

Diseases of Turnip and Mustard Greens

Sherrie Smith
Instructor -
Plant Pathologist

Introduction

Greens is the common name for the edible leaves of turnips, mustard, collards and related *Brassica* spp. (mustard family). Greens have long been a popular addition to the early fall garden. These plants are easy to grow but are susceptible to several fungal and bacterial leaf spot diseases when environmental conditions are favorable for infection.

Common diseases of greens in Arkansas include:

- **Anthracnose**
(*Colletotrichum higginsianum*)
- **Cercospora leaf spot**
(*Cercospora brassicicola*)
- **White spot**
(*Pseudocercospora capsellae*)
- **Downy mildew**
(*Peronospora parasitica*)
- **Bacterial leaf spot**
(*Pseudomonas maculicola*)

Disease Development and Spread

Foliar diseases of greens are spread by wind or rain and are strongly favored by wet conditions. Anthracnose survives on volunteer plants, dead leaves and related weed hosts and is most severe during wet conditions with warm temperatures between 79°-86°F (warm, rainy periods during August and September). The pathogens that cause Cercospora leaf spot and white spot survive on volunteer plants, perennial weeds and less commonly on infected seed. Cool temperatures of 55°-64°F and frequent rain, heavy dew or overhead irrigation increase both diseases. Night temperatures of 46°-61°F with daytime temperatures below 75°F favor downy mildew. The downy mildew fungus overwinters on *Brassica* spp. residue and is also more severe under frequent wet conditions. Bacterial leaf spot is favored by cool weather where

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Figure 1.
Anthracnose
symptoms
include small,
gray- to straw-
colored spots
on leaves.

Photo by Sherrie Smith,
University of Arkansas
Division of Agriculture

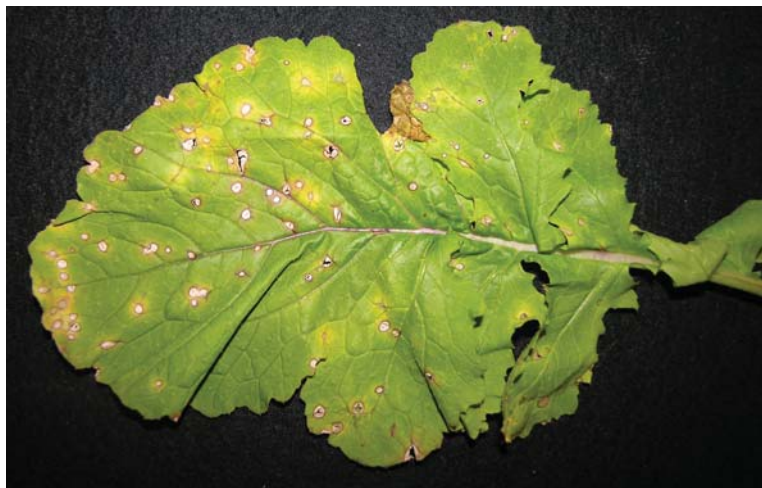




Figure 2. Circular spots with gray, brown or nearly white centers on cotyledons, leaves and petioles are symptoms of white spot.

Photo by Keri Welch, County Extension Agent - Agriculture, University of Arkansas Division of Agriculture



Figure 3. Cercospora leaf spot lesions are pale green to gray or white and angular in shape.

Photo by Sherrie Smith, University of Arkansas Division of Agriculture

daytime highs only reach 65°-75°F. The bacterial leaf spot pathogen can survive on crop residue for several years and on seed. Weather conditions in late September or during October and November in Arkansas favor all diseases except anthracnose (earlier disease).

Symptoms

Anthracnose attacks turnips, mustard, broccoli, collards and kale. Symptoms are small, gray- to straw-colored circular spots on the leaves and petioles (Figure 1). Lesions on the stalks are sunken, elongated and gray to brown with a black border.

Symptoms of white spot include circular spots with gray, brown or nearly white centers on cotyledons, leaves and petioles (Figure 2). Edges of the lesions may become slightly darkened with age. Leaves turn yellow and drop prematurely with this disease. Mustard, collards and turnip greens are all susceptible. Seedlings may be killed outright if the disease is severe at emergence.

Cercospora leaf spot lesions are pale green to gray or white and often have a brown border (Figure 3). Lesions are angular or circular in shape. This disease is sometimes called frog-eye leaf spot. Plants can be defoliated when infections are severe.

Downy mildew usually attacks lower leaves first. Small, yellow-brown spots appear which eventually expand and develop gray to black lace-like or streaky markings. In moist weather, white fungal mats are visible on the underside of leaves (Figure 4). Downy mildew can spread very fast under ideal (wet, cool) conditions.

Bacterial leaf spot symptoms begin on leaves as numerous pinpoint-sized and irregular brown spots with yellow halos. This stage is difficult to see on the upper leaf surface, whereas water-soaked brown spots are clearly visible on the leaf underside. As the disease progresses, the many small spots coalesce into large, brown papery areas with yellow borders that tear, giving the plant a ragged appearance (Figure 5).

Disease Control

- Start with a soil test before planting and fertilize according to test results to ensure adequate, balanced fertility.
- Plant in warm, well-drained and tilled soil.
- Plant certified clean seed and healthy transplants. If certified seed is not available, use an approved seed treatment.
- Practice good weed control in and around the field. Remove all volunteer crucifer (*Brassica* spp.) weeds such as wild mustards, shepherd's purse, pepper-grasses and wild radish.
- Practice crop rotation and do not grow crucifers again for at least three years on the same spot.
- Monitor and use pesticides as necessary for insect and disease control (see Table 1).
- Remove any diseased plants immediately, if possible, to prevent disease buildup and spread.
- Till all old crop debris immediately after harvest to allow time to rot.
- Avoid overhead sprinkler irrigation if possible as this makes disease worse. Work in the fields only when leaves are dry to prevent spreading disease with your hands, tools or clothing.



Figure 4. Visible white fungal mats on the underside of leaves are evidence of downy mildew.

Photo by David B. Langston,
University of Georgia, *Bugwood.org*



Figure 5. Bacterial leaf spot progresses into large, brown papery areas with yellow borders giving the plant a ragged appearance.

Photo by Sherrie Smith,
University of Arkansas Division of Agriculture

Table 1. Fungicides (0 = ineffective, 4 = very effective)

Commercial Production	Preharvest Internal (DAYS)	Downy Mildew	White Spot Cercospora Leaf Spot	Anthracnose	Bacterial Leaf Spot
azoxystrobin (Amistar, Quadris)	0	3	3	4	0
cyprodinil + fludioxonil (Switch)	7	0	2	1	0
fixed copper (Kocide)	0	2	1	1	3
maneb (Manex)	7	3	2	3	0
pyraclostrobin (Cabrio EG)	3	3	4	4	0
Home Gardens					
Copper hydroxide (Kocide)	0	2	1	1	3

Disclaimer: THE LABEL IS THE LAW. The above information should be used as a general guide on effectiveness, but actual use and other factors are strictly governed by the registered and latest label on the product. Always read and follow the label. This information is for educational purposes only and was as accurate as could be determined as of November 2012. The University of Arkansas Division of Agriculture makes no purposeful distinctions between brands or products mentioned, except where scientific research has been published to indicate differences.

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Printed by University of Arkansas Cooperative Extension Service Printing Services.

SHERRIE SMITH is an instructor - plant pathologist and diagnostician with the University of Arkansas Division of Agriculture located at the Plant Health Clinic at the University Farm in Fayetteville.

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FSA7549-PD-12-12RV