

PUMPKIN (*Cucurbita pepo* 'Howden')

Powdery mildew; *Podosphaera xanthii* (syn. *Sphaerotheca fuliginea*)

Downy mildew; *Pseudoperonospora cubensis*

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### **Evaluation of fungicides for control of powdery mildew and downy mildew of pumpkin, 2004.**

A field experiment was conducted at the University of Illinois Vegetable Research Farm near Champaign, IL, to evaluate the efficacy of selected fungicides to control mildew diseases of pumpkin. The soil was a silt clay loam with pH 6.5. Soil was deep-tilled in the fall of 2003 after corn was harvested and disked on 19 Apr and 7 Jun. Fertilizers, 250 lb nitrogen, 220 lb phosphorus, and 200 lb potassium, per acre, were incorporated into soil on 23 Mar. Furadan 4F insecticide (2 pt/A) was broadcast over planted rows on 9 Jun. Also, Strategy 0.5+1.6EC herbicide (4 pt/A), in 20 gal of water/A, was applied over entire field on 9 Jun. During the growing season, weeds were controlled by cultivation and hand weeding. Jack-o-lantern pumpkin cultivar Howden was planted on 9 Jun. Seeds were sown 18 in. apart in single-row plots, 25 ft long. The plots were spaced 40 ft apart in a randomized complete block design with three replications. Cucumber beetles (*Acalymma vittatum* and *Diabrotica undecimpunctata*) and other insects were managed by applying Capture 2EC (6 fl oz/A) on 15 Jul, 2 Aug, and 17 Aug. Application of fungicides began on 14 Jul and continued (at 7-day intervals) until 15 Sep. Fungicides were applied with a backpack sprayer, using 50 gal of water per acre. Average monthly high and low temperatures (°F) were 80/59, 82/63, 79/58, and 77/54 in Jun, Jul, Aug, and Sep, respectively. Precipitation occurred on 5 days (4.10 in.) in Jun, 8 days (5.60 in.) in Jul, 6 days (3.65 in.) in Aug, and 1 day (1.75 in.) in Sep. Severity of powdery mildew (percent total area of vines and leaves affected), and severity of downy mildew (percent total area of leaves affected), was visually evaluated on 29 Jul, 16 Aug, 31 Aug, and 14 Sep. Severity of disease was assessed at four locations (43 sq ft each) in each plot, and at the same locations, throughout the season. Area under disease progress curve (AUDPC) for each treatment was calculated by plotting mean disease severity of the four evaluations.

Powdery mildew was first observed on 5 Aug and its severity increased as the season progressed. Overall, severity of the disease was significantly higher in unsprayed plots than the sprayed plots. All of the treatments controlled powdery mildew satisfactorily throughout the season. Pristine plus Cuprofix in alternation with Nova plus Cuprofix, Cabrio plus Cuprofix in alternation with Nova plus Cuprofix, Quadris plus Cuprofix in alternation with Nova plus Cuprofix, Quadris plus Bravo Weather Stik in alternation with Nova plus Bravo Weather Stik, Topsin-M plus Cuprofix in alternation with Cuprofix, Pristine, Flint plus Cuprofix in alternation with Nova plus Cuprofix, Procure 50 plus Latron, and Tanos plus Kocide-2000 in alternation with Nova plus Kocide-2000 were highly effective against powdery mildew. Downy mildew was first observed in the plots on 20 Aug and its severity slowly increased as the season progressed. Overall severity of downy mildew was low. Severity of downy mildew in unsprayed plots was significantly higher than that of sprayed plots. Ranman in alternation with Cabrio plus Bravo Weather Stik, Tanos plus Kocide-2000 in alternation with Nova plus Kocide-2000, Quadris plus Bravo Weather Stik in alternation with Nova plus Bravo Weather Stik, and Quadris plus Cuprofix in alternation with Nova plus Cuprofix were the most effective fungicides for control of downy mildew. Yield was the highest in the plots treated with Procure 50WS plus Latron and it was the lowest in untreated plots.

| Treatment, rate/A (application) <sup>y</sup>   | Powdery mildew severity (%) <sup>z</sup> |         |          |          |          |          | Downy mildew severity (%) <sup>x</sup> | Yield/acre (lb) |
|--|--|---------|----------|----------|----------|----------|--|-----------------|
|  | 16 Aug                                   |         | 14 Sep   |          | AUDPC    |          |  |                 |
|  | Vine                                     | Leaf    | Vine     | Leaf     | Vine     | Leaf     |  |                 |
| Untreated check .....  | 7.8 a <sup>w</sup>                       | 5.7 a   | 58.3 a   | 60.8 a   | 88.6 a   | 87.7 a   | 21.7 a                                 | 23,958 c        |
| Tanos 38WDG, 8.0 oz<br>+ Kocide-2000 53.8DF, 1.5 lb (1,3,5,7,9)<br><i>alt</i> Nova 40W, 4.5 oz<br>+ Kocide-2000 53.8DF, 1.5 lb (2,4,6,8,10).....             | 0.3 c-e                                  | 0.2 f   | 20.8 c-e | 22.5 c-e | 14.2 d-g | 13.8 d-f | 5.2 ef                                 | 31,145 a-c      |
| Cabrio EG, 15 oz<br>+ Cuprofix 36.9DF, 2.0 lb (1,4,7,10)<br><i>alt</i> Nova 40W, 4.5 oz<br>+ Cuprofix 36.9DF, 2.0 lb (3,6,9) .....                           | 0.3 c-e                                  | 0.2 f   | 12.1 f-h | 13.2 fg  | 8.7 g    | 9.1 f    | 7.0 de                                 | 29,222 a-c      |
| Pristine 38WG, 15 oz<br>+ Cuprofix 36.9DF, 2.0 lb (1,4,7,10)<br><i>alt</i> Nova 40W, 4.5 oz<br>+ Cuprofix 36.9DF, 2.0 lb (3,6,9) .....                       | 0.0 e                                    | 0.0 f   | 10.8 gh  | 13.3 fg  | 7.9 g    | 8.7 f    | 7.7 c-e                                | 32,797 ab       |
| Pristine 38WG, 15 oz (2,4,6,8) .....   | 0.2 de                                   | 0.2 f   | 18.3 c-f | 20.0 de  | 11.2 fg  | 11.2 ef  | 9.2 b-e                                | 26,408 bc       |
| Flint 50WG, 2.0 oz<br>+ Cuprofix 36.9DF, 2.0 lb (1,4,7,10)<br><i>alt</i> Nova 40W, 4.5 oz<br>+ Cuprofix 36.9DF, 2.0 lb (3,6,9) .....                         | 0.0 e                                    | 0.0 f   | 15.4 e-g | 17.9 d-f | 12.5 e-g | 13.0 d-f | 10.8 b-d                               | 32,361 ab       |
| Quadris 2.08SC, 12.3 fl oz<br>+ Cuprofix 36.9DF, 2.0 lb (1,4,7,10)<br><i>alt</i> Nova 40W, 4.5 oz<br>+ Cuprofix 36.9DF, 2.0 lb (3,6,9) .....                 | 0.0 e                                    | 0.0 f   | 15.8 e-g | 16.7 ef  | 11.1 fg  | 11.0 ef  | 6.3 ef                                 | 30,982 a-c      |
| Quadris 2.08SC, 12.3 fl oz<br>+ Bravo Weather Stik 6F, 2.0 pt (1,4,7,10)<br><i>alt</i> Nova 40W, 4.5 oz<br>+ Bravo Weather Stik 6F, 2.0 pt (3,6,9) .....     | 0.1 e                                    | 0.1 f   | 17.1 d-g | 18.3 d-f | 10.6 g   | 11.2 ef  | 5.9 ef                                 | 25,501 bc       |
| Topsin-M 70WSB, 1.5 lb<br>+ Cuprofix 36.9DF, 2.0 lb (1,3,5,7,9)<br><i>alt</i> Cuprofix 36.9DF, 2.0 lb (2,4,6,8,10) .....                                     | 0.9 c-e                                  | 0.6 d-f | 8.6 h    | 10.4 g   | 10.7 g   | 10.7 f   | 11.9 b                                 | 25,120 bc       |
| TD2470-0170WSG, 1.5 lb<br>+ Cuprofix 36.9DF, 2.0 lb (1,3,5,7,9)<br><i>alt</i> Cuprofix 36.9DF, 2.0 lb (2,4,6,8,10) .....                                     | 1.7 cd                                   | 1.6 b-d | 19.6 c-e | 20.4 de  | 17.3 d-f | 16.8 de  | 9.0 b-e                                | 25,047 bc       |
| Procure 50WS, 6.0 oz<br>+ Latron CS-7, 0.125% (2,4,6,8,10) .....   | 0.5 c-e                                  | 0.3 ef  | 21.2 c-e | 21.2 c-e | 13.5 d-g | 13.3 d-f | 12.9 b                                 | 36,173 a        |
| Procure 480SC, 6.0 fl oz<br>+ Latron CS-7, 0.125% (2,4,6,8,10) .....   | 3.7 b                                    | 2.0 bc  | 17.5 d-g | 19.2 d-f | 18.8 d   | 17.2 d   | 11.6 bc                                | 29,004 a-c      |
| Flint 50WG, 2.0 oz (1,4,7,10)<br><i>alt</i> Procure 50WS, 6 oz<br>+ Latron CS-7, 0.125% (3,6,9) .....  | 1.8 c                                    | 1.5 c-e | 22.9 b-d | 23.3 cd  | 18.0 de  | 16.7 de  | 7.0 de                                 | 32,724 ab       |
| Flint 50WG, 2.0 oz (1,4,7,10)<br><i>alt</i> Procure 480SC, 6 fl oz<br>+ Latron CS-7, 0.125% (3,6,9) .....  | 0.6 c-e                                  | 0.2 f   | 20.8 c-e | 21.2 c-e | 17.3 d-f | 16.8 de  | 10.4 b-d                               | 26,916 bc       |
| Flint 50WG, 2.0 oz<br>+ Latron CS-7, 0.125% (1,4,7,10)<br><i>alt</i> Nova 40W, 4.5 oz<br>+ Latron CS-7, 0.125% (3,6,9) .....                                 | 1.3 c-e                                  | 0.8 c-f | 22.9 b-d | 23.3 cd  | 19.4 d   | 18.2 d   | 9.2 b-e                                | 28,713 a-c      |
| Ranman 400SC, 2.75 fl oz<br>+ Silwet L-77, 5 fl oz (2,3,4,5,6,7,8,9,10) ....   | 4.4 b                                    | 2.6 b   | 28.7 b   | 30.0 b   | 42.1 b   | 34.2 b   | 7.5 de                                 | 26,408 bc       |
| Bravo Weather Stik 6F, 2.0 pt (2,3)<br><i>alt</i> Cabrio EG, 15 oz (5,7,9)<br><i>alt</i> Ranman 400SC, 2.75 fl oz<br>+ Silwet L-77, 5 fl oz (4,6,8,10) ..... | 0.8 c-e                                  | 0.5 d-f | 25.0 bc  | 29.6 c   | 27.2 c   | 27.2 c   | 2.7 f                                  | 26,862 bc       |
| LSD ( $P=0.05$ )   | 1.6                                      | 1.2     | 6.7      | 6.2      | 6.5      | 6.0      | 4.1                                    | 8191            |

<sup>z</sup> Severity=percent area of vines or leaves affected.

<sup>y</sup> Application time: 1=14 Jul, 2=21 Jul, 3=28 Jul, 4=4 Aug, 5=11 Aug, 6=18 Aug, 7=25 Aug, 8=1 Sep, 9=8 Sep, and 10=15 Sep.

<sup>x</sup> Severity of downy mildew was assessed on 14 Sep and represents percent area of leaves affected.

<sup>w</sup> Values within each column followed with the same letter are not significantly different ( $P=0.05$ ) according to Fisher's Protected Least Significant Difference test.