

LETTUCE (*Lactuca sativa* ‘Winter Select’)Downy mildew; *Bremia lactucae*Powdery mildew; *Golovinomyces cichoracearum*

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Comparison of fungicides for management of downy and powdery mildew on lettuce, 2010.

This study was conducted at the University of Arizona, Yuma Valley Agricultural Center. The soil was a silty clay loam (7-56-37 sand-silt-clay, pH 7.2, O.M. 0.7%). Lettuce ‘Winter Select’ was seeded on 10 Nov 09 in double rows 12 in. apart on beds with 40 in. between bed centers, then sprinkler-irrigation was used to germinate the seed. Treatments were replicated five times in a randomized complete block design. Each replicate plot consisted of 25 ft of bed, which contained two 25 ft rows of lettuce separated by a 5 ft length of non-treated bed. Plants were thinned 14 Dec at the 3-4 leaf stage to a 12-in. spacing within rows. Treatment beds were separated by single non-treated beds. Treatments were applied with a tractor-mounted boom sprayer that delivered 50 gal/acre at 100 psi to hollow-cone nozzles spaced 12 in. apart. Foliar applications of treatments for the downy mildew portion of the trial were made 3,8,12,15, and 22 Feb 10, depending on the treatment. Microthiol Disperss was applied 15 Feb over all downy mildew plots to control powdery mildew. Foliar applications of powdery mildew treatments were made 4, 12, and 19 Feb. Maximum and minimum ranges (°F) of air temperature were as follows: Dec 09, 58-74, 31-51; Jan 10, 60-75, 36-52; Feb, 58-81, 38-53; 1-12 Mar, 60-78, 39-52. Maximum and minimum ranges (%) for relative humidity were as follows: Dec, 51-95, 9-48; Jan, 38-100, 11-37; Feb, 69-100, 12-66; 1-12 Mar, 43-99, 12-51. Total rainfall in inches was as follows: Dec, 0.02; Jan, 3.12; Feb, 0.51; 1-8 Mar 1.00. The severity of downy mildew was determined at plant maturity (11-12 Mar) by counting the number of downy mildew lesions on 10 different plants within each of the five replicate plots per treatment. The severity of powdery mildew was determined 10 Mar by rating 10 plants within each of the five replicate plots per treatment using the following rating system: 0 = no powdery mildew present; 1 = powdery mildew present on bottom leaves of plant; 2 = powdery mildew present on bottom leaves and lower wrapper leaves; 3= powdery mildew present on bottom leaves and all wrapper leaves; 4 = powdery mildew present on bottom leaves, wrapper leaves and cap leaf; 5 = powdery mildew present on entire head. For powdery mildew, yield loss due to rejected heads would normally begin to occur on plants with a rating above 2.0.

An occasional lesion caused by the downy mildew pathogen (*Bremia lactucae*) or powdery mildew pathogen (*Golovinomyces cichoracearum*) was observed on some plants when the first application of treatments was made for the respective diseases. Among treatments, disease reduction levels ranged from 12 to 86% for downy mildew and 73 to 100% for powdery mildew, compared to nontreated plots. All treatments for both diseases provided statistically significant reductions in disease compared to nontreated plants. Phytotoxicity symptoms were not noted on lettuce for any of the materials tested.

Treatment and rate of product/A ^z	Downy mildew lesions / leaf ^y	Powdery mildew severity rating ^y
Tanos 50WG 8.0 oz + Aliette 80WG 2.0 lb (1,3), Presidio 4SC 4.0 fl oz + Aliette 80WDG 2.0 lb (2)	2.8	-----
Manzate Pro-Stick 75WG 1.0 lb + Agridex 1.0 pt (1,2), Curzate 60DF 5.0 oz + Previcur 6SL 2.0 pt + Agridex 1.0 pt (3)	3.2	-----
Manex 4SC 35.8 fl oz (1,3), Aliette 80WP 3.0 lb (2)	3.2	-----
BAS 651 14.0 fl oz + Silwet L-77 1.9 fl oz (1,3), Manex 4SC 3.0 pt (2)	3.2	-----
Manex 4SC 3.0 pt + Agridex 1.0 pt (1,2), Curzate 60DF 5.0 oz + Previcur 6SL 2.0 pt + Agridex 1.0 pt (3)	3.8	-----
Rebus 250SC 8.0 fl oz + Induce 16.0 fl oz (1,3,5)	4.6	-----
Rebus 250SC 8.0 fl oz + Agridex 1.0 pt (1,2), Curzate 60DF 5.0 oz + Previcur 6SL 2.0 pt + Agridex 1.0 pt (3)	4.8	-----
Manex 4SC 35.8 fl oz (1,3), Reason 500SC 8.2 fl oz + Bond 0.5 pt (2)	5.8	-----
Rebus 250SC 8.0 fl oz + Induce 16.0 fl oz (1,3), Manex 4SC 3.0 pt (2)	6.0	-----
Presidio 4SC 3.0 fl oz + Regalia 1.0 qt (1,3), Regalia 1.0 qt + Manzate FL 1.5 pt (2)	6.2	-----
Tanos 50WG 8.0 oz + Aliette 80WG 2.0 lb (1,3,5), Presidio 4SC 4.0 fl oz + Aliette 80WDG 2.0 lb (2,4)	6.8	-----
Manzate FL 1.5 pt + Agridex 1.0 pt (1,2), Curzate 60DF 5.0 oz + Previcur 6SL 2.0 pt + Agridex 1.0 pt (3)	7.2	-----
Aliette 80WDG 3.0 lb + Reason 500SC 8.2 fl oz + Bond 0.5 pt (1,3), Manex 4SC 35.8 fl oz (2)	8.4	-----
Cabrio 20WG 1.0 lb + Agridex 1.0 pt (1,2), Curzate 60DF 5.0 oz + Previcur 6SL 2.0 pt + Agridex 1.0 pt (3)	8.8	-----
BAS 651 14.0 fl oz + Silwet L-77 1.9 fl oz (1), Manex 4SC 3.0 pt (2), Aliette 80WDG 5.0 lb (3)	8.8	-----
Aliette 80WDG 3.0 lb (1), Reason 500SC 8.2 fl oz + Bond 0.5 pt (2), Manex 4SC		

35.8 fl oz (3)	10.8	-----
Presidio 4SC 4.0 fl oz + Agridex 1.0 pt (1,2), Curzate 60DF 5.0 oz + Previcur 6SL 2.0 pt + Agridex 1.0 pt (3)	10.8	-----
BAS 651 14.0 fl oz + Induce 16.0 fl oz (1,2,3)	12.0	-----
V-10208 3.2FS 6.0 fl oz (1,2,3)	13.8	-----
BAS 651 14.0 fl oz + Silwet L-77 1.9 fl oz (1,2,3)	15.6	-----
BAS 651 14.0 fl oz + Penetrator Plus 16.0 fl oz (1,2,3)	16.0	-----
V-10208 3.2FS 8.0 fl oz (1,2,3)	18.4	-----
Quintec 250SC 6.0 fl oz + Dyne-Amic 16.0 fl oz (1,2,3)	-----	0
Pristine 38WDG 1.56 lb (1,2,3)	-----	0
Procure 480SC 8.0 fl oz + Microthiol Disperss 10.0 lb (1,2,3)	-----	0
Quintec 250SC 6.0 fl oz (1,3), Regalia 1.0 qt (2)	-----	0
Rally 5.0 fl oz + Dyne-Amic 16.0 fl oz (1,2,3)	-----	0.1
NAI-2302 21.0 fl oz + Dyne-Amic 16.0 fl oz (1,2,3)	-----	0.2
Procure 480SC 8.0 fl oz (1,2,3)	-----	0.3
Microthiol Disperss 80DF 10.0 lb (1,2,3)	-----	0.3
NAI-2302 17.0 fl oz + Dyne-Amic 16.0 fl oz (1,3), Quintec 250SC 4.0 fl oz + Dyne-Amic 16.0 fl oz (2)	-----	0.6
NAI-2302 17.0 fl oz + Dyne-Amic 16.0 fl oz (1,2,3)	-----	0.7
Cabrio 20EG 1.0 lb (1,2,3)	-----	0.8
Pristine 38WDG 1.25 lb (1,2,3)	-----	0.9
Untreated control	20.8	3.4
LSD ($P = 0.05$) ^x	1.9	0.2

^z Foliar applications of treatments for downy mildew: (1) = 3 Feb; (2) = 8 Feb; (3) = 12 Feb, (4) = 15 Feb;
(5) = 22 Feb 10 and for powdery mildew: (1) = 4 Feb; (2) = 12 Feb; (3) = 19 Feb. An occasional lesion caused by
the downy mildew or powdery mildew pathogen was observed on some plants when the first application of
treatments was made.

^y Disease severity was assessed at plant maturity on 11-12 Mar for downy mildew by counting the number of lesions
on a plant and on 10 Mar for powdery mildew by using the rating system described earlier. For each disease, data
was collected from each of 10 plants per replicate plot.

^x Least Significant Difference at $P = 0.05$. Values in each column differing by more than the least significant
difference are significantly different according to Fisher's Protected LSD test.