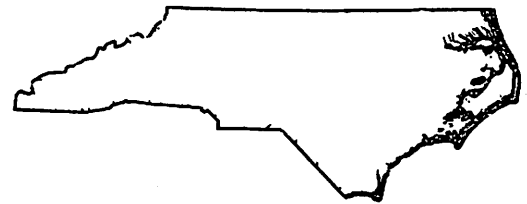


North Carolina

# Flower



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## DAMPING OFF AND ITS CONTROL

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Bedding plant growers will soon be sowing seedling flats. This is a very critical time in a bedding plant operation. The success of the entire season depends on having a good supply of healthy vigorous seedlings to transplant. One of the most serious threats to germinating seeds and young seedlings is damping-off.

Cause: Damping-off is a fungus disease caused primarily by species of Rhizoctonia, and Pythium, and to a lesser extent by Fusarium, Phytophthora, Sclerotium, Botrytis, and others. Any one or more of these fungi may be present in greenhouses in North Carolina. Germinating seed and seedlings, especially weak ones, are vulnerable to attack by these fungi. Species of Pythium and Phytophthora are more likely to cause damping off in cool, wet soils; whereas species of Rhizoctonia, Fusarium, and Sclerotium are more common under warmer and drier conditions.

Damping-off caused by one of the above fungi can be confused with plant injury caused by excessive fertilization, high soluble salts, drowning in wet soil, dessication in dry soil, or death of seedlings from excessive heat, cold, smoke fumes, or chemical injury.

Symptoms: Typical symptoms of damping-off are rotting stems at or near the soil line and root decay. Germinating seed can also be attacked by these fungi before they emerge from the soil, resulting in poor stands. Damping-off usually occurs in circular areas a foot or more in diameter with shriveled brown, collapsed or stunted seedlings. Fungal growth may be seen as a stringy or webby-white mass on affected plants or on the soil surface.

Source: The fungi that cause damping-off can occur in many places around a greenhouse, but the primary source is soil, either unsterilized or poorly sterilized. Some damping-off fungi are also carried on seed. Other sources include water and unsterile pots, flats, benches, hoses and other tools. (See Fig. 1 and 2).

Control: The best control of damping-off is to avoid it altogether by carrying out a thorough sanitation program before and after planting. Once damping-off has

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started, it may be difficult to stop and many seedlings will be lost. Control of damping-off consists of a total program including: 1) pre-plant practices - sanitation, seed treatment, and soil treatment; 2) providing cultural conditions for optimum growth; 3) post-plant sanitation; and, 4) post-plant chemical treatment.

Preplant practices: The most effective control practices against damping-off are employed before planting and are aimed at avoiding the problem and thus elimination of the need for employing the less effective post-plant chemical treatments. Complete soil treatment with either steam at 180°F for 30 min. or methyl bromide at 2 pounds per 100 sq.ft. or methyl bromide at 4 pounds per 100 cu.ft. of soil is essential. Some growers may purchase pre-treated "peat-lite" soil mixes for seed flats and eliminate soil treatment; however, flats, pots, and tools must still be treated. These prepared soil mixes should be used immediately after purchasing or stored dry above ground. More information on soil treatment can be obtained from Plant Pathology Information Note No. 170 at your local County Extension Office. At the same time the soil mixture is being treated, all pots, flats, benches, and tools should also be sterilized with either steam or methyl bromide. Seed should also be treated to eliminate fungi on the seed surface. Many seeds are now treated with a fungicide routinely by seed suppliers. When buying seed, growers should specify fungicide-treated seed with a high per cent germination. Untreated seed can be treated with either 4-12% thiram (Arasan) or some species can be soaked in one part Clorox to 9 parts water for 5 min. Seed of some species can also be treated with hot water, but check with your seed supplier for specific recommendations.

Cultural practices: Providing conditions necessary for optimum growth will help reduce the incidence of damping-off. Weak, succulent, or injured plants are more susceptible for a longer period of time than are healthy vigorous seedlings. Conditions such as low soil temperatures, high soil moisture, high soluble salts, excessive fertilization, incorrect pH, too low or too high light intensity, thick plant stands, and poor air movement cause seedlings to be weak and more vulnerable to damping-off.

Post-plant sanitation: Once the disease-free seeds are planted in clean soil in clean flats, much effort must be directed toward keeping the seed flats free of disease-causing fungi. If disease-causing fungi are introduced into treated soil, they spread rapidly, killing many seedlings. Hoses and nozzles should be kept clean and placed in a hose clamp above the bench to avoid contamination from unsterile soil.

Post-plant chemical treatment: If damping-off develops after utilizing all of the above measures, chemical drenches can be used successfully if applied thoroughly as soon as damping-off is first observed. The growing conditions or practices that are contributing to the disease problem must also be improved or changed. A combination of fungicides is necessary until specific control measures can be obtained following identification of the causal fungus. For identification of the causal fungi, send a sample in a plastic bag to the Plant Disease and Insect Clinic, 1300 Gardner Hall, N. C. State University, Raleigh, N. C. 27607. Check with your local county extension office for additional information.

The following suggested combinations will control most damping-off fungi:

Use Benlate 50% WP (benomyl) at 1 pound per 100 gal. of water (1 tbsp per gal) and apply at the rate of 1-2 pints per sq. foot, or

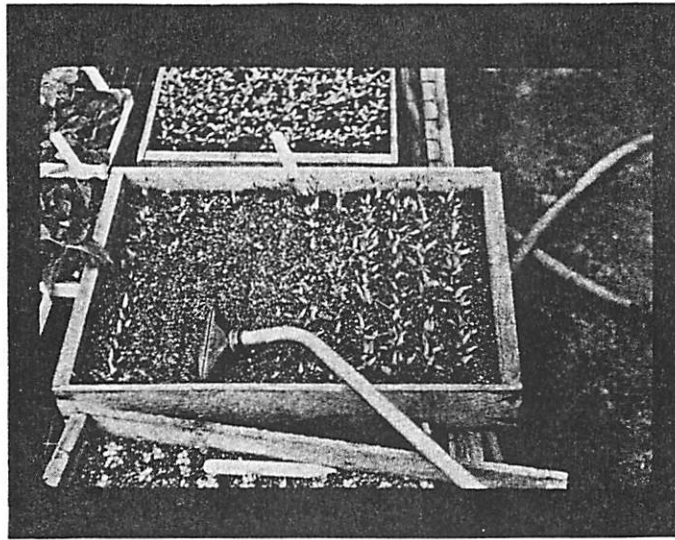


Fig. 1. Seedling flat showing damping-off in left-hand side of flat. The hose nozzle is probably the source of the fungi causing the damping-off.

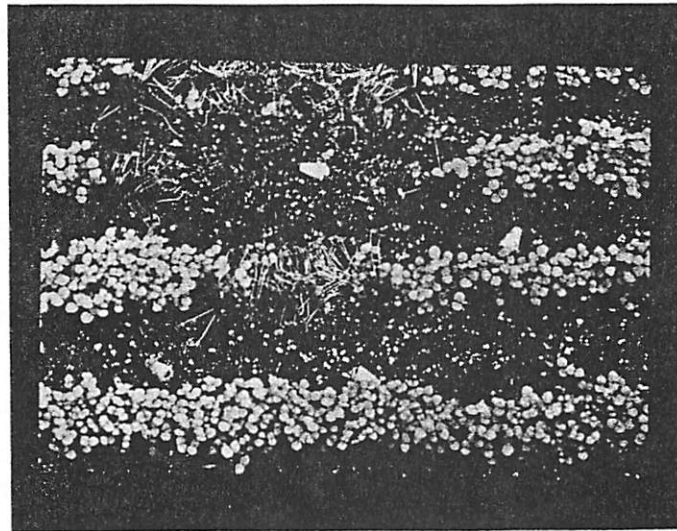


Fig. 2. Close-up of seedlings showing damping-off. The lead weight on the watering tubes are another source of damping-off fungi. These seedlings are also planted too thick.

Terraclor 75% WP at 1/2 pound per 100 gal of water (1 1/2 tsp per gal) and apply at the rate of 1 pint per sq foot, or

Captan at 2 pounds per 100 gal of water (5 tsp per gal) and apply at the rate of 1 pint per sq foot,

PLUS

Dexon 35% WP at 1/2 - 1 pound per 100 gal of water (1 1/2 - 3 tsp per gal) and apply at the rate of 1 pint per sq foot, or

Truban 30% WP at 4-6 ounces per 100 gal of water (3/4 - 1 tsp per gal) and apply at the rate of 1 pint per sq foot.