CAES
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GRAY MOLD OF TOMATO

Gray mold, also called Botrytis blight, is a common disease of greenhouse-grown tomato worldwide. In cool and humid conditions, severe epidemics of the disease can cause significant leaf damage, stem canker, and fruit rot, which results in severe yield reduction during the production and postharvest losses during storage and transportation.

SYMPTOMS AND DIAGNOSTICS

Gray mold affects all aboveground parts of the tomato plant including leaves, stems, faded flowers, and fruit. Infection of leaves is generally associated with wounds and insect injury. The symptom on leaves appears as irregular light brown spots (Figure 1) or "V" shaped necrosis when infection occurs at the edge. As the disease progresses, the whole leaflet becomes withered and scorched eventually. Fading flowers are very susceptible to gray mold and can serve as a starting point for leaflet colonization when they fall onto leaves. Leaf scars and pruning wounds are common entrances of stem infection. Symptoms on stems appear as dark brown lesions and cankers that can cause girdling of the stems and wilting above the infected area on the plant. On fruit, the symptoms normally start from infected fruit calyx and expand from top to bottom (Figure 2). The initial symptoms on fruit appear as gray to light brown irregular spots, followed by a water-soaked soft rot. Eventually, the whole infected fruit rots in the field or during postharvest transportation. When small green fruit are infected directly by airborne spores, the symptoms appear as white, circular ring spots called "ghost spots" (Figure 3). Although they may affect marketability of the fruit, ghost spots usually do not result in fruit

Figure 1. A large brown lesion and gray sporulation on the surface (arrow)

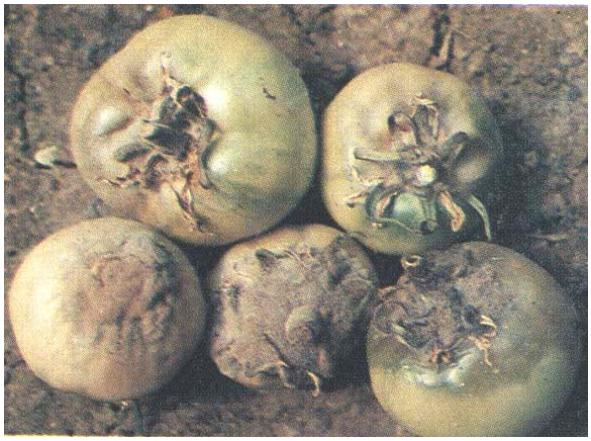

Figure 2. Fruit rot with fuzzy gray spore masses on the surface (arrow).

Figure 3. Ghost spots with pale green halos (arrow) on fruit

rot. In humid conditions, the fungus forms fuzzy gray mold on the surface of diseased leaves, flowers, stems and fruit, which is a characteristic sign of the disease and a diagnostic feature to distinguish gray mold from other biotic and abiotic tomato diseases (Figures 1 and 2).

DISEASE DEVELOPMENT

The causing agent of gray mold, *Botrytis cinerea*, is a weak fungal pathogen that has an extremely wide host range with more than 200 reported species in vegetables and ornamentals. The fungus survives as mycelia and/or sclerotia in perennial plants, in soil, and on plant debris between seasons. Fungal spores are readily airborne and can be blown from field to field. Spores germinate and penetrate plant tissues through wounds caused by insects or physical injuries. The optimum temperature range for the disease development is 65-73°F. Spore germination and infection does not require a prolonged period of high humidity. In fact, the humid conditions within the tomato canopy at night are usually enough for the infection. So, dense plantings favor disease development due to limited air movement and high relative humidity within the canopy. Relatively cool and humid conditions in early spring and late fall are favorable for the disease development.

MANAGEMENT

Cultural practices: Reduce inoculum by a year-around sanitation practice by removing and destroying all infected stems, leaves, and fruit from plants and the ground. Keep relative humidity low (below 80%) in greenhouses and prevent condensation during the night by heat and venting at sundown. Improve air circulation by maintaining adequate spaces between plants and by removing old leaves from the bottom of the plant. Avoid overhead irrigation or spray operations in late afternoon or cloudy/or rainy days. Handle plants and fruit carefully to avoid unnecessary injury. Inspect the crop for gray mold regularly so that the initial infection can be found at an early stage.

Fungicide application: When there is an increased risk of gray mold, preventative application of fungicides should begin before a dense canopy develops because fungicidal control of gray mold may be dependent on residual fungicide in the canopy. Fungicides that are labeled for gray mold on tomato include pyrimethanil, cyprodinil plus fludioxonil, fenhexamid, and polyoxin D zinc. Rotate or mix fungicides that are in different mode of action to prevent or slow down fungicide resistance in the fungus. The organic option to control gray mold includes *Reynoutria sachalinensis* extract, *Bacillus subtilis* QST 713, *B. amyloliquefaciens* D747, and *Gliocladium catenulatum*. Protectant fungicides only provide a protective barrier to the surface of the plant, but do not cure the disease once it has developed. Always read the entire label carefully before using any fungicides.

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