

Rodent and Rabbit Bot Flies

Scientific Name: *Cuterebra* spp.

Order: Diptera (True Flies)

Family: Oestridae (Bot and Warble Flies)

Identification and Descriptive Features: Adults are large (20 mm+), stout-bodied dark flies that have some superficial resemblance to bumble bees. Larvae are oval-bodied grubs with many spines that may encircle the body. Overall color is grayish-white in younger stages and reddish brown as they get older. Fully grown larvae will measure from 15 to 42 mm in length to 7 to 10 mm in width.

Distribution in Colorado: Rodent and rabbit bots are probably found where ever their mammal hosts occur (Table 1).

Life History and Habits: Rodent and rabbit bot flies develop as parasites of mammals. Adult flies lay their eggs near the entrance of rabbit or rodent burrows or runways and other sites frequented by their animal hosts. The eggs hatch in response to the warmth of a potential host and the maggots enter natural openings, such as the nose or mouth. Initial development usually occurs at these areas but later migrate. Ultimately they settle under the skin in sites typical of the species (neck, abdomen) and as they grow they appear as large swellings known as warbles.



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Figure 2. A rodent bot pupa following emergence from its host. Photograph by Jim Kalisch, University of Nebraska.



Figure 1. *Cuterebra fontinella*, a bot fly associated with deer mice. Photograph courtesy Sturgis MacKeever/IPM Images.

Larval development within the host animal typically takes 3-5 weeks in small rodents and about two months in jackrabbits. When full-grown they exit the animal and burrow into the soil where they pupate within 24 hours. (Pupae are black with spines.) If temperatures allow, pupation may only take about a month, allowing a second generation to be produced. Often, pupation requires a considerably longer period and is the life stage in which bot flies survive winter.

Adults emerge in morning. Males usually perch on vegetation where they can get a good range of vision and pursue passing females for mating. Mating occurs in flight and adults live only about two weeks.

Despite their enormous relative size, larvae of bot flies rarely kill their host animal. However, their effects are debilitating and can make them more susceptible to predation and other causes of natural mortality. Parasitism of younger animals is particularly injurious.



Figure 3. Three rodent and rabbit bot flies that occur in Colorado: *Cuterebra lepusculi* (top), *C. tenebrosa* (middle), and *C. approximata* (bottom).

Rarely, aberrant host animals are parasitized by rodents. Most common are dogs and cats, likely as they examine the nests of animals where bot fly eggs have been laid. There are a few known cases where humans have also been incidentally parasitized. Treatment for bot fly infestation usually involves incisions to remove the insect and full recovery is normal.

Related Species: Bot flies in the genus *Cephenemyia* are also native to Colorado and develop as parasites of deer and elk. Three species are recorded from the state (Table 1).

In addition there are some bot flies associated with domestic animals that have been introduced into North America and have been reported from Colorado. These include the sheep bot fly, *Oestrus ovis* L., horse bot fly (*Gasterophilus intestinalis* (De Geer), throat bot fly, *G. nasalis* (F.), northern cattle grub, *Hypoderma bovis* (L.), and common cattle grub, *H. lineatum* (Villers). These introduced species are now very rare due to the widespread use of anti-parasite treatments such as ivermectin in livestock.

Human Myiasis Involving Bot Flies: Human infestation by rodent bot flies has been reported in the medical literature but is extremely rare. Humans are incidentally infested in the same manner as are other aberrant hosts (e.g., dogs, cats) that contact newly laid eggs.

The most widespread involvement of bot flies with humans occurs in tropical areas of South

and Central America where the human bot fly, *Dermatobia hominis* (Linnaeus Jr.), is present. This insect develops in a wide range of hosts including cattle and primates. Visitors to such areas as Ecuador and Panama sometimes acquire this parasite, which similarly develops under the skin. Most infestations merely involve temporary discomfort without complications. Bot flies can be removed easily by medical treatments.

Table 1. Bot flies known from Colorado. Species that are most common are indicated with an asterisk (*).

Species (Common Name)	Host Mammals
* <i>Cephenemyia jellisoni</i> Townsend	Deer (<i>Odocoileus</i>), elk (<i>Cervus</i>), moose (<i>Alces</i>)
<i>Cephenemyia phobifer</i> (Clark)	Deer (<i>Odocoileus</i>), moose (<i>Alces</i>)
<i>Cephenemyia pratti</i> Hunter	Deer (<i>Odocoileus</i>)
<i>Oestrus ovis</i> L. (sheep bot fly)	Sheep (<i>Ovis</i>)
<i>Gastrophilus intestinalis</i> (De Geer) (horse bot fly)	Horses (<i>Equus</i>)
<i>Gastrophilus nasalis</i> L (throat bot fly)	Horses (<i>Equus</i>)
<i>Hypoderma bovis</i> (L.) (northern cattle grub)	Cattle (<i>Bos</i>)
<i>Hypoderma lineatum</i> (Villers) (common cattle grub)	Cattle (<i>Bos</i>)
<i>Cuterebra americana</i> (F.)	Woodrats (<i>Neotoma</i>)
* <i>Cuterebra approximata</i> Walker	Deer mice (<i>Peromyscus</i>)
<i>Cuterebra atrax</i> Clark	Unknown
<i>Cuterebra austeni</i> Sabrosky	Woodrats (<i>Neotoma</i>)
<i>Cuterebra fasciata</i> Swevic	Unknown
<i>Cuterebra fontinella fontinella</i> Clark	Deer mice (<i>Peromyscus</i>)
* <i>Cuterebra jellisoni</i> Curran	Cottontails (<i>Sylvilagus</i>), jackrabbits (<i>Lepus</i>)
<i>Cuterebra lepusculi</i> Townsend	Cottontails (<i>Sylvilagus</i>), jackrabbits (<i>Lepus</i>)
<i>Cuterebra neomexicana</i> Sabrosky	Deer mice (<i>Peromyscus</i>)
<i>Cuterebra polita</i> Coquillett	Woodrats (<i>Neotoma</i>)
<i>Cuterebra ruficrus ruficrus</i> (Austen)	Jackrabbits (<i>Lepus</i>)
* <i>Cuterebra tenebrosa</i> Coquillett	Woodrats (<i>Neotoma</i>)