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Preventing

Seed Decay Damping Off Root Rots

*in Vegetable
and Flower Gardens*

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The labors of the vegetable and flower gardener are looked upon not as work in most cases, but as a means of relaxation and exercise and a measure of our ability to grow plants and express our landscaping abilities. However, the enthusiasm and exhilaration for gardening in the spring often results in frustration and disappointment. Prized vegetable and ornamental plants turn out to be poor quality, or may even be killed by the many diseases that can occur in the plantings.

Disease control in the home garden must start long before seeds and plants are put in the ground. Successful disease control actually is *disease prevention*. Planting plans should include the following practices:

Plan a long-range program of crop rotation. Growing the same or similar plants in the same area of the garden enables disease-causing organisms specific to those plants to build up to high populations. For example, do not follow beans with peas or beets because certain fungi will attack the roots of all these plants causing damping-off or root rot. Rotate with corn, if possible, or incorporate grass clippings into the soil. In general, the disease-causing organisms that attack narrow-leaved plants will not attack broad-leaved plants and vice versa.

Dispose of plant refuse at the end of each season. Either incorporate it into the soil early in the fall to allow for decomposition or remove it from the garden site, and put it in a compost pile or destroy it. Plant refuse should be composted 2 or more years before it is returned to the garden. Many plant disease-causing organisms survive on dead, nondecomposed plant material. Some cannot survive if the plant material is completely decomposed before the next planting.

Obtain seed and plants of disease-resistant varieties. Many varieties of vegetable or ornamental plants are resistant to one or more specific diseases such as wilts, rusts, mildews, leaf spots, or viruses.

Prepare the soil. Time used to prepare the soil is time well spent. It is usually desirable to plow or spade the garden site to a depth of 6 to 8 inches in the fall or spring. Then use a disk, harrow or garden rake to prepare a good seed bed.

Rotary tillers do a good job of stirring the soil, killing weeds, mixing in organic matter and preparing the seed bed. Some hand work may be necessary to level the surface. Packing or settling the soil also may be necessary.

The importance of a good seed bed cannot be overemphasized. Seeds placed in moist, finely granulated firm soil germinate readily. Small seeds placed in cloddy soil often germinate poorly or die soon after germination because the soil dries before the roots become established.

Obtain disease-free seed or transplants. Many plant disease-causing organisms are capable of living over, on or in the seed. It usually is unwise for the home gardener to save seed from his own garden, unless the seed is known to be disease-free. Seed and transplants should be purchased from reliable seedsmen or dealers who have a reputation for producing high quality seed and plants.

Some varieties are hybrids. If the seed of such varieties is saved and planted, the resulting plants will not be like those planted the year before. Although the plants that result from such seed are "interesting" to observe, many will look a little odd.

Be sure to plant only certified potato seed. Potatoes from the grocery store are edible but they often are infected with viruses that substantially reduce the yield and quality of tubers produced from such planting stock. Certified seed, on the other hand, must meet strict standards of freedom from disease in order to be labeled "certified." In addition, "non-certified" potato seed may introduce plant disease-causing fungi, bacteria or nematodes to your garden site.

Sterilize or sanitize the soil. For hot beds, cold frames, starting flats, etc., where seed decay, damping-off and root rot are likely to occur, it is a good idea to treat the soil. The same is true for outdoor garden sites where root disease problems have previously occurred. For details on procedures see University of Idaho Current Information Series No. 274 and 283.

Treat the seed. Most soils and some seeds have plant disease-causing organisms capable of causing seeds to decay or young seedlings to die. These diseases are most

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likely to be severe when garden crops are planted early in the season, when the soil is cold and wet. Planting treated seed often will help to insure good stands and avoid the time and expense of replanting.

The main objectives of seed treatment are (a) to kill disease-causing organisms on the seed, and (b) to protect the seed and young seedlings from certain fungus disease-causing organisms in the soil.

Much seed on the market is treated and stamped "treated." If untreated seed is purchased, you can treat it with recommended chemicals such as Thiram, Chloronil, or Captan according to the manufacturer's directions. When treating small paper packets of seed, tear off one corner of the packet. Put about twice as much chemical material in the packet as can be picked up on the first half inch of the flat end of a toothpick. Shake the packet until the seed is thinly coated with the chemical.

To treat large seeds such as beans, corn, peas, squash, etc., place the seed in a jar, spread the required amount of chemical over the seed (1/2 to 3/4 level teaspoon per pound of seed) and shake or rotate the jar until each seed is coated with the chemical. You may need to screen off excessive amounts of the seed treatment chemical.

Many vegetable and flower seeds are extremely small. With several, chemicals do not adhere well to the seed coat. This difficulty can be overcome by mixing Thiram or Captan into the top 2 or 3 inches of soil at the rate of 2 1/2 ounces per square foot of soil.

Cold weather which occurs after planting will impede seedling emergence. A soil drench may be helpful to prevent damping-off at these times. You can use any of these fungicides for this purpose:

Benlate 50 WP *	1 tbsp/gal	Use 1 gal/5 sq. ft.
Captan 50 WP	1 tbsp/gal	Use 1 gal/40 sq. ft.
Dexon 35 WP	3/4 tbsp/gal	Use 1 gal/10 sq. ft.
Ferbam 76 WP	1 tbsp/gal	Use 1 gal/40 sq. ft.
Truban 30 WP	5/8 tbsp/gal	Use 1 gal/4 sq. ft.

* 50 WP denotes a 50% wettable powder material.

Follow good cultural practices. Cultural practices play important roles in the incidence and severity of plant diseases. Any practice that imposes a stress factor on plants predisposes those plants to root-rotting diseases. The higher the frequency and number of stress factors, the more severe are the diseases. Each stress factor is additive. The most common factors imposing stress to plants in the home garden are irrigation, nutrition and cultivation.

Irrigation

Garden crops and annual flowers usually are shallow-rooted plants. Soil that is too dry may seriously limit plant growth. Any method of applying water is satisfactory if properly used. Avoid rapid rates of application that may cause water runoff or soil compaction. Light, frequent water applications are best when starting seedlings. As the plants grow, apply just enough moisture at each irrigation to fill the rooting zone of the plant.

Plants that have developed shallow root systems can be injured easily during hot weather. Shallow roots develop from excessively wet conditions and from frequent light irrigations that do not completely fill the potential rooting depth.

Generally, you should irrigate light sandy soils one or

more times per week and heavy soils every 10 days to 2 weeks depending upon the weather. Plants will transpire 2 to 3 times more moisture on hot, windy days than on cool, cloudy, windless days.

Keep the soil moisture supply as constant as possible throughout the growing season. Roots **do not** seek out water. Instead, roots will grow only when water is readily available. Any time plants wilt from lack of water, stress has been imposed on the plants for two or more days.

One way to tell when irrigation is needed is to dig into the root zone. If the soil holds firmly together when gently pressed in your hand, it is moist enough. If the soil crumbles easily, it is too dry. Remember, dig to the root zone. This will be different levels for different plants. For this reason, it would be wise to grow all shallow-rooted plants in one part of the garden and those that develop deep root systems in another part. A mulch of compost or grass clippings helps to retain moisture and hold down soil temperature. A black plastic mulch also will help retain moisture, but will increase the soil temperature.

Nutrition

Plants require varying amounts of nutrition for maximum production and quality. Excess as well as deficient nutrients will impose stress upon the plants.

Organic materials such as well-rotted manure or dried and pulverized manures supply good quantities of plant nutrients. Usually, the manure should be supplemented with commercial fertilizers.

A soil test is the best means of determining the kind and amount of fertilizer needed. This test can be obtained by sending a soil sample to the Soil Testing Laboratory at the University of Idaho, Moscow, Idaho. Directions for taking the samples, cost information and mailing instructions are available from your University of Idaho County Extension Office.

Cultivation

Cultivation should be shallow and frequent. Keep the soil from becoming packed and soggy. Cultivation after rains or sprinkling controls weeds and keeps the soil surface from crusting. A weedless garden should be your goal. Weeds use valuable plant nutrients, reduce the moisture supply, are unsightly and harbor many plant disease-causing organisms and insect pests.

PESTICIDE RESIDUES: These recommendations are based on the best information currently available for each chemical listed. If followed carefully, residues should not exceed the tolerance established for any particular chemical. To avoid excessive residues, follow recommendations carefully with respect to dosage levels, number of applications and minimum interval between application and harvest.

Remember: Read the label directions thoroughly before preparing and applying pesticides. Many of the commercially prepared mixtures contain insecticides as well as fungicides.

THE GROWER IS RESPONSIBLE FOR RESIDUES ON HIS CROPS AS WELL AS FOR PROBLEMS CAUSED BY DRIFT FROM HIS PROPERTY TO OTHER PROPERTIES OR CROPS.

The toxicity of pesticides listed here is relatively low. Trade names are used only to identify the chemicals as they are known in the marketplace. No endorsement by the University is intended, nor is discrimination implied against products not listed.

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