This fungus disease is present in all parts of the Temperature Zones. It was serious in Virginia in 1973. In recent times, the disease had become less important because hot water treatment of the seed was generally accepted as a practical control measure.

SYMPTOMS: Cabbage and other crucifers may become infected in the seed bed or any time later in the summer. Usually, the first symptom is an oval, depressed, light-brown canker near the base of the stem (Figure 1). The canker enlarges until the stem is girdled. Circular light-brown spots also appear on the leaves (Figure 2). Similar lesions slenderly elliptical in shape occur on the seed stalks and pods of seed plants. Soon after the cankers or spots begin to form, they are marked with numerous black dots, the spore producing bodies of the fungus (Figure 3). The presence of these bodies is an important diagnostic sign. When the plants are badly diseased, they wilt or the edges of leaves turn a bluish-red in color. Older affected plants may lean or fall over. This has caused the disease to be called "drop" in some countries. Usually the affected plant soon dies, but in damp soil, it may form new roots near the soil surface fast enough to survive, but seldom produces a marketable head.

SURVIVAL AND SPREAD OF THE FUNGUS: The fungus has been reported to live for at least three seasons in the soil. It is also carried in and on the seed. When infected seed is planted, the dead seeds permit the fungus
to live and fruit in the soil while the cotyledons of the viable ones push above the ground and serve as a sporulating site for the fungus. Infection also occurs at the base of the new stem from the mycelium harbored under the seed coat. Dissemination and inoculation take place rapidly. In wet weather a few infected seeds may be the source of an epidemic later. A common method by which many plants may become infected is the practice of pulling up a large number of young plants and placing them together in water. If spores are present, every seedling may become infected under such conditions.

The causal fungus is limited by certain environmental conditions. For example, in the Puget Sound district of Washington and northward, where the rainfall from May to July is extremely light, very little of the disease has been present. In the seed-growing areas of Denmark where the disease has occurred, extreme cultural care has essentially eliminated infection.

The severity of the disease is in direct proportion to the amount of rainfall in early summer. The fungus grows well at all temperatures where crucifers thrive.

DISEASE PREVENTION IN THE PLANT BED (SEED BED) THROUGH SEED TREATMENT AND ROTATION:

1. All seed sown in plant beds should be hot water treated by immersing in water heated to 122°F (50°C) for 25-30 minutes. If non-hot water treated seed is sown, it should be sown in separate plant beds or sown in plant beds isolated from hot water treated plant beds.

2. Plant beds should be located at least 1/4 mile from cabbage production fields.

3. Plant beds should be located on fertile well-drained ground where crucifers have not been grown for at least 4 years and placed where surface water is not likely to be contaminated from adjoining plant beds or cabbage production fields.

4. Plant beds should be kept free of mustard and wild radish.

5. Plant beds should be sown for early transplant production and shipment made to other states or areas within 1/4 mile of cabbage production fields.

6. Plant beds should receive regular applications of fungicides and insecticides to insure that the foliage is free from disease like downy mildew or injury which might mask the symptoms of black leg.

7. Transplants should not be mechanically "topped" or chopped to toughen them or reduce their size in order to fit the plants into shipment crates because this may serve to infect healthy plants.

8. Transplants should not be sprayed or dipped in water prior to transplanting.

9. Use only new crates or crates which have never been used to ship cabbage or other crucifers for shipping transplants.

10. Farm equipment used to cultivate the cabbage crop or seed bed containing untreated seed should not be used in the cabbage seed beds.

DISEASE PREVENTION IN THE FIELD:

1. A 4-year rotation is sufficient to avoid infestations of the fungus.
(2) Harvested fields should be plowed under immediately or as soon as possible after cutting to hasten plant decay and provide the longest possible interval between crops.

RESISTANT VARIETIES: Little progress has been made in breeding resistant varieties, probably because hot water seed treatment and long rotations have controlled the disease so completely. Besides, the fungus appears to have strains varying in virulence. Therefore, it is difficult to obtain suitable varieties of crucifers that are resistant to all strains.

CRUCIFER SUSCEPTIBILITY: Those most susceptible are red cabbage, savoy cabbage, brussels sprouts, white cabbage, Chinese cabbage. Very resistant or occasionally immune are horse-radish, winter-cress, false flax, shepherd's purse.