaf cupping was the most conspicuous foliar symptom. The development of purple leaf spotting in the tunnel was suppressed compared to infections in the open field. Mycelial growth on the foliage was relatively sparse, which is typical for the 'Camarosa' x *S. macularis* interaction. Quintec significantly reduced disease on the foliage and fruit compared to other treatments. However, an alternating program of Procure and Microthiol Disperss was also very effective in controlling fruit symptoms and produced the second highest marketable yield. Applications of Microthiol Disperss alone produced the highest numerical yield in the trial. Tunnel conditions appear to enhance the efficacy of Microthiol Disperss (elemental sulfur) relative to the open field. The DMI fungicides IR14360, Nova, and Procure lost some ability to control foliar symptoms over time, as indicated by the relative disease control values. The bio-pesticides products Keyplex, MOI-106, and Serenade failed to control powdery mildew and did not significantly improve marketable yield.

| Treatments (products and rates/A)[z] | Spray timing[y] | Yield (lb/A) | Diseased fruit (%) | Foliar severity (28 Jan)[x] | | Foliar severity (28 Feb)[x] | |
|---|---|---|---|---|---|---|---|
| Quintec 250SC (6 fl oz) + Captan 80WDG (1.5 lb) | 1,3,5...13 | | | | | | |
| Nova 40W (5 oz) + Captan 80WDG (1.5 lb)..... | 2,4,6...12 | 3200 bcd | 3.6 a | 0.13 a | (95)[w] | 0.78 a | (77) |
| Quintec 250SC (6 fl oz) + Captan 80WDG (1.5 lb).. | 1,3,5...13 | 4500 ab | 4.6 a | 0.88 b | (67) | 1.00 a | (71) |
| Procure 480SC (8 fl oz) | 1,3,5...13 | | | | | | |
| Microthiol Disperss 80WP (7.5 lb)..... | 2,4,6...12 | 5200 a | 3.4 a | 1.06 bc | (60) | 2.28 b | (33) |
| IR14360 (5.7 fl oz)..... | 1,3,5...13 | 2900 cde | 41.8 cd | 1.32 bc | (50) | 2.69 bcd | (21) |
| IR14360 (4.57 fl oz)..... | 1,3,5...13 | 3300 bc | 37.6 c | 1.47 cd | (44) | 2.57 bc | (25) |
| Procure 480SC (8 fl.oz) + Thiram Granuflo 75WDG (1.6 lb)..... | 1,3,5...13 | 2800 cde | 41.8 cd | 1.53 cd | (42) | 2.88 cd | (16) |
| Microthiol Disperss 80WP (7.5 lb)..... | 1,3,5...13 | 5700 a | 11.9 b | 1.94 de | (26) | 2.38 bc | (30) |
| KeyPlex 350 DP (1 qt) + potassium nitrate (3 lb)..... | 1,2,3...13 | 2100 cde | 56.2 de | 2.25 ef | (14) | 3.41 e | (0) |
| MOI-106 1% v/v + Nu-Film P (0.02%)..... | 1,2,3...13 | 2200 cde | 55.2 de | 2.35 ef | (10) | 3.19 de | (7) |
| Serenade Max (1.0 lb)..... | 1,2,3...13 | 1600 e | 64.8 e | 2.50 f | (5) | 3.60 e | (-6) |
| Nontreated control ..... | -- | 1800 e | 62.6 e | 2.63 f | | 3.41 e | |

[z]Tank mixes are indicated by plus "+" signs.
[y]Application timing is indicated by the week of application during a 13-wk period from 28 Nov to 20 Feb. The series 1,2,3... indicates weekly applications; 1,3,5... indicates 14-d spray intervals.
[x]Means within a column followed by the same letter are not significantly different by Fisher's protected LSD ($P \leq 0.05$)...
[w]Percent disease control values in parenthesis were calculated relative to their respective nontreated control.