

## AILRC Grant Research Project Final Report

### **Establishing the inherent efficacy of individual fungicide products for optimizing management of downy mildew on lettuce (11/05)**

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Downy mildew, caused by the oomycete pathogen *Bremia lactucae*, is an annual concern for Arizona lettuce producers. Disease severity and resultant crop losses are highly dependent on environmental conditions. The critical factor that drives the development of downy mildew is the presence and duration of moisture on leaves. When this moisture, usually from rainfall and dew formation, is present on lettuce plants for several nights, conditions become favorable for spore formation, release, and subsequent infection of lettuce leaves by the downy mildew pathogen. Management strategies for downy mildew are heavily reliant on fungicides. To obtain maximum control of downy mildew, the first application should be made when environmental conditions favor disease but before the actual appearance of downy mildew symptoms, then continuing as long as the threat of disease persists until crop maturity. The use of mixtures or alternation of products containing different modes of action is essential in minimizing development of resistance to particular materials within the pathogen population. To deploy the most effective fungicide treatment program, knowledge of the inherent efficacy of each component fungicide within the treatment program is essential. Why? In recently completed work with powdery mildew on cantaloupe, we found that the overall degree of disease control achieved was dictated by the most effective fungicide within a treatment program. Whenever a highly efficacious fungicide was alternated with a fungicide of moderate or low efficacy, the degree of disease control was similar to that recorded when only the highly efficacious material was applied. It is reasonable to assume that the same relationship would hold for downy mildew; therefore, identifying the fungicides with the highest efficacy and constructing fungicide application programs based on these highly effective materials should maximize the level of disease control achieved and support resistance management as well. The specific objective of this field trial was to ascertain the intrinsic efficacy of registered fungicides on lettuce downy mildew. By identifying the fungicides with the highest efficacy and including them in downy mildew treatment programs, growers should be able to maximize control of downy mildew and at the same time support resistance management.

This study was conducted at the 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 'Winterhaven' was seeded 7 Nov, 2011 in double rows, 12 in. apart on beds with 40 in. between bed centers, then sprinkler-irrigation was used to germinate the seed. All other water was supplied by furrow irrigations or rainfall. Treatments were replicated five times in a randomized complete block design. Each replicate consisted of 25 ft of bed, which contained two 25 ft rows of lettuce. Plants were thinned Dec 6 at the 3-4 leaf stage to a 12 in. spacing. Treatment beds were separated by single nontreated beds. Treatments were applied with a tractor-mounted boom sprayer that delivered 50 gal/acre at 100 psi to flat-fan nozzles spaced 12 in. apart. Foliar applications of treatments were made Jan 19, 30, Feb 13 and 29, depending on the treatment. Microthiol Disperss was applied in mid-Feb over all downy mildew plots to control powdery mildew. Maximum and minimum ranges (°F) of air temperature were as follows: Dec, 2011, 56-79, 29-47; Jan, 2012, 65-80, 33-52; Feb, 66-85, 36-51; 1-13 Mar, 63-86, 37-47. Maximum and minimum ranges (%) for relative humidity were as follows: Dec 2011, 57-100, 10-82; Jan 2012,

36-92, 7-34; Feb, 62-100, 8-33; 1-13 Mar, 35-79, 7-25. Monthly rainfall in inches was as follows: Dec, 0.75; Jan, 0.06; Feb, 0.18; 1-12 Mar, 0.00.

Downy mildew did not develop in plots this season. Low rainfall and resultant humidity levels were not sufficient to support disease development. This trial was to be a repeat of the trial conducted last year. A list of products and rates tested is provided below.

<b>2011-2012 Lettuce Downy Mildew Fungicide Efficacy Trial</b>	
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Treatment <sup>1</sup>	Rate of product per acre
Forum	6.0 fl oz
Curzate 60DF	5.0 oz
Presidio 4SC	4.0 fl oz
Manzate FL 10.85LG	1.6 qt
Actigard 50WG	1.0 oz
Reason 500SC	8.2 fl oz
Quadris 2.08SC	15.5 fl oz
Aliette 80WDG	5.0 lb
Revus 2.08SC	8.0 fl oz
Tanos 50WG	10.0 oz
Manzate Pro-Stick 75WG	2.1 lb
Previcur Flex	2.0 pt
Cabrio 20EG	16.0 oz
<b>Nontreated control</b>	-----

1 Foliar applications of treatments were made 19 Jan, 30 Jan, 13 Feb, and 29 Feb, 2012.