

Diseases of Specific Florist Crops

Keeping florist crops free of disease requires constant care and planning. Prevention is the basis of freedom from disease and should be an integral part of the general cultural program. The symptoms of the diseases of major florist crops are described individually by crop in a series of fact sheets.

Geranium (*Pelargonium hortorum*)

- Bacterial blight (*Xanthomonas campestris* pv. *pelargonii*): Tiny (1/16 in. diameter) round brown leaf spots, often surrounded by a chlorotic zone. Spots form when bacteria have been splashed onto the leaf surface. Subsequent systemic invasion of the plant leads to the development of a yellow or tan wedge-shaped area at the leaf edge and then to wilting of the leaf. Further progression of the disease may lead to brown stem cankers at nodes, brown to black vascular discoloration inside the stem, and tip dieback or wilting of all or part of the plant. Roots usually remain healthy-looking. Disease symptoms develop most readily under warm (spring) greenhouse temperatures. Spread is rapid during the handling and overhead irrigation associated with propagation.

Only geraniums are susceptible to bacterial blight. *P. hortorum* (zonal) and *P. peltatum* (ivy) both show symptoms; *P. domesticum* (Martha Washington or Regal) is less likely to show symptoms. Hardy *Geranium* species may also be a source of infection; these will show leaf spot but not wilt symptoms.

Infested plants should be destroyed; there are no chemical controls. Although culture-indexing procedures should have eliminated this disease from modern geranium production, it remains all too common in the industry today, causing large financial losses to geranium growers. Plants with symptoms suggesting bacterial blight should be sent to a lab for diagnosis.

- Verticillium wilt: Yellowing, browning, and wilting of lower leaves, possibly with some internal vascular discoloration in the stem. Culture indexing has largely eliminated this disease.

- Botrytis blight: Large brown zonate lesions on leaves, browning of flowers, dieback of stubs on stock plants after cutting harvest, and infection of wounds on cuttings.

- Bacterial fasciation (*Rhodococcus fascians*): Clumped stubby shoots form at or below soil level. May also affect lily, gladiolus, viburnum, chrysanthemum, dahlia, sweet pea, buddleia, hollyhock, forsythia, phlox, primula, delphinium, and petunia. No treatments are available; infected material should be discarded.

- Edema (physiological disorder): Tiny water-soaked blisters that later turn brown and corky. Most severe on ivy geraniums. To discourage edema, ivies should be grown at a pH of 5.0 to 5.5 and given light levels of no more than 4,000 foot candles. Remove saucers from hanging baskets and water early in the day. Keep nitrogen and iron levels high in the foliage. Use a hand lens to look carefully for spider mites when edema is noted—mite feeding may be responsible.

- Rust (*Puccinia pelargonii-zonalis*): Yellow spots show on the upper leaf surface, and pustules of reddish-brown spores appear in concentric rings on the underside. Pustules on the leaf underside may not be evident until two weeks or more after exposure to spore inoculum, whereas pale spots on the upper surface are visible within 7 to 10 days. Only *P. hortorum*, the florist's geranium, is affected (ivy and Martha Washington/Regal types are not susceptible). This is a very serious disease. Incoming shipments should be closely examined for signs of rust. Spores are spread easily by splashing water or strong air currents. Plants infected in the greenhouse may decline rapidly in outdoor plantings. Systemic fungicides are particularly valuable for eradicating infestations in the greenhouse.

- Pelargonium flower break virus (PFBV): Chlorotic mottle or ring spot patterns form in foliage, and white streaks develop on the back of petals. Although geraniums are susceptible to many different viruses, most of the disfiguring viruses have been eliminated from geranium stock by virus indexing. In recent years, PFBV symptoms have frequently been observed in geranium foliage, as this virus has not been included in the standard virus-indexing programs. Fortunately, symptoms of disease may be obvious during winter growing conditions in the greenhouse, but symptoms are not evident by the time the crop is sold in the northeastern United States. Although future improvements in the indexing procedures will eventually eliminate PFBV, at present additional research is necessary to answer questions about this virus.

- Other viruses: Symptoms may include yellow spots, rings, petal distortions, leaf curl or crinkle, dark green patterns along veins, white or yellow splotchy patterns on the leaves, yellow veins, and cupping of leaves. Tomato ring spot virus and tobacco ring spot virus may be carried in seed or by nematodes. Because of the benefits of virus-indexing programs, viruses are generally not a problem in modern geranium production.

- Southern wilt (*Ralstonia [Pseudomonas] solanacearum*): This disease is not as common as bacterial blight caused by *Xanthomonas campestris* pv. *pelargonii*, but it is a very important disease. The same strain of *Ralstonia solanacearum* that has been detected in a few instances in geraniums (Race 3, Biovar 2) also causes a very serious disease in potatoes and tomatoes. If you detect wilting in geraniums that does not appear to be due to Pythium root rot, it is important to contact a diagnostic lab to make an accurate diagnosis of the problem. The symptoms of *Ralstonia* infection on geraniums are a diffuse yellowing, wilt, and death of leaves, usually beginning with the oldest leaves. Brown wedges may develop in leaves as they decline. This disease is differentiated from bacterial blight caused by *Xanthomonas* in that *Ralstonia* does not cause leaf spots. The systemic symptoms caused by the two bacteria look extremely similar. Plants with Southern wilt will need to be eradicated from the greenhouse.