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# Powdery Mildew on Greenhouse-Grown Lettuce

*Powdery mildew commonly affects greenhouse lettuce crops - and can lead to significant losses if not properly managed. Learn a few key tips to prevent powdery mildew from impacting your lettuce crop.*

Many growers struggle with controlling powdery mildew on greenhouse-grown lettuce crops, especially during the fall and winter months. Symptoms of powdery mildew include patches of white powdery growth on the upper and lower leaves and stems. Disease severity depends upon lettuce type and variety, age and overall condition of the plant, as well as microclimate conditions. Older leaves and mature plants are usually affected first and become chlorotic and deformed, limiting plant growth and marketable yield. Severely affected tissues may turn necrotic and die.

Powdery mildews are fairly host-specific, although plants in the same family can be susceptible to the same mildew species. The fungus *Golovinomyces cichoracearum* (formerly *Erysiphe cichoracearum*) causes powdery mildew on lettuce. Strains of *G. cichoracearum* have infected over 150 species, including other greenhouse crops in the Asteraceae such as *Achillea*, *Dahlia*, *Cosmos*, *Dendranthema*, *Leucanthemum*, *Zinnia*, and *Gerbera*, among others.

The greenhouse environment provides ideal conditions for development of powdery mildew on lettuce, especially

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Figure 1. Characteristic patches of powdery white growth on lower lettuce leaves. (Photos by B. Scheckelhoff)

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when the foliage canopy is dense and air flow restricted. Mildew spores are spread via the air current and will germinate at a broad temperature range from 41-86 °F (5-30 °C) with an optimum at 64-77 °F (18-25 °C). Optimum relative humidity (RH) levels for germination are 95-98%, though germination can occur when the RH is at 50%, enabling the disease to develop in both humid and dry environments. Interestingly, free water on plant surfaces prevents spore germination and infection.

### Control Recommendations

Powdery mildew can be controlled with a multi-pronged approach involving plant selection, environmental control and the use of fungicides. The first step in alleviating powdery mildew concerns in lettuce production is to select varieties that are less susceptible to the pathogen. Studies have shown leaf and butterhead types show more resistance to powdery mildew than romaine and crisphead lettuces. Check seed company and University trial results for varieties and cultivars that show resistance, though performance may vary depending on your specific greenhouse conditions and cultural practices.

Monitor and scout for disease presence regularly, especially in sections of the greenhouse that have reduced air flow, dense plant canopies, or standing water. Examine both the upper and lower side of leaves. Powdery mildew forming on the underside of leaves can go undetected and move quickly through the greenhouse before it is noticed. Growers should also harvest mature plants in a timely manner to prevent overgrowth and the formation of dense canopies where powdery mildew can thrive.

Growers can limit powdery mildew in lettuce by properly venting the greenhouse to keep humidity levels low, by using fans and ventilation tubing to increase air movement within the plant canopy, and by selecting appropriate fungicides. Powdery mildew on lettuce is best controlled when products are applied before symptoms are detected on plants.

Carefully read fungicide labels and follow all guidelines. Check with your state pesticide regulatory agency to verify the state's interpretation of greenhouse label use. Some product labels do not specify whether a

product is prohibited nor labeled for greenhouse use. For example, Ohio will allow greenhouse use provided the treated crop is on the label (e.g., Serenade® on lettuce). Please also note that products labeled for control of powdery mildew on ornamentals may not be labeled for use on greenhouse vegetables (e.g., pyraclostrobin (Insignia®)). Likewise, products labeled for application to lettuce grown outdoors may not be labeled for use in the greenhouse (e.g., Merivon®). Remember to rotate fungicide products with different modes of action to limit the development of fungicide resistance.



Figure 2. NFT troughs have a fixed plant spacing, and scouting efforts should ramp up when the crop canopy begins to close. (Photo by B. Scheckelhoff)

**References**

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