CAES
The Connecticut Agricultural Experiment Station
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Dr. Yonghao Li
Department of Plant Pathology and Ecology
The Connecticut Agricultural Experiment Station
123 Huntington Street
New Haven, CT 06511

Phone: (203) 974-8601
Fax: (203) 974-8502
Email: Yonghao.Li@ct.gov
Website: portal.ct.gov/caes

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BLACK ROT OF BRASSICAS

Black rot is a seed-borne bacterial disease of brassica crops including cabbage, cauliflower, broccoli, Brussels sprout, kale, and collard. The disease attacks host plants at any growth stages in greenhouses and fields. Severe damage from the disease can cause significant yield losses in fields, and infected plants are vulnerable to postharvest diseases during storage and transportation.

SYMPTOMS AND DIAGNOSTICS

Symptoms on seedlings from contaminated seeds include slight yellowing or necrosis at the margin of cotyledons. When true leaves get infected, the initial symptom appears as irregular chlorosis with blackening of veins at the edge of infected leaves, then it expands inward to the midrib and forms distinctive V-shaped lesions (Figure 1). As the disease progresses, infected leaf tissues become wilted and dried with a yellow halo at the edge of lesions (Figure 2). The infection through hydathodes normally leads to characteristic V-shaped lesions, whereas the infection through stomata or wounds may result in irregular lesions at any part of a leaf (Figures 3 and 4). When the bacteria move into xylem tissues, the disease can cause systemic infections, resulting in stunted growth, chlorosis, wilting of the entire plant, and seed contamination.

DISEASE DEVELOPMENT

The pathogen, *Xanthomonas campestris* pv. *campestris,* can infect brassica vegetables and other cruciferous crops, ornamentals, and weeds. The pathogen can survive in contaminated seed that results in diseased

Figure 1. Yellowing of leaves and blackening of veins at the edge of a cabbage leaf.

Figure 2. Necrosis and wilting of leaf tissues at the edge of broccoli leaves.

Figure 3. An infected broccoli leaf with V-shaped lesions and irregular lesions.

Figure 4. V-shaped and irregular-shaped lesions on an infected kale plant.

seedlings. Even a low level of seed contamination rate (> 0.03 %) can result in severe disease epidemics and yield losses in fields under conducive environment conditions. The movement of contaminated seeds or infected transplants is a means of long-distance dissemination of the disease. The pathogen also survives in plant debris for 1-2 years until they are completely decomposed. The bacteria spread between plants through rain, irrigation water, tools, equipment and human activity. The bacteria enter plants through natural openings and wounds. The infection requires free water (dew, rain, irrigation, etc.) on the surface of leaves. Warm (77°-82°F) and humid weather conditions are favorable for the disease development.

MANAGEMENT

Cultural practice: Plant certified disease-free seeds or transplants. Treat seed in hot water (122°F) for 20-25 minutes to reduce the primary inoculum. Avoid overhead irrigation. Space plants adequately for good air circulation. Do not handle plants when they are wet with rain or irrigation water. Reduce mechanical injuries to plants. Remove and destroy plant debris. Practice a three-year rotation with non-brassica crops. Plow the fields after harvest in the fall to accelerate decomposition of plant debris.

Fungicide application: There are no curative fungicides available after plants are infected. Apply fungicide preventatively. Fungicides that are registered for the disease include copper products and acibenzolar-s-methyl that may be effective in suppressing the disease when they are used before plants get infected.

READ THE LABEL BEFORE APPLYING ANY PESTICIDE! We keep all archives of our fact sheets posted. While most practices for disease management do not change over time, please be aware that changes in pesticide regulations occur constantly. When applying pesticides, always consult the label to make sure the pesticide is approved for use on your plants.