

AGRICULTURAL EXTENSION SERVICE  
 UNIVERSITY OF MINNESOTA — U. S. DEPARTMENT OF AGRICULTURE  
 UNIVERSITY FARM ST. PAUL 1 MINNESOTA

CLUB-ROOT DISEASE OF CABBAGE

A number of vegetable producers near the Twin Cities and Duluth have learned through experience in late years that club root can cause serious losses. Although this disease can be controlled, not many growers know just how to proceed.

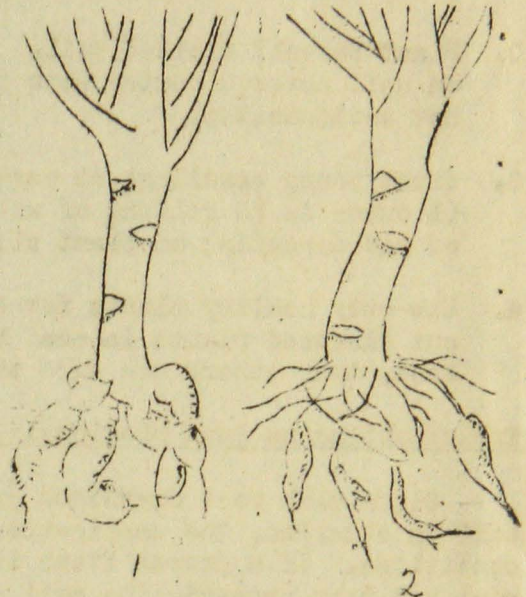
It is very important that gardeners learn to recognize the disease and to distinguish it from other diseases if they are to get results from control practices. The first symptoms on a growing plant are yellowing of foliage, stunted growth, and a wilting of the tops. If the roots on such plants are distorted and swollen several times normal size, it is quite certain that club root is present. Affected plants either fail to head or the heads are small and stunted.

The disease is due to a fungus that may live in the soil for many years especially if certain crops or weeds related to cabbage grow on the infected land. Usually the organism is not carried on the seed, but it can be present if infected soil has become mixed with the seed. The disease is most often introduced with plants purchased from growers who grow plants on contaminated seed beds. Manure from livestock, fed on diseased crops, may carry infection if used on plant beds or on fields to be used for cabbage. Acid soils that are wet are most favorable to this fungus and, therefore, suffer heaviest losses.

Club root affects other crops also.

A number of other plants belonging to the cabbage family are affected by club root, but there is a wide variation in susceptibility as indicated below:

Most susceptible	Medium susceptible	Mildly susceptible	Very resistant or occasionally immune
White Mustard	Kohlrabi	Rape	Winter Cress
Indian Mustard	Kale	Black Mustard	Shepherd's Purse
Wormseed Mustard	Cauliflower	Sea Kale	Wallflower
Charlock	Some var. Turnips	Tumble Mustard	Dames Violet
Cabbage	Some var. Radishes	Some var. Turnips	Pepper Grass
Brussels Sprouts	Some sp. Candytuft	Some var. Radishes	Garden Cress
Some var. Turnips			Stock
Some sp. Candytuft			Some Radishes



1. On untreated soil galls are larger and close to crown
2. Plants set with corrosive sublimate solution are healthy close to crown and injury is less severe.



Control

1. Practice long rotations with non-susceptible crops. Some authorities claim the disease dies out in six years if no susceptible weeds are present. In some localities it is claimed that the disease was eradicated by a four year rotation with three non-susceptible crops.
2. Plant on well drained soil. The fungus thrives in wet soils. Locate seed bed on soil never affected with this disease and never flooded. Use manure that is not contaminated.
3. Treat young seedlings at weekly intervals with corrosive sublimate solution (1 ounce in 15 gallons of water). Apply at the rate of 1 gallon to 20 to 40 ft. of row depending on plant size.
4. Use only healthy plants for setting out in the field. It is impossible to pick out diseased plants in seed bed. Even if only one plant in a lot shows club root, many others are sure to be infected.

Transplanting on land previously diseased.

Since club root organisms grow best on acid soils and less vigorously if the soil is alkaline, the application of lime to the soil might be advisable under certain conditions. If a grower finds it necessary to plant cabbage on a field where club root has been present, the soil should be limed with hydrated lime at least six weeks before the crop is set. Ground limestone or air-slaked lime are not recommended as they will not control the disease unless excessive amounts are applied. The amount of hydrated lime needed will depend on the soil.

pH of Soil	Amount of Hydrated Lime Needed per Acre
5.0	2.5 tons
5.5	2.0 "
6.0	1.5 "
6.5	1.0 "
7.0	1500 pounds
7.5	1500 "
8.0	None

The hydrated lime should be applied to the soil in the same year as the cabbage is planted, and rotations should be long so that previous applications will disappear. County agents can help farmers determine how much lime to apply.

Another method of control is to add corrosive sublimate to the water used in transplanting. Add one ounce of this chemical to 15 gallons of water. The powder should first be dissolved in a small amount of hot water before adding it to the water tank on the transplanter. Treating plants in this manner will require about 400 gallons per acre, or 1/3 pint to each plant. This treatment may cause some stunting on cabbage but it is not serious. Cauliflower is more susceptible to injury and therefore the method should not be used on that crop except on muck soils.

For cauliflower, calomel can be used instead of corrosive sublimate. It will not injure this crop. About 7 1/2 pounds per acre will be required. Gum arabic dissolved and added to the calomel will keep the calomel from settling in the tank. This method may be prohibitive if the calomel is too expensive.

