

Bumble Bees

Scientific Name: *Bombus* species

Order: Hymenoptera (Bees, Wasps, Ants, Sawflies and Relatives)

Family/Subfamily: Apidae/Bombinae (Bees/Bumble Bees)

Identification and Descriptive Features:

Bumble bees are large, heavy-bodied and quite fuzzy bees. Although most North American species of bumble bees are black and yellow, orange markings occur on several species found in Colorado. The most common species in much of the state, *Bombus huntii*, has a large band of orange on its abdomen and most of the species that are restricted to higher elevations of the state have some orange markings. The largest species in the state, *B. morrisoni* and *B. nevadensis*, are primarily yellow. Size among all species varies considerably with production of large queens and some quite small workers.



Figure 2. Bumble bee (top) compared to a honey bee (bottom).

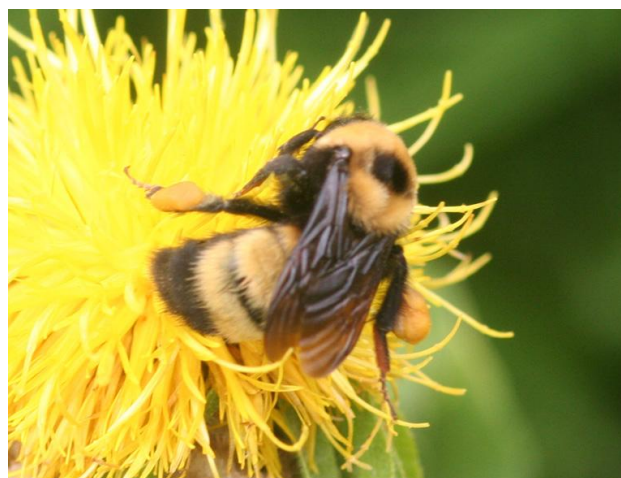


Figure 1. Foraging bumble bee with filled pollen baskets on hind legs.

Distribution in Colorado: At least one of the 23 species of bumble bees (Table 1) present in Colorado can be found any where in the state. Among those that have the widest range within Colorado are *Bombus huntii*, *B. appositus*, *B. morrisoni*, and *B. nevadensis*. Several are found primarily at higher elevations, including *Bombus balteatus*, *B. bifarius*, *B. centralis*, *B. melanopygus*, *B. rufocinctus*, *B. sylvicola*.

Life History and Habits: Bumble bees are social insects that establish colonies which last through a growing season. Colonies are initiated in spring by an overwintered and previously fertilized female, known as the queen. As the colony develops and expands it may ultimately be populated over 100 individuals that are organized into different castes. Dominating are infertile females, known as workers. By midsummer

some males are usually produced along with some large females, which will serve as potential queens of the following season. The original queen, along with all workers and males perish at the end of the year.



Figure 3. Interior of a bumble bee nest showing wax cells, many of which are capped and contain pupae. The species is *Bombus vagans*, not present in Colorado. Photograph courtesy of the Ken Gray Collection, Oregon State University.

Bumble bee colonies are established in cavities, usually with some sort of insulating material present. Abandoned rodent burrows and bird nests are common sites for nest construction. They have sometimes been observed to nest among stuffing of old couches, in insulation inside the body of long unused cars, and similar sites that provide the protection and space they seek.

Within the colony, rearing and food storage occurs in roundish wax pots that are spread throughout the nest space. The wax produced from abdominal glands by the bees and the jug-like cells are often being reformed to meet colony needs. Eggs are laid in these wax pots

and the larvae develop within them, being fed and tended by adult bees. When full-grown the larvae cap over the rearing cell with silk and pupate, later emerging as a winged adult.

Nectar and pollen serve as the foods that sustain the bumble bee colony and forager bees collect the pollen on the hind legs, in specialized pollen baskets, similar to honey bees and digger bees (Family Apidae). Excess food will be stored for later use but bumble bees do not produce large amounts of honey (processed nectar) and ultimately use all food that is collected.

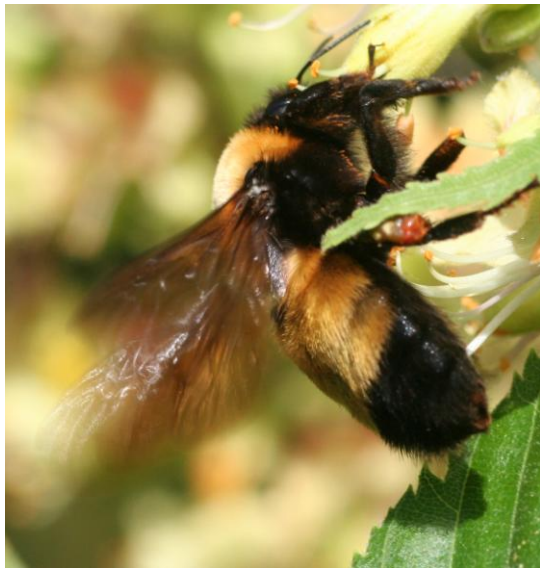


Figure 4. Overwintered queen of *Bombus morrisoni*.

As the colony develops through the season several changes in the colony occur. Originally there is a single queen that is charged with all colony functions - from nest construction to food collection as well as rearing. Subsequently the first workers produced tend to be rather small because of poor diet, and size contrasts markedly from the queen. However, as the workers assist with and take over most colony functions the larvae are increasingly well fed and subsequently develop into larger workers.

The colonies are usually sufficiently well established by midsummer that some males are produced along with some large and potentially fertile females, potential queens. Males spend most of the time outside the colony in roosts established at prominent points. Virgin fertile females that pass are pursued by the males for mating. Male bumble bees can be distinguished from the females by having substantially larger eyes; they also lack a stinger.

Bumble bee females can sting and workers will readily defend a colony if it is disturbed. The sting is quite painful but, unlike honey bee workers, bumble bee stingers do not detach and they are capable of repeated stings.



Figure 5. Size range of *Bombus huntii*. An overwintered queen is on the left.

Among the plants that are dependent on buzz-pollination are many plants in the nightshade family (Solanaceae). As a result, bumble bees are used widely in pollination of greenhouse-grown tomatoes and peppers, which are produced commercially in several areas of Colorado.

Cuckoo Bumble Bees: Among the native Colorado species are three cuckoo bumble bees (subgenus *Psithyrus*). Queens of cuckoo bumble bees enter and displace the queen of existing colonies and the workers then rear the young of the invader. The cuckoo bumble bees are usually distinguished from other bumble bee species by having an abdomen that is less hairy. The most common species, *Bombus (Psithyrus) insularis* Smith, is also one of the lighter colored species.

Bumble bees are very important in providing pollination services to many plants. They have a different approach to pollen collection than do honey bees and most other bees, known as “buzz pollination.” When visiting a flower a bumble bee will often grasp it with its mandibles and vibrate, causing the pollen to be shaken out onto its body. Such pollination style is critical for many native plants which are dependent on bumble bees for pollination and subsequent seed production.



Figure 6. A commercial bumble bee hive used in pollination of greenhouse-grown tomatoes.

Table 1. A checklist of bumble bee species (*Bombus*) present in Colorado, arranged by subgenera (in parentheses). Notes on distribution provided by Virginia Scott, University of Colorado.

(*Aplinobombus*)

balteatus - high elevation over 10,000 ft

(*Bombias*)

auricomis (sometimes considered a subspecies of *nevadensis*) - Eastern CO

nevadensis nevadensis - Our biggest species. Found throughout most of the state roughly 5000-8000 ft

(*Bombus* s.str.)

occidentalis – formerly common from the Front Range west. Decreased populations of this species have been noted in several western states

(*Cullumanobombus*)

fraternus - Front Range and eastern Colorado up to about 6500 ft

riseocollis - across state at lower elevations (<6000 ft)

morrisoni - across state at lower elevations (<6500 ft)

ufocinctus – Front Range-west below about 8000 ft

(*Psithyrus*)

fernalde - about 7000-8500 ft

insularis - across state (4500-11,000 ft)

suckleyi - mountains (6500-10,000 ft)

(*Pyrobombus*)

bifarius - mountains (7500-10,000 ft)

centralis - mountains (7000-9000 ft)

flavifrons - mountain (8500 - >12,000 ft)

frigidus - over 10,000 ft

huntii - across state 5000-7000 ft, not along eastern edge of state

sylvicola - mountains over 10,000 ft

melanopygus - mountains roughly 9500-12,000 ft

mixtus - mountains roughly 9000-11,000 ft

(*Subterraneobombus*)

appositus - across state between (roughly) 7500-10,000ft

(*Thoracobombus*)

californicus (sometimes considered a subspecies of *fervidus*) - 7500-10,000 ft

fervidus fervidus - lower elevation 5000-8000 ft

pensylvanicus - lower elevations, mostly eastern plains up to 6000 ft; valid Moffat and Delta county records
