



## Disease Management for Vegetable Crops

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### Program Objectives

Optimize management of diseases affecting vegetables grown on Long Island within organic as well as conventional production systems by:

- investigating pathogen biology, including sources.
- developing scouting protocols and action thresholds.
- evaluating control practices, including fungicides, resistant varieties, and integration of chemical and genetic control.

Examine impact on diseases of practices to improve soil health: annual compost amendments, reduced tillage, and clover living mulch.

Diagnose disease problems for growers.

Determine impact of ambient ozone on plant productivity.



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### Program Summary

The fungal pathogen that causes powdery mildew in cucurbits, which is the most important disease of this crop group, has proven itself adept at evolving to overcome management tools; therefore, to ensure management guidelines developed for growers are sound, efficacy of fungicides and resistant varieties, which are the only management tools for powdery mildew, needs to be examined regularly. Research conducted in 2012 included 1) testing registered conventional fungicides and experimentals; 2) examining fungicide sensitivity of the pathogen population in commercial and research fields, and its impact on disease control and management; 3) determining fungicide sensitivity of pathogen isolates to currently registered products and fungicides in development; and 4) evaluating resistant melon varieties.

Varieties and experimentals were also evaluated with resistance to late blight in tomato, downy mildew in cucumber, and black rot in cabbage. Horticultural characteristics and resistance were assessed.

Fungicides were also evaluated for white mold in tomato, downy mildew in cucumber, and downy mildew in basil.

Biopesticides were evaluated for Phytophthora blight in pepper and squash, foliar diseases in tomato and downy mildew of basil.

Results from evaluations are used to justify labeling for new products and to provide growers information on efficacy to assist with selection of registered products.

A sentinel plot was maintained for the national cucurbit downy mildew forecasting program.

Impact on plant productivity of ambient ozone was examined by conducting research with a snap bean bioassay system developed to assess impact for a national research project.

Production of vegetables using reduced tillage was examined in research fields and on farms. A goal of this multi-disciplinary project is to examine impact of improving soil health on disease occurrence.



*Mt Fresh Plus with late blight in front of resistant variety Mt Magic.*

## Program Justification

Powdery mildew is the most important disease affecting cucurbit crops every year throughout LI. Fungicide resistance is a major concern. A new strain of the cucurbit downy mildew pathogen occurring since 2004 has been causing more significant losses than previously. Cucurbits, especially pumpkin, are very important crops on LI. Late blight has been occurring every year on LI since 2009 especially impacting tomato in commercial fields and gardens. This change is associated with appearance in the US of new pathogen strains. Basil downy mildew is a new disease that has occurred in NY every year since 2008 in commercial field and greenhouse crops plus gardens. Ambient ozone causes acute foliar injury to many crops each year on LI. Recognized need for practices to improve soil health.

## Impact to Industry

Research conducted in 2012 yielded information useful to growers producing vegetables and basil. Growers were informed of occurrence on LI of downy mildew on different cucurbit crop types.

The web-based monitoring program for basil downy mildew proved useful for tracking and sharing information about its occurrence, and contributed to recognition of its importance in the US.

Powdery mildew resistant melon varieties provided excellent suppression. Thus the pathogen has not evolved a new race. Several new specialty-type melons (including honeydew) were examined in 2012.

New resistant cucumber varieties did not adequately suppress downy mildew.

Tomato with *Ph2* and *Ph3* genes exhibited excellent resistant to late blight genotype US-23, which was the primary one detected in the Northeastern US in 2012. An educational brochure about late blight for gardeners was prepared and widely distributed because gardens have been among the first places with this very destructive disease and can be a source of the pathogen for commercial crops. Conducting fruit evaluations from this and other variety trials with public groups provided education opportunities.

Among fungicides currently registered for cucurbit powdery mildew, Pristine (contains FRAC Code 7 and 11 ingredients) applied at its highest label rate was ineffective. In previous years on LI, pathogen isolates resistant to both fungicide components have been detected, and the fungicide has exhibited variable performance. Among the 55 isolates collected in Sept 2011 when Pristine was effective, 79% were resistant to Code 11 chemistry while only 6% were resistant to the Code 7 ingredient in Pristine. Ineffectiveness in 2012 suggests resistant isolates were more common. Resistant isolates were detected with the in-field seedling bioassay conducted early in disease development (mid-July 2012). Fontelis, a chemically-related (FRAC 7) fungicide registered in 2012, was only somewhat more effective than Pristine. Procure (FRAC 3) applied at its highest label rate was effective. In lab assays only 4% of 2011 isolates tolerated 80 ppm of myclobutanil, a FRAC 3 ingredient. Similar control was achieved with Mettle, a new FRAC 3 fungicide not registered yet for this use. Quintec (FRAC 13) was highly effective through the last assessment when the other registered fungicides were no longer effective.

Phytophthora blight was less severe in research and commercial fields where there was a history of crops being grown using reduced tillage.

## Program Team

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