DAMPING-OFF DISEASES IN THE GARDEN

Integrated Pest Management for Home Gardeners and Landscape Professionals

In the field, garden, or planter box, seedlings often fail to come up, or die soon after they have emerged from the soil. Seeds may rot before they germinate; shoots may be decayed before they emerge, or stems of seedlings may be attacked near the soil line, causing young plants to collapse. These diseases often are collectively referred to as “damping-off,” and may be caused by a number of soil-inhabiting pathogens.

Species of the soil organism *Pythium* are most often responsible for damping-off, but several other pathogens, including species of *Rhizoctonia*, *Fusarium*, and *Phytophthora*, can also cause decay. Decay is most likely to occur when old seeds or seed pieces are planted in cold, wet soil and is further increased by poor soil drainage, the use of green compost, and planting too deeply.

SYMPTOMS
The first evidence of damping-off or seed piece decay (as in potatoes) is the failure of some plants to emerge. If seeds are attacked before they germinate, they become soft and mushy; turn dark brown, and decay. They may have a layer of soil clinging to them when they are dug up because the soil is interwoven with fine, threadlike fungus growth. Germinating seedlings shrivel and may darken. If seedlings are attacked after they emerge, stem tissue near the soil line is decayed and weakened, usually causing plants to topple and die (Fig. 1). When only roots are decayed, plants may continue standing but remain stunted, wilt and eventually die. As seedlings get older, they become less susceptible to damping-off pathogens.

SIMILAR INJURY
Garden pests such as cutworms, earwigs, flea beetles, snails and slugs, and root maggots may also damage seedlings in the garden. It’s important to distinguish the damage done by pests from damping-off injury.

• Cutworms are dull-brownish, smooth-skinned caterpillars that emerge from the soil at night to feed on newly emerged seedlings and newly set transplants. They are called “cutworms” because they frequently snip plants off at or just below the soil surface. Look for cutoff plants, and dig around the base of injured plants to look for cutworms.

• Earwigs feed most actively at night, and can cause substantial damage to seedling plants. Damaged seedlings may be missing all or parts of their leaves and stem.

• Flea beetles are small, shiny beetles with large hind legs used for jumping. They are common in newly planted vegetable gardens, and may seriously damage seedlings by chewing dozens of holes in leaves or removing leaves completely. Feeding by large numbers of beetles gives leaves a shot-hole appearance and slows plant growth.

• Snails and slugs are most active at night and on cloudy or foggy days. Snails and slugs chew irregular holes with smooth edges in leaves, and can clip succulent plant parts and seedlings. Look for the silvery mucous trails to confirm damage was caused by slugs or snails and not damping-off pathogens or other causes.

• Root maggots are small, legless, and white. Look for their brown pupal cases in or around damaged seeds or seedlings. Seedcorn maggots infest newly sprouted seed before plants can emerge. Cabbage maggots attack older plants riddling roots with tunnels.

BIOLOGY
The pathogens that cause damping-off and seed piece decay are present in virtually all soils. They survive on dead organic matter and also produce spores or other structures that survive for long periods of time. The young tissue of emerging seedlings is least resistant to infection when plants are growing slowly in cold, wet soil. Vigorously growing seedlings are fairly resistant to infection.

Damping-off pathogens can be divided into two main groups. The “true fungi” include *Rhizoctonia*, *Fusarium*, and *Thielaviopsis* genera. A second group, previously considered fungi but now placed in a separate classification called oomycetes, includes the *Pythium* and *Phytophthora* genera.

MANAGEMENT
Damping-off is controlled primarily through good sanitation, high quality
plating material, and proper cultural and environmental controls. Damping-off is worse when soil is wet or compacted. Prepare planting beds so that the soil has good drainage. Drainage can be improved by using raised beds and soil amendments such as redwood shavings, peat moss, or fir bark. Use only well-decomposed compost. The overly moist environment of green compost will encourage a damping-off problem. Use aerobic (well aerated) composting procedures to reduce the population of disease-causing pathogens in the compost. Composted hard-wood bark has been reported to reduce damping-off.

Plant when temperatures are favorable for rapid seedling growth. Shallow planting will speed up germination outdoors if conditions are marginal. Planting too deeply can delay germination and emergence of the seedling and increase damping-off problems. If you want to start seedlings before temperatures are favorable, start them in the greenhouse or other protected areas. Planting in the highest quality seed available. Use sterilize containers.

For more information contact the University of California Cooperative Extension in your county. See your telephone directory for addresses and phone numbers.

AUTHOR: E. J. Perry, UC Cooperative Extension, Stanislaus Co.
TECHNICAL EDITOR: M. L. Flint
COORDINATION & PRODUCTION: P. N. Galin
ILLUSTRATIONS: Fig. 1: W. Suckow

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WARNING ON THE USE OF CHEMICALS
Pesticides are poisonous. Always read and carefully follow all precautions and safety recommendations given on the container label. Store all chemicals in the original labeled containers in a locked cabinet or shed, away from food or feeds, and out of the reach of children, unauthorized persons, pets, and livestock.

For outdoor planting beds, in the warmer regions of California, soil solarization during fallow periods can reduce pathogens. To solarize, place clear plastic tarps over moist, bare soil for 4 to 6 weeks during the hottest part of the year.

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SUGGESTED READING
Soil Solarization method described online, www.ipm.ucdavis.edu/TOOLS/TURF/SITEPREP/soilsolar.html

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