

### **Evaluation of products for the control of powdery mildew in annual strawberry, 2017-2018.**

On 16 Oct 2017, bare-root, green-top plants from Canada were transplanted into plastic-mulched, raised beds in an open field. 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 staggered rows of plants 12-in. apart with 15-in. in-row plant spacing. Selected plants were removed on 20 Oct to form 14-plant plots that were 9.4 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 four or eight times over an 8-wk period from 22 Nov to 12 Jan, and made with a CO<sub>2</sub> backpack sprayer calibrated to deliver 100 gal/A at 60 psi through two TeeJet disc-core hollow-cone nozzles spaced 12 in apart on the boom. Foliar colonization by *P. aphanis* was evaluated by removing a center leaflet from each of 10 plants/plot on 4 Jan and evaluating 10 microscopic fields/leaflet at 25X for the presence or absence of mycelial growth. Leaflets were removed from leaves tagged during the petiole elongation stage on 21 Dec. and were approximately 14 days old. The number of positive fields/leaflet was averaged for all 10 leaflets/plot and expressed as a percentage representing foliar mycelial coverage. Fruit were harvested once or twice weekly from 11 Dec to 25 Jan (11 harvests). Marketable fruit were counted and weighed to determine yield. Unmarketable fruit were also enumerated. Fruit with visible powdery mildew growth on more than 25% of the achenes were considered non-marketable culls. Fruit disease incidence was expressed as a percentage of all fruit harvested and was arcsine square root transformed before analysis. Non-transformed data are presented. Data were analyzed by ANOVA GLM procedure in SAS (SAS Institute, Cary, NC).

Powdery mildew development from 18 to 31 Dec was rapid due to use of a susceptible cultivar and favorable environmental conditions, i.e., average minimum and maximum temperatures of 54.4° F and 76.7° F, respectively, mean relative humidity of 86%, and trace rainfall. These dates overlapped a critical 2-wk period during tagging of emerging leaves on 21 Dec, application of the third complete set of treatments on 22 Dec, and the removal of leaflets for microscopic observations on 4 Jan. Foliar mycelial coverage following this period exceeded 93% in most treatments. However, coverage was dramatically reduced by the three pyraziflumid treatments, which exhibited a clear dose rate response. Two rates of Rhyme alternated with Quintec, and SAF01 + VBS also reduced coverage to ~ 90% compared to 99.5% in the non-treated control. Incidence of culled fruit due to conspicuous PM growth was 25.9% in the control. Only pyraziflumid and Quadris Top alternated with Quintec significantly reduced fruit colonization. Marketable yields were increased by all three rates of pyraziflumid, SAF01 + VBS, Quintec alternated with either Rhyme or Quadris Top, and ER. Phytotoxicity symptoms were not observed in this trial.

| Treatment (product and rate/A)                  | Week of application <sup>z</sup> | Yield (lb/A) | % diseased fruit <sup>y</sup> | % foliar coverage <sup>x</sup> |
|---|----------------------------------|--------------|-------------------------------|--------------------------------|
| Pyraziflumid 20SC 3.08 fl oz + Kinetic 12 fl oz | 1,3,5,7                          | 7645 ab      | 2.7 a                         | 26.2 a <sup>w</sup>            |
| Pyraziflumid 20SC 2.30 fl oz + Kinetic 12 fl oz | 1,3,5,7                          | 6715 b - e   | 8.2 bc                        | 34.5 b                         |
| Pyraziflumid 20SC 1.54 fl oz + Kinetic 12 fl oz | 1,3,5,7                          | 8593 a       | 7.5 ab                        | 49.0 c                         |
| Rhyme 7 fl oz                                   | 1,5                              |              |                               |                                |
| Quintec 6 fl oz                                 | 3,7                              | 5234 efg     | 22.0 de                       | 88.8 d                         |
| SAF01 5 fl oz + VBS 0.25% = 2 pt                | 1,3,5,7                          | 6977 bcd     | 16.1 cde                      | 90.0 de                        |
| Rhyme 5 fl oz                                   | 1,5                              |              |                               |                                |
| Quintec 6 fl oz                                 | 3,7                              | 6846 bcd     | 18.2 de                       | 91.5 def                       |
| Quadris Top 14 fl oz                            | 1,5                              |              |                               |                                |
| Quintec 6 fl oz                                 | 3,7                              | 7305 abc     | 12.7 bcd                      | 93.5 d - g                     |
| SAF01 5 fl oz                                   | 1,3,5,7                          | 6192 b - f   | 21.2 de                       | 94.8 d - g                     |
| Prolivo 300SC 5 fl oz + Kinetic 12 fl oz        | 1,3,5,7                          | 6486 b - f   | 16.8 de                       | 96.8 efg                       |
| Regalia 12% 32 fl oz                            | 1,5                              |              |                               |                                |
| Torino 3.4 fl oz                                | 3,7                              | 5510 d - g   | 16.4 de                       | 97.8 fg                        |
| ER 0.1% = 12.8 fl oz                            | 1,2,3,4,5,6,7,8                  | 6894 bcd     | 18.8 de                       | 97.8 fg                        |
| Regalia 12% 16 fl oz + Torino 3.4 fl oz         | 1,3,5,7                          | 5983 c - g   | 18.9 de                       | 98.3 fg                        |
| Kenja 400SC 15.5 fl oz + Kinetic 12 fl oz       | 1,3,5,7                          | 6040 c - g   | 18.9 de                       | 98.5 fg                        |
| Torino 3.4 fl oz                                | 1,5                              |              |                               |                                |
| Quintec 6 fl oz                                 | 3,7                              | 4905 g       | 22.4 e                        | 99.0 g                         |
| Timorex Act 12 fl oz                            | 1,2,3,4,5,6,7,8                  | 6503 b - f   | 25.0 e                        | 99.0 g                         |
| AVIV 20 fl oz                                   | 1,2,3,4,5,6,7,8                  | 5688 d - g   | 24.0 e                        | 99.3 g                         |
| AG 0.1% = 12.8 fl oz                            | 1,2,3,4,5,6,7,8                  | 6254 b - g   | 21.6 de                       | 99.8 g                         |
| Timorex Act 12 fl oz + AVIV 20 fl oz            | 1,3,5,7                          |              |                               |                                |
| AVIV 20 fl oz                                   | 2,4,6,8                          | 5241 efg     | 25.3 e                        | 99.8 g                         |
| Control   | n.a.                             | 5151 fg      | 25.9 e                        | 99.5 g                         |

<sup>z</sup> Week of application in a series of 8 weekly applications made from 22 Nov 2017 to 12 Jan 2018.

<sup>y</sup> Percent fruit with conspicuous powdery mildew (PM) growth on more than 25% of the achenes.

<sup>x</sup> Percent of leaf area covered with powdery mildew based on microscopic observations at 25x.

<sup>w</sup> Means in a column followed by the same letter are not significantly different by Fisher's Protected LSD test ( $\alpha = 0.05$ ).