

Gladiolus Rust: A New Threat



Figure 1—Healthy gladiolus leaves.



Figure 2—Gladiolus leaves severely infected with gladiolus rust.

Background

Gladiolus rust (GR), a plant disease of quarantine significance, was detected and confirmed for the first time in the United States in April 2006 on a gladiolus production farm in Manatee County, FL. The disease was later found on another commercial gladiolus farm in Hendry County, FL. In May 2006, GR was detected at one commercial and three residential sites in San Diego County, CA, just north of the Mexican border. State and Federal officials destroyed the infected plants and placed stop sale notices on the facilities.

The Center for Plant Health Science and Technology—part of the U.S. Department of Agriculture's (USDA) Animal and Plant Health Inspection Service (APHIS)—organized a technical committee to devise appropriate eradication techniques specific to the infested areas of Florida and California. Although the

specific source of the 2006 infections is not known, in recent years, GR has been intercepted many times on cut gladiolus flowers entering the country as commercial shipments and/or in passenger baggage from Mexico, Brazil, and other countries.

Causal Agent

The fungus *Uromyces transversalis* Thum. causes GR only in the members of the family Iridaceae, including *Gladiolus*, *Tritonia*, *Crocasmia*, and *Watsonia* spp. Severely damaged plants do not flower and/or their corms do not ripen. The disease is serious in nurseries and can completely destroy commercial gladiolus crops unless fungicides are used.

Origin

GR is indigenous to southern Africa, where it was first noted on leaves of *Tritonia securigera* in 1876. *U. transversalis* remained

on the African continent until it reached the shores of the Mediterranean and spread to southern Europe almost a century later. The fungus was reported from southern France and northern Italy in 1966, from Malta in 1969, and from Morocco and southern Italy in 1977. *U. transversalis* had also spread to western France and England by 1996, where it is an aggressive pathogen of commercial gladioli.

Transmission

Plants and cut flowers are the primary pathways for the introduction of GR. Its local spread occurs mainly by airborne spores, which are produced in prolific quantities on aboveground portions of the plant, especially on leaves, and disperse easily by wind or by lightly brushing the plants. Spores can travel long distances by wind or through the movement of cut flowers. GR spores can also be spread



Figure 3—Inspecting young gladiolus plants for GR.



Figure 4—Gladiolus plants ready for cutting.

by surface-contaminated corms, rhizomes, and flowers. Interceptions from commercial shipments and passenger baggage at ports-of-entry in Arizona, California, and Texas confirm that cut flowers are the major pathway bringing GR into the country from Mexico and other countries.

Symptoms and Identification

The presence of GR is determined by inspecting the leaves and stem of a plant. Symptoms are easily recognized as “typical rust” with orange sori (small blisterlike elevations of epidermis formed when spores have emerged) or pustules on both sides of the leaves. In *U. transversalis*, pustules tend to be elongated across the width of veins of a leaf and contain many spores.

The first symptoms of GR are small, yellowish spots. Later, the epidermis breaks down, exposing the pustules full of yellowish-orange spores and measuring 1 mm x 1 cm. Eventually, the pustules coalesce and form larger patches of damaged tissue.

Disease Management

Fungicides can control GR, and for severe infections, weekly applications of bitertanol or triadimefon may be necessary to achieve a marketable yield of flowers. Systemic fungicides such as benodanil and oxycarboxin, sprayed weekly starting soon after emergence, provide good control.

Mexican government officials who recommend technical procedures for GR management stress that prevention is key. A recommended preventative control strategy is to combine a contact product (e.g., mancozeb) with a systemic fungicide (e.g., tebuconazole), thus providing the host plant with external and internal protection against rust.

For More Information

To learn more about gladiolus rust (GR), and/or if you see this disease, please contact USDA–APHIS at (301) 851–2104.

The U.S. Department of Agriculture is an equal opportunity provider and employer.

This publication reports research involving pesticides. All uses of pesticides must be registered by appropriate State and/or Federal agencies before they can be recommended.

CAUTION: Pesticides can be injurious to humans, domestic animals, desirable plants, and fish or other wildlife—if they are not handled or applied properly. Use all pesticides selectively and carefully. Follow recommended practices for the disposal of surplus pesticides and pesticide containers.

Photo credits: All images were taken by APHIS plant pathologist Kimberly A. Schwartzburg.

**United States
Department of Agriculture**
Animal and Plant Health
Inspection Service

APHIS 81–35–011

