



# Gladiolus Rust in the USA: A New Project

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# Gladiolus

- Over 200 species
- Widely distributed in the Middle East, Mediterranean, Europe
- SW South Africa considered center of origin
- Used in gardens & as cut flowers
- Grown from corms
- The farms of interest in Florida grow ~700 acres of gladiolus

# Gladiolus Rust

- Caused by *Uromyces transversalis*
- Not established in USA—quarantine-significant
- Only infects tropical members of the family Iridaceae:
  - *Gladiolus*, *Tritonia*, *Crocasmia*, *Watsonia* spp.



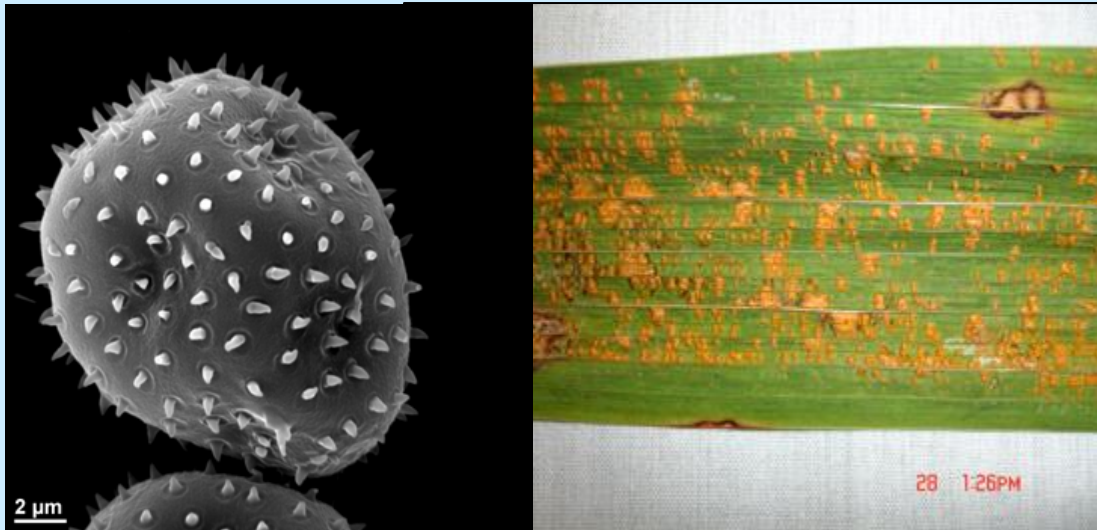
Gladiolus



Crocasmia

# Gladiolus Rust Symptoms

- Typical rust pustules with yellowish-orange spores
- Sori are **transverse**—developing horizontally across veins
  - sori on most rusts of monocots develop between and parallel to veins



# Pathways and Spread

- *U. transversalis* infects leaves, stems, flowers
- Pathogen dispersal
  - long distance dispersal of urediniospores by wind
  - movement of contaminated plants & plant parts
- Fungus native to South Africa
  - reported in southern Europe, Morocco, South America, Martinique, Mexico, Australia, New Zealand
- Method of introduction into USA unknown
  - cuttings from Mexico implicated
- In 2005: 100% incidence reported in a 20-ha field in Michoacan, Mexico

# Status of Glad Rust in USA

- 2006**
- April: GR intercepted on cut flowers in Hawaii & traced back to Florida
  - Florida: 2 farms & 8 residential gardens
  - San Diego Co., CA: 1 nursery & 2 residential gardens
- 2007**
- February: same farm in Hendry County, FL
- 2008**
- March: same farm in Hendry County, FL
  - April: Minnesota—on cut flowers from FL
  - Sep: CA residential garden (found by C. Warfield)

# Technical Working Group

- Comprised of APHIS staff, Schmale (SAF), Chase, Daughtrey, Jeffers, Buck, and others...
- Recommendations—April 2006:
  - Fungicide program alternating protectants and systemics—weekly applications
  - Host-free period of 3 to 4 months
  - Intensive surveys of farms & surrounding areas
  - Infested fields not used the following season
  - Use of sanitation (hot water/fungicides) on corms
  - Outreach and education programs

# Recurrence in 2007 at One Farm

- Recommendations—May 2007:
  - Remove all green material and corms except for current flower production
  - Burn or bury infected plant material
  - Deep plowing or disking post-harvest
  - 3-month host-free period
  - Volunteer host plants removed & destroyed

\*emphasized Program *only* will be successful if all recommendations are followed

# Glad Rust Problems at One Farm

- Location: Hendry County, FL
- Rust has occurred in three consecutive years
- 3-month host-free period not fully accomplished
- In 2007, shipped plants **not** dipped in fungicide
- Leaves stripped from plants were not properly disposed:
  - fed to cattle or left in field to dry due to burning restrictions
- Glad cultivars had different blooming periods in same field—extending exposure period

# Gladiolus Rust Sampling July 2008

- We wanted infected material to initiate trials
- Grower granted permission to sample on Wednesday
  - he planned to finish harvest on Friday
- Left UGA on Thursday - obtained state of FL permission to go to farm
- Arrived on farm with state reps Friday to collect infected materials



Gladiolus farm -  
what we expected

## Gladiolus farm - what we saw



- 'Mis-communication' resulted in all plants plowed under that morning
- While digging to get corms and infected plant debris tractor continuously circled our crew!
- Some lesions survived and are at Dr. Tim Schubert's lab in Gainesville, FL

# Glad Rust Research Objectives

## Objective 1:

Evaluate the direct toxicity of fungicides and selected disinfestants to urediniospores in a laboratory environment

## Objective 2:

Determine the survival potential of urediniospores on plant debris at a field location

## Objective 3:

Examine variation in the pathogen population by DNA sequence analysis

# Questions??

