

Colorado Insect of Interest

Narcissus Bulb Fly

Scientific Name: *Merodon equestris* (F.)

Order: Diptera (Flies, Gnats, Midges, Mosquitoes, etc.)

Family: Syrphidae (Flower and Bulb Flies)

Identification and Descriptive Features: The adult is a heavy-bodied fly that is a mimic of bumble bees and is usually seen resting on vegetation. They are hairy and variably colored with black, orange and yellow. Average length is about 12 mm (0.5 in).

Larvae are dirty white, although usually covered with dark soil. They are plump bodied maggots that lack a distinct head capsule. The larvae are found within the base of bulbs.

Distribution in Colorado: This insect becomes introduced into a new area with infested bulbs and then spreads slowly from these point introductions. Narcissus bulb fly likely could establish almost anywhere in the state, except perhaps at higher, cooler locations. However, its incidence is spotty and dependent on local introductions.

Life History and Habits: One generation is produced each year. Winter is spent as a full grown larva within a cavity excavated from the base of a host plant bulb. In early spring the larvae migrate from the plant, often exiting through the neck and pupate nearby in the soil, about an inch below the soil surface. The pupal stage lasts about one month.

Adults normally emerge in late April or early May and are present through June. The adults are normally observed resting on foliage but may visit flowers for nectar. Individual adults normally live about 2 ½ weeks.

Periodically females move to host plants to lay eggs. A single egg is laid with each plant, placed in a soil crack near the base of the plant. As many as 100 eggs may be laid by a single female, during the course of her life. Upon hatch, about 8-10 after egg are laid, the larvae migrate into the soil and enters the bulb, usually at the basal plate.



Figures 1, 2. Narcissus bulb fly, adults. These flies are bumble bee mimics and show differences in patterning. Upper picture courtesy of Joseph Berger.



Figure 3. Full grown narcissus bulb fly larva in base of daffodil. The larva is the dark, brown object in the upper part of the picture. Damaged tissue and insect waste fill the center of this photo.



Figure 4. Narcissus bulb fly larva washed to show features..

effectively controlled narcissus bulb fly when applied as a drench at the base of plants during egg laying or surrounding the bulb at planting.

Attempts to control this insect with existing products labeled for use on ornamentals/flowers might consider targeting the points when/where eggs are laid or attempt to control larvae. Many of the persisting pyrethroid insecticides (e.g., permethrin, bifenthrin, deltamethrin, cyfluthrin, cyhalothrin) likely would kill newly hatched larvae they contact. Sprays of these products would be targeted just to the area at the base of the plant; the soil cracks/crevices around the base of the plant where eggs are laid and later the newly hatched larvae use to travel to the bulb. Repeat applications would likely be needed since these insecticides cannot be expected to persist for more than a week, and egg laying occurs over several weeks. (Note: Pyrethroids do not move in soil and are useful only as surface treatments.) Insect parasitic nematodes, particularly *Steinernema feltiae*, applied as a drench at the base of the plant during the period when egg hatch is likely to occur (May-mid June), might be effective in killing larvae as it works on other fly larvae in soil (e.g., fungus gnats), although this has not been tested.

Throughout summer the larvae continue to feed and grow, largely consuming the base of the bulb during this period. Additional damage is done by various rotting organisms that develop in the wounded areas. Bulbs are severely damaged, often destroyed by infestations of this insect.

Narcissus (narcissus, daffodils) is particularly badly damaged by narcissus bulb fly. However they may also damage other bulbs including hyacinth, certain lilies, and amaryllis.

Associated Species: The “lesser bulb flies”, *Eumerus strigatus* and *E. tuberculatus*, are smaller species of bulb flies (Diptera: Syrphidae) associated with several bulb crops, including *Allium*. They are considered to be secondary pests of lesser importance, being attracted to plants that have preexisting damage from decay. However, the tunneling of the larvae through these plants can completely destroy affected bulbs.

Management of Narcissus Bulb Fly: No recent published research appears to have been done on the management of this insect. Formerly several insecticides were used, all of which are now removed from the market. These insecticides