GRIMM FAMILY CENTER FOR ORGANIC PRODUCTION AND RESEARCH

EVALUATION OF FUNGICIDES FOR CONTROLLING DOWNY MILDEW ON CENTRAL COAST LETTUCE:

Downy mildew is a serious disease of lettuce. We evaluated both organic and non-organic fungicides on an experimental field at the Cal Poly campus in Fall of 2023. The USDA organic compliant fungicides tested included: ProBlad Verde, Cinnerate, Serenade ASO, and Howler EVO.

THE APPROACH

- Lettuce was directly seeded on 13 Oct 2023 in double rows with 10 inches between plants.
- Eleven-foot plots were replicated four times
- Experimental applications were made on 8 Dec, 15 Dec, 25 Dec, and 4 Jan 2024 at 60 psi and a 50 gal/A volume
- The nonionic surfactant Dyne-Amic was added to all fungicide treatments on a 0.125% v:v basis.
- Downy mildew incidence and severity was assessed on 23 Jan 2024, rating all plants in each plot:
  - 0 = no downy mildew (considered marketable)
  - 1 = downy mildew on bottom and lower wrapper leaves (considered marketable)
  - 2 = downy mildew on wrapper leaves
  - 3 = downy mildew on cap leaves
- Marketable weight is based on 10 randomly selected lettuce in each treatment replication
- Marketable rate was calculated as the % of plants scoring 0 and 1 out of the total in each plot.

DOWNY MILDEW SIGNS AND SYMPTOMS

Downy mildew disease pressure was low to medium during November but increased starting in December. Downy mildew signs were first observed on 15 Dec 2023 in the non-treated control plots.

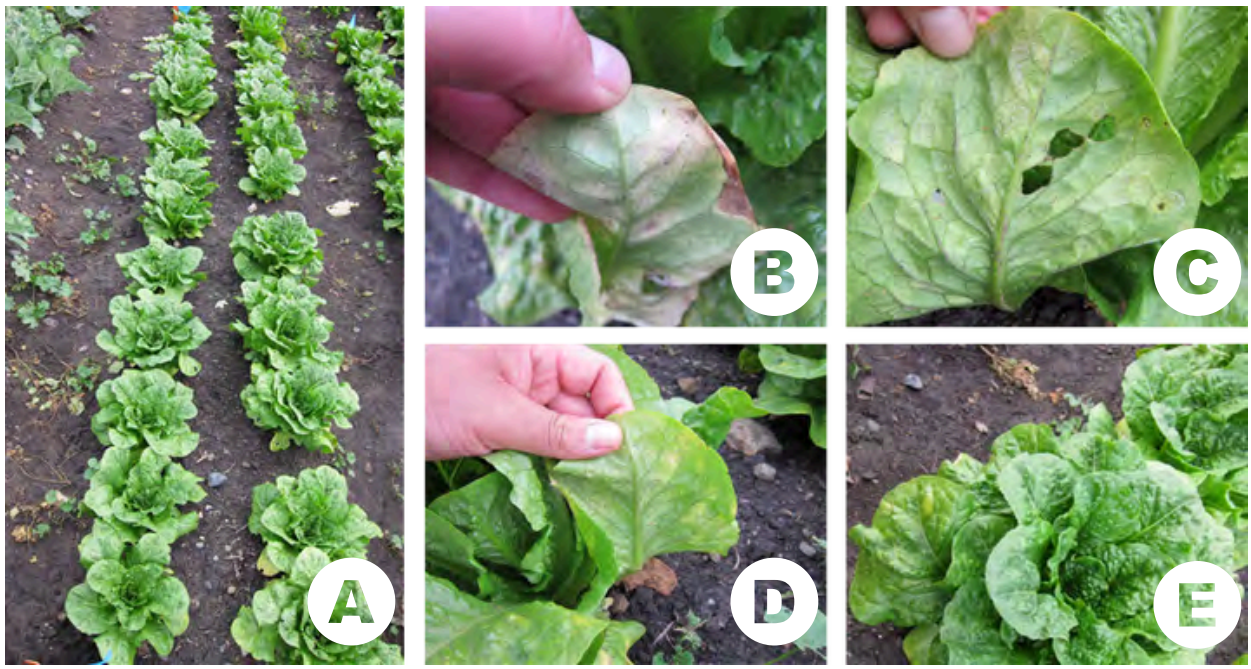

Fig 1. Images of the experimental plot and downy mildew-infected plants. A. Experimental plot. B-D Downy mildew sporulating on the underside of the leaves. E. Wrapper leaves showing chlorotic patches caused by infection.

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KEY FINDINGS

Table 1. Results of the field trial including disease severity, incidence, and yield

TRT #	Products	Rate per Acre	Apps*	Sever-ity	Inciden ce (%)	Yield (lbs)	Market Rate (%)
1	Untreated	NA	NA	2 a	100 A	6 ab	11 E
2	***Problade Verde*** ★	45 Fl oz	AC	1.6 b	100 A	5.3 ab	35 DE
3	***Problade Verde*** ★	45 Fl oz	ABCD	1.5 bcd	100 A	5.2 ab	47 CD
4	***Problade Verde*** ★	32 Fl oz	ABCD	1.6 bc	100 A	5.7 ab	43 CD
5	***Cinnerate***	32 Fl oz	ABCD	1.5 cde	100 A	5.3 ab	57 ABCD
6	Ridomil	4 Fl oz	AC	1.5 bcd	100 A	7 ab	54 BCD
7	***Serenade ASO***	2 Qt	AC	1.4 def	100 A	8.4 a	65 ABC
	Presidio	4 Fl oz	BD				
8	***Howler EVO*** ★	1.25 Lb	AC	1.3 f	100 A	7.3 ab	77 AB
	Presidio	4 Fl oz	BD				
9	Revus	8 Fl oz	AC	1.3 ef	93.8 AB	4 b	73 AB
	Howler EVO ★	1.25 Lb	BD				
10	Revus	8 Fl oz	AC	1.1 g	87 B	7.4 ab	81 A
	Presidio	4 Fl oz	BD				

* Spray dates: A = 8 Dec 2023, B = 15 Dec, C = 25 Dec, and D = 4 Jan 2024

★ product not currently labeled for use on lettuce in California.

Organic products in **bold text**

Means followed by the same letter within a column are not significantly different at P = 0.05 as determined by Fisher's protected LSD test.

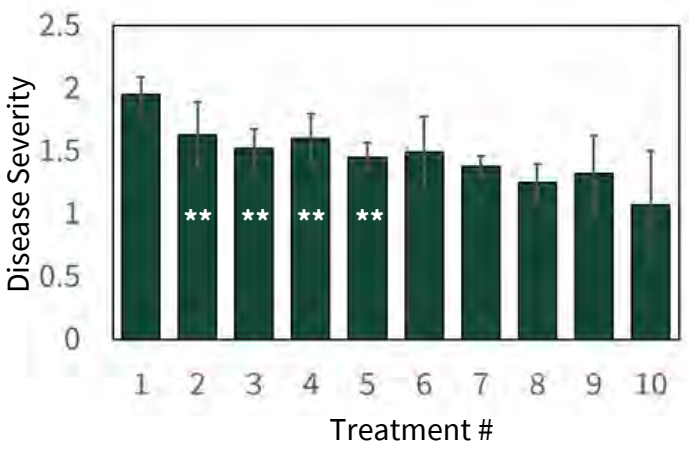

Fig. 2. Mean downy mildew severity on Romaine lettuce (control = 1). ** = Organic Program

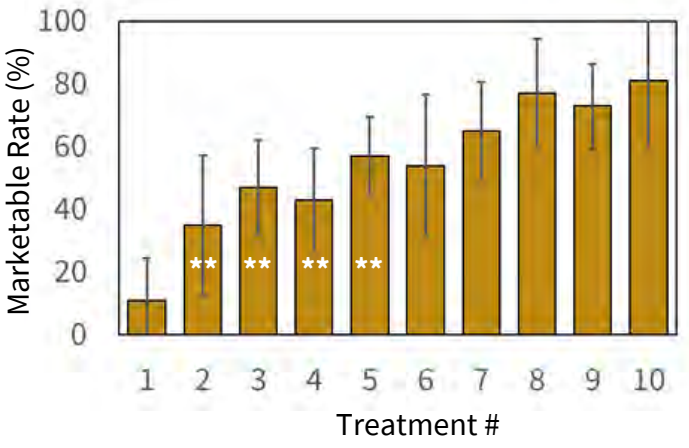

Fig. 3. Mean marketable rate (%) for Romaine lettuce by treatment (Control = 1). ** = Organic Program

- **Cinnerate provided the highest marketable rate of the organic products tested**
- **Combining organic and conventional products improved performance**
- **Organic products did not provide comparable control to the best conventional treatment**

NEXT STEPS

- 2024 field trials for biological disease management products are underway for a variety of vegetable crops as well as grapes.
- Beginning in winter 2024 the Ding lab will begin testing organic soil treatments for soil-borne disease management in leafy greens.

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