Regal Fritillary Fact Sheet

at Fort Indiantown Gap National Guard Training Center

Identifying Characteristics

- The regal fritillary *(Speyeria idalia)* is a large, orange, and black butterfly
- Forewings variously spotted and marked with black, and the upper surfaces of the hind wings greatly darkened (blueblack in the larger female) and marked by two rows of large spots.
- The sexes; the outer row white in the female, orange in the male. It was once commonly found throughout the Northeast.
- It looks like a "Monarch Butterfly dipped in chocolate."

Reasons for Concern

- Grassland destruction/alteration and loss of food or places to live/grow during critical stages of its life cycle over the past 30 years has reduced its range and abundance. At one time it was found from Maine to Montana and south to Oklahoma and North Carolina. It occurs only in local colonies in Pennsylvania and Virginia as well as from southern Wisconsin west to Montana and south to northeast Oklahoma.
- This is the largest population of this species remaining east of Indiana, a second population occurs at Radford Army Ammunition Plant in Virginia. It is also the largest documented population on a single landholding in North America.
- 219 acres of Training Areas and Ranges have been set aside to conduct research on regal habitat. In addition over 75 acres of dispersal corridor (areas where butterflies can move to live) has been created. All regal-occupied habitat is on an active or inactive military range.

Habitat

- The regal fritillary requires open damp meadows, old fields or pastures with marshy or boggy patches which also support the violets, milkweeds, thistles and other nectar sources the butterfly requires.
- Habitat is created and maintained by repeated, frequent soil disturbance, patchy fires, and stewardship efforts that create diverse grassland dominated by native plants.
- Population is around 1,000 adults and has been secure since monitoring started in 1998.
- Survival and persistence in an area depends on three main habitat components
    - Larval host plants - at least 5,000 violets per acre
    - Adult nectar sources - approximately 150 blooming milkweeds and thistles per acre
    - Native warm season bunch grasses - little bluestem (*Schizachyrium scoparium*) and broomsedge *(Andropogon virginicus*) in the order of 30-75% of plant cover.
- Larval host plants - field violets that thrive in dry, grassy areas
    - The main violet species utilized as food is the arrow-leaved violet (*Viola sagittata*)
    - This violet species grows best on bare, low nutrient soils that exist due to light military training activities and both wildland and prescribed fires

        - Research shows violets increase 4-fold after tracked military vehicle activity and 8-fold after a fire for about 3-5 years after the disturbance (i.e., fire, vehicle activity).
- Adult nectar plant survival and abundance is also dependent on periodic disturbances as they are wind dispersed fluffy seeds that need bare soil to grow.
    - Common milkweed (*Asclepias syriaca*) and orange/butterfly milkweed (*A. tuberosa)*
    - Native thistles: pasture thistle (*Cirsium pumilum*) and field thistle (C. *discolor*)
    - Others include swamp milkweed, swamp thistle, wild bergamot. dogbane, Indian hemp, non-native thistles (Canada, musk/nodding, and bull), and exotic spotted knapweed
- Native Warm Season Grasses (grow best during hot, humid summer weather)
    - Little bluestem and broomsedge grasses dominate typical habitat
    - Ft. Indiantown Gap is the best example of warm season grass in Pennsylvania with respect to quality (PA-ecotype) and quantity. Regals use native bunch grasses for protection in all stages of the life cycle.

Current research and monitoring efforts

- Pollard Walk technique - survey routes walked every week during summer to assess abundance and distribution of adults for population comparison among years
- Larval, pupal, and violet plant consumption surveys - visual surveys for presence and occurrence
- Presence/Absence surveys - time-dependent searches for colonization monitoring
- Violet, nectar plant, and warm season grass abundance surveys - habitat and ecological monitoring to aid stewardship and land management activities
- Mark/Recapture (MR) surveys - researchers mark wings to perform population census
- Repatriation ("reintroduction") project at Gettysburg National Military Park and selected Pennsylvania State Parks funded by Legacy Program (Department of Defense) and the Wild Resource Conservation Program (PA DCNR)
- In 2006, Pennsylvania Chapter of The Nature Conservancy transferred the research and monitoring efforts to The Pennsylvania State University.

Management programs

- Controlled burn is the planned ignition/burning of plants under proper weather conditions in a controlled manner by properly trained and equipped personnel
    - Controlled burn has been used to restore regal fritillary habitat since 2004.
    - Fire decreases the amount of plant leaf litter/mulch and woody vegetation and creates bare soil necessary for the germination of violet, nectar, and native grass seeds; also may reduce pests and disease. Controlled fire is more efficient in reaching these goals than unplanned training incidents and prevents wildfires during critical points in the life cycle
        - On occasion, training related fires occur within regal research areas.
        - Large burns have occurred historically about once per decade based on tree ring data, while small, patchy fire appear to reoccur every 3-5+ years
    - All of these burns, controlled or wildland, provide us with the opportunity to conduct research and monitor fires effect on habitat (landscape) and wildlife.

- Other land stewardship activities
    - Mowing, selective herbicide application, and manual tree & brush removal to supplement fire in slowing native woody plant taking over (succession) and non-native plant invasion
    - Supplemental plantings of nectar species and violets have been used on post.
- Disturbance
    - Preventing disturbance by fire or military vehicles leads to the natural conversion of grasslands and meadows to shrubland or forest
    - Plant research plot data suggest that just removing woody vegetation maintains native grass abundance but violet and nectar plant densities decline.

Regal Fritillary Identification/Natural History:

Clockwise from upper left: regal larva in habitat three months after a 2004 spring controlled burn; regal pupa (quite possibly the only one photographed in the wild); male regal fritillary butterfly and female regal fritillary (two rows of white spots on hind wing).

- Adults may be found from late May to mid October, but most males are active between mid June and mid July, and females between early July and mid-August.
- Flight each day is low and steady, after an early morning period of "sunbathing."
- Both sexes imbibe nectar from various milkweeds and thistles.

- Females deposit eggs primarily in late summer on various plants as they walk through vegetation close to the ground.
- Eggs hatch in the fall, and the young larvae (caterpillars) over winter. Growth is rapid during the following spring and early summer as the larvae feed at night, only on various violets. The mature larva is velvet black with yellowish or orange mottlings and six rows of barbed spines, which are silver with black tips along the back, and yellow-orange at the base along the sides.
- When mature, the larva pupates and completes its development to the adult stage within a chrysalis with a brown and yellow abdomen and pink-brown wing cases, both spotted with scattered dark brown patches.