CAES
The Connecticut Agricultural Experiment Station
Putting Science to Work for Society since 1875

Tracy Zarrillo
Department of Entomology
The Connecticut Agricultural Experiment Station
123 Huntington Street
New Haven, CT 06511
Phone: (203) 974-8473
Email: Tracy.Zarrillo@ct.gov
Website: https://portal.ct.gov/caes

The Connecticut Bumble Bee Guide

Please report sightings of rare and state-listed bumble bees to the author (tracy.zarrillo@ct.gov) and the Connecticut Department of Energy and Environmental Protection: Laura Saucier (laura.saucier@ct.gov) and Karen Zyko (karen.zyko@ct.gov)

What to do if you think you see a rare or state-listed bumble bee:

- Take photos! Ideally, it would be great to have three photos – one looking down on the bee (dorsal), one from the side (lateral), and one frontal to capture the face. Take as many photos as possible (easiest to do while the bee is gathering pollen or taking a sip of nectar). Crop photo as needed.
- Upload your photos to i-Naturalist https://www.inaturalist.org/ Experts across the globe will help identify the bumble bee for you.

Pollinators play a critical role in natural and agricultural ecosystems, both for the reproduction of native plants and for crop production. Animal pollinators (mainly bees and other insects) are essential to the fruit set or seed production of about 2/3 of human crop plants. Bees are the most important pollinators of many crops and a broad range of other flowering plants. The decline of several species of wild bumble bees in the United States, Canada, Europe, South America, and China is well documented and cause for concern. Pathogens, parasites, disease and pesticides play a role in bumble bee decline, and there is evidence to support the theory that pathogen spillover from commercially raised bumble bees has caused the decline of four sister species of *Bombus* in the same subgenus. Two of those species, the rusty-patched bumble bee (*Bombus affinis*) and yellow-banded bumble bee (*Bombus terricola*), used to be common in Connecticut. Today *Bombus affinis* is listed as a species of special concern (likely extirpated) in our state, and *Bombus terricola* is listed as threatened. Their social parasite, *Bombus ashtoni*, is also listed as being a species of special concern (likely extirpated). There have been 16 species of *Bombus* recorded in Connecticut since the early 1900's. The table on the following page shows the scientific and common name of each species, as well as their lifestyle and habitat preference, status in Connecticut, and first and last year detected in the state up until 2025. The rest of this document details ways to differentiate these species in the field and under a dissecting microscope.

Table 1: Bumble Bee Species in Connecticut

Species	Common Name	First and Last Year Detected	Status in Connecticut	Lifestyle	Nest/Habitat Preference
Bombus affinis Cresson, 1863	Rusty-Patched Bumble Bee	1904 - 1997	Federally endangered, State listed as Special Concern	Social	Underground; close to or within woodlands, urban parks and gardens
Bombus ashtoni (Cresson, 1864)	Ashton's Cuckoo-Bumble Bee	1905 - 1992	State listed as Special Concern	Parasite	Parasitizes nests of *B. affinis* and *B. terricola*
Bombus auricomus (Robertson, 1903)	Black-and-gold Bumble Bee	1905 - 2021	Rare, 6 records	Social	Small, above ground; open farmland and fields, pollinator gardens
Bombus bimaculatus Cresson, 1863	Two-spotted Bumble Bee	1863 - 2025	Common	Social	Underground mostly; close to or within wooded areas, urban parks and gardens
Bombus borealis Kirby, 1837	Northern Amber Bumble Bee	1932 - 2010	Rare, 3 records	Social	Underground; close to or within wooded areas
Bombus citrinus (Smith, 1854)	Lemon Cuckoo-Bumble Bee	1904 - 2025	May be declining in CT	Parasite	Parasitizes nests of *B. bimaculatus, B. impatiens,* and *B. vagans*
Bombus flavidus appalachiensis Lhomme and Hines, 2021	Fernald's Cuckoo-Bumble bee	1911 - 2025	Northern, rare but may be increasing in CT and the northeast	Parasite	Parasitizes nests of *B. bimaculatus, B. impatiens,* and *B. vagans*
Bombus fervidus (Fabricius, 1798)	Golden Northern Bumble Bee	1881 - 2025	Localized	Social	Above ground; open grasslands, farmland, urban parks and gardens
Bombus griseocollis (De Geer, 1773)	Brown-belted Bumble Bee	1910 - 2025	Common	Social	Underground; wide variety of habitats

Species	Common Name	First and Last Year Detected	Status in Connecticut	Lifestyle	Nest/Habitat Preference
Bombus impatiens Cresson, 1863	Common Eastern Bumble Bee	1863 - 2025	Common, most abundant species	Social	Underground; wide variety of habitats
Bombus pensylvanicus (De Geer, 1773)	American Bumble Bee	1902 - 2006	Declining, historically common	Social	Mostly above ground; open farmland and fields
Bombus perplexus Cresson, 1863	Perplexing Bumble Bee	1863 - 2025	Common	Social	Underground; close to or within wooded areas, urban parks and gardens, wetlands
Bombus sandersoni Franklin, 1913	Sanderson's Bumble Bee	1905 - 2025	Northern, localized	Social	Underground; in or near wooded areas
Bombus ternarius Say, 1837	Tricolored Bumble Bee	1914 - 2024	Northern, may be declining in CT	Social	Mostly underground; close to or within woodlands, wetlands
Bombus terricola Kirby, 1837	Yellow-banded Bumble Bee	1904 - 2025	State Listed as Threatened	Social	Underground; close to or within woodlands and wetlands
Bombus vagans Smith, 1854	Mainland Half-black Bumble Bee	1904 - 2025	Common	Social	Mostly underground; wide variety of habitats

FIELD GUIDE TO SPECIES

Bombus impatiens

Female

1. **Malar space**: the space between the mid-point of attachment of mandible and very bottom of eye is clearly SHORTER than the width of mandible base
2. **Thorax hair color pattern**: YELLOW with DIFFUSED BLACK in the center
3. **Abdomen hair color pattern**: T1 YELLOW or OFF-WHITE; T2-T6 BLACK (although a few specimens show a FEW light colored hairs on T2; when in doubt, check the malar space)

Male

1. **Malar space:** VARIABLE**,** can be longer, shorter, or equal
2. **Abdomen hair color pattern:** T1 YELLOW or OFF-WHITE; T2-T7 BLACK (although a few specimens show a FEW light colored hairs on T2)

Can be confused with *Bombus bimaculatus*.

Look for:

-*B. bimaculatus* has a LONG malar space, while *B. impatiens* has a SHORT malar space

-*B. impatiens* is the only bumble bee in CT that has T1 yellow with T2-T6 black

Open Source iNaturalist

Bombus affinis

(Please report all sightings - see details on first page for how to report)

FEMALE

1. **Malar space:** the space between the mid-point of attachment of mandible and very bottom of eye is SHORTER or EQUAL to the width of base of mandible.
2. **Facial hair color:** all BLACK with no specimens showing yellow hairs
3. **Thorax hair color pattern:** scutum has YELLOW WITH A PATCH OF BLACK or NO HAIR in center
4. **Pleura hair color:** YELLOW
5. **Abdomen hair color pattern:** T1 YELLOW, T2 all YELLOW with patches of BROWN, RED, or ORANGE, light hairs extend to apical margin creating a distinct edge between T2 and T3; T3-T6 BLACK

MALE

1. **Malar space:** clearly and often very much SHORTER than width of mandible base
2. **Facial hair color:** hair above ocelli, around antennae, and on cheeks all BLACK, with only a FEW yellow hairs
3. **Abdomen hair color pattern:** T1-T2 yellow or yellow tinged with brown medially; T3-T7 all BLACK

Can be confused with *Bombus griseocollis, B. vagans, B. bimaculatus and B. impatiens*—see links below for details on how to distinguish these species

http://www.xerces.org/rusty-patched-bumble-bee/
http://www.xerces.org/wp-content/uploads/2009/02/affinis_pocketid.pdf

Open Source iNaturalist

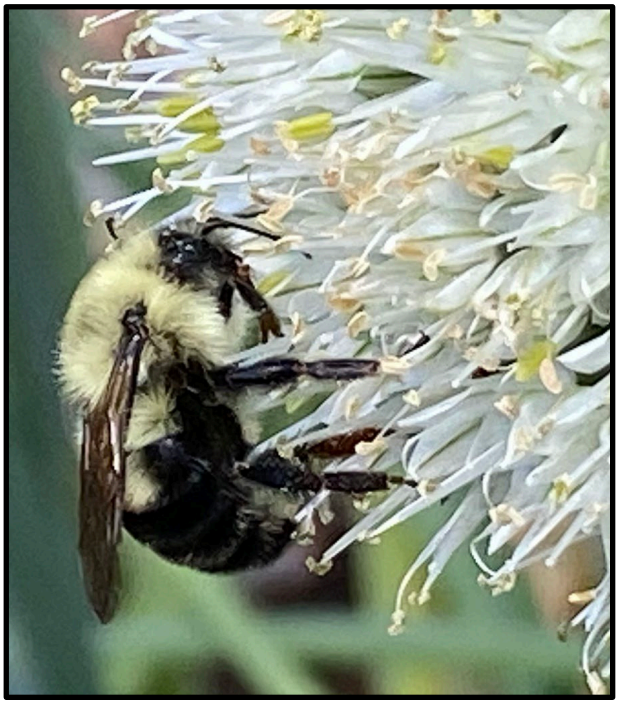
Bombus bimaculatus

FEMALE

1. **Malar space:** the space between the mid-point of attachment of mandible and very bottom of eye is clearly LONGER than width of mandible base
2. **Ocelli:** in line with top of compound eyes
3. **Vertex hair color:** yellow
4. **Thorax hair color pattern:** black hairs on scutum are largely restricted to the center, creating a small patch of black surrounded by yellow (interalar band ABSENT); hair length long
5. **Pleura hair color:** yellow
6. **Abdomen hair color pattern:** T1 YELLOW**,** T2 BLACK WITH YELLOW PATCH IN CENTER, (yellow patch usually does not reach the rim); T3-T6 BLACK
7. **T2 integument:** appears SHINY and reflective

MALE

1. **Malar space:** LONGER or EQUAL TO width of mandible base
2. **Facial hair color:** YELLOW hairs throughout
3. **Abdomen hair color pattern:** T1 YELLOW, T2 most often BLACK WITH YELLOW PATCH IN CENTER, but sometimes all yellow OR with mixed light and dark hairs, T3 usually all BLACK, but can be yellow with some black hairs intermixed (never pure yellow), T4-T7 all black or can have extensive amounts of yellow mixed in



Open Source iNaturalist

Females can be confused with *Bombus griseocollis* and *Bombus impatiens*.

Look for:

- The malar space is long in *B. bimaculatus*, and short in *B. griseocollis* and *B. impatiens*
- The integument under the hairs on T2 is dull on *B. griseocollis* and shiny on *B. bimaculatus*
-The ocelli are in line with the top of the compound eyes in *B. bimaculatus*, and slightly below the top of the compound eyes in *B. griseocollis*

Males can be confused with *Bombus perplexus*.

Look for:

-The hair on T3 is usually all black in *B. bimaculatus*, giving the appearance of a band, or yellow with black hairs intermixed; T3 in *B. perplexus* is always completely yellow with NO black hairs

Bombus griseocollis

FEMALE

1. **Malar space:** the space between the mid-point of attachment of mandible and very bottom of eye is clearly SHORTER than width of mandible base
2. **Ocelli:** upper edges slightly BELOW the imaginary line that crosses between the top of compound eyes
3. **Facial hair color:** ALL BLACK with insignificant amounts of light hair mixed in, however some specimens showing equal amounts of light and dark hairs mixed; vertex is mostly BLACK
4. **Thorax hair color:** yellow, with a DISTINCT CIRCULAR PATCH OF BLACK or no hair in center of scutum; hair is short, trim and dense
5. **Abdomen hair color pattern**: T1 YELLOW; T2 BROWNISH-RED or BURNT ORANGE which does NOT extend to apical margin; T3-T6 ALL BLACK
6. **T2 integument**: DULL and NON-REFLECTIVE

MALE

1. **Malar space:** SHORTER than width of mandible base
2. **Eyes:** compound EYES LARGE and bulging; ocelli clearly BELOW the imaginary line going across the tops of compound eyes
3. **Facial hair color:** mostly YELLOW with very few black hairs mixed in
4. **Thorax hair color:** rear half of scutum all YELLOW
5. **Abdomen hair color:** T2 BLACK with YELLOW/ORANGE/BROWN in the center of the segment, or yellow hairs along the front of the rim of the segment; T3-T7 ALL BLACK

Open Source iNaturalist

Females can be confused with *Bombus bimaculatus*.

Look for:

-Malar space is long in *B. bimaculatus* and short in *B. griseocollis*

-The integument under the hairs on T2 is dull on *B. griseocollis* and shiny on *B. bimaculatus*

-The ocelli are in line with the top of the compound eyes in *B. bimaculatus*, and slightly below the top of the compound eyes in *B. griseocollis*

Can also be confused with *Bombus affinis*—see links below for information on how to distinguish these species.

http://www.xerces.org/rusty-patched-bumble-bee/

http://www.xerces.org/wp-content/uploads/2009/02/affinis_pocketid.pdf

Bombus fervidus

FEMALE

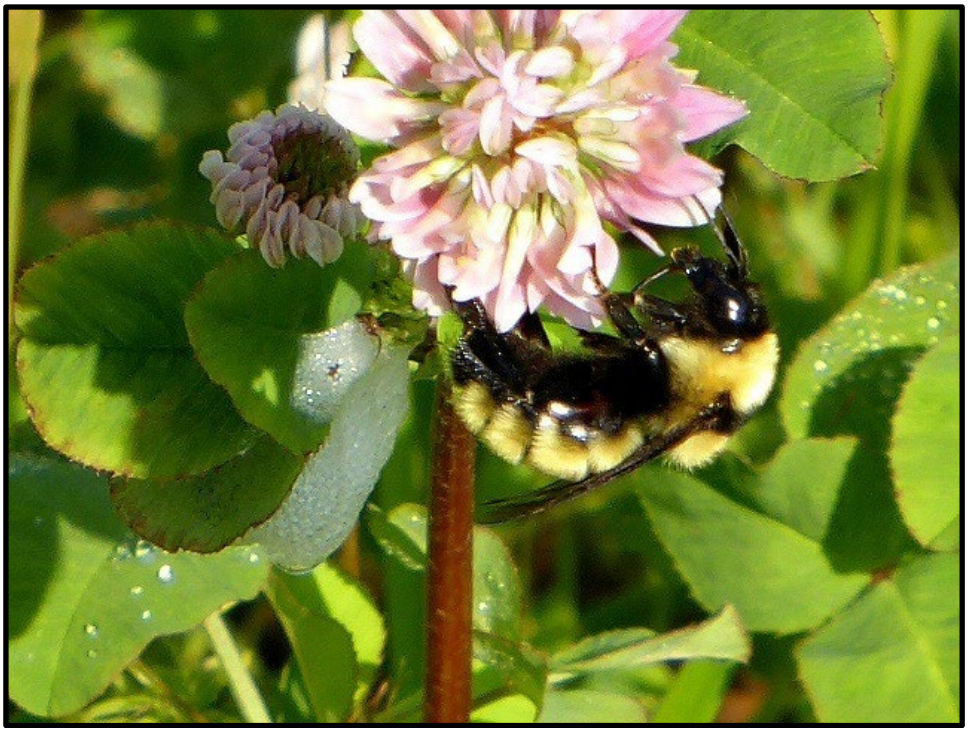
1. **Malar space**: the space between the mid-point of attachment of mandible and very bottom of eye is clearly LONGER than width of mandible base
2. **Facial hair color**: BLACK
3. **Pleura hair color**: mostly YELLOW, with darker hairs in lower 1/3
4. **Thorax hair color**: rear half of scutum has a DISTINCT BAND OF BLACK (interalar band)
5. **Abdomen hair color pattern**: T1-T4 uniformly YELLOW, T5-T6 BLACK

MALE

1. **Malar space:** longer than width of mandible base
2. **Facial hair color:** BLACK, with a few yellow hairs at most
3. **Pleura hair color:** YELLOW
4. **Thorax hair color:** black interalar band present
5. **Abdomen hair color:** T1-T5 uniformly YELLOW; T6 -T7 completely BLACK

Females can be confused with *Bombus borealis*.
Look for:
-*B. fervidus* has mostly yellow hairs on the pleura, with black hair on the face, while *B. borealis* has black hairs on the pleura, and pale hair on the face

Males can be confused with *Bombus pensylvanicus*.
Look for:
-*B. pensylvanicus* has black hairs on the pleura, while *B. fervidus* has yellow hairs; also, *B. pensylvanicus* has some orange hairs usually intermixed on T7



Open Source iNaturalist

Bombus borealis

(Please report all sightings - see details on first page for how to report)

FEMALE

1. **Malar space**: long
2. **Facial hair color**: predominately YELLOW
3. **Pleura hair color**: mostly BLACK
4. **Thorax hair color**: rear half of scutum has a DISTINCT BAND OF BLACK (interalar band)
5. **Abdomen hair color pattern**: T1-T4 uniformly TAWNY YELLOW; T5-T6 BLACK

MALE

1. **Facial hair color:** predominately YELLOW
2. **Pleura hair color:** BLACK
3. **Abdomen hair color pattern:** T1-T4 tawny YELLOW; T5-T6 BLACK basally with YELLOW apically; T7 ELONGATE and BLACK

Females can be confused with *Bombus fervidus*.

Look for:

-*B. fervidus* has mostly yellow hairs on the pleura and black hairs on the face, while *B. borealis* has black hairs on the pleura and pale hairs on the face

Open Source iNaturalist

Bombus terricola

(Please report all sightings - see details on first page for how to report)

FEMALE

1. **Malar space**: the space between the mid-point of attachment of mandible and very bottom of eye is clearly SHORTER than width of mandible base
2. **Facial hair color:** BLACK
3. **Thorax hair color**: lower 2/3 of scutum is BLACK, scutellum is BLACK
4. **Pleura hair color**: BLACK
5. **Abdomen hair color pattern**: T1 BLACK, T2-T3 YELLOW; T4 BLACK; T5-T6 BLACK with YELLOWISH BROWN fringe apically

MALE

1. **Malar space**: the space between the mid-point of attachment of mandible and very bottom of eye is clearly SHORTER than width of mandible base
2. **Thorax hair color**: lower 2/3 of scutum is BLACK, scutellum is BLACK
3. **Abdomen hair color pattern:** T2-T3 are YELLOW; T1, T5-T6 mostly BLACK, but T6-T7 can have yellow hairs apically and laterally

Can be confused with *B. auricomus* and *B. pensylvanicus*. See links below for details on how to distinguish these species.

http://www.xerces.org/yellow-banded-bumble-bee/

Open Source iNaturalist

Bombus perplexus

FEMALE

1. **Facial hair color:** color varies above antennae, with some specimens showing all light, all dark, or a mix of light and dark hair; vertex is LIGHT with insignificant amounts of dark hairs mixed in
2. **Malar space:** VARIABLE, from being distinctly short, roughly equal, or clearly longer than width of mandible
3. **Thorax hair color:** scutum and scutellum all YELLOW; interalar band ABSENT
4. **Pleura hair color:** upper area YELLOW, transitioning to BLACK hairs, though can look like a washed out grey or in some cases look completely yellow
5. **Abdomen hair color pattern:** T1-T2 completely covered with YELLOW hairs; T3-T4 are BLACK; apical end of T6 has a few light-colored long hairs along the edge

MALE

1. **Malar space:** space between bottom of eye and mid-point of attachment of mandible slightly LONGER than width of base of mandible
2. **Facial hair color:** vertex is YELLOW, facial hair in general has copious amounts of YELLOW
3. **Thorax hair color:** scutum is ALL YELLOW, LONG and COPIUS
4. **Pleura hair color:** yellow
5. **Abdominal hair color pattern:** T1-T7 completely YELLOW, LONG and COPIUS

Females can be confused with *Bombus vagans*.

Look for:

-Black hairs on pleura of *B. perplexus* (although may be hard to distinguish on some specimens), and a completely yellow pleura on *B. vagans*

-*B. perplexus* also has light-colored long hairs at the apical end of T6, while *B. vagans* has dark colored long hairs at end of T6

Photo credit: Sam Droege

Males can be confused with *Bombus bimaculatus*.

Look for:

-Hair on T3 usually all black in *B. bimaculatus*, giving the appearance of a band, or yellow with black hairs intermixed; T3 in *B. perplexus* is always completely yellow with NO black hairs

Bombus vagans

FEMALE

1. **Malar space:** s pace between bottom of eye and mid-point of attachment to mandible LONGER than width of base of mandible, appearing "horsey"
2. **Facial hair color:** vertex has extensive amounts of YELLOW, apparently never all black
3. **Thorax hair color:** interalar band is ABSENT; the black hairs on the scutum are largely restricted to the center, creating only a small patch of black amidst a largely yellow-haired scutum
4. **Pleura hair color:** all YELLOW
5. **Abdomen hair color pattern:** T1-T2 YELLOW, T3-T6 Black; apical end of T6 has scattered DARK colored longer hairs along the edge

MALE

1. **Malar space:** space between bottom of eye and mid-point of attachment to mandible LONGER than width of base of mandible
2. **Facial hair color:** variable, can be all black, or with extensive amounts of yellow
3. **Thorax hair color:** rear half of scutum YELLOW, but can have some black hairs mixed in
4. **Abdomen hair color pattern:** T1-T2 YELLOW, T5-T7 all black or often with a few yellow hairs on the far sides

Males can be confused with *Bombus sandersoni.*

Look for:

-The length vs. width ratio of the 3rd antennal segment (F3): *B. vagans* F3 is 2x width, with all segments having a straight edge, while *B. sandersoni* F3 is 1.5x width with all segments having a curved edge.

Females can be confused with *B. sandersoni* and *B. perplexus*.

Look for:

-*B. vagans* has a longer malar space, yellow pleura and black T5. *B. perplexus* has a shorter malar space comparatively, and usually the pleura has at least some black or washed-out grey hairs (look closely). *B. sandersoni* has a shorter malar space, and sometimes T5 has yellow or white hairs. It is very tricky to separate *B. vagans* from *B. sandersoni* – expect some specimens to not resolve without the use of a reticule to measure the malar space ratio (Milam et al. 2020).

Open Source iNaturalist

Bombus citrinus

FEMALE- parasitic (pollen basket absent)

1. **Malar space:** space between bottom of eye and mid-point of attachment to mandible SHORTER or EQUAL TO width of base of mandible
2. **Facial hair color:** vertex YELLOW
3. **Thorax hair color:** all or nearly all YELLOW, limited black hairs can be present in the center
4. **Pleura hair color:** YELLOW, however, can become dark ventrally
5. **Abdomen hair color pattern:** T1-T2 black or light and dark hairs mixed, never completely yellow; T3-T5 BLACK or largely so

MALE

1. **Malar space:** space between bottom of eye and mid-point of attachment to mandible SHORTER than width of base of mandible
2. **Facial hair color:** BLACK with few yellow hairs at most
3. **Thorax hair color:** lower 2/3 scutum mostly BLACK, scutellum YELLOW with V-SHAPED patch of dark hair in center
4. **Pleura hair color:** hair on lower half YELLOW, can become dark ventrally
5. **Abdomen hair color pattern:** T1-T2 all yellow or dark and light hairs intermixed, T3 light and dark hairs intermixed or black with yellow laterally; T4-T7 completely black

Males can be confused with *Bombus flavidus*.

Look for:

-T4 in *B. citrinus* is BLACK, and T4 in *B. flavidus* is YELLOW

Open Source iNaturalist

Bombus flavidus

FEMALE – parasitic (pollen basket absent)

1. **Facial hair color:** vertex BLACK
2. **Pleura hair color:** YELLOW
3. **Abdomen hair color pattern:** T1 BLACK with lateral tufts of yellow; T4 predominantly YELLOW
4. S6 extends beyond T6, with tip of abdomen being recurved

MALE

1. **Malar space**: space between midpoint of attachment of mandible and bottom of eye compared to width of base of mandible LONG, with an occasional specimen being about equal in length
2. **Facial hair color:** vertex YELLOW
3. **Thorax hair color:** scutellum hair dark or yellow with a V-SHAPED patch of BLACK hair
4. **Pleura hair color:** YELLOW
5. **Abdomen hair color:** T2 mostly BLACK, T3 with BLACK hair on ANTERIOR MEDIAL area, T4 YELLOW, T7 YELLOW

Males can be confused with *Bombus citrinus*.

Look for:

-T4 in *B. citrinus* is BLACK, and T4 in *B. flavidus* is YELLOW

Open Source iNaturalist

Bombus pensylvanicus

(Please report all sightings to CT-DEEP (see details on first page for how to report)

FEMALE

1. **Malar space:** space between midpoint of attachment of mandible and bottom of eye LONGER or EQUAL TO width of base of mandible
2. **Facial hair color:** vertex BLACK
3. **Ocelli:** slightly below the imaginary line that runs between the tops of the compound eyes
4. **Thorax hair color:** scutellum usually all BLACK but can have short branched yellow hairs intermixed with the long black ones along the rim
5. **Pleura hair color:** BLACK
6. **Abdomen hair color pattern:** T1 mixed yellow and black hairs, usually with yellow at the rear edge, although exact patterns and amount varies; T2-T3 YELLOW, T4-T5 BLACK

MALE

1. **Malar space:** space between midpoint of attachment of mandible and bottom of eye LONGER or EQUAL TO width of base of mandible
2. **Thorax hair color:** interalar band present
3. **Pleura hair color:** broad upper part always with some regularly spaced long black hairs (on some individuals this can be extensive and the entire region can appear dark)
4. **Abdomen hair color:** T1-T4 YELLOW; T5 VARIES-yellow, black or mixed light and dark hairs; T6-T7 BLACK on disc, but fringed laterally and on T7 fringed apically with yellowish hairs

Can be confused with *B. auricomus* and *B. pensylvanicus*. See link below for details on how to distinguish these species.

http://www.xerces.org/yellow-banded-bumble-bee/

Open Source iNaturalist

Bombus sandersoni

FEMALE

1. **Malar space:** space between bottom of eye and mid-point of attachment of mandible EQUAL TO or slightly LONGER than width of base of mandible
2. **Facial hair color:** hair above ocelli BLACK with scattered YELLOW hairs
3. **Thorax hair color:** posterior half of the scutum BLACK, with yellow hairs bordering the junction with the scutellum and near the tegulae
4. **Pleura hair color:** YELLOW
5. **Abdomen hair color:** T1-T2 entirely YELLOW (though some individuals may show black hairs mixed in with the yellow in the middle of T2) ***Diagnostic is the presence of pale yellow to off-white hairs on T5 but this can vary from completely pale to completely black; usually there is at least a little yellow on the far sides, and at times there is yellow on the far sides of T4**

MALE

1. **Malar space:** space between bottom of eye and mid-point of attachment of mandible EQUAL to width of base of mandible
2. **Thorax hair color:** scutum YELLOW, with a few black hairs at most, black patch not wider than 1/3 interalar width
3. **Abdomen hair color pattern:** T1-T2 YELLOW, T5-T7 usually with completely BLACK hair, though yellow present in some specimens

Males can be confused with *Bombus vagans*.
Look for:
-the length vs. width ratio of the 3rd antennal segment (F3): *B. vagans* F3 is 2x width, with all segments having a straight edge, while *B. sandersoni* F3 is 1.5x width with all segments having a curved edge.

Females can be confused with *B. vagans* and *B. perplexus*.
Look for:
-*B. vagans* has a longer malar space, yellow pleura and black T5. *B. perplexus* has a shorter malar space comparatively, and usually the pleura has at least some black or washed-out grey hairs (look closely). *B. sandersoni* has a shorter malar space, and sometimes T5 has yellow or white hairs. It is very tricky to separate *B. vagans* from *B. sandersoni* – expect some specimens to not resolve without the use of a reticule to measure the malar space ratio (Milam et al. 2020)

Photo credit: Sam Droege

Bombus ternarius

FEMALE

1. **Malar space:** space between bottom of eye and mid-point of attachment to mandible SHORTER than width of base of mandible
2. **Facial hair color:** vertex predominantly BLACK
3. **Thorax hair color:** scutum hair color YELLOW in front of interalar band, scutellum hair color YELLOW with a DISTINCT TRIANGLE OF BLACK hair pointing toward the abdomen
4. **Abdomen hair color pattern:** T1 YELLOW, T2-3 RED/ORANGE, T5 BLACK

MALE

1. **Malar space:** space between bottom of eye and mid-point of attachment of mandible SHORTER than width of base of mandible
2. **Facial hair color:** predominately YELLOW
3. **Thorax hair color:** hair in front of interalar band completely yellow
4. **Abdomen hair color:** T1 YELLOW, T2-T3 RED, T5-T7 BLACK

Open Source iNaturalist

Bombus auricomus

(Please report all sightings - see details on first page for how to report)

FEMALE

1. **Facial hair color:** vertex YELLOW, can look like "eyebrows"
2. **Ocelli:** set well below the imaginary line that runs between the tops of the compound eyes
3. **Malar space:** space between bottom of eye and mid-point of attachment to mandible LONGER than width of base of mandible
4. **Thorax hair color:** interalar band present; scutellum usually lined along the rim with LONG YELLOW hairs intermixed with the usually long black ones
5. **Abdomen hair color pattern:** T1 BLACK but often with some yellow hairs at the sides; T2-T3 YELLOW; T4-T6 BLACK

MALE

1. **Compound eyes:** LARGE and BULGING, extending over at least half the frontal width of face at broadest point
2. **Ocelli:** set well below the imaginary line that runs between the tops of the compound eyes
3. **Malar space:** space between bottom of eye and mid-point of attachment to mandible SHORTER or EQUAL to width of base of mandible
4. **Thorax hair color:** scutum with black central spot, having YELLOW along the rear half of thorax
5. **Abdomen hair color pattern:** T1-T3 YELLOW; T4-T7 BLACK

Can be confused with *B. auricomus* and *B. pensylvanicus*. See link below for details on how to distinguish these species.

http://www.xerces.org/yellow-banded-bumble-bee/

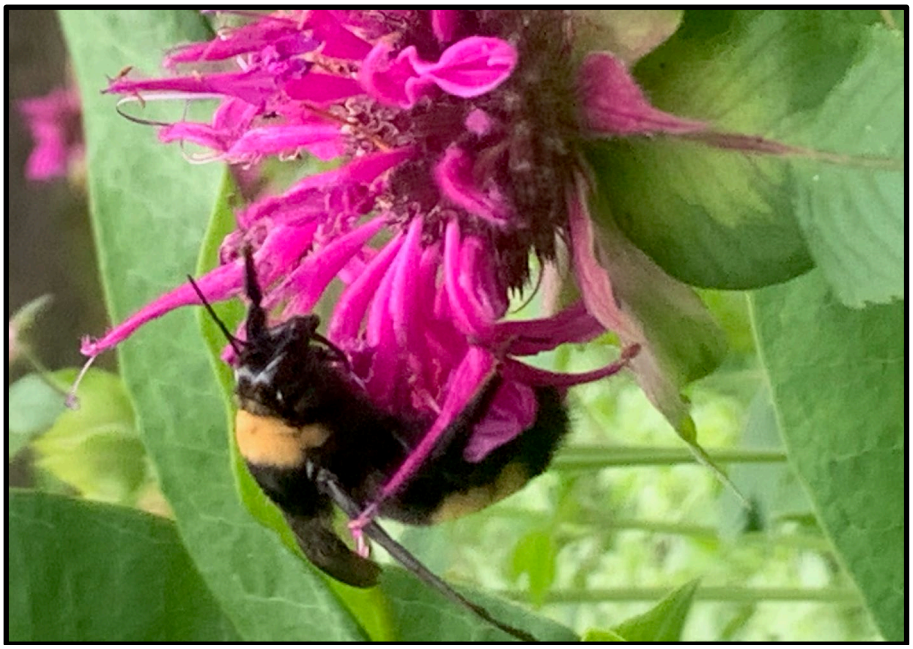


Photo credit: Monica Nichols

Bombus ashtoni

(Please report all sightings - see details on first page for how to report)

FEMALE – parasitic (pollen basket absent)

1. **Malar space:** space between bottom of eye and mid-point of attachment to mandible SHORTER or EQUAL to width of mandible base
2. **Facial hair color:** BLACK
3. **Pleura hair color:** all BLACK or with a small amount of yellow at the top (covering not more than ¼ of the segment)
4. **Abdomen hair color pattern:** T1-T2 all black or light/dark mixed; T3 variable; T4 completely PALLID YELLOW; T5 black or light/dark mixed

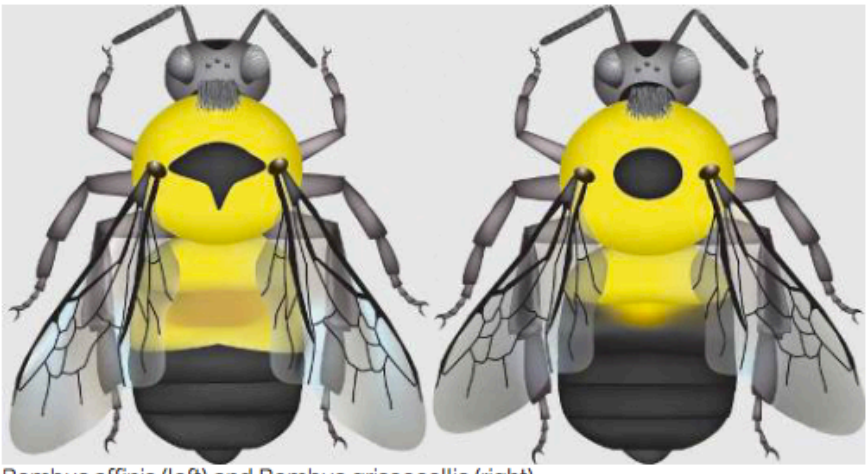
MALE

1. **Malar space:** space between bottom of eye and mid-point of attachment to mandible SHORTER or EQUAL to width of mandible base
2. **Facial hair color:** BLACK
3. **Pleura hair color:** lower half BLACK
4. **Abdomen hair color pattern:** T1 all yellow or light/dark mixed; T2-T3 variable; T4 all yellow or light/dark mixed; T5 variable

Photo credit: Sam Droege

Xerces Bumble bee guide illustrations by Elaine Evans (used with permission)

Distinguishing *B. affinis* from *B. griseocollis*

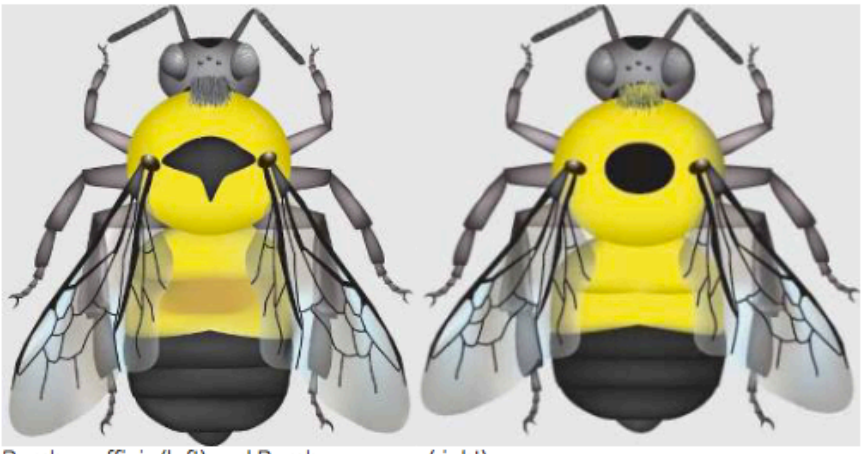


Bombus affinis (left) and Bombus griseocollis (right)

Bombus griseocollis can be distinguished from *B. affinis* by several key features. *B. affinis* have a stripe of black hairs that extends between the wings on the thorax. *B. griseocollis* have a central bare black spot with only a few black hairs at the edges of this spot. The hair on the thorax of *B. griseocollis* workers is predominately yellow. *B. affinis* have yellow hairs extending to the lateral margins of the second abdominal segment. *B. griseocollis* have black hairs along the sides of the second abdominal segment. *B. griseocollis* does have a rusty brownish patch in the middle of its second abdominal segment but this patch is flanked by black hairs along the rear and the sides of the segment.

Male *B. griseocollis* are easily distinguished from *B. affinis* by their large eyes and a prominent patch of dense yellow hairs on the front of their faces.

Distinguishing *B. affinis* from *B. vagans*



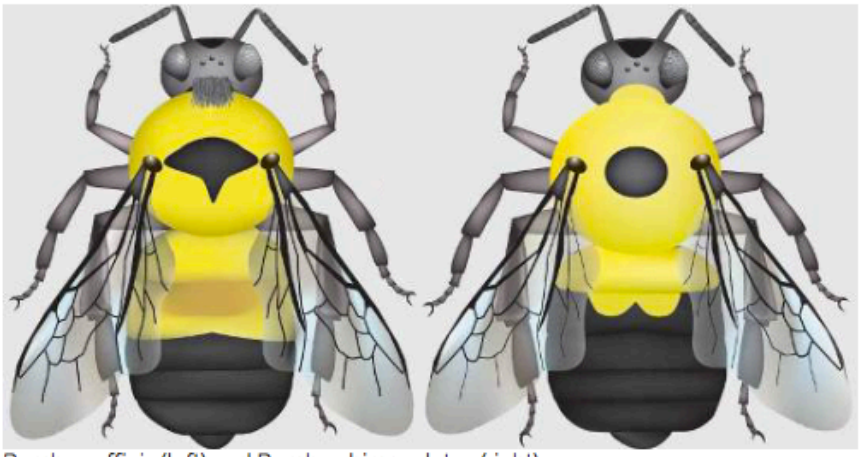
Bombus affinis (left) and Bombus vagans (right)

B. vagans have a longer face than *B. affinis*. *B. vagans* workers and queens have yellow hair on the first two abdominal segments and black on the rest of the abdominal segments. There is no rusty patch on their abdomen. *B. vagans* have a patch of yellow hair the top of their heads in contrast with *B. affinis* patch of black hairs.

In addition to the lack of the rusty patch, male *B. vagans* can be distinguished from *B. affinis* by yellow hairs along the margins of their abdominal segments and some yellow hairs mixed in among the black hair of the more apical abdominal segments.

Xerces Bumble bee guide illustrations by Elaine Evans (used with permission)

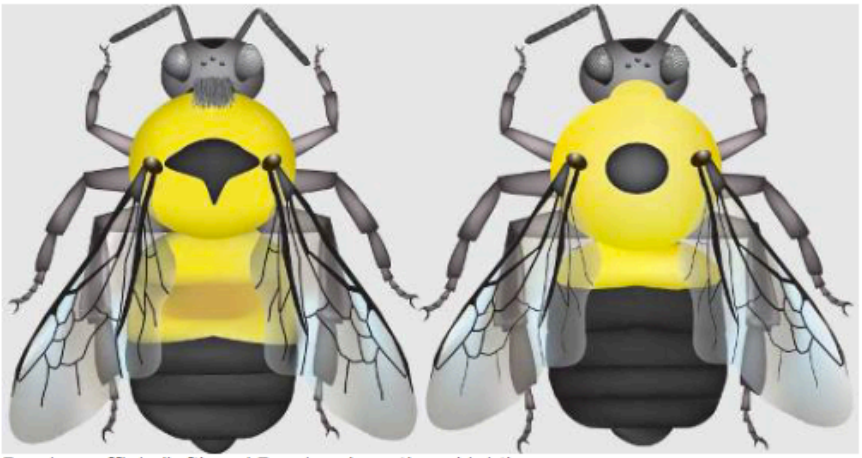
Distinguishing *B. affinis* from *B. bimaculatus*



Bombus affinis (left) and Bombus bimaculatus (right)

B. bimaculatus have longer faces than *B. affinis*. *B. bimaculatus* queens, males, and workers have black along the sides of their second abdominal segment, whereas *B. affinis* have yellow hairs that extend to the sides. *B. bimaculatus* have yellow hairs in a central notched pattern on the second abdominal segment. Workers of *B. bimaculatus* also have a bare patch in the middle of the thorax surrounded by predominately yellow hair, as opposed to *B. affinis* with their patch of predominately black hair extending between the wing bases. Male *B. bimaculatus* have a prominent patch of yellow hair on the front of their face, as opposed to *B. affinis* with mostly black hair on the front of the face.

Distinguishing *B. affinis* from *B. impatiens*



Bombus affinis (left) and Bombus impatiens (right)

B. impatiens queens, workers, and males have yellow on only the first abdominal segment, with the rest of the segments black, whereas *B. affinis* have yellow on the first and second abdominal segments. Also, *B. impatiens* have a bare patch in the middle of the thorax surrounded by yellow hair, as opposed to *B. affinis* with their patch of black hair extending between the wing bases. Male *B. impatiens* have a prominent patch of yellow hair on the front of their face, as opposed to *B. affinis* with mostly black hair on the front of the face.

Xerces Bumble bee guide illustrations by Elaine Evans (used with permission)

Identifying *Bombus terricola*

Worker Queen

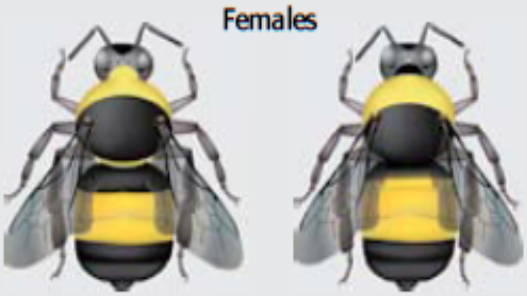
Workers and queens have yellow on the front of the thorax as well as on abdominal segments two and three. The head and other abdominal segments are black with the exception of a fringe of brownish yellow hair on the far edge of the fifth abdominal segment. Queens are similar to workers except they are larger in size. There is variation in coloration across its range.

Male

Male coloration is similar to females, except for patches of long pale yellow hair on the top of their heads and the front of their faces.

Similar bumble bees

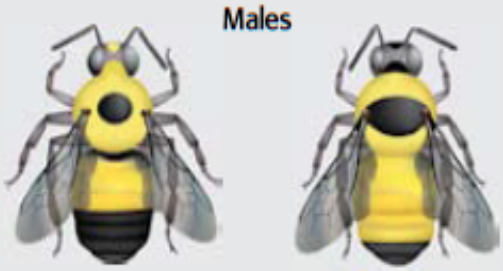
Females



Bombus auricomus *Bombus pensylvanicus*

B. auricomus have yellow hair on top of their head. *B. pensylvanicus* have yellow at the rear edge of their first abdominal segment. B. auricomus and *B. pensylvanicus* lack the fringe of brown hair on the fifth abdominal segment present on *B. terricola*.

Males



Bombus auricomus *Bombus pensylvanicus*

Male *B. auricomus* and *B. pensylvanicus* have yellow hair along the rear of the thorax while *B. terricola* males have black hair.

General Information

Bumble bees are social and live in colonies, but they have a very different life cycle than honey bees. A bumble bee colony only persists for a single season. In the spring as the weather warms, a queen bumble bee will come out of hibernation and begin to look for a suitable place to settle down and form a nest. The exact preferences for what makes a nest site suitable is not known, but we do know that certain species prefer different habitats and have preferences to nest either above or below ground. After a queen chooses a nest location, she begins the journey of colony formation. In the beginning, she alone must forage for sustenance and take care of all nest duties. This is a crucial period in colony success, and springtime forage availability is a limiting factor, as well as exposure to pesticides. Some important early season plants for queen bumble bees are listed in Table 2. The queen collects pollen and nectar from these plants and brings them back to her nest to deposit inside the waxy brood cells that she has made. After the cells contain enough provisions, she begins to lay eggs on the food stores inside the brood cells. These first workers hatch in four to five weeks and so begins the development of the colony. As the colony grows, the sister workers take over the tasks of feeding pollen to the young larvae, nest guarding and nest cleaning. Bumble bee workers prefer certain flowers, depending on their tongue length. Flowers for worker bees are listed in Table 3. At the end of the colony life cycle, males and new queens are produced. They mate, and the cycle continues, with the males eventually dying, and the new queens finding a quiet place to hibernate in the ground until the following spring.

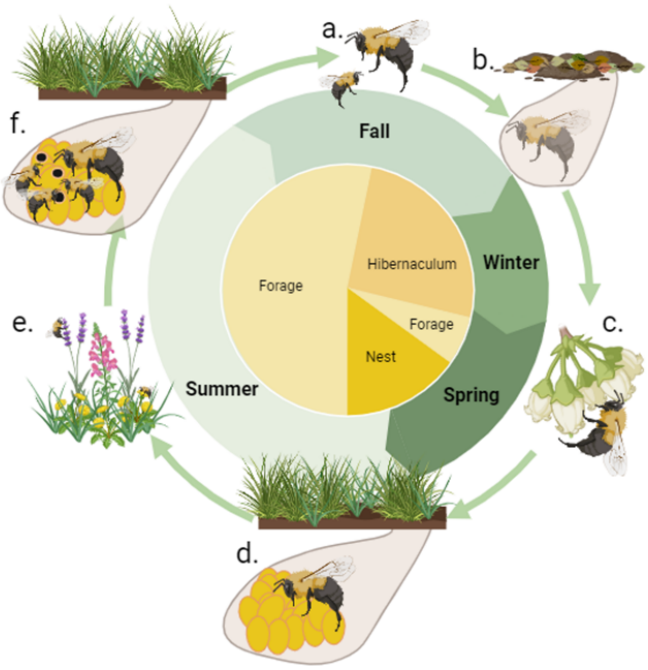


Fig 1. Bumblebee lifecycle. New queens and males emerge from bumblebee colonies; queens mate with males from other colonies (i.e., nuptial flight) (a). Queens overwinter individually in hibernacula (b). Queens emerge and forage for floral resources to support her colony (i.e., foraging flight) (c). Queen establishes her nest and starts to produce a brood of workers (d). Workers forage for floral resources to support their colony (e). Queen and workers tend the colony, ultimately producing a new queen and several males (f). Seasons are represented by the shaded green arrows and the limiting habitat types at a given part of the lifecycle are represented by the yellow pie chart..

But not all bumble bees live like this! Did you know that a few species of bumble bees are social parasites of other bumble bee species? It is not surprising to see the decline of a parasitic bumble bee species parallel a decline in its host species, for instance *Bombus ashtoni* is a social parasite of *Bombus affinis* and *Bombus terricola*. Parasitic bumble bees, also called cuckoo bumble bees, move into an established nest and kill the queen of its host species. She also kills many of the larvae of the host species and lays her own eggs in the nest. Host workers are fooled by chemical pheromones and feed the larvae of the parasitic species. At the end of their colony life cycle, cuckoo males and females mate, and the females overwinter like other bumble bees.

Table 2. Early Season Plants for Queen Bumble Bees
(Extracted from Couto. A. V. and A. L. Averill. A review on Bees, Northeast Crops Edition)

- Rhododenron (*Rhododendron* spp.)
- American pussy willow (*Salix discolor*)
- Dogwood (*Cornus* spp.)
- American holly (*Ilex opaca*)
- Black cherry (*Prunus serotina*)
- Winterberry (*Ilex verticillata*)
- Black Willow (*Salix nigra*)
- Beach plum (*Prunus maritima*)
- Beard Tongue (*Penstemon* spp.)
- Southern arrowwood (*Viburnum dentatum*)
- Swamp rose (*Rosa palustris*)
- Lowbush blueberry (*Vaccinium angustifolium*)
- Wild lupine (*Lupinus perennis*)

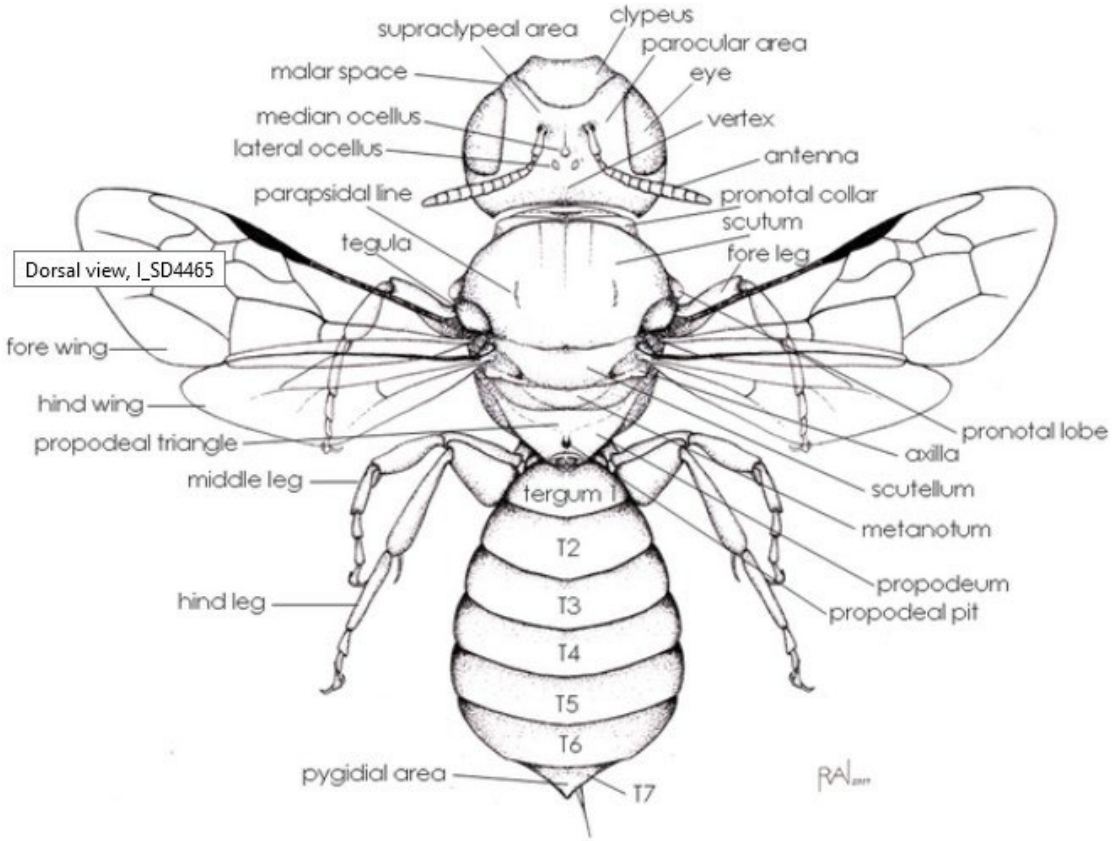
Table 3. Later Season Plants for Bumble Bee Workers
(Extracted from Couto. A. V. and A. L. Averill. A review on Bees, Northeast Crops Edition)

- Shrubby St. John's wort (*Hypericum prolificum*)
- White meadowsweet (*Spiraea alba*)
- Honeysuckle (*Lonicera* spp.)
- Threadleaf coreopsis (*Coreopsis verticillata*)
- Mountain laurel (*Kalmia latifolia*)
- Dewberry (*Rubus* spp.)
- Virginia rose (*Rosa virginiana*)
- Sweet pepperbush (*Clethra alnifolia*)
- Evening primrose (*Oenothera biennis*)
- Wild hydrangea (*Hydrangea arborescens*)
- Anise hyssop (*Agastache foeniculum*)
- Wild bergamot (*Monarda fistulosa*)
- Gayfeather (*Liatris spicata*)
- Jewelweed (*Impatiens capensis*)
- Joe-Pyeweed (*Eutrochium purpureum*)
- Gray goldenrod (*Solidago nemoralis*)
- Showy goldenrod (*Solidago speciosa*)
- Heath aster (*Symphyotrichum ericoides*)
- New England aster (*Symphyotrichum novae-angliae*)
- White clover (*Trifolium repens*)
- Red clover (*Trifolium pratense*)

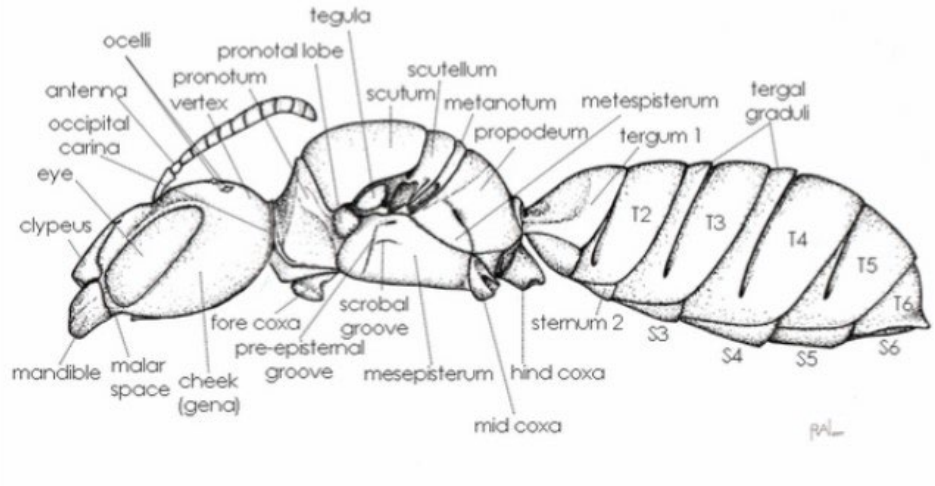
Basic Bee Anatomy

(images extracted from DiscoverLife.org, illustrations by Rebecca Andrus Nelson)

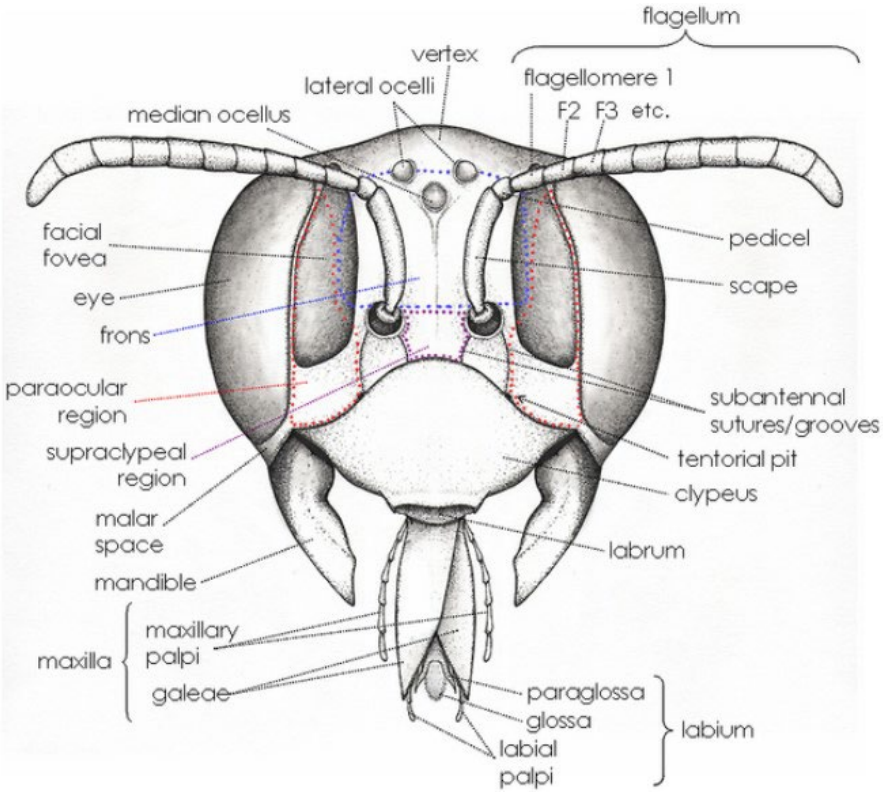
Dorsal View



Lateral view



Bee Face



For More Information, Visit the Pollinator Information Page on the CT Agricultural Experiment Station Website

https://portal.ct.gov/CAES/Publications/Publications/Pollinator-Information

Material reviewed by Sam Droege, USGS Eastern Ecological Science Center

Sources:

Bumble bees of Eastern United States, by Sheila Colla, Leif Richardson and Paul Williams http://www.fs.fed.us/wildflowers/pollinators/documents/BumbleBeeGuideEast2011.pdf

Couto. A. V. and A. L. Averill. A review on Bees, Northeast crops Edition. https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&ved=2ahUKEwj1nqDLoKTyAhVpFVkFHanZD98QFnoECAUQAw&url=https%3A%2F%2Fag.umass.edu%2Fsites%2Fag.umass.edu%2Ffiles%2Fpdf-doc-ppt%2F2-1-17_a_review_on_bees.pdf&usg=AOvVaw1BIAORn43gOFbDQQHDjWra
(Accessed 9 August 2021)

DiscoverLife Bumble Bee Guide https://www.discoverlife.org/mp/20q?guide=Bombus

Laverty T. M. and L. D. Harder. 1988. The Bumble Bees of Eastern Canada. The Canadian Entomologist, 120, pp 965-987. doi:10.4039/Ent120965-11.

Williams, P., R. Thorp, L. Richardson, and S. Colla. 2014. An identification Guide, Bumble Bees of North America. Princeton University Press.

Xerces Bumble Bee Identification http://www.xerces.org/bumble-bee-identification/ Illustrations by Elaine Evans.