

A NEW WAY TO GROW HEALTHIER LETTUCE

USING UV LIGHT AND ORGANIC FUNGICIDE TO CONTROL POWDERY MILDEW IN THE GREENHOUSE

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OVERVIEW

Powdery mildew is a common disease in lettuce that can reduce yields by up to 30% and lower the quality of the harvest. Finding better ways to manage this disease is an important area of research, especially for regenerative organic farms.

One promising method involves using ultraviolet (UV) light. UV light comes in three types: UV-A, UV-B, and UV-C. Certain types of UV light can affect how plants grow, their nutrient levels, and even their leaf color. This method could be a helpful tool for controlling disease, along with commercially available chemicals like biopesticides.

A greenhouse study was conducted by exposing lettuce seedlings to UV light before planting, and then applying a fungicide, i.e., MilStop (which is approved by organic material review institute, OMRI) after planting. We looked at how this affected mildew levels, yield, and the nutritional quality of lettuce.

HIGHLIGHTS



Using both UV-B light and MilStop together helped reduce powdery mildew in lettuce.



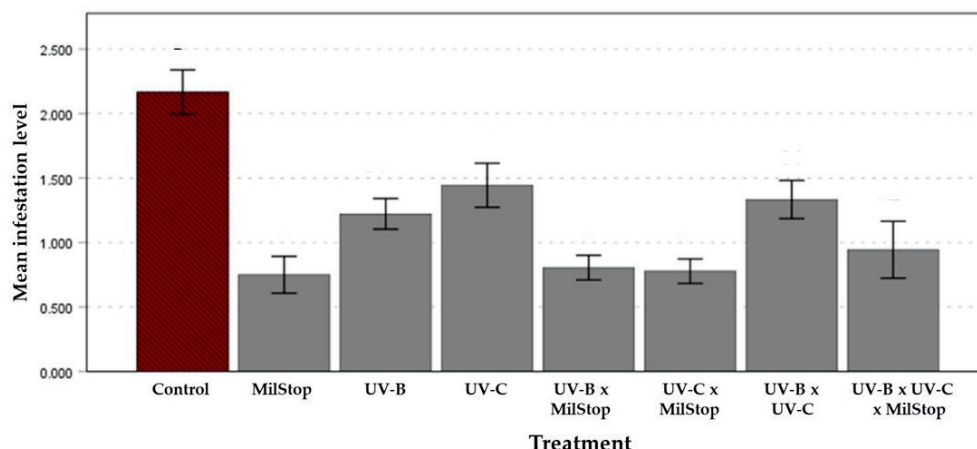
MilStop boosted lettuce yield, while UV-B light increased the amount of amino acids in leaves, which are important for plant nutrition.

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UV light supports plant health in different ways. UV-A (315 to 400 nm) helps boost plant growth and metabolism, UV-B (280 to 315 nm) improves growth, nutrient content, and flavor, while UV-C (100 to 280 nm) is effective at killing viruses, bacteria, and fungal diseases. We exposed lettuce seedlings to UV light before transplanting and applied MilStop twice after transplanting—one week and two weeks later.

FIGURE 1. Mean powdery mildew levels ($\pm$ standard deviation) on lettuce leaves (rated from 0 to 5) for each treatment.



Using UV-B or UV-C light together with MilStop helped reduce powdery mildew in the plants (Figure 1). However, using UV-C light by itself did not help much with disease control.

MilStop alone also improved yields. Plants treated with it had a total weight of about 116.4 grams and fresh leaf weight of around 101.2 grams. In some cases, yields increased by up to 44.8% compared to untreated (or control) plants.

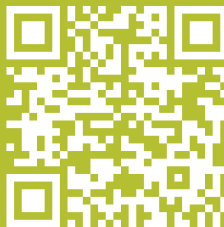
We also looked at how the treatments affected nutrients and compounds in the plants. Only UV-B light increased the total amino acid content in the leaves, which includes both essential and non-essential amino acids.

We also found a strong negative relationship between powdery mildew severity and harvestable weight, showing how important it is to control this disease for good yields.



KEY TAKEAWAY

Using UV-B light with MilStop provided the best control of powdery mildew in lettuce production. However, because UV light can be harmful to humans, it is important to use protective equipment and automated systems in greenhouse settings.



Acknowledgment: Information presented herein is based upon work supported by National Institute of Food and Agriculture, U.S. Department of Agriculture, through the Northeast Sustainable Agriculture Re-search and Education program under subaward number [ONE22-413]. Its contents are solely the responsibility of the authors and do not necessarily represent the official views of USDA.