virginia home food production

FACT SHEET

Reprinted January 1981 BLACKSBURG, VIRGINIA MH 365

PREVENTION AND CONTROL OF VEGETABLE DISEASES

The prevention of diseases in the home vegetable garden is important if the gardener is to harvest attractive nutritious vegetables. Each year, losses due to diseases in Virginia home gardens cost gardeners millions of dollars in lost produce. Although diseases are frequently seasonal in their occurrence, losses due to diseases can be reduced if consideration is given to a few basic principles.

Prevention of Vegetable Diseases in the Home Garden

A. Varieties that have been selected for resistance to diseases are used. Vegetables may also be made more tolerant of disease by balanced nutrition.

B. The environment is made less favorable for disease environment which will be unfavorable to the growth, multiplication and spread of disease producing organisms. This can be done by the following:

(1) Keeping the foliage as dry as possible for as long as possible. Bacteria and fungi (with the exception of powdery mildews) require free moisture on the foliage for 3 to 12 hours or more for infection to take place. Therefore, spacing rows and orienting them to take advantage of the drying effects of the daily winds, plus irrigating or sprinkling only when the temperatures are rising, (usually in the morning), will help reduce the time the foliage will remain wet. Weed control is also important since the weeds may slow down air movement. Avoid working among the plants when the leaves are wet because this may promote disease spread from plant to plant.

(2) Provide good drainage and aeration. Water should drain from the soil rapidly and the surface should dry out to prevent the development of root-rotting diseases. Planting in a well-prepared seedbed in well-drained soil will reduce the possibility of damping-off or seedling diseases.

(3) Mulching or staking plants (wire cages) so that the fruit does not come in contact with the soil. Many fruit rots can be avoided by this practice.

(4) Storing vegetables in a dry area or under refrigeration will prevent the development of rots caused by fungi and bacteria.

(5) Avoid injury to vegetables. Cuts, bruises, cracks and insect damage are often the site for infection by disease causing organisms.

C. The disease causing organism is prevented from coming in contact with the vegetable.

(1) Elimination of dead and diseased plant parts: Removal of diseased plant parts reduces the primary means of overwintering for certain disease organisms as well as reducing the amount of infectious material in the garden. Spading or roto-tilling under this diseased plant material will aid in the destruction of disease causing organisms. There are many beneficial bacteria and fungi in the soil.

Issued in furtherance of Cooperative Extension work, Acts of May 8 and June 30, 1914, and September 30, 1977, in cooperation with the U.S. Department of Agriculture. W. R. Van Dresser, Dean, Extension Division, Cooperative Extension Service, Virginia Polytechnic Institute and State University, Blacksburg, Virginia 24061; M. C. Harding, Sr., Administrator, 1890 Extension Program, Virginia State University, Petersburg, Virginia 23803.

2. Rotating the vegetables resistant to certain diseases with susceptible ones. It is important to know the vegetables and weeds which are susceptible to certain diseases, and how long a period of rotation is necessary to starve out the disease-causing organisms. This is frequently impractical in the home garden where a small area is used repeatedly to grow vegetables.

3. Planting only certified disease-free transplants and/or seed: Vegetable seed should be grown in dry, arid areas of the western United States. Transplants or seed of questionable origin should not be planted.

4. Hot water treatment of seed is frequently provided by the seed company. This will prevent seed-borne diseases. Seed rot and damping-off of seedlings is prevented by application of a fungicide by the seed company.

D. The use of fungicides on a preventative schedule before diseases occur is important. Insects which transmit disease-causing viruses, bacteria or fungi should be controlled with insecticides or other practices to prevent disease spread. Disease prevention is possible if all above-ground plant parts and surfaces are covered with a fungicide, with applications starting before the disease occurs. Most fungicides are protective and not curative in their actions. Applications at intervals of 5-10 days must be used when conditions are favorable for disease development. Sprays are more effective than dusts in the home vegetable garden because of improved coverage and weathering of the chemical.

E. Crop rotation is often impractical in the home garden and many of our disease causing fungi can persist for long periods of time in the soil. For example, the crucifer club root fungus will survive for 7 years. Therefore, the use of a chemical which will fumigate or eradicate disease-causing organisms in the soil is suggested. (See Pest Management Guides for approved chemicals.)

Control of Vegetable Diseases in the Home Garden

Satisfactory yields for most home vegetable gardens such as asparagus, beans, radish, cabbage, corn and cucumbers are possible without the application of fungicides or other chemicals. Vegetables that are more prone to leaf diseases such as tomatoes and white potatoes may require spraying with a fungicide to keep the first crop disease free until frost. However, in many instances, more vegetables are grown than needed to insure sufficient quantities to offset diseases. If fungicides, bactericides or nematicides are used, they should be registered by the Environmental Protection Agency to insure safety to the user and the vegetable. Fungicides should be used on a preventative schedule before disease occurs. Because most fungicides are protective and not curative in their action, sprays are more effective than dusts because of improved coverage and weathering of the chemical. Printed recommendations for the chemical control of diseases in the home vegetable garden prepared by VPI & SU are revised annually to be sure they are current with the latest

Environmental Protection Agency regulations. Not only do they contain correct spray concentrations but also proper interval between applications and the necessary waiting period after application before harvest can begin.

Rotenone and pyrethrum are non-poisonous to humans and may therefore be used on crops nearing harvest.

Follow precautions on insecticide labels and always store in a safe place.

Fungicides

Fungicides are chemicals which inhibit or kill fungi or their spores. They may be applied to the plant surface as dust, or used as soil drenches. When applied properly and on time, fungicides control most soil-borne and leaf spotting diseases.

When using fungicides as a drench to control soil-borne diseases, make sure soil is in good tilth and use enough water to soak the material into the soil.
Among the best fungicides for the garden are zineb, captan, maneb and copper. When used properly, the maneb-type fungicides control and prevent the spread of most leaf spotting diseases. Mix the specified amount of material with water and apply as a fine spray. Cover entire plant, including upper and lower leaf surfaces. Two or three drops of detergent or surfactant per gallon of water reduces surface tension and improves coverage of waxy leaves. Sprays generally give better protection than dusts.

If you discover a leaf spotting disease in your garden, begin a spraying program at once to prevent its spreading. Most fungicides are short-lived, so repeated applications are necessary.

Controlling Nematodes

If you grow the same crops in your garden every year, nematodes may become a problem. The most common symptom of nematode damage is knotty or swollen roots (caused by the entrance of a tiny eelworm). Other nematodes which feed on the root surface are very hard to detect -- nematodes are colorless and about 1/75th of an inch long.

Plants affected by nematodes usually become stunted and unthrifty and may finally die. If you suspect nematode damage in your garden, call your extension agent. He will tell you where to send your soil to have it checked for nematodes. He may also suggest that you use a commercial soil fumigant.

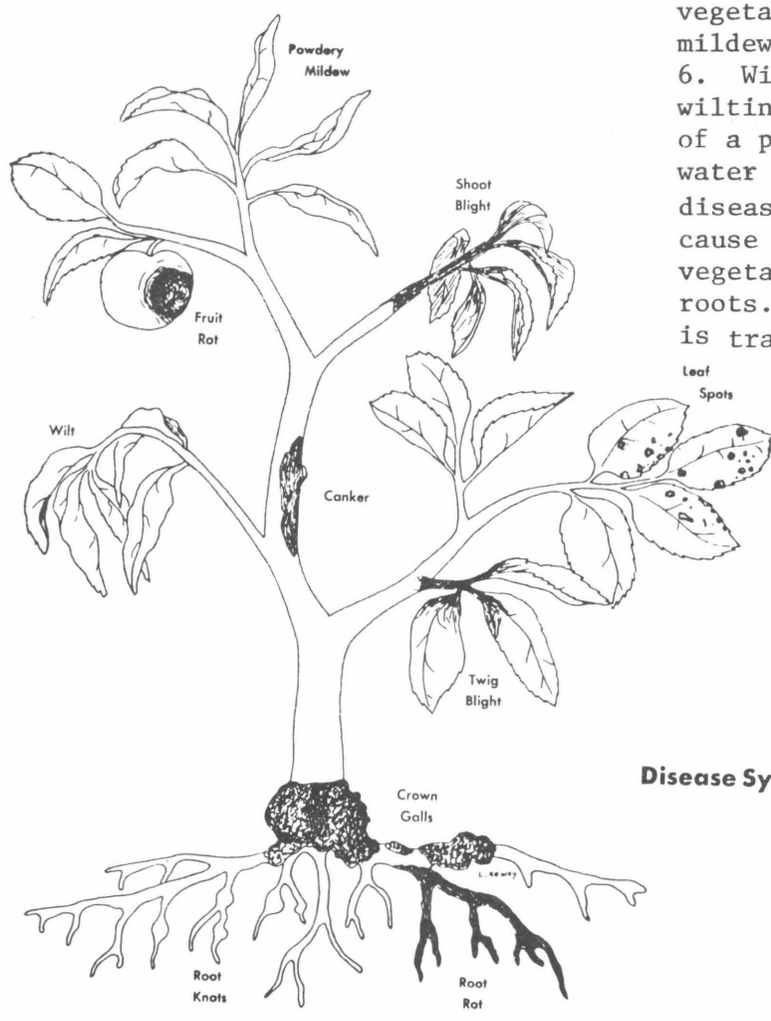
Prepared by: R. Lambe

Ways in Which Infectious Diseases Injure Plants

1. Interfere with the supply lines by clogging water-conduction cells. Example: tomato wilt, cabbage yellows.
2. Destroy manufacturing equipment (chlorophyll). Example: early blight of tomato.
3. Destroy water and mineral-collecting equipment. Examples and symptoms: root rot and stem rot.
4. Gall-forming diseases disrupt the normal cellular organization. Example and symptom: root knot nematode, crown gall.
5. Cause seeds to rot. Example: bacterial rot of potato.
6. Damping-off, soil-borne fungi like pithium and botrytis.

Plant Disease Terms

1. Blight: This describes a general killing of leaves and stem.
2. Damping-off: Soil-borne fungi cause seed rot and stem rot and both pre-emergence and post-emergence death of seedlings.
3. Gall: Swellings produced by abnormal cell development. Characteristic of crown gall and black-knot.
4. Leaf spot: Circular or irregular light green to yellow spots becoming brown. They are frequently small but may enlarge involving large areas of dead tissue. Leaf spots may also be called lesions. Both bacteria and fungi and occasionally foliar nematodes cause leaf spots.
5. Mildew: This term is generally used to describe powdery mildew fungi: however, mildews caused on certain vegetable crops are called downy mildew and are caused by other fungi.
6. Wilt: Used to describe leaf wilting on portions of the entire top of a plant caused by the failure of water to move from the roots through diseased stems. The fungus that cause Verticillium wilt of numerous vegetables infects through the roots. Bacterial wilt of cucumber is transmitted by cucumber beetles.



Disease Symptoms

Adapted from: Cornell Miscellaneous Bulletin 74