CUCUMBER (*Cucumis sativus* ‘Straight-Eight’) M.R. Uebbing and M.K. Hausbeck

Downy mildew, *Pseudoperonospora cubensis* Michigan State University

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**Evaluation of disease forecasters for control of downy mildew on pickling cucumbers, 2021.**

This trial was conducted at the Michigan State University Plant Pathology Farm in Lansing, MI in a field of Capac loam soil previously planted to cucumber. Pre-plant fertilizer (urea 100 lb/A, potash 180 lb/A, sulfur 25 lb/A, boron 20 lb/A) was applied on 20 May. The field was prepared by plowing on 5 May and discing 17 and 20 May. Raised beds were formed, plastic was laid, and drip tape was established for irrigation on 25 May. Weeds were controlled via mechanical cultivation and hand weeding. Cucumber ‘Straight-Eight’ seeds were planted from seed by hand on 30 Jul and spaced 12 in. apart in rows that were spaced on 6-ft centers. Treatments were arranged in a completely randomized block design with four replicates. Each treatment replicate consisted of a single 20-ft row plot with a 5-ft buffer between treatments within a row. The trial was fertilized throughout the growing season with weekly applications of 28% nitrogen via drip tape at 1 gal/A. Insects were controlled with an application of Admire Pro (10.5 fl oz/A) through drip tape on 13 Aug and non-target diseases (Alternaria Leaf Spot/Blight and Powdery Mildew) were controlled with applications of Quadris (15.5 fl oz/A) and Quintec (6 fl oz/A) on 25 Aug and 1 Sep. Each treatment was sprayed with the following fungicide program upon initiation: Ranman (2.75 fl oz/A) alternated with Orondis Opti (2.5 pt/A) alternated with Zampro (14 fl oz/A) + Bravo WeatherStik (2 pt/A). Applications for the 7-day treatment were applied on 6, 13, 20, 26 Aug, and 3, 10, 17 Sep. Applications for the 10-day treatment were applied on 6, 16, 25 Aug, and 3, 13 Sep. Applications for the TOM-CAST 15DSV treatment were applied on 6, 18, 26 Aug, and 9 Sep. Applications for the TOM-CAST 12DSV treatment were applied on 6, 16, 23, 30 Aug, and 13 Sep. Applications for the BLITE-CAST 18DSV treatment were applied on 6, 20, 25 Aug, and 1, 14 Sep. Applications for the BLITE-CAST 15DSV treatment were applied on 6, 18, 25, 30 Aug, and 7, 14 Sep. Applications for the DM-CAST treatment were applied on 6, 9, 18, 21, 25 Aug, and 5, 13, 18 Sep.

Over the course of the study, foliar disease progressed from 16.3% to 87.5% in the untreated control plots. BLITE-CAST 15DSV was the most effective forecaster with 13% foliar infection on the last rating date (20 Sep), significantly better than all other forecasters (p = 0.05) and not statistically different than the 7-day calendar program. All forecasters were significantly better than the untreated control. The TOM-CAST forecaster performed significantly worse than the other two forecasters when triggered at 12DSV and significantly worse than the DM-CAST forecaster and BLITE-CAST 15DSV forecaster when triggered at 15DSV. The BLITE-CAST forecaster was significantly better when triggered at 15DSV compared to 18DSV. According to AUDPC, the DM-CAST and BLITE-CAST 15DSV forecasters performed best with the DM-CAST being significantly better and BLITE-CAST 15DSV not being significantly better than the 7-day calendar program. Both TOM-CAST treatments and the 10-day calendar program were not significantly different from each other. The BLITE-CAST 18DSV treatment was not significantly different from the 10-day treatment and TOM-CAST 15DSV treatment.

| Program | Treatmentz and rate/A, *application schedule* | Foliar infection (%)y | AUDPCx |
| --- | --- | --- | --- |
| 23 Aug | 30 Aug | 3 Sep | 8 Sep | 13 Sep | 16 Sep | 20 Sep |
| Untreated control |  | 16.3 | aw | 53.8 | a | 67.5 | a | 80.0 | a | 83.8 | a | 83.8 | a | 87.5 | a | 1859.4 | a |
| DM-CAST | Ranman 2.75 fl oz, *A,D,G**-alt-* Orondis Opti 2.5 pt, *B,E,H**-alt-* Zampro 14 fl oz + BWS 2 pt, *C,F* | 2.0 | b | 0.0 | b | 0.3 | d | 3.3 | c | 7.3 | g | 7.8 | f | 18.8 | d | 118.0 | f |
| BLIGHT-CAST15 DSV | Ranman 2.75 fl oz, *A,D**-alt-* Orondis Opti 2.5 pt, *B,E**-alt-* Zampro 14 fl oz + BWS 2 pt, *C,F* | 0.0 | c | 0.0 | b | 5.3 | bc | 14.5 | b | 13.8 | f | 13.8 | e | 13.0 | e | 225.3 | e |
| 7-Day Calendar | Ranman 2.75 fl oz, *A,D,G**-alt-* Orondis Opti 2.5 pt, *B,E**-alt-* Zampro 14 fl oz + BWS 2 pt, *C,F* | 0.0 | c | 0.8 | b | 7.0 | b | 15.8 | b | 18.3 | e | 17.8 | e | 17.8 | d | 285.0 | de |
| BLIGHT-CAST18DSV | Ranman 2.75 fl oz, *A,D**-alt-* Orondis Opti 2.5 pt, *B,E**-alt-* Zampro 14 fl oz + BWS 2 pt, *C* | 0.8 | c | 0.0 | b | 2.8 | bcd | 18.8 | b | 22.5 | d | 23.3 | d | 28.3 | c | 336.6 | cd |
| 10-Day Calendar | Ranman 2.75 fl oz, *A,D**-alt-* Orondis Opti 2.5 pt, *B,E**-alt-* Zampro 14 fl oz + BWS 2 pt, *C* | 0.0 | c | 0.0 | b | 8.3 | bc | 15.5 | b | 25.5 | cd | 26.8 | cd | 30.8 | c | 371.8 | bcd |
| TOM-CAST15DSV | Ranman 2.75 fl oz, *A,D**-alt-* Orondis Opti 2.5 pt, *B**-alt-* Zampro 14 fl oz + BWS 2 pt, *C* | 0.0 | c | 0.0 | b | 1.3 | cd | 21.3 | b | 28.8 | bc | 30.8 | bc | 36.0 | b | 406.5 | bc |
| TOM-CAST12 DSV | Ranman 2.75 fl oz, *A,D**-alt-* Orondis Opti 2.5 pt, *B,E**-alt-* Zampro 14 fl oz + BWS 2 pt, *C* | 0.0 | c | 0.0 | b | 8.3 | b | 18.8 | b | 30.0 | b | 33.8 | b | 38.3 | b | 445.5 | b |

z*-alt-* = alternate. BWS = Bravo WeatherStik

yBased on visual assessment of foliage diseased.

xArea Under the Disease Progress Curve

wColumn means with a letter in common are not significantly different at p = 0.05 as determined by Tukey’s multiple-range test using ANOVA, SAS.