Specific Common Diseases

Alternaria Leaf Spot (Alternaria brassicicola, Alternaria brassicae, and A. raphani)

**Symptoms:** The disease first appears as small dark brown or black spots on the leaves. As the spots enlarge a definite zonation, or concentric rings, becomes evident. As spores are produced, the spots, especially in the center, become darker than other areas of the spots. With development of numerous spots, the leaves may turn yellow and die. Spots on stems and leaf petioles are elongate and purple to brown. The fungus produces numerous small brown sunken spots on cauliflower heads. See Plant Pathology Fact Sheet PP-34.

**Cultural Controls:** Use crop rotation. Plow down old plant beds and harvested fields. Use a fungicide seed treatment. Employ fungicide sprays starting in the seed production system. Ship produce at a 40-45°F. Purchase disease-free transplants. Wet conditions facilitate disease development. See Plant Pathology Fact Sheet No. 34.

**Chemical Controls:** See PPP-6.

Anthracnose (Colletotrichum higginsianum)

**Symptoms:** This disease occurs primarily on turnip, mustard, and Chinese cabbage. Small dry circular, gray to straw-colored leaf spots are produced. On leaf petioles and stalks the spots are sunken, elongated and gray to brown with black border. Gray or light tan spots, somewhat sunken, are produced on turnip roots.

**Cultural Controls:** Use crop rotation.

**Chemical Controls:** Apply fungicides if needed. The use of fungicides to control Alternaria leaf spot will also confer a measure of control on this disease. See PPP-6.

Bacterial Leaf Spot (Pseudomonas cicurii)

**Symptoms:** Slightly sunken gray-brown to dark-brown, round or oval spots up to about 1/4 inch across. Spots may show concentric (target spot) rings; these spots usually larger than plain spots. Spots may coalesce into large ones. Disease occurs
mainly on the wrapper leaves, but under favorable conditions, may cause injury to inside leaves.

**Cultural Controls:** Practice crop rotation. Disease is favored by overhead irrigation and poor field drainage. Purchase disease-free transplants.

**Black Rot (Xanthomonas campestris pv. campestris)**

**Symptoms:** Areas of yellow and light brown with a network of black veins develop in leaves of affected plants. Often there are "V" shaped areas at the edges of the leaves. Movement of the bacteria down the leaf veins into the vascular tissue of the stem produces the systemic stage of the disease. A cross section of a diseased stem shows the damaged vascular system in a circle around the central pith. Bacteria move from this area into upper, uninjured leaves.

**Cultural Controls:** To obtain control of black rot disease, a complete package approach to control must be followed. Omission of any one step in the control procedure may result in negation of disease control efforts.

1. Purchase certified, disease-free transplants.
2. Upon receipt of transplants, examine plants for early black rot symptoms before, not after, planting. Refuse payment on shipments with potential transplant-borne black rot. Infested shipments can be legally refused.
3. Do not locate seedbeds or field plantings on land planted to any crucifer during the preceding 12 months.
4. The use of tolerant varieties can decrease disease losses in the field especially when proper rotation is impossible.
5. Use strict sanitation in the transplant production areas and in productions fields.

6. Plow down old crop debris in field as soon as possible after harvesting.
7. Do not establish cull piles on the farm.
8. See Plant Pathology Fact Sheet No. PP-13 for total disease control program.
9. Hot water treatment of all cabbage seed is suggested regardless of source. Hot water treatment is as follows:
   - Treat seed at 122° F.
   - Cabbage and brussels sprouts seed should be treated for 25-35 minutes.
   - Broccoli, cauliflower, collards, Chinese cabbage, kale, kohlrabi, rutabaga and turnips should be treated for 18 minutes.
   - Retreat seed with a seed treatment fungicide prior to planting.

**Black Speck (unknown cause)**

**Symptoms:** On cabbage harvested during the winter months, numerous pin head-sized black specks may appear on the leaves extending all the way to the core. Usually they appear approximately one week after harvest. These specks may occur on cabbage in the field, particularly if harvest is delayed.

**Cultural Controls:** The exact cause of these black specks is not fully understood, however, some varieties and hybrids are much more susceptible than others.

**Cercospora Leaf Spot (Cercospora sp.)**

**Symptoms:** Definite spots, which are circular to angular, pale-green to light-brown, are found commonly on turnips in Florida. This disease also occurs in cabbage within transplant production greenhouses.

**Chemical Controls:** See PPP-6.
Damping-Off (Fusarium spp., Pythium spp., and Rhizoctonia spp.)

**Symptoms:** Failure of plants to emerge often indicates pre-emergence damping-off. Post-emergence symptoms show a water-soaked, collapsed area in the stem below or near the soil surface. Later the darkened, shrunken stem cannot support the seedling and it wilts, falls over and dies. Damped-off plants often are in circular areas or extend some distance in rows.

**Cultural Controls:** Use seed treated with an approved fungicide. Use healthy transplants. The field should be free of old crop and weed debris in the soil surface. See Plant Pathology Fact Sheets No. 1 and 53, and Circular 1025.

**Chemical Controls:** See PPP-6.

Downy Mildew (Peronospora parasitica)

**Symptoms:** All plant parts of crucifers can become infected with this fungus. Leaf symptoms are most commonly observed in Florida. Black or dark specks appear on young leaves, usually on the underside of the leaf first. Such spots are often irregular in shape and may appear net-like. The upper side of the leaf will also develop dark spots similar in shape and may be accompanied by leaf yellowing. On older leaves, coalescence of these spots can occur, resulting in larger areas of the leaf blade having large, sunken, paper tan-colored spots. Leaf yellowing, again, may accompany these symptoms. Early infection on young plants can cause stunting. Disease is favored by cool wet weather.

On the underside of the leaf spots, a gray-white downy growth can be observed with or without the aid of a hand lens, especially when leaves are wet. On mature cabbage, downy mildew can appear as dark sunken spots on the head or wrapper leaves. Often infections on the cabbage head will result in a purplish tinge. Infections predispose the plant to soft rot bacteria or Sclerotiniose, which can further rot tissue in the field or after harvest.

Cauliflower curds and broccoli heads can become infected with blackened areas on the outside of the tissue. The infection can become systemic and turn inner curd and stem tissue dark. Radish and turnip “roots” can become infected from spores that are washed down to the soil from the leaves. Symptoms might predominate on the upper part of the root but the entire root is susceptible. Black spotting or a netted appearance can be observed on the outside of the root but an internal, firm rot can occur as well in some situations. Some root distortion could occur, especially, if infection occurred early in relation to root swelling. Flowers and weed stalks of cruciferous crops, especially mustard, are also infected.

**Cultural Controls:** Plow under abandoned seedbeds and harvested fields to prevent diseases from spreading to new plantings. Eradicate all crucifers and weeds in vicinity of seedbed or transplant production area. See Plant Pathology Fact Sheet No. 33.

**Chemical Controls:** See PPP-6.

Sclerotinose (Sclerotinia sclerotiorum)

**Symptoms:** All parts of the plants are susceptible. Infection occurs on leaves and stems nearest the ground, or on the wrapper leaves in cabbage. A small water-soaked spot appears and as it enlarges, a growth of white mycelium is produced. As the fungus grows upward on a maturing plant, it often spreads over the head, darkening the leaves into a soft, water-soaked mass. At this stage, numerous black sclerotia (seed-like fungus reproductive structures) 1/8 - 1 inch in length are produced on the dead and dying parts. Where stems are heavily infected, the plant wilts, falls over and dies. This disease can follow cold temperature damage or other injuries.

**Cultural Controls:** The following control methods are recommended:

1. Rotate with a crop not susceptible to Sclerotinia such as sweet corn.
2. Turn soil at least 6 inches deep when plowing.
3. Where possible, flood the soil either completely, partially or intermittently for a period of 6 weeks during the summer. Before using flooding as a control measure, find out from local authorities if
drainage into a given body of water after flooding fields is permissible.

4. The use of overhead irrigation may favor severe disease incidence.

**Chemical Controls:** See PPP-6.

**Turnip Mosaic (Turnip mosaic virus)**

**Symptoms:** This disease (also known as black ringspot) infects crucifers, beets, spinach, tobacco and other plants and is transmitted by aphids. Plants develop conspicuous symptoms between 75-85°F and appear stunted with mottled leaves. The typical mosaic symptom often develops first on the leaf under surface as dark green spots which turn necrotic forming a ring spot pattern. Symptoms on apparently normal heads may develop in a post-harvest storage situation.

**Cultural Controls:** Eliminate the natural weed hosts of this virus (such as mustard type weeds) in both seedbed and field situations. Early, rigorous aphid control, especially in the seedbed, will reduce subsequent virus incidence.

**Wirestem (Rhizoctonia solani)**

**Symptoms:** Roots (root rot), stems (damping-off, wirestem), and leaves (bottom rot, head rot) may be damaged by this fungus. One of the most common types of damage is wirestem where the outer tissues of the seedling stem shrivel, turn yellow to orange to brown to black, and become tough and woody. These tissues may slough off or, depending on weather conditions, the seedling may recover. If growth of the fungus continues up the stem, the bottom rot and head rot conditions may develop. Disease is favored by moist conditions.

**Cultural Controls:** Use treated seed, rotate seedbeds and fields, give as good drainage as possible, and cultivate soon after heavy rains to aerate and dry soil. Avoid planting in crop debris or in a recently incorporated green manure crop. See Plant Pathology Fact Sheet No.1.

**Chemical Controls:** See PPP-6.

**Yellows (Fusarium oxysporum f. conglutinans)**

**Symptoms:** A characteristic yellow-green color first appears in one or more of the lower leaves and may progress upward to the top leaves. In some cases, only one side may be infected and a resultant bending and curling usually occurs. As the yellow tissue ages, it turns brown, dies and leaves shed prematurely. A cross section of the stem shows the vascular tissue area to be blackened. Vascular tissues in the infected leaf petioles also show this dark discoloration.

**Cultural Controls:** The primary control after soil is infested is use of resistant varieties. Growers should take every possible precaution to secure disease-free transplants. Use crop rotation.