



Regal Fritillary (*Speyeria Idalia*)

Landowner Guide

IDENTIFICATION

The regal fritillary butterfly (*Speyeria idalia*) has large orange and black wings. Once found throughout much of the United States, the species' range and abundance has been greatly reduced by habitat alteration, including loss of food plants and places to live and grow. Regal fritillary now occurs only in local colonies of rare grassland habitats in Pennsylvania and Virginia in the east, from southern Wisconsin west to Montana, and south to northeast Oklahoma in the west.

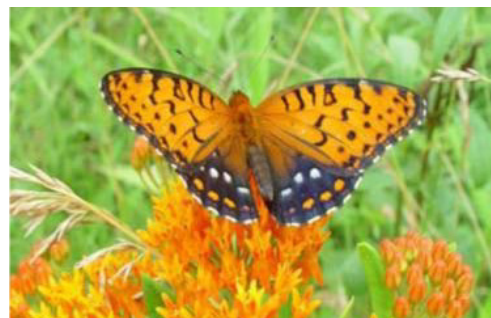


Photo courtesy of Penn State University

This species is considered critically imperiled in Pennsylvania. Although the species was once found throughout Pennsylvania, there has been a major decrease in population since 1980, putting it at a high risk of extinction. Today, there is only one known population at Fort Indiantown Gap (FTIG).

LIFE HISTORY

Regal fritillary butterflies have four life history stages: eggs, two larvae stages, and adults. Adult males emerge in late spring and females appear in early summer. The female does not lay eggs until fall, which allows the larvae to emerge in the spring when violet host plants are young.

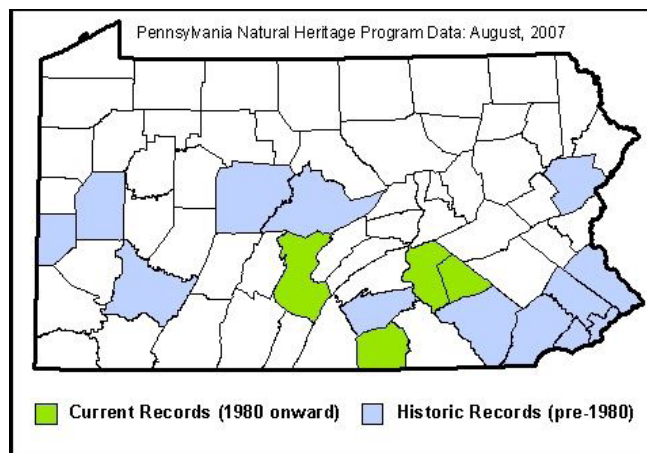
Female regal fritillary butterflies may lay more than 2,000 single eggs throughout their habitat on vegetation, dead leaves, and pebbles, but seldom on violets. The eggs hatch within three to four weeks.

Larvae seek a hibernation site quickly after hatching, which is often clumps of dried grass stems on the ground. Once the larvae burrow into the litter, they spend the winter there without feeding. After becoming active in the spring, they eat the leaves of young violets.

Finding a violet host plant is crucial for larvae because without one, they will die. They are also susceptible to disease and parasites, as well as direct and indirect mortality from fires that burn the vegetation where they are sheltered. Following the pupal stage of two to four weeks, the adults emerge.

HABITAT

Regal fritillary butterflies live in tall-grass prairies and other sunny and open locations such as damp meadows, marshes, wet fields, and mountain pastures that depend on periodic, natural disturbance. Regal fritillary butterflies depend on three main habitat components: violet hostplants for larvae, nectar plants for adults, and native warm-season bunch grasses that provide protective sites for all life stages. Adults are found in both upland prairies and wet prairies, which provide critical nectar sources under drought conditions.



A healthy population needs about 120 to 240 acres to sustain itself, though adults have been observed in smaller, remnant habitats. These butterflies may fly further than several miles, however they tend to remain within the bounds of the grassland where they emerged, especially if it is surrounded by trees, croplands, or roads.

Larval Hostplants

Violets are the only plant that regal fritillary larvae eat, though they also require warm-season grasses for cover. Butterflies have been observed on several types of violet. Healthy butterfly populations require a large number of violet plants for a sustainable ecosystem.



Photo courtesy of Joshua Mayer

Adult Nectar Plants

Adult regal fritillaries feed on nectar from various flowers such as milkweeds, native thistles, blazing stars, coneflowers, joe-pye weed, and ironweeds. Their use of nectar plants changes over time and they will leave an area if there are not enough nectar plants present when needed. If nectar is limited, butterflies may lay fewer eggs, or the eggs may not be fertile.

HABITAT RESTORATION RECOMMENDATIONS

Restoration Approaches

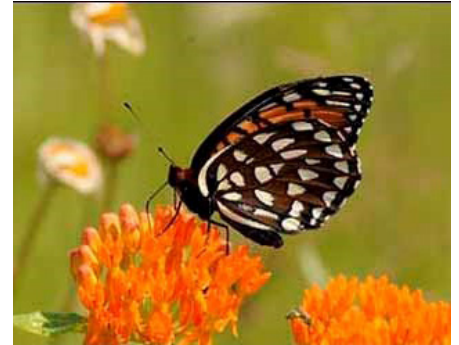
Objective – create prairie upland habitat with violets interspersed with wet meadow patches or swales using the target species identified above under a diverse disturbance regime (see Long-Term Maintenance section).

1) Crop Field Conversion

- Herbicide – One application to control weeds
- Prairie and Wet Meadow seed mixes - fall with cover crop or spring without
- Violet seeds (fall or spring in mix) or plugs (spring only)

2) Hayfield/Pasture Conversion (with interim crop)

- Herbicide – Fall and Spring applications to eliminate grasses and weeds
- Crops – Soybeans followed by winter cover crop or seed mix with cover crop
- Prairie and Wet Meadow seed mixes – fall with cover crop or spring without
- Violet seeds (fall or spring in mix) or plugs (spring only)



*Photo courtesy of Tom Cherry,
PA National Guard*

3) Warm season grass areas or swales lacking preferred forbs (spring only)

- Mowing
- Nectar plant plugs
- Violet plugs

LONG-TERM MAINTENANCE

1) Existing Habitat

- Evaluate the existing disturbance regime (e.g., burning, mowing, cattle grazing (little damage to violets), vehicular traffic). For populations less than 100 adults, existing disturbance activities may need to be revised. Where an existing population has been maintained without fire, do not introduce fire. If mowing is used, thatch must be removed to prevent smothering of violets.
- Management activities should be during the dormant season to avoid destroying eggs or larvae. Grass and nectar areas should be on a three to four-year disturbance cycle in uplands, while wet meadows may need disturbances every two to three years to limit woody species. Violets need disturbances every two to three years to prevent shading. Vehicle tracking, mowing, and light grazing are better for maintaining mixed habitats than

- burning because they can be used to improve violet areas without reducing grass and nectar plant cover.
- If adjacent to crops, implement an adequate buffer to prevent pesticide drift, including biocides.

2) Restored Habitat

- Conduct surveys and/or use citizen scientists to monitor butterfly occupancy.
- Use vehicle tracking, mowing, and light cattle grazing to maintain mosaics on divergent schedules. Avoid using sheep or goats as effects of these grazers on violets is unknown. If mowing is used, thatch must be removed to prevent smothering of violets.
- Perform activities during the dormant season when larvae are overwintering in the organic layer.
- Maintain violet areas without severely reducing grass and nectar plant cover.
- Maintain an adequate buffer to prevent effects from pesticide drift, including biocides.



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