STRAWBERRY (*Fragaria* x *ananassa* 'Florida 127')
Powdery mildew; *Podosphaera aphanis*

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Evaluation of products for the control of powdery mildew of annual strawberry, 2014-2015.

On 8 Oct 2014, bare-root, green-top plants from Canada were transplanted into plastic-mulched, raised beds in a high plastic tunnel. Transplants were irrigated by overhead sprinkler for 10 days to facilitate establishment, then irrigated and fertilized through drip tape. The beds were 28-in. wide on 4-ft centers and were fumigated with Telone C-35 (300 lb/A) at bed formation. Each bed contained two rows of plants 12-in. apart with 15-in. in-row plant spacing. Selected plants were removed in November to form 12-plant plots that were 8.1 ft long, separated by 3- to 4-ft of empty bed. Treatments were arranged in a randomized complete block design with four blocks on adjacent beds. Treatments were applied on 7- or 14-d schedules over a 10-wk period from 14 Nov to 16 Jan with a CO_2 backpack sprayer delivering 100 gal/A at 60 psi through two TeeJet disc-core hollow-cone nozzles. Foliar colonization by *P. aphanis* was evaluated by removing one leaflet from each of 10 plants/plot on 28 Dec and evaluating 10 microscopic fields/leaflet for mycelial growth at 25X. Fields more than 50% covered were counted positive for powdery mildew. Leaflets were taken from leaves previously tagged on 12 Dec during the petiole elongation stage and were similar in age. The number of positive fields/leaflet was averaged for all 10 leaflets/plot and expressed as a percentage representing mycelial coverage of the foliage. Fruit were harvested twice weekly from 1 Dec to 26 Jan (15 harvests). Marketable fruit were counted and weighed to determine yield. Fruit with visible powdery mildew growth on more than 25% of the achenes were enumerated, and not considered marketable; other unmarketable fruit were also counted. Fruit disease incidence was expressed as a percentage of all marketable and unmarketable fruit. Data were analyzed by two-way ANOVA in SAS (SAS Institute, Cary, NC).

Powdery mildew quickly developed in the closed tunnel environment and was observed only 4 weeks after planting. Young leaves were tagged on 12 Dec and removed for microscopic observations on 28 Dec. Powdery mildew (PM) colonization of these leaves was influenced, directly or indirectly, by treatments made during weeks 1 – 6 of the application period. Foliar coverage ranged from 7.3 to 86.3% across all treatments and was 83.5% in the water control. Most treatments reduced foliar coverage although Mettle alone, GWN-1320 at 1.5 pt/A, and *Bacillus subtilis* formulations Serenade and Taegro did not. Interestingly, foliar coverage was moderately reduced by two other biorational products, Armour-Zen and Regalia. The most dramatic reductions in foliar disease were made by treatments which included Merivon or alternations of Quintec and Torino. These treatments also dramatically reduced fruit disease or fruit rejection due to PM. With one or two exceptions, marketable yields tended to decrease as the number of PM-rejected fruit increased. Unfortunately, within-treatment yield data were highly variable, resulting in a non-significant ANOVA (P = 0.096). Therefore, statistical separations for marketable yield are not presented. Phytotoxicity was not observed in this trial.

Products and rates/A	Week of application[z]	Yield (lb/A)	% Diseased fruit[y]	% Foliar coverage[x]
Actinovate 6 oz + Merivon 5.5 fl oz Actinovate 6 oz + Nu Film P 8 fl oz	1, 3, 5, 7, 9 2, 4, 6, 8, 10	8526	11.6 abc[w]	7.3 a
Merivon 5.5 fl oz	1, 3, 5, 7, 9	9261	9.2 a	18.6 ab
Actinovate 6 oz + Merivon 2.75 fl oz Actinovate 6 oz + Nu Film P 8 fl oz	1, 3, 5, 7, 9 2, 4, 6, 8, 10	8007	13.3 a – d	21.5 ab
Merivon 5.5 fl oz + BAS 97471 F 0.25 lb Torino 3.4 fl oz	1, 5, 9 3, 7	8503	16.9 a – e	22.5 ab
Quintec 6 fl oz alt Torino 3.4 fl oz	1, 5, 9 3, 7	9299	10.6 ab	25.5 bc
Merivon 5.5 fl oz + BAS 97471 F 0.5 lb Torino 3.4 fl oz	1, 5, 9 3, 7	8796	13.2 a – d	26.6 bc

Torino 3.4 fl oz	1, 3, 5, 7, 9	8423	19.5 b – f	41.1 cd
Mettle 5 fl oz Torino 3.4 fl oz	1, 5, 9 3, 7	6802	18.5 a – e	45.3 de
Armour-Zen 2 qt + SilWet L-77 0.8 pt/A = 0.1%	1 – 10	6973	27.2 e – i	46.4 de
Fontelis 24 fl oz	1, 3, 5, 7, 9	6490	21.3 c – g	47.4 de
GWN-10411 10 fl oz	1 – 10	9238	21.7 c – g	49.8 def
GWN-10411 5 fl oz	1 – 10	7977	25.1 e – h	57.8 d - g
Regalia 3 qt	1 – 10	6881	25.5 e – h	58.0 efg
Quilt Xcel 14 fl oz Torino 3.4 fl oz	1, 5, 9 3, 7	7198	30.3 g – j	60.3 e - h
GWN-10320 1.0 pt + Cohere 0.6 pt	1 – 10	7454	29.4 g – j	64.8 f - i
GWN-10411 7 fl oz	1 -10	8119	22.7 d – h	65.3 f - i
Mettle 5 fl oz	1, 3, 5, 7, 9	9419	26.3 e – i	67.6 g - j
Taegro 5.2 oz + Cohere 0.6 pt	1 – 10	7489	30.8 g – j	75.5 h- k
Serenade ASO 4 qt	1 – 10	7415	36.1 ijk	79.8 ijk
GWN-10320 1.5 pt + Cohere 0.6 pt	1 – 10	6026	32.5 h – k	80.2 ijk
Serenade Opti 1 lb	1 – 10	6843	40.3 jk	86.3 k
Control (water)	n.a.	6412	41.8 k	83.5 jk

[z] Week of application in a series of 10 weekly applications made from 14 Nov 2014 to 16 Jan 2015.
[y] Percent of fruit with conspicuous powdery mildew (PM) growth on more than 25% of the achenes.
[x] Percent of leaf area covered with powdery mildew based on microscopic observations at 25x.
[w] Means in a column followed by the same letter are not significantly different by Fisher's Protected LSD test ($\alpha = 0.05$). Statistics are provided if the Pr > F term in the analysis of variance was significant, i.e, ≤ 0.05.

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