

Evaluation of fungicide rotation for downy mildew management on cucumbers, Clinton 2022.

The research trial was conducted at the Horticultural Crops Research Station in Clinton, NC. Experimental plots were single raised beds on 5-ft centers covered with white plastic mulch; 14-ft long with 5-ft fallow borders on each end and non-treated guard rows on each side. The field was planted last year with soybean as a rotational crop. Cucumber was directly seeded on 21 Jun (2-ft in-row spacing, 2 seed/hill) and thinned to one plant per hill after emergence (7 plants/plot). Irrigation and fertilization (4-0-8, N-P-K) were applied via drip tape. Five treatments and the non-treated control were tested in a randomized complete block design with four repetitions. Fungicide treatments were applied using a CO₂-pressurized backpack sprayer equipped with a single-nozzle, handheld boom with a hollow cone nozzle (TXVS-26) delivering 40 gal/A at 35 psi. Applications were made on 20 and 29 Jul and 4, 11 and 18 Aug. Disease severity per plot was assessed on 20 and 29 Jul, 3, 10, 17 and 24 Aug. Data were analyzed in the software ARM (Gylling Data Management, Brookings, SD) using analysis of variance (AOV) and Fisher’s protected least significant differences (LSD) test to separate the means.

Downy mildew was first detected on 18 Jul at approximately 5% disease severity in the field. No phytotoxicity was observed in the experiment. At the disease severity data obtained on 3 Aug 6 weeks after planting the treatment Ranman alternated with Previcur Flex, Reason alternated with Badge, Zing! and Badge and Ranman alternated with Badge, Previcur Flex and Badge were statistically different from the non-treated control, but not for other treatments. No significant differences were observed in the disease summary for the season (AUDPC). Yields were assessed every week (4 data points) as marketable and non-marketable (summarized as total marketable and total non-marketable). For the marketable yields there is not a statistical difference between the treatments and the non-treated control. For the non-marketable treatment, Reason alternated with Zing! was statistically different from the non-treated control but not for other treatments.

Treatments	Rate /Acre	Disease Severity ^z (%) 3 Aug – Week 6	AUDPC ^y	Marketable Yields ^x (lbs./treatment)	Non-marketable Yields (lbs./treatment)
Non-treated control	–	16.0 a ^w	531.88 a	36.09 a	19.45 c
Reason 44.4%	5.0 fl oz	13.3 ab	731.13 a	48.39 a	21.7 bc
Badge 32.17%	1.0 pt				
Zing! 46.8%	36.0 fl oz				
Badge 32.17%	1.0 pt				
Reason 44.4%	5.0 fl oz	10.0 b	471.13 a	47.94 a	21.23 bc
Badge 32.17%	2.0 pt				
Zing! 46.8%	36.0 fl oz				
Badge 32.17%	1.0 pt				
Reason 44.4%	5.0 fl oz	12.5 ab	660.88 a	50.67 a	25.9 a
Zing! 46.8%	36.0 fl oz				
Ranman 34.5%	2.75 fl oz	10.0 b	499.88 a	49.15 a	24.05 ab
Badge 32.17%	2.0 pt				
Previcur Flex 66.5%	19.2 fl oz				
Badge 32.17%	2.0 pt				
Ranman 34.5 %	2.75 fl oz	11.5 b	539.75 a	45.48 a	23.9 ab
Previcur Flex 66.5%	19.2 fl oz				

^z Disease rating scale based on percent necrotic foliage caused by *P. cubensis*. / Data point 3 Aug, 6 weeks after planting.

^y Area under disease progress curve for total of all the foliar diseases present. $AUDPC = \sum_{i=1}^{n-1} \frac{y_i + y_{i+1}}{2} x(t_{i+1} - t_i)$

^x Marketable and non-marketable total yields (lbs./treatment).

^w Treatments followed by the same letter(s) within a column are not statistically different ($P=0.05$, Fisher’s Protected LSD).