United States Department of Agriculture

Marketing and Regulatory Programs

Animal and Plant Health Inspection Service

Eradication Program for Gladiolus Rust in Hendry County, Florida

Environmental Assessment, August 2008

Eradication Program for Gladiolus Rust in Hendry County, Florida

Environmental Assessment, August 2008

Agency Contact:
Anwar Rizvi
Emergency and Domestic Programs
Plant Protection and Quarantine
Animal and Plant Health Inspection Service
U.S. Department of Agriculture
4700 River Road, Unit 140
Riverdale, MD 20737–1236

Table of Contents

Deleted: 11

Deleted: 11

Deleted: 17

I. Background

A. History of Gladiolus Rust in the United States

Gladiolus rust (GR) is a plant disease of quarantine significance threatening United States agriculture. Both the pathogen and host are native to southern Africa. GR was identified in South America in the early 1980's, Martinique in 1996, and central Mexico in 2004–2005.

GR was first identified in the United States in both Manatee and Hendry Counties, Florida, in April 2006. The rust was confined to two commercial farms, one in each county, and a residential garden in Manatee County. In May 2006, GR was also discovered in San Diego \County, California, on one commercial farm and three residential sites just north of the Mexico border. State and Federal officials destroyed infected plants and placed stop sale notices on the facilities.

In February 2007, GR was again identified at the site in Manatee County, and a month later at the Hendry County site. In June 2007, GR also reappeared in San Diego County, California. A national management plan for exclusion and eradication was drafted by the U.S. Department of Agriculture (USDA), Animal and Plant Health Inspection Program (APHIS), Plant Protection and Quarantine (PPQ), Emergency and Domestic Programs, to provide the framework to minimize the impacts of GR in the United States.

On March 14, 2008, GR was found yet again at the Hendry County site (Zipperer Farms). No additional GR finds have been identified in either Manatee County, Florida, or in San Diego County, California, in 2008. A Federal Order was issued in May 2008 for the site in Hendry County, Florida.

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

B. Gladiolus Rust Information

The fungus *Uromyces transversalis* Thum. causes GR only in members of the plant family Iridaceae, including *Gladiolus*, *Tritonia*, *Crocosmia*, and *Watsonia* species. Severely damaged plants do not flower and/or their corms do not ripen. A corm is a fleshy underground stem that is similar to a bulb but stores its food as stem tissue and has fewer and thinner leaflike scales. GR is native 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 identified in southern France and northern Italy in 1966, Malta in 1969, and Morocco and southern Italy in 1977. *U. transversalis* also has spread to western France and England by 1996, where it is an aggressive pathogen of commercial gladiolus.

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 large 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 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 that brings GR into the United States from Mexico and other countries.

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, measuring 1 millimeter by 1 centimeter. Eventually, the pustules coalesce and form larger patches of damaged tissue.

II. Purpose and Need for the Proposed Action

USDA, APHIS is proposing an eradication and quarantine program for GR at Zipperer Farms in Clewiston, Florida (Hendry County). This action is necessary to prevent the interstate spread of GR, which was recently confirmed among gladiolus plants, cut flowers, corms, and leaves originating from the affected farm.

APHIS has the responsibility for taking actions to exclude, eradicate, and/or control plant pests under the Plant Protection Act (7 United States Code (U.S.C.) 7701 et seq.). It is important that APHIS take steps necessary to implement a quarantine and eradicate GR from Clewiston, Florida, to prevent damage to members of the plant family Iridaceae, including *Gladiolus*, *Tritonia*, *Crocosmia*, and *Watsonia* species in the

United States. The program proposes to eradicate and prevent the spread of GR through treatment with a variety of fungicides, flooding of fields, inspection, and restricting interstate movement.

This environmental assessment (EA) has been prepared consistent with the National Environmental Policy Act of 1969 (NEPA) and APHIS' NEPA implementing procedures (7 Code of Federal Regulations (CFR) part 372) for the purpose of evaluating how the proposed action, if implemented, may affect the quality of the human environment.

III. Alternatives

APHIS considered two alternatives in response to the need to eradicate and contain infestations of GR: (1) no action, and (2) the combination of quarantine and eradication (preferred alternative). Both alternatives are described briefly in this section, and the potential impacts of each are considered in the following section.

A. No Action

Under the no action alternative, APHIS would not implement any measures to manage GR infestations. Some control or management measures could be taken by other non-Federal entities, such as the State of Florida; those actions would not be under APHIS' control nor funded by APHIS. Local gladiolus growers could attempt to limit damage from GR by applying fungicides to gladioli on their properties if the fungus were to spread there. The lack of measures to prevent the spread of GR from Zipperer Farms in Clewiston, Florida, (occurring via natural dispersal of the fungus or artificial spread from movement of infested gladiolus products) could lead to an increase in GR infestation within the United States.

B. Proposed Action

Under this alternative, APHIS would implement a quarantine area within and around Zipperer Farms located at 69 County Road 833, Clewiston, Florida. GR is not widely prevalent or distributed within and throughout the United States; therefore, in order to prevent the further dissemination and interstate movement of *Gladiolus* sp. plants, cut flowers, corms, and leaves infected with GR, all of these articles originating from the quarantined farm are restricted from moving from the farm premises. Interstate movement will only be permitted if the following measures are put into place and are completely fulfilled prior to the shipment of gladiolus plant material from Zipperer Farms. In addition to the quarantine, APHIS would require that the owners of Zipperer Farms work

to eradicate GR from their property in order to prevent the natural spread of GR to other gladiolus farms in the United States.

The activities APHIS will require for implementation of a quarantine and eradication program are described below.

1. Quarantine

a. Restricted Articles

All live, green, and/or infected or exposed gladiolus plants and plant parts (including corms, stems, flowers, leaves, etc.).

APHIS prohibits the interstate movement of restricted gladiolus plant material unless it has been grown, produced, manufactured, stored, and handled in a manner that, in the judgment of APHIS, prevents the restricted article from presenting a risk of spreading GR.

b. Requirements for Interstate Movement

In order to be eligible to move interstate from the quarantined area, regulated articles must meet all of the following requirements—

(1) Measures in the Field

While in the field, all harvested gladiolus material must be dipped in Phyton 27® (copper sulfate pentahydrate) following the manufacturer's recommended concentration and duration of treatment. The fungicide must be in contact with all the outer leaves of the gladiolus stems for the manufacturer's specified duration of treatment.

(2) Packinghouse Procedures

All leaves of the plant must be stripped from each individual stem, including the top two immature leaves that are located below the lowest flower on the stem. After all leaf material has been completely removed, stems are grouped into bundles which must be dipped in Phyton 27® following the manufacturer's recommended concentration and duration of treatment. Bundled stems must be dipped such that all stems in the bundle are immersed in the fungicide solution from the end of the stem to the base of the lowest flower bract, ensuring that all stems in the bundle are adequately exposed to the fungicide for the manufacturer's specified duration of treatment. All stripped leaf material must be disposed of, either by burial or burning, within 24 hours.

(3) Packinghouse Inspection

All gladiolus plant material must be examined by inspectors and certified by those inspectors to be free of GR symptoms prior to movement from the packinghouse.

- Bundled plant stems, free of all leaves (processed bundles), will be examined and GR determinations made by examining all stems within the bundle for symptoms.

- If the inspector finds GR symptoms on any plant material, the entire processed bundle must be destroyed either by burial or burning, within 24 hours.

- If GR is found during packinghouse inspection, the inspection table, any related equipment and surfaces, and personnel conducting the leaf stripping operation must be disinfected by thorough application of a 10 percent bleach (sodium hypochlorite) solution or 70 percent ethyl alcohol solution prior to reuse.

(4) Compliance Agreement

The owner of Zipperer Farms must enter into a compliance agreement with APHIS to facilitate the interstate movement of regulated articles in accordance with all of the requirements of the Federal Order, subject to monitoring and audits by an APHIS or a State regulatory official. Such persons must agree to handle, pack, process, treat, and move regulated articles in accordance with the Federal Order.

The compliance agreement may be cancelled orally or in writing by an inspector if the inspector finds that the person who entered into the compliance agreement has failed to comply with all of the requirements of the Federal Order.

2. Eradication

In addition to the Federal Order to eradicate GR from the premises, the following requirements will be included in the compliance agreement between APHIS and the owner of Zipperer Farms—

- **Designated Host-free Periods:** Designated host-free periods must be maintained by the grower prior to planting any gladiolus bulbs. Any find of gladiolus plants by an APHIS or Florida Department of Agriculture and Consumer Service (FDACS) inspector during the designated host-free period will result in the initiation of a new host-free period. Written certification that the necessary host-free period has been achieved must be received from APHIS and FDACS prior to the planting of any gladiolus.

- *90-Day Host-free Period:* A 90-day host-free period must occur within the 1-mile radius of the 2007–2008 growing season gladiolus fields.

- *60-Day Host-free Period:* A 60-day host-free period of gladiolus must occur outside the 1-mile radius of the Zipperer farms fields planted with gladiolus during the 2007–2008 growing season.

- Recognizing that green host material takes approximately 2 weeks to emerge from planted bulbs, gladiolus bulbs may be planted at 76 days or 46 days after the destruction of the last volunteer found in the 1-mile radius of the 2007–2008 gladiolus fields and outside of this 1-mile radius, respectively. This, combined with the 2 weeks for gladiolus emergence, will accomplish the 90-day/60-day host-free period.

- **Volunteer Gladiolus Plant Material:** 2007–2008 gladiolus production fields may be initiated prior to completion of the 90-day host-free period; however, these fields still must be maintained gladiolus plant-free by the grower. Thus, the fields must be frequently monitored, at least twice weekly, for volunteer gladiolus plants. If volunteer gladiolus plants are detected by inspectors in these fields, a new host-free period is initiated, as stated above.

  - Volunteer gladiolus plants must be destroyed immediately, within 24 hours of the find.

  - APHIS and FDACS recommend at least a minimum 30-day flooding period followed by weekly disking for as long as possible. After disking is no longer possible, manual removal of volunteer gladiolus plants must be continued as long as necessary.

  - Any find of gladiolus plants by APHIS or FDACS inspectors initiates a new 90-day host-free period in the 1-mile radius, and 60-day host-free period outside the 1-mile radius.

- **Treatment Schedule:** A treatment schedule that includes both preventative fungicides and curative fungicides must be submitted to and approved by APHIS or FDACS prior to the planting of gladiolus on the premises. The grower may revise the approved fungicide plan at any point during the growing season; however, the revision must be submitted to and approved by APHIS or FDACS prior to implementation.

- **Disenfection:** Disinfection of equipment and personnel is required using approved disinfectants upon entering and leaving each separate field.

    - In the event of GR detection in a field, more stringent disinfection measures may be required by APHIS or FDACS.

- **Fungicide:** The approved fungicide treatment schedule must be initiated and followed for the entire period of time gladiolus plants are in the fields, beginning with the first emergence of plants, with treatments initiating no later than 1 week following first emergence, and terminating only when the gladiolus field is destroyed.

    - Appropriate spray nozzles and equipment must be used in the application of the fungicide treatments at rates identified on the label.

    - Spray records are required. Records must include information on the fungicide applications on each field, including the date, block sprayed, fungicide used, and quantity applied.

- **Documentation:** Documentation of farm activities must include the following records:

    - dates of each gladiolus planting and the location;

    - spray records, as described above;

    - detection dates of GR and the location(s) if GR is discovered;

    - dates and locations of field harvests, both cut flowers and bulbs;

    - dates of completion of bulb harvest; and

    - dates of completion of host destruction (i.e. flooding, disking, etc.).

- **Training:** All farm personnel must receive training on the conditions set out in the compliance agreement, the detection of GR, and the proper handling of GR-infected plant material prior to the planting of gladiolus.

- **Reporting Requirements**: Report all GR-infected plants to APHIS or FDACS personnel within 24 hours of the discovery.

- **Detection:** Detection of GR in the field requires:

  - Destruction of the infected plant(s) and all plants within a 2-foot radius. All infected plants and those within a 2-foot radius must be removed from the fields. In the field, GR-infected plants and surrounding plants must be placed into a leak-proof bag, the bag must then be sealed and disinfected with approved treatment, and removed from the site for immediate (not to exceed 24 hours) destruction either by burial to a depth of at least 3 to 6 inches or by burning at an approved disposal site. Workers (including clothes, hands, and feet), tools used, and vehicles must be disinfected when leaving the infected field.

  - Application of curative fungicides at the highest labeled rate approved at the appropriate interval to treat all exposed gladiolus plants within an 8-foot radius outside of the infected and removed plants.

  - Discontinuation of the use of overhead sprinkler systems in the field where GR has been detected.

- **Exhibiting GR Symptoms:** If plant material exhibiting symptoms of GR infection is found by APHIS and/or FDACS inspectors in the packinghouse area, which includes the cull pile, processing line, and processed bundles, the grower will immediately implement the "Dip-Strip - Dip-Ship Method."

  - For the remainder of the growing season, all harvested gladiolus must be dipped into a USDA-approved fungicide in the field at harvest; stripped of all leaves, including the top two immature leaves directly at the base of the lowest flower; and all processed bundles of flower stems dipped a second time into a USDA-approved fungicide prior to shipping.

  - If any gladiolus stems that are ready for shipment (i.e. processed bundles) are found by APHIS or FDACS inspectors to have GR, then gladiolus plants from the infected block(s) will no longer be eligible for shipment.

  - If GR is found on stems from the farm at an interstate destination, the farm is no longer eligible to ship gladiolus interstate for the remainder of the 2008–2009 production season.

- **Excess Plant Material:** Regardless of GR status, all excess plant material resulting from the harvest and processing of the cut flowers must be discarded either by burial to a depth of at least 3 to 6 inches, or burning within 24 hours.

- **Harvest Requirements:** As flower harvest is completed within a block/planting, the grower must follow one of the stipulated actions to reduce the amount of GR host material in the environment:

  - If not harvesting corms, spray with a curative and then disk the remaining gladiolus plant material to a depth of at least 3 to 6 inches. Following disking, management practices for prevention and elimination of volunteer gladiolus plants must begin.

  - If planning to harvest corms, spray with a curative fungicide, mow to 6 to 7 inches in height, and continue the approved spray regime until the final harvest of corms. Following the final harvest of corms, disk the remaining gladiolus plant material to a depth of at least 3 to 6 inches.

- **Entry:** APHIS or FDACS personnel will be allowed entry to the entire premises at any time for inspections in the packinghouse and the fields. Additionally, all records of farm activities associated with the gladiolus fields must be made available upon request.

3. Approved Fungicides

The active ingredients in the fungicides proposed for use in fields include: Azoxystrobin, Captan, Chlorothalonil, Copper Ammonium Complex, Copper Hydroxide, Copper Oxychloride, Cuprous Oxide, Fludioxonil, Flutolanil, Mancozeb, Maneb, Myclobutanil, Propiconazole, Triadimefon, Trifloxystrobin, Triflumizole, and Ziram. There are different, specific labels containing each of these active ingredients that may be used, depending on availability and existing approvals for use in the State of Florida.

4. Approved Disinfectants

Personnel. All personnel for whom treatment is required must clean their hands using one of the following disinfectants: Gallex 1027 Antimicrobial Soap, Hibiclens, Hibistat, Sani Clean Hand Soap, or Seventy Percent Isopropyl Alcohol.

Vehicles,Equipment, and Other Articles. All vehicles, equipment, and other articles for which treatment is required must be cleaned and disinfected by removing all plants, leaves, twigs, fruit, and other plant parts from all areas of the equipment or vehicles, including in cracks, under chrome strips, and on the undercarriage of vehicles, and by wetting

all surfaces (including the inside of boxes and trailers), to the point of runoff, with one of the following disinfectants—

- 200-ppm solution of sodium hypochlorite with a pH of 6.0 to 7.5;
- 0.2-percent solution of a quaternary ammonium chloride (QAC) compound;
- solution of hot water and detergent, under high pressure (at least 30 pounds per square inch), at a minimum temperature of 160 °F, steam, at a minimum temperature of 160 °F at the point of contact; or
- solution containing 85 parts per million peroxyacetic acid (indoor use only).

IV. Affected Environment

In the United States, to date, GR has been found in several locations in the United States, including Manatee and Hendry Counties in Florida, and San Diego County, California. There are also some reports of detection of GR in cut flowers from Florida in Minnesota; however, it appears that it was a result of cut flowers shipped from affected areas in Florida or California (MDA, 2008).

Gladiolus plants are grown commercially in the field and in greenhouses in the United States. Large scale production of plants (mainly to be sold as bulbs and cut flowers) exists in numerous States. The plants are commonly used as indoor ornamentals throughout the country, and are currently grown in large portions of the United States in USDA Hardiness Zones 7 through 10. As discussed in APHIS' risk assessment on the risk of introduction of GR from cut flowers and propagative material from Mexico (USDA, APHIS, 2005), the potential for establishment of GR in many areas of the United States is high. However, the focus of this EA is quarantine and eradication of GR at Zipperer Farms in Hendry County, Florida. Five soil types are found at this location: Immokalee sand, Myakka sand, Basinger sand, Okeelanta muck, and Delray sand (depressional).

Only three of the soil types (Immokalee sand, Myakka sand, and Basinger sand) are within the planted fields. All three of these soil types are characterized as poorly drained; the other two soil types are cut-outs within a field or on the edges of the zone, and are not used commercially for planting or otherwise. Generally, the planted portions of the fields are surrounded by canals and dikes used to control water issues year-round.

Water flow and runoff are closely regulated by the Southwest Florida Water Management District (NRCS, 2008).

Specific information on the depth of the water table at Zipperer Farms is not available. Generally, the water table in highly conductive sandy soils in Florida is at a depth of between 8 and 50 inches, depending on the time of year (Shukla and Jaber, 2006).

V. Environmental Consequences

A. No Action

The potential environmental consequences of opting for the no action alternative relate to the uncontrolled spread of GR. A prior APHIS risk assessment discussed the risk of introduction, as well as the consequences of introduction of GR via cut flowers from Mexico (USDA, APHIS, 2005). If GR is allowed to spread without any control measures taken by APHIS, two potential environmental impacts may occur. First, GR may become established in the United States, limiting the ability to grow gladiolus plants both commercially and in home gardens. The APHIS risk assessment stated that GR can exist throughout most of the United States. GR has the ability to not only impact gladiolus flowers, but also members of the plant family Iridaceae, including *Gladiolus*, *Tritonia*, *Crocosmia*, and *Watsonia* species. GR can spread through airborne spores which are produced in large 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. In addition, GR can spread through interstate movement of infected material.

Second, if GR spreads, a significant increase in the use of fungicides may occur as private, commercial, and State entities attempt to remove it from commercial and home locations. Areas surrounding the treatment areas may reintroduce GR year after year, thus requiring many years of treatment of fungicides. Many types of fungicides are available for potential use in combating GR; the chemical profiles of these pesticides are discussed in more detail in the "Proposed Action" section below.

B. Proposed Action

The environmental impacts of the quarantine portion of the proposed action are expected to be minimal. As described in previous sections of this EA, the quarantine activities include restriction from interstate movement. In order to be approved to move plants, plant dipping, leaf stripping, and inspections must be conducted. Plant dipping is discussed in more detail in the "Cumulative Impacts" section of this EA. Leaf

stripping involves removal of all leaves from each individual stem and disposal of the leaf material, either by burying or burning (where allowed by law). If disposal of leaf material is done according to applicable State and local laws, no significant environmental impacts are expected to occur.

In the eradication portion of the proposed action discussed in this document, there are three major components—maintenance of a host-free period, use of fungicides in a treatment schedule, and cleaning of equipment and personnel with approved disinfectants. Two of these actions, maintenance of a host-free period and disinfection of equipment and personnel, are not expected to have significant environmental consequences. A list of the approved disinfectants proposed for use is discussed below in the "Chemical Profiles" section of this EA. If the approved disinfectants are used according to applicable use directions and wastes are disposed of according to State and local laws, the potential environmental impacts will be minimized.

The potential environmental consequences resulting from the eradication portion of the preferred alternative are the primary concern. The chemical toxicity and exposure profiles of each proposed fungicide are presented to aid evaluation of these concerns.

Chemical Profiles

The fungicides which are being considered for use to combat an outbreak of GR include products containing the following active ingredients (a description of the profile of each active ingredient by chemical class is provided below in this section).

- **Flutolanil**—benzanilide fungicide. Mammalian toxicity studies conducted with flutolanil show little to no toxicological effects of significance. Flutolanil is toxic to aquatic organisms; however, if applied according to label directions and precautions, the risk to aquatic organisms is minimized. Flutolanil is persistent in water and can be mobile in sandy soils; nevertheless, uptake of flutolanil into plant root systems and adsorption to soil significantly minimize potential leaching into groundwater. Mitigation measures to reduce the potential for risks to aquatic organisms and to address potential leaching issues have been incorporated into pesticide product label directions and use precautions. These mitigation measures include prohibiting use over water, prohibiting use in intertidal areas or below the mean high tide watermark, and limiting application techniques and timing to those that minimize potential leaching (73 Federal Register (FR) 33013–33018, June 11, 2008; NYSDEC, 1995).

Active Ingredient	Chemical Class
Flutolanil	Benzanilide
Chlorothalonil	Chlorinated Benzonitrile
Copper Ammonium Complex	Copper
Copper Hydroxide	Copper
Copper Oxychloride	Copper
Cuprous Oxide	Copper
Mancozeb	Dithiocarbamate
Maneb	Dithiocarbamate
Ziram	Dithiocarbamate
Captan	Phthalimide
Fludioxonil	Pyrrole
Azoxystrobin	Strobilurin
Trifloxystrobin	Strobilurin
Myclobutanil	Triazole
Propiconazole	Triazole
Triadimefon	Triazole
Triflumizole	Triazole

- **Chlorothalonil**—chlorinated benzonitrile fungicide. Studies with chlorothalonil have demonstrated low acute, developmental, and reproductive toxicity. Chronic toxicity studies support classification of chlorothalonil as a likely human carcinogen. One impurity in chlorothalonil, hexachlorobenzene, is also classified as a likely human carcinogen. Chlorothalonil is toxic to aquatic organisms, is somewhat persistent in water, and degrades moderately in soil. It has some ability to reach groundwater, and has low potential to bioaccumulate. Any potential for human-related risk will be limited to applicators because no dietary exposure is expected from this program. Mitigation measures to reduce worker and aquatic exposure and risk, as well as potential leaching, have been incorporated into pesticide product label directions and use precautions. These mitigation measures include personal protective equipment for applicators and handlers to minimize exposure, prohibiting use over water, drift minimization language, prohibiting use in intertidal areas or below the mean high tide watermark, and a statement on product labels alerting users to potential groundwater contamination issues (a groundwater statement) (EPA, 1999a).

- **Copper Ammonium Complex, Copper Hydroxide, Copper Oxychloride, Cuprous Oxide**—copper fungicides. Studies conducted with copper compounds used as pesticides do not demonstrate any significant mammalian toxicity concerns. Some formulations have been shown to cause acute eye or dermal irritation as a result of direct exposure. Copper is common in the environment

because it is a naturally occurring compound, and is also an essential element in the human body. Copper pesticides are highly toxic to aquatic species and bind to the gill membranes of species, such as fish. While copper pesticides show some nontarget toxicity, the proposed use in this program is not expected to result in significant exposure or risk to nontarget organisms. Copper pesticides have a relatively low potential to leach in soil. To minimize risks to applicators, as well as aquatic environment, mitigation measures to reduce exposure have been incorporated into pesticide product label directions and use precautions. These mitigation measures include personal protective equipment for applicators and handlers to minimize exposure, prohibiting use over water, and prohibiting use in intertidal areas or below the mean high tide watermark (EPA, 2008; U.S. National Library of Medicine, 1995).

- **Mancozeb, Maneb, and Ziram**—dithiocarbamate fungicides. Mancozeb and maneb have lower mammalian toxicity when compared to ziram. Mancozeb and maneb show little evidence of chronic risk to humans based on the available toxicity data and expected low exposure from application proposed in this program. Ziram chronic toxicity studies indicate that it is classified as "suggestive of carcinogenicity" to humans. Toxicity to nontarget terrestrial organisms is low for each fungicide. All three fungicides are toxic to aquatic organisms. Mancozeb does not persist in the environment long enough to have the potential to reach groundwater. Macozeb's degradation product, ethylenethiourea (ETU), was assessed for its potential to leach because of indications that it has potential chronic toxicity to humans. Risk assessments conducted by the U.S. Environmental Protection Agency (EPA) concluded the degradation of mancozeb would produce low concentrations of ETU that were "not of concern." For maneb, similar assessments of ETU showed that estimated concentrations in both surface and drinking water were below levels of concern. Environmental fate studies demonstrate that ziram degrades rapidly, and residues in soil are low. The potential for ziram to persist and leach to groundwater is low. Based on the limited area of application and the lack of dietary exposure, any potential risks to humans will be confined to workers. To minimize risks to applicators, as well as aquatic environments, mitigation measures to reduce exposure to workers and aquatic organisms have been incorporated into pesticide product label directions and use precautions. These mitigation measures include personal protective equipment for applicators and handlers to minimize exposure, prohibiting use over water, and prohibiting use in intertidal areas or below the mean high tide watermark. In addition, EPA cancelled some uses where risks outweighed benefits, further reducing any

aggregate risk associated with dithiocarbamate fungicides (EPA, 2005a; EPA, 2005b; EPA, 2004).

- **Captan**—Phthalimide fungicide. Captan has low acute mammalian toxicity, with the exception of high acute eye irritation. Captan's developmental and reproductive toxicity are low. Captan is classified as a probable human carcinogen based on chronic toxicity studies in rats and mice. Captan's toxicity to fish is high, however, toxicity to other aquatic organisms and plants is low. Toxicity to terrestrial nontarget organisms is low. Captan dissipates quickly in the environment, but two of its major degradation products, tetrahydrophthalimide (THPI) and tetrahydrophthalimic acid (THPAm), are mobile in soil. Neither THPI nor THPAm are persistent in the environment, therefore, the potential for them to reach groundwater is low. Mitigation measures to reduce mammalian toxicological risks and fish exposure, as well as the potential for leaching, have been incorporated into pesticide product label directions and use precautions. These mitigation measures include personal protective equipment for applicators and handlers to minimize exposure, prohibiting use over water, and prohibiting use in intertidal areas or below the mean high tide watermark (EPA, 1999). The proposed mitigation measures, as well as the lack of dietary exposure from the proposed applications, and limited geographical use of captan will minimize risk to human health and nontarget organisms.

- **Fludioxonil**—Pyrrole fungicide. The acute and chronic mammalian toxicity of fludioxonil is low. Carcinogenicity studies with fludioxonil have demonstrated that it cannot be classified as to human carcinogenicity potential. Fludioxonil is toxic to aquatic organisms, including fish, invertebrates, and plants. Toxicity to nontarget terrestrial organisms is relatively low. Fludioxonil is persistent in soil; however, its potential mobility is low, decreasing the risk that fludioxonil would leach to groundwater. Mitigation measures to reduce aquatic toxicity risks have been incorporated into pesticide product label directions and use precautions. These mitigation measures include prohibiting use over water, and prohibiting use in intertidal areas or below the mean high tide watermark (65 FR 82927–82937, 2000; UKDEFRA, 1995). The proposed mitigation measures, as well as the lack of dietary exposure from the proposed applications and limited geographical use of fludioxonil, will minimize risk to human health and nontarget organisms.

- **Azoxystrobin and Trifloxystrobin**—strobilurin fungicides. Azoxystrobin and trifloxystrobin, have low acute and chronic mammalian toxicity profiles. No reproductive or development toxicity is demonstrated for either fungicide in mammalian studies. Both

fungicides have very low toxicity to terrestrial nontarget organisms, including plants and animals. Azoxystrobin and trifloxystrobin are highly toxic to aquatic organisms, such as fish and invertebrates. For azoxystrobin, laboratory studies show that the fungicide is persistent and potentially mobile; however, field studies show that azoxystrobin is "moderately immobile and relatively nonpersistent under actual use conditions." Trifloxystrobin degrades rapidly; however, one of its acid metabolites may be mobile and persistent in soil. The acid metabolites for trifloxystrobin demonstrate lower aquatic toxicity when compared to the parent material. Mitigation measures to reduce aquatic organism exposure and leaching risks have been incorporated into pesticide product label directions and use precautions. These mitigation measures include prohibiting use over water, prohibiting use in intertidal areas or below the mean high tide watermark, and a statement on product labels alerting users to potential groundwater contamination issues (a groundwater statement) (EPA, 1997; EPA, 1999c).

- **Myclobutanil, Propiconazole, Triadimefon, and Triflumizole**—triazole fungicides. Myclobutanil has low acute mammalian toxicity, but it is an acute eye irritant. Myclobutanil studies show no evidence of chronic toxicity, including carcinogenicity. Propiconazole has low mammalian acute toxicity, some developmental toxicity, and is classified as a possible human carcinogen. Triadimefon has moderate mammalian acute toxicity, and little to no observable chronic toxicity. Triflumizole has low acute mammalian toxicity, and little evidence of chronic toxicity to mammals. All four fungicides have minimal toxicity to nontarget terrestrial organisms, including both animals and plants. Myclobutanil, propiconazole, and triadimefon show low toxicity to aquatic organisms, and triflumizole has moderate toxicity to fish. Propiconazole, triadimefon, and triflumizole degrade relatively rapidly and have low potential to leach to groundwater. Myclobutanil has some mobility and leaching potential. Mitigation measures to reduce human and aquatic exposure and risk have been incorporated into pesticide product label directions and use precautions. These mitigation measures include personal protective equipment for applicators and handlers to minimize exposure, prohibiting use over water, and prohibiting use in intertidal areas or below the mean high tide watermark (EPA, 2006a; EPA, 2006b; EPA, 1991; 62 FR 1284–1288, January 9, 1997). The proposed mitigation measures, as well as the lack of dietary exposure from the proposed applications, and limited geographical use of these products will minimize risk to human health and nontarget organisms.

The profiles of each of the classes of fungicides discussed above differ.

All of the specific pesticide product labels for each active ingredient, however, contain mitigation measures that address the risks associated with use of the fungicides. The lack of application of any of these fungicides to food crops for the proposed alternative discussed in this document eliminates dietary exposure to humans. If each fungicide product is used according to applicable label directions, use precautions, and any other specific restrictions, no significant environmental impacts are expected to occur.

All the fungicide active ingredients discussed above will not necessarily be applied in the event of an outbreak of GR. The purpose of including all of the fungicides in this EA is to be able to design a program of application that adequately addresses the conditions that exist at the time of the outbreak, and allows for flexibility in containing the disease.

C. Cumulative Impacts

Cumulative impact is defined as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions" (40 CFR § 1508.7).

In April 2008, prior to considering the use of fungicides in the field environment discussed in this EA, APHIS quarantined the infected area at Zipperer Farms and required harvested gladiolus material to be dipped in the fungicide Phyton 27® (active ingredient: copper sulfate pentahydrate). Based on the method of use and the expected lack of human health or environmental impacts, APHIS categorically excluded this action from further NEPA consideration in accordance with APHIS' NEPA implementing regulations (7 CFR § 372.5). In order to move gladiolus products out of the quarantine area, producers in the regulated area must dip gladiolus plants in Phyton 27®. This is done by hand in the field or packinghouse using a sealed plastic container holding the chemical. Once dipped, plant bundles are held over the container for a few seconds to collect any dripping chemical; this may result in minor spills of fungicide on the soil in the field. The resulting minor spills are not expected to contribute to adverse human or environmental effects.

No cumulative effects are expected from the postharvest cut flower dipping treatment in combination with the proposed field applications of fungicides. Other than the anticipated minor spills of fungicide on the field soil, the plant dipping and field applications are separated temporally, making any interaction and resulting cumulative effects of the two actions extremely unlikely.

All the fungicide active ingredients discussed above in the "Environmental Impacts" section will not necessarily be applied in the event of an outbreak of GR. Fungicides used will not be applied at the same time, however, will become part of planned applications at specific times while gladiolus plants are growing. These planned applications will be made according to all applicable label directions, and will be designed to minimize the potential for any cumulative effects. In addition, the uses of fungicides under the proposed action alternative discussed in this document would be used on a small scale at one farm location only.

D. Endangered Species Act

Section 7 of the Endangered Species Act and its implementing regulations require Federal agencies to consult with the U.S. Fish and Wildlife Service (FWS) and/or the National Marine Fisheries Service to ensure their actions are not likely to jeopardize the continued existence of threatened or endangered species or result in the destruction or adverse modification of critical habitat.

APHIS has considered the impact of fungicide treatments on federally listed threatened and endangered species and designated critical habitat in the area. In a report from the Florida Natural Areas Inventory (FNAI, 2008), two listed species were documented on or near the site.

The Florida panther (*Felis concolor coryi*) prefers remote habitats that contain heavy vegetation, such as swamp forests, hardwood hammock, and oak pine woodlands. These habitat types are not part of the program area. Because Zipperer Farms is an active farm, no activities required by the Federal Order or compliance agreement would cause excessive or unusual disturbance to the panther, should it be in the area. The primary potential effect would be exposure to the proposed fungicides. Although the panther could potentially wander through gladiolus fields of the farm at night, any fungicide applications that may have been applied would be dry (applied in daytime) and would not expose Florida panthers to this material. In addition, the fungicides that would be used are practically nontoxic or only slightly to moderately toxic to large mammals (White, 2004; EPA, 1998; EPA, 1999).

Dipping of gladiolus plant material in Phyton 27® fungicide in the field and packinghouse would not expose panthers to this material. Therefore, APHIS has determined that the program will have no effect on the Florida panther.

No reported observations of the Audubon's crested caracara (*Polyborus plancus audubonii*) have occurred in the vicinity of the

farm since 1993 (FNAI, 2008). The caracara was reported to follow behind a tractor plowing (1998), flying over (1988), and sitting on a nest and a structure (1993) in the vicinity of Zipperer Farm. Because Zipperer Farm is an active farm, no activities required by the Federal Order or compliance agreement would cause excessive or unusual disturbance to the caracara. The primary potential effect would be exposure to the proposed fungicides. It is unlikely that the caracara would be present in fungicide-treated gladiolus fields as this is not its known habitat. In addition, the fungicides that would be used are practically nontoxic or only slightly to moderately toxic to birds (White, 2004; EPA, 1998; EPA, 1999). Dipping of gladiolus plant material in Phyton 27® fungicide in the field and packinghouse would not expose the caracara to this material. Therefore, APHIS determined that the program will have no effect on Audubon's crested caracara.

VI. Other Issues

Consistent with Executive Order (EO) 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low-income Populations," APHIS considered the potential for disproportionately high and adverse human health or environmental effects on any minority populations and low-income populations. No disproportionate adverse effects are anticipated to any minority or low-income population, or particular subgroup of the U.S. population as a result of implementing the proposed action considered in this document.

Consistent with EO 13045, "Protection of Children From Environmental Health Risks and Safety Risks," APHIS considered the potential for disproportionately high and adverse environmental health and safety risks to children. No disproportionate adverse effects to children are anticipated as a result of implementing the proposed action considered in this document.

EO 13175, "Consultation and Coordination with Indian Tribal Governments," was issued to ensure there would be "meaningful consultation and collaboration with tribal officials in the development of Federal policies that have tribal implications…." No aspect of implementation of the proposed action considered in this document would result in tribal impacts which would require the need for consultation or collaboration with tribal officials.

VII. Agencies and Organizations Consulted

This EA was prepared and reviewed by APHIS. The addresses of participating APHIS units, cooperators, and consultants (as applicable) follow.

U.S. Department of Agriculture
Animal and Plant Health Inspection Service
Policy and Program Development
Environmental Services
4700 River Road, Unit 149
Riverdale, MD 20737

U.S. Department of Agriculture
Animal and Plant Health Inspection Service
Plant Protection and Quarantine
Environmental Compliance
4700 River Road, Unit 150
Riverdale, MD 20737

U.S. Department of Agriculture
Animal and Plant Health Inspection Service
Plant Protection and Quarantine
Emergency and Domestic Programs
4700 River Road, Unit 140
Riverdale, MD 20737–1236

U.S. Department of Agriculture
Animal and Plant Health Inspection Service
Plant Protection and Quarantine
Emergency Response
920 Main Campus Drive, Suite 200
Raleigh, NC 27606

U.S. Department of Agriculture
Animal and Plant Health Inspection Service
Plant Protection and Quarantine
8100 NW 15th Place
Gainesville, Florida 32606

U.S. Department of Agriculture
Animal and Plant Health Inspection Service
Plant Protection and Quarantine
Center for Plant Health Science and Technology
Response and Recovery Systems Technology
1730 Varsity Drive
Raleigh, NC 27607

VIII. References

FNAI—See Florida Natural Areas Inventory.

Florida Natural Areas Inventory Report, 2008. FNAI Standard data request report received from Lindsay Horton, Data Services Coordinator, on July 18, 2008. [Online.] Available: http://www.fnai.org/. [2008, August 18].

MDA—See Minnesota Department of Agriculture.

Minnesota Department of Agriculture, 2008. Pest alert: gladiolus rust. [Online.] Available: http://www.mda.state.mn.us/plants/plantdiseases/gladiolusrust.htm. [2008, August 18.]

Natural Resources Conservation Service, 2008. Web soil survey. [Online.] Available: http://websoilsurvey.nrcs.usda.gov/app/. [2008, August 15.]

NRCS—See Natural Resources Conservation Service.

New York State Department of Environmental Conservation, 1995. Letter from NYSDEC director to pesticide registrant: registration of the pesticide product ProStar 50WP Fungicide (EPA Reg. No. 45639–153) containing the new active ingredient flutolanil. [Online.] Available: http://pmep.cce.cornell.edu/profiles/fung-nemat/febuconazole-sulfur/flutolanil/flutolanil_reg_995.html. [2008, August 17.]

NYSDEC—See New York State Department of Environmental Conservation.

Shukla, S., and Jaber, F., 2006. Groundwater recharge from agricultural areas in the flatwoods region of south Florida. Fact sheet ABE370, one of a series of the Agricultural and Biological Engineering Department, Florida Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida. [Online.] Available: http://edis.ifas.ufl.edu/AE399. [2008, August 17.]

UKDEFRA—See United Kingdom Department for Environment, Food and Rural Affairs.

United Kingdom Department for Environment, Food and Rural Affairs, 1995. Evaluation of fludioxonil. [Online.] Available: http://www.pesticides.gov.uk/PSD_PDFs/Evaluations/126_fludioxonil.pdf [2008, August 17.] 173 pp.

USDA—See U.S. Department of Agriculture.

U.S. Department of Agriculture, Animal and Plant Health Inspection Service, 2008. Flutolanil: pesticide tolerances. 73 FR 113:33013-33018, June 11. [Online.] Available: http://www.epa.gov/EPA-PEST/2008/June/Day-11/p13000.htm [2008, August 15.]

U.S. Department of Agriculture, Animal and Plant Health Inspection Service, 2005. *Uromyces transversalis*: assessment of the risk of introduction, recommendations for risk mitigation for *Gladiolus* spp. cut flowers and propagative material from Mexico: a qualitative, organism-based pathway risk assessment. http://www.doacs.state.fl.us/pi/enpp/pathology/images/gladrustmexpra.pdf [2008, August 13.]

U.S. Department of Agriculture, Animal and Plant Health Inspection Service, 2000. Fludioxonil: pesticide tolerance. 65 FR 251:82927–829379. [Online.] Available: http://www.epa.gov/EPA-PEST/2000/December/Day-29/p33168.htm. [2008, August 15.]

U.S. Department of Agriculture, Animal and Plant Health Inspection Service, 1997. Myclobutanil: pesticide tolerances for emergency exemption. 62 FR 6:1284–1288, January 9. [Online.] Available: http://www.epa.gov/EPA-PEST/1997/January/Day-09/pr-948.html. [2008, August 17.]

U.S. Department of Agriculture, National Resources Conservation Service, 2008. Web soil survey. [Online.] Available: http://websoilsurvey.nrcs.usda.gov/. [2008, August 13.]

U.S. Environmental Protection Agency, Office of Pesticides and Toxic Substances, 2008. Pesticide fact sheet for copper (EPA-738-F-06-014). http://www.epa.gov/oppsrrd1/REDs/factsheets/copper_red_fs.pdf. [2008, August 15.] 5 pp.

U.S. Environmental Protection Agency, Office of Pesticides and Toxic Substances, 2006a. Reregistration eligibility decision (RED) for propiconazole. [Online.] Available: http://www.epa.gov/pesticides/reregistration/REDs/propiconazole_red.pdf. [2008, August 17.]

U.S. Environmental Protection Agency, Office of Pesticides and Toxic Substances, 2006b. Reregistration eligibility decision (RED) for triadimefon. [Online.] Available: http://www.epa.gov/oppsrrd1/REDs/triadimefon_red.pdf *last accessed* [2008, August 17.]

U.S. Environmental Protection Agency, Office of Pesticides and Toxic Substances, 2005a. Pesticide fact sheet for maneb (EPA-738-F-05-XX). http://www.epa.gov/oppsrrd1/REDs/factsheets/maneb_fact.pdf. [2008, August 15.] 4 pp.

U.S. Environmental Protection Agency, Office of Pesticides and Toxic Substances. 2005b. Pesticide fact sheet for Mancozeb (EPA-738-F-05-XX). [Online.] Available: http://www.epa.gov/oppsrrd1/REDs/factsheets/mancozeb_fact.pdf. [2008, August 15.] 6 pp.

U.S. Environmental Protection Agency, Office of Pesticides and Toxic Substances. 2004. Pesticide fact sheet for ziram (EPA-738-F-04-008). [Online.] Available: http://www.epa.gov/oppsrrd1/REDs/factsheets/ziram_red_fs.pdf. [2008, August 15.] 6 pp.

U.S. Environmental Protection Agency, Office of Pesticides and Toxic Substances, 1999a. Pesticide fact sheet for chlorothalonil (EPA-738-F-99-008). [Online.] Available: http://www.epa.gov/oppsrrd1/REDs/factsheets/0097fact.pdf. [2008, August 15.] 14 pp.

U.S. Environmental Protection Agency, Office of Pesticides and Toxic Substances, 1999b. Pesticide fact sheet for captan (EPA-738-F-99-015). [Online.] Available: http://www.epa.gov/oppsrrd1/REDs/factsheets/0120fact.pdf. [2008, August 15.] 7 pp.

U.S. Environmental Protection Agency, Office of Pesticides and Toxic Substances, 1999c. Pesticide fact sheet for trifloxystrobin. [Online.} Available: http://www.epa.gov/opprd001/factsheets/trifloxystrobin.pdf. [2008, August 15.] 12 pp.

U.S. Environmental Protection Agency, Office of Pesticides and Toxic Substances, 1997. Pesticide fact sheet for azoxystrobin. [Online.] Available: http://www.epa.gov/opprd001/factsheets/azoxystr.pdf. [2008, July 23.] 23 pp.

U.S. Environmental Protection Agency, Office of Pesticides and Toxic Substances, 1991. Triflumizole fact sheet: fact sheet number 228. [Online.] Available: http://pmep.cce.cornell.edu/profiles/fung-nemat/tcmtb-ziram/triflumizole/fung-prof-triflumizole.html. [2008, August 17.]

U.S. National Library of Medicine, 1999. Hazardous substances databank: elemental copper. [Online.] Available: http://toxnet.nlm.nih.gov/cgi-bin/sis/htmlgen?HSDB. [2008, August 15.]

White, J.A., 2004. Recommended protection measures for pesticide applications in region 2 of the U.S. Fish and Wildlife Service. U.S. Fish and Wildlife Service, Austin, TX. 203 pp.