CUCUMBER, SUMMER (*Cucumis sativus* 'Lizst')
Downy mildew; *Pseudoperonospora cubensis*

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Chemical management for downy mildew on cucumbers, Clinton, NC 2023.

This research was performed 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. Cucumber 'Lizst' was directly seeded on 3 Jul (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. Seven treatments and a nontreated control were evaluated in a randomized complete block design with four repetitions. Fungicide treatments were applied using a CO_2-pressurized backpack sprayer equipped with a single-nozzle, handheld boom with a hollow cone nozzle (TXVS-26) delivering 40 gal/A at 35 psi on 30 Aug, 6, 15, 20, 27 Sep, and 4 Oct. Percent disease severity per plot was assessed every week for 13 weeks, from 30 Aug to 11 Oct. Marketable and non-marketable yield data was collected five times and summarized as total marketable yield. 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 means.

Downy mildew was first detected on 30 Aug at approximately 1% disease severity in the field. The disease severity data obtained on 9 Sep showed that Ranman alone was the most effective at reducing downy mildew severity compared to the nontreated control, Reason, and Torac + Dyne-Amic. Season-long management, measured using Area Under the Disease Progress Curve values (AUDPC), showed that Zing! and Ranman significantly reduced disease severity compared to the non-treated control. Marketable yields were not significantly different across all treatments. No phytotoxicity was observed in the experiment.

Treatments and Rate/A	Disease severity (%)[z] 6 Sep	AUDPC[y]	Total marketable yield (lb/plot)
Non-treated control	55.0 a[x]	1314.0 a	16.0 a
Reason 5.5 fl oz/A	50.0 ab	1244.5 ab	15.8 a
Zing! 36.0 fl oz/A	38.8 bc	945.5 c	19.8 a
Torac 21.0 fl oz/A Dyne-Amic 0.125% v/v	50.0 ab	1240.7 ab	21.1 a
Cymbol Advance 3.0 pt/A Dyne-Amic 0.125% v/v	45.0 abc	1034.1 bc	29.0 a
Ranman 2.75 fl oz/A	32.5 c	772.1 c	20.3 a
Howler Evo 2.5 lb/A Dyne-Amic 0.375% v/v Orondis Opti 1.75 pt/A	41.3 bc	1044.4 abc	21.2 a
Howler Evo 2.5 lb/A Dyne-Amic 0.375% v/v Ranman 2.1 fl oz/A	42.5 abc	970.0 bc	20.3 a

[z]Disease rating based on percent necrotic foliage per plot caused by *P. cubensis* at 9 weeks after planting.
[y]Area under disease progress curve calculated as AUDPC = $\sum_{i=1}^{n-1} \frac{y_i+y_{i+1}}{2} x(t_{i+1} - t_i)$ using weekly ratings from 30 Aug to 11 Oct.
[x]Treatments followed by the same letter(s) within a column are not statistically different (P=0.05, Fisher's Protected LSD).