

Michigan Bumble Bee Identification Reference Guide



Bombus auricomus, Black
and gold bumble bee



Bombus ternarius, Tri-
colored bumble bee



Bombus fervidus, Golden
northern bumble bee



Bombus pensylvanicus,
American bumble bee

Prepared By:
Summer Eckhardt and Logan Rowe
Michigan Natural Features Inventory
Michigan State University Extension
P.O. Box 30444
Lansing, MI 48909-7944

Contents

Introduction	2
Examples of good bumble bee photos for photo identification:	2
Anatomical Terms Used in this Guide:	3
Mostly Black Abdomen.....	4
Common Eastern Bumble Bee – <i>Bombus impatiens</i>	5
Two-spotted Bumble Bee – <i>Bombus bimaculatus</i>	6
Lemon Cuckoo Bumble Bee – <i>Bombus citrinus</i>	7
Confusing Bumble Bee – <i>Bombus perplexus</i>	8
Half-black Bumble Bee – <i>Bombus vagans</i>	9
Sanderson’s Bumble Bee – <i>Bombus sandersoni</i>	10
Comparing <i>B. vagans</i> and <i>B. sandersoni</i> workers.....	11
Mostly Yellow Abdomen.....	12
Northern Amber Bumble Bee – <i>Bombus borealis</i>	13
Golden Northern Bumble Bee – <i>Bombus fervidus</i>	14
Red on Abdomen.....	15
Red-belted Bumble Bee – <i>Bombus rufocinctus</i>	16
Tri-Colored Bumble Bee – <i>Bombus ternarius</i>	17
Yellow-banded Abdomen	18
Black and Gold Bumble Bee- <i>Bombus auricomus</i>	19
American Bumble Bee – <i>Bombus pensylvanicus</i>	20
Comparing <i>B. auricomus</i> and <i>B. pensylvanicus</i>	21
Yellow Banded Bumble Bee- <i>Bombus terricola</i>	22
Brown on Mid-abdomen	23
Brown-belted Bumble Bee – <i>Bombus griseocollis</i>	24
Miscellaneous	25
Fernald’s Cuckoo Bumble Bee – <i>Bombus flavidus</i>	26
Indiscriminate Cuckoo Bumble Bee – <i>Bombus insularis</i>	27
Frigid Bumble Bee – <i>Bombus frigidus</i>	28
Acknowledgements.....	29

Introduction

Identifying bumble bees can be tricky. At first glance, most species in Michigan may seem to look very similar, but closer examination of the hair colors on the head, thorax and the abdomen can generally be used to differentiate species. Most species even have some variability in coloration when compared to others of the same species! The best resource available to determine a species in Michigan is the book [*Bumble Bees of North America*](#) by Paul Williams, Robbin Thorp, Leif Richardson, and Sheila Colla. An additional free PDF guide titled [*Bumble Bees of the Eastern United States*](#) by Sheila Colla, Leif Richardson, and Paul Williams provides some additional species level detail for the bumble bees found in Michigan and can be used to determine the species of a bumble bee.

From photographs, bumble bees are best identified by examining the coloration of different body parts. The main body parts to examine closely when attempting to identify to species include the head, thorax, and abdomen. Females and males of a species can generally be separated from each other by 1) looking for a stinger (female only) and 2) looking for pollen on the corbicula, or what you might think of as the knees on the back leg (female only).

Identification pointers:

- 1) Pay close attention to the colors of hairs on the vertex (top of head) and the face (between and below the antennae).
- 2) A bumble bee's thorax will generally be yellow or a mix of yellow and black. The amount and location of yellow/black hair on the thorax can help determine the identification of a species. The colors of hair on the sides of the thorax (below the wing joints) can also help determine the species.

The abdomen contains 6 (or 7 for males) horizontal segments called terga. Determining the color of each segment (T1, T2, T...) is the best way to identify most species from photos.

Examples of good bumble bee photos for photo identification:



Anatomical Terms Used in this Guide:

Thorax – Middle segment of bee; wings and legs attach here

Scutum – Upper region of the thorax; closer to head

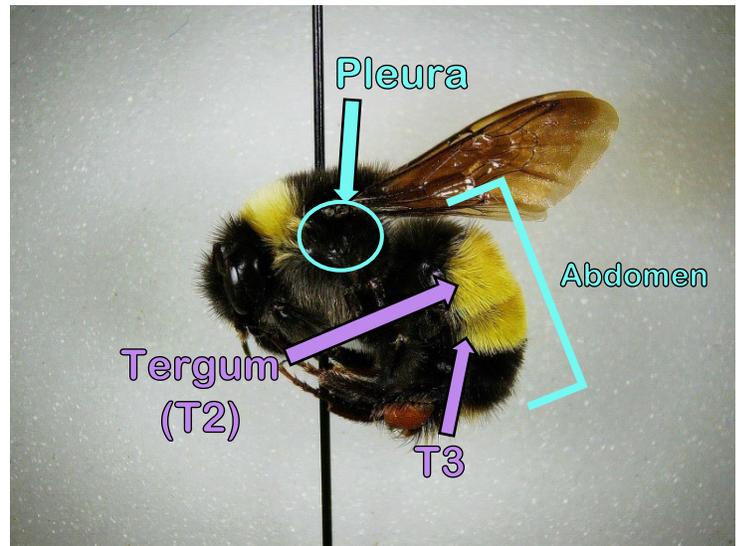
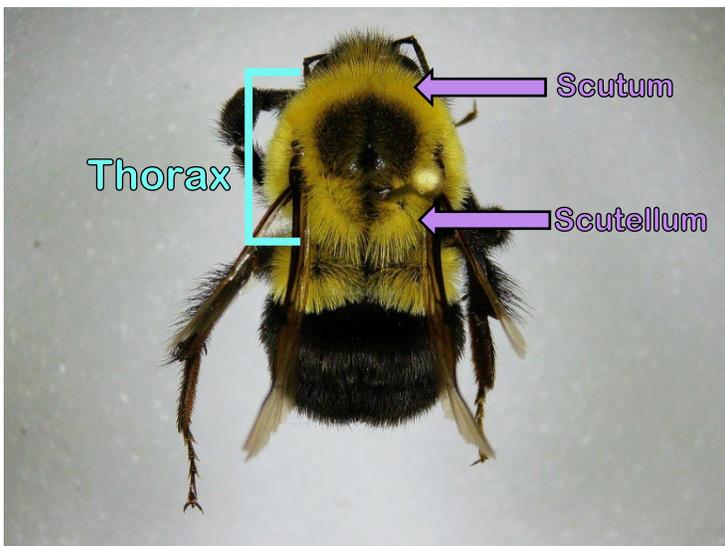
Scutellum – Lower region of the thorax, closer to abdomen

Pleura – region on side of thorax under the wing

Abdomen – Third and largest segment of the bee

Terga – Abdomen is broken up into segments called terga (referred to as T1, T2, and so on)

Ocelli – bumble bee 'simple eyes' – three small circles located on top of head between the two large compound eyes



Mostly Black Abdomen

Common Eastern Bumble Bee- *Bombus impatiens*

Two-spotted Bumble Bee- *Bombus bimaculatus*

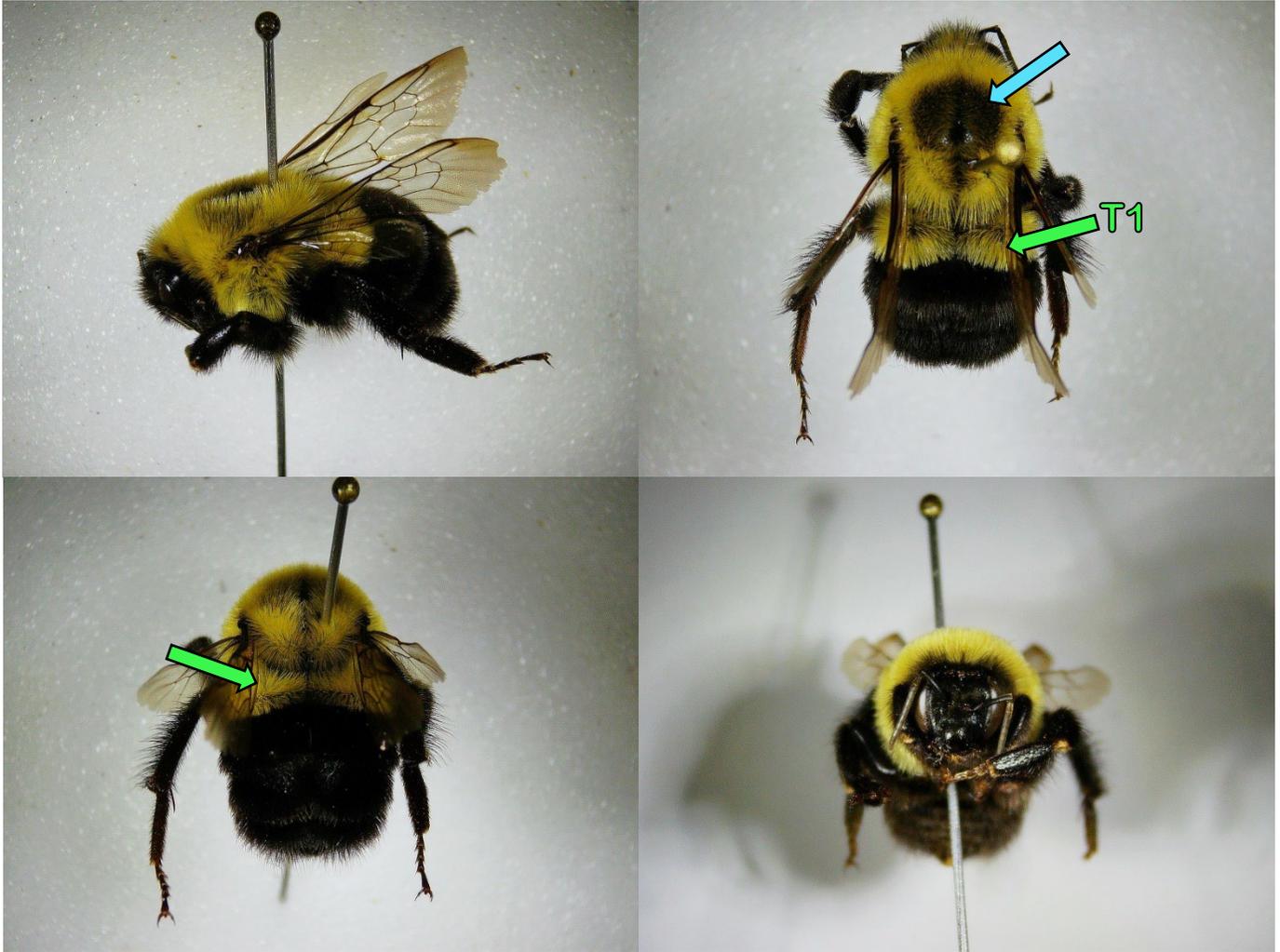
Lemon Cuckoo Bumble Bee- *Bombus citrinus*

Confusing Bumble Bee- *Bombus perplexus*

Half-black Bumble Bee- *Bombus vagans*

Sanderson's Bumble Bee- *Bombus sandersoni*

Common Eastern Bumble Bee – *Bombus impatiens*



- Short malar space
- Thorax mostly yellow, black circle between wing bases (usually has some yellow hairs intermixed) (→)
- T1 yellow (→), all other abdominal segments black
- Males typically with yellow on face
- Some impatiens are odd – T2-T6 (+T7 for males) may be brownish/rusty instead of black



Two-spotted Bumble Bee – *Bombus bimaculatus*



- Long malar space
- Thorax mostly yellow, black circle between wing bases

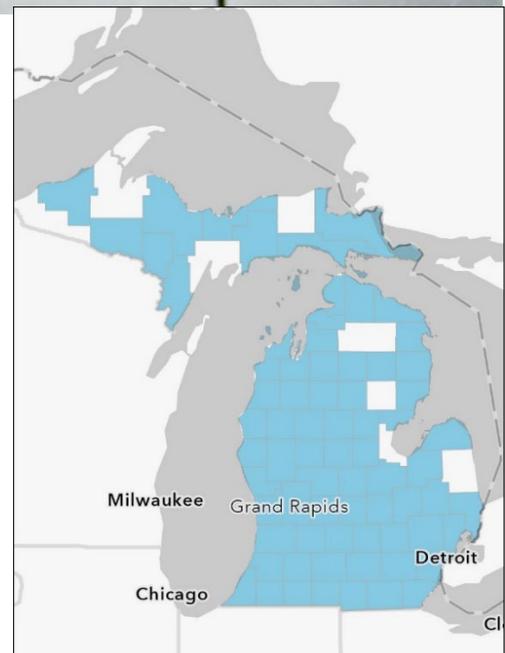
FEMALE

- T1 yellow. T2 having a yellow 'w' or two spots centrally (→), with the rest of T2 being black
- Yellow w on T2 almost never connects all the way to edges of tergal segment (opposed to *B. griseocollis*)
- All other abdominal segments (T3+) black

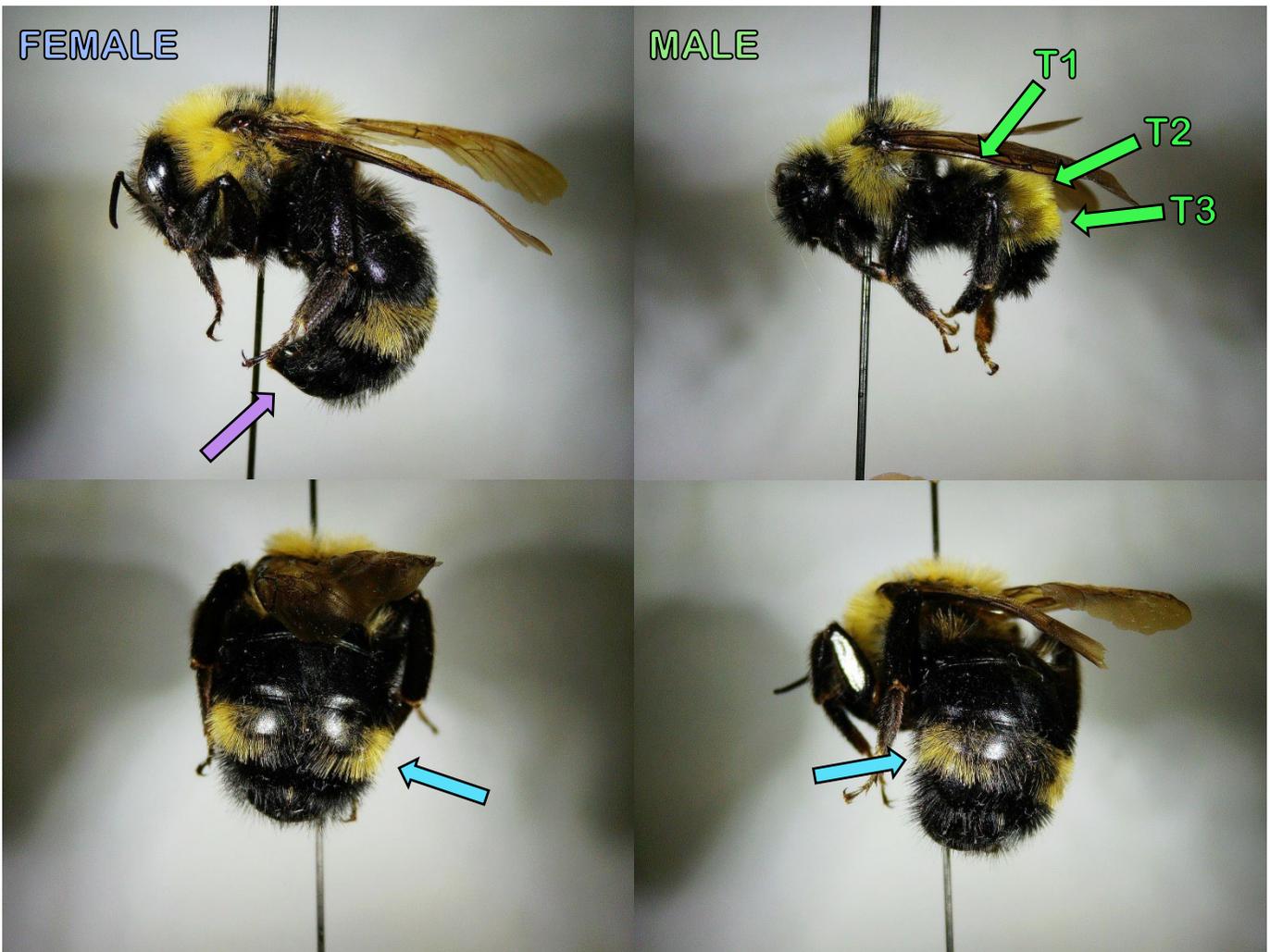
MALE

- Similar to females, T1 yellow, T2 with yellow 'w' or two spots, with rest of T2 black
- Many males will also have yellow striping in T2-T7

*Note – characteristic 'w' can range from being very pronounced to barely visible



Lemon Cuckoo Bumble Bee – *Bombus citrinus*



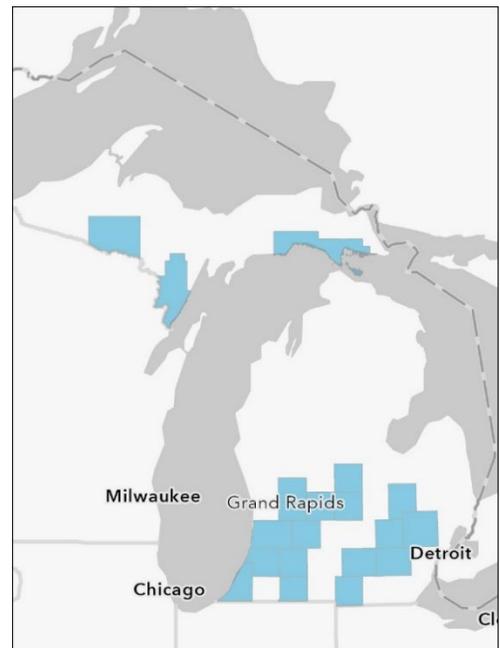
- Parasitic bumble; parasite of *B. impatiens*, *B. bimaculatus*, and *B. vagans*
- Abdomens appear very hooked (⇨)

FEMALE

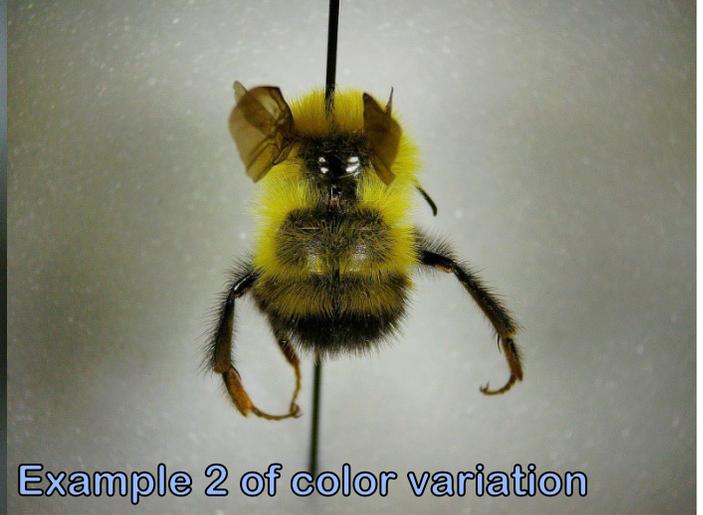
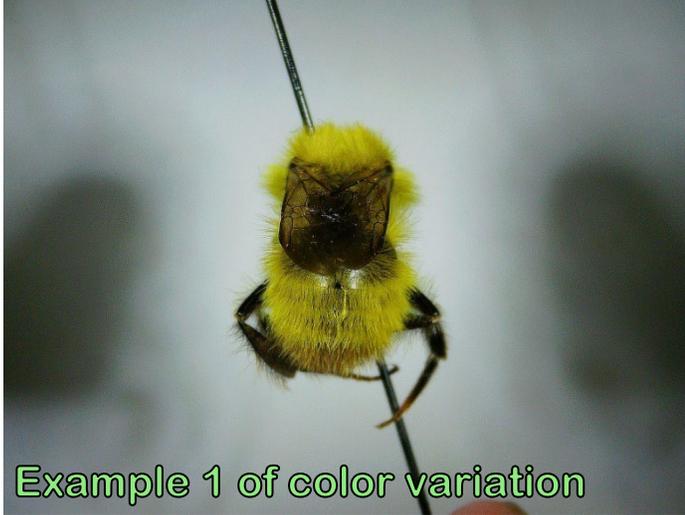
- Large head / mandibles
- Thorax mainly yellow, sometimes with small black circle between wing base
- Abdomen almost entirely black, T3 having light hairs either on edges or thin band across (⇨)

MALE

- Thorax yellow, with very exaggerated black “thumb-tack” shape between wing bases
- T1-T3 yellow (⇨), T4-T7 black
- Abdomen looks thin



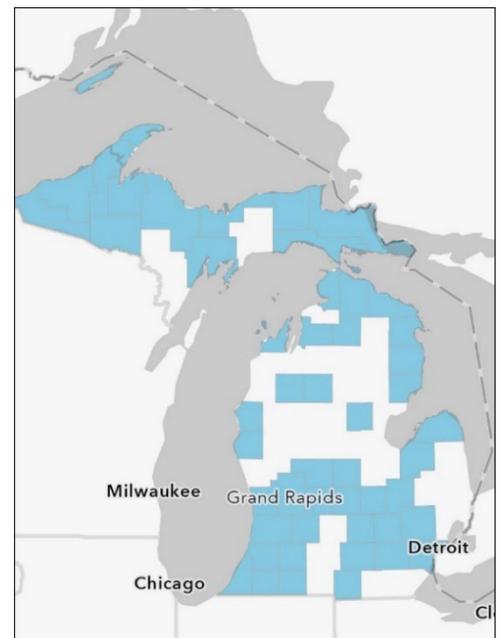
Confusing Bumble Bee – *Bombus perplexus*



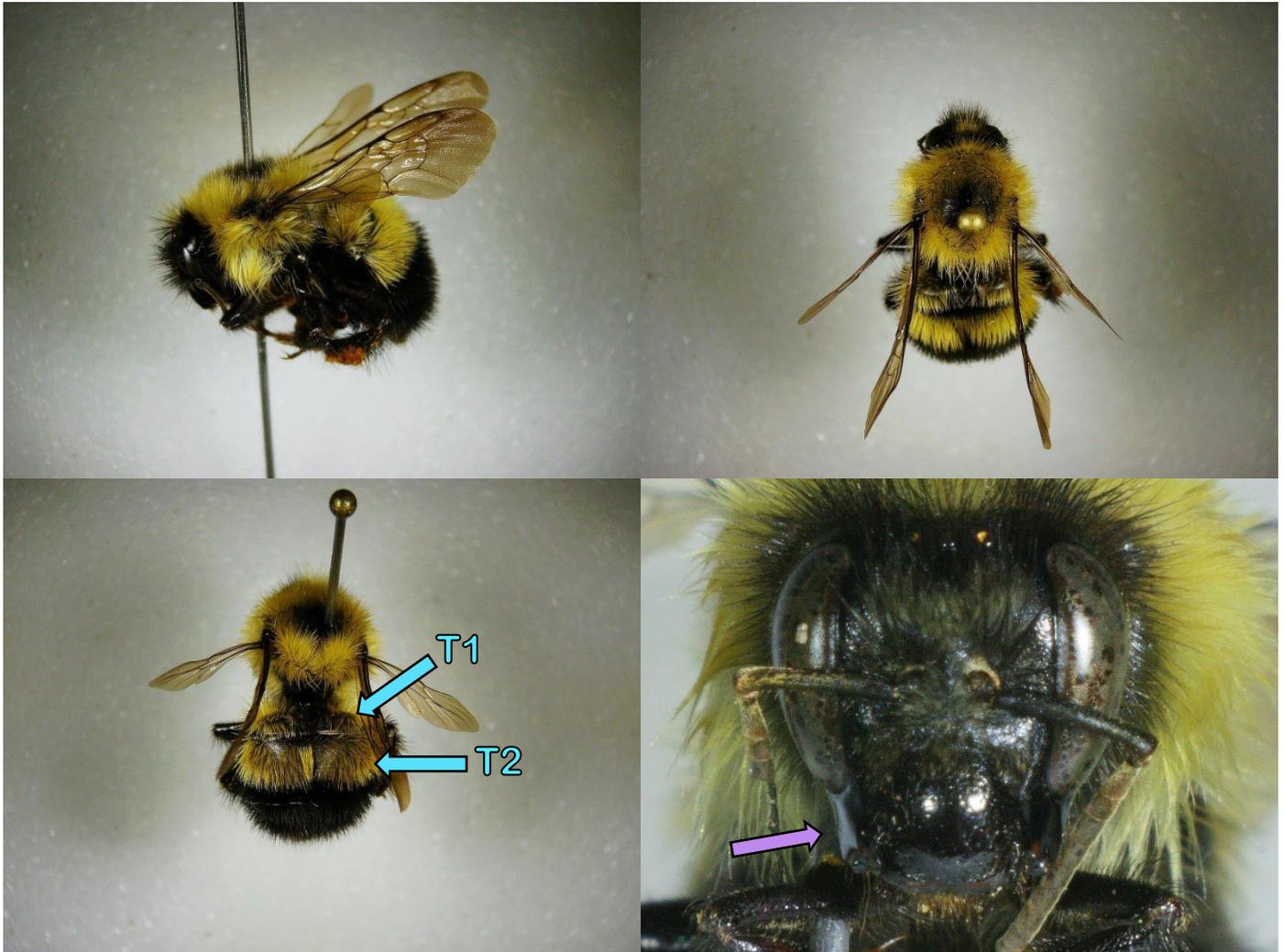
Example 1 of color variation

Example 2 of color variation

- Color pattern highly variable within species
- Thorax completely yellow / no obvious spot
- T1-T3 typically yellow, may have more yellow bands, or the rest of abdomen may be black
- Yellow tends to be more vibrant than other species

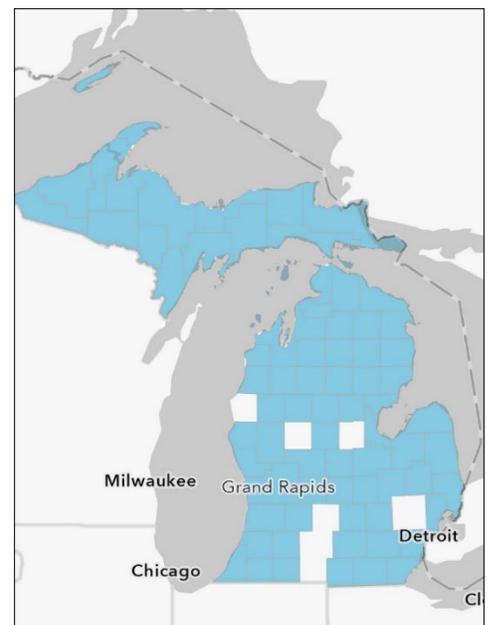


Half-black Bumble Bee – *Bombus vagans*



- Smaller bee
- Thorax mostly yellow, black circle between wing bases
- Thorax looks shaggier
- T1 and T2 yellow (→)
- T3+ black
- Malar space long; 'horse face' (→)

*Very important to look at under microscope, as it looks nearly identical to *B. sandersoni*



Sanderson's Bumble Bee – *Bombus sandersoni*



- Quite small
- Thorax mostly yellow, black circle (may be a bit more ovular (⇨) than *vagans*) between wing bases
- T1 and T2 yellow, all other abdominal segments black
- Shorter/moderate malar space (⇨)

*Very important to look at under microscope, as it looks nearly identical to *B. vagans*



Comparing *B. vagans* and *B. sandersoni* workers

Bombus vagans



Bombus sandersoni



Without the use of a microscope, *B. vagans* and *B. sandersoni* are almost indistinguishable

Under the scope – the difference becomes much more apparent!

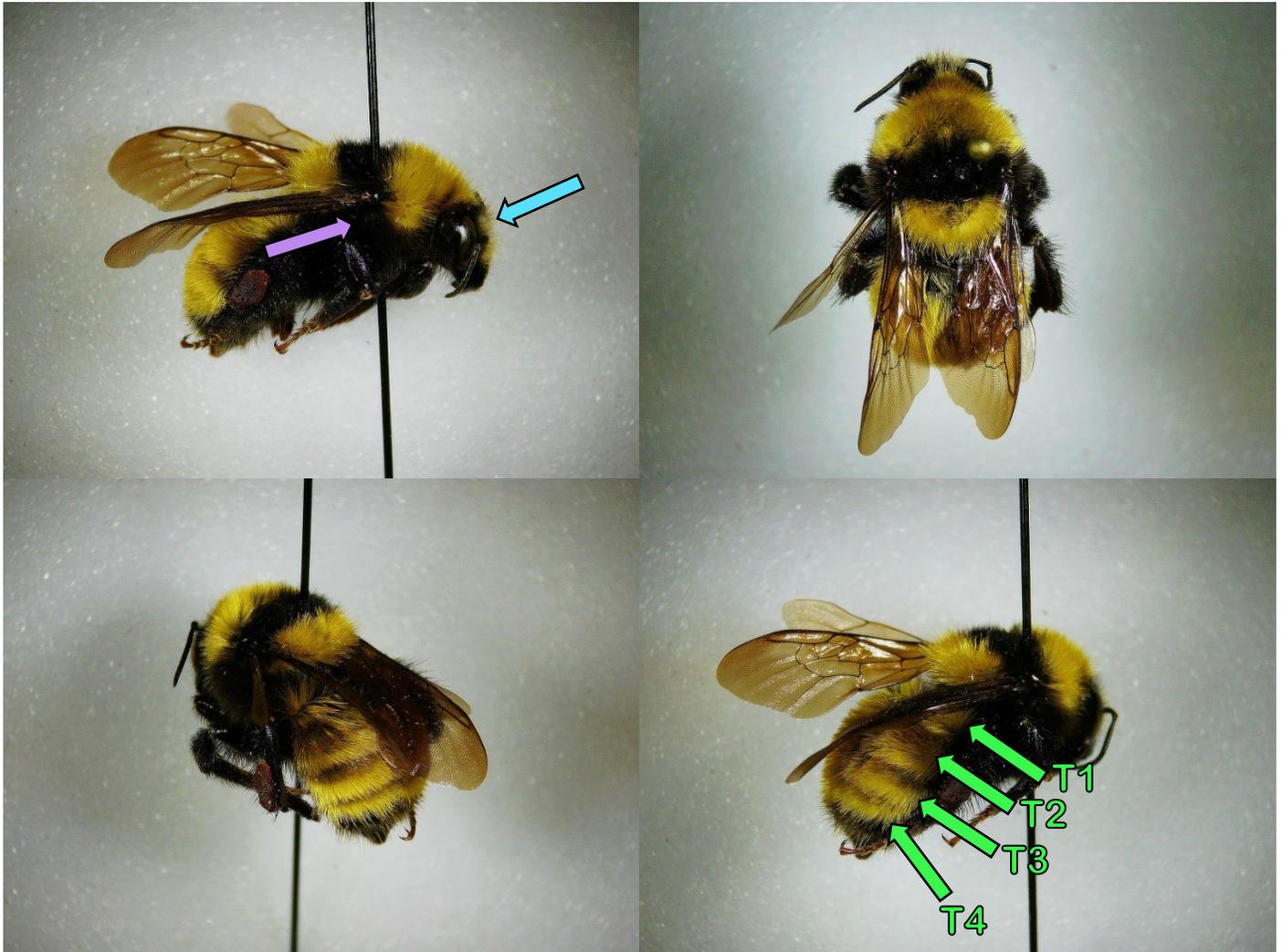
- Notice *vagans* worker with much longer malar space ('horsey face')
- Opposed to *sandersoni* worker short malar space, head looking much more round

Mostly Yellow Abdomen

Northern Amber Bumble Bee- *Bombus borealis*

Golden Northern Bumble Bee- *Bombus fervidus*

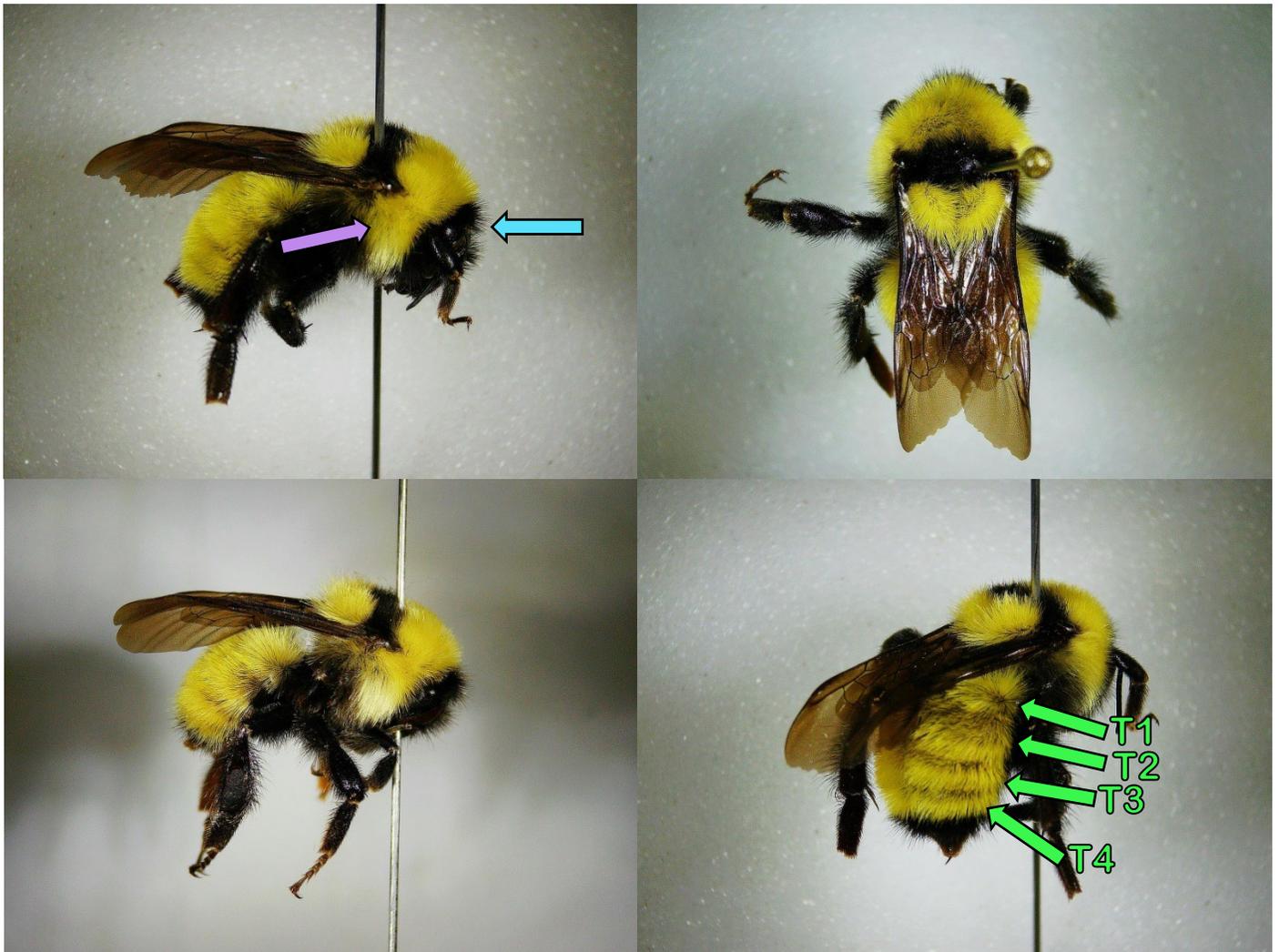
Northern Amber Bumble Bee – *Bombus borealis*



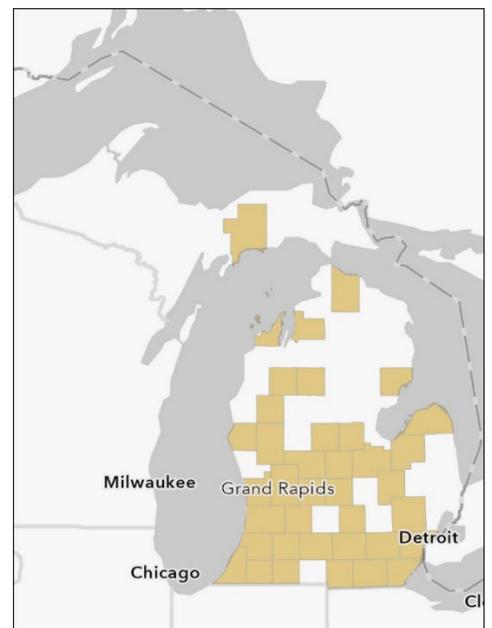
- Long malar space
- Yellow hairs on top of head / on face (→)
- Thorax mostly yellow, with black band between wing bases
- Pleura black (→)
- T1-T4 yellow (→)
- T5+ black
- More of an amber shade of yellow



Golden Northern Bumble Bee – *Bombus fervidus*



- Long malar space
- Black hairs on top of head (⇨)
- Thorax mostly yellow, with thin black band between wing bases
- Pleura yellow (⇨)
- T1-T4 of abdomen yellow (⇨)
- T5+ black
- A lighter / gentler shade of yellow

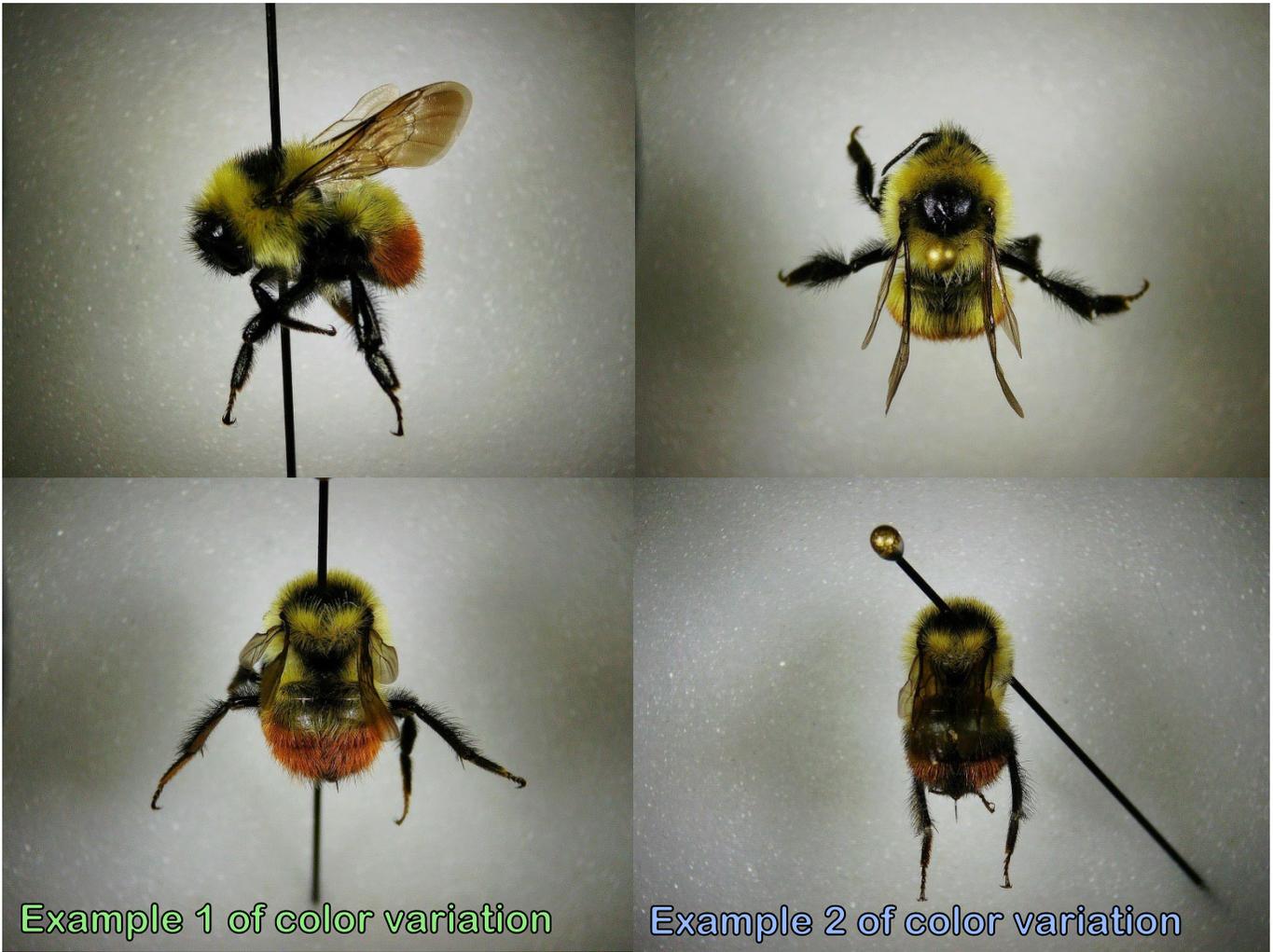


Red on Abdomen

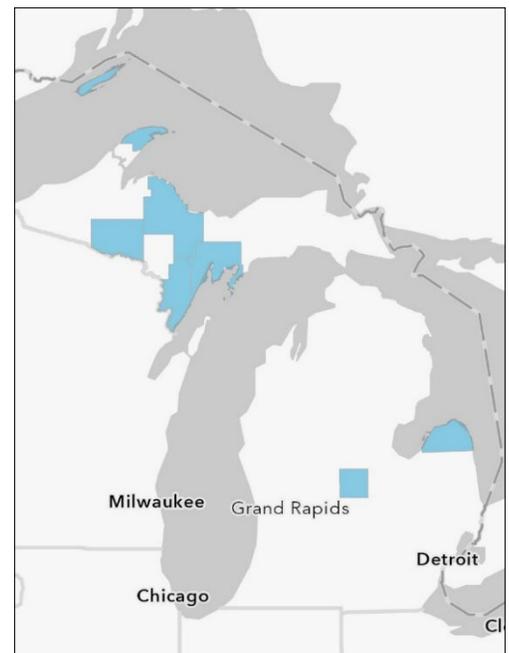
Red-belted Bumble Bee- *Bombus rufocinctus*

Tri-colored Bumble Bee- *Bombus ternarius*

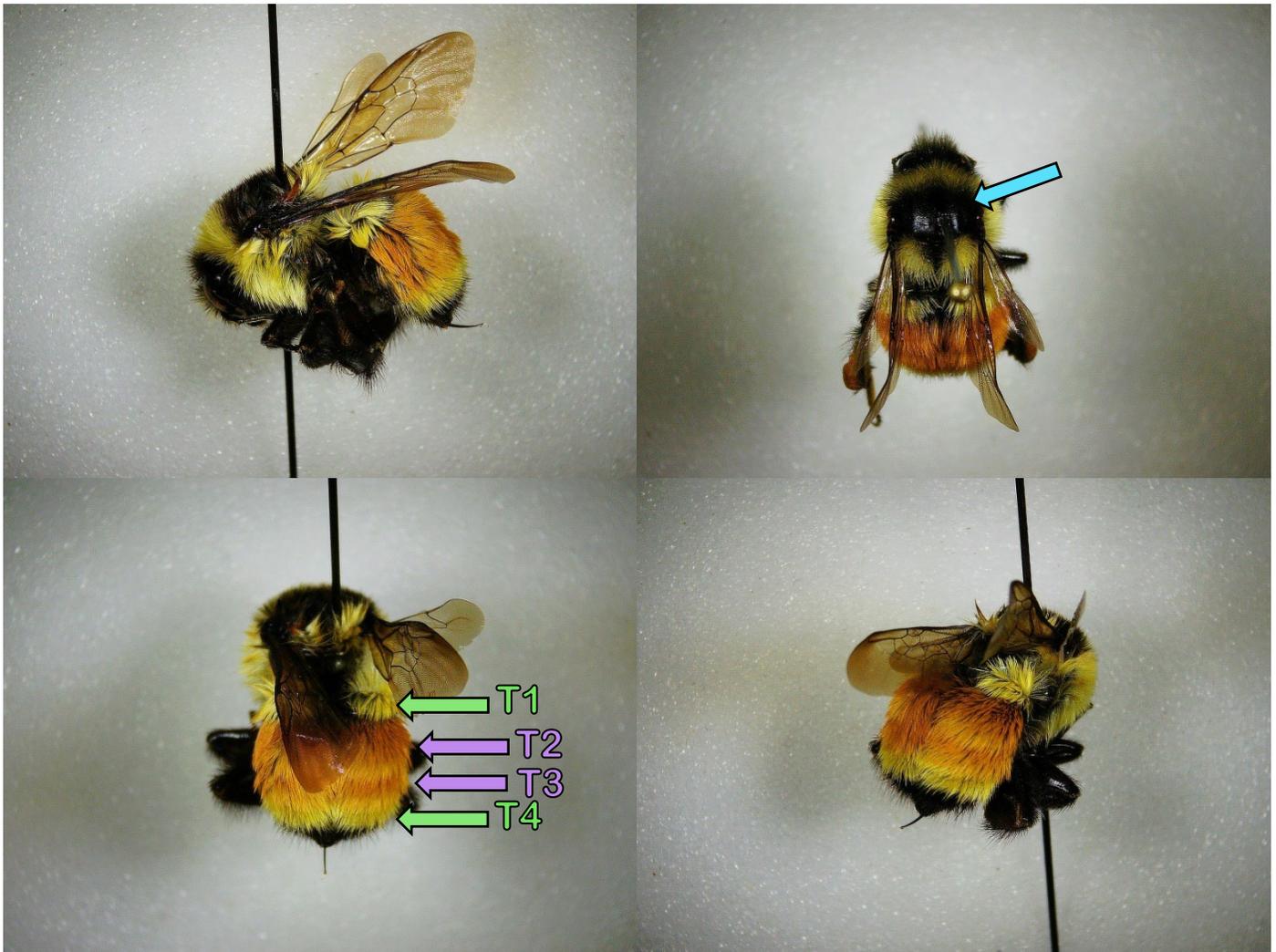
Red-belted Bumble Bee – *Bombus rufocinctus*



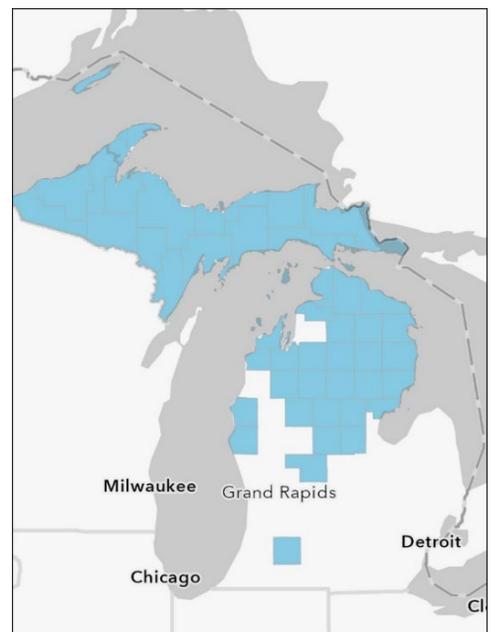
- Small
- Very variable in color pattern
- Yellow always on T1 and at least part of T2; T2 rarely fully yellow
- Edge of T2 and T3 either red/orange or black
- T4 can be black, red/orange, or yellow
- T5 varies
- Short malar space
- Males slightly enlarged eyes. Males follow somewhat similar color pattern; T1 and T2 fully yellow, rest of abdomen can be any color (yellow, black, red, mix)



Tri-Colored Bumble Bee – *Bombus ternarius*



- Thorax mostly yellow, black 'thumb-tack' shape between wing bases (→)
- T1 yellow (→)
- T2 and T3 red/orange (→)
- T4 yellow (→)
- T5 + black
- **Males** usually have very yellow face



Yellow-banded Abdomen

Black and Gold Bumble Bee- *Bombus auricomus*

American Bumble Bee- *Bombus pensylvanicus*

Yellow Banded Bumble Bee- *Bombus terricola*

Black and Gold Bumble Bee- *Bombus auricomus*



- Large bee!
- Dark wings

FEMALES

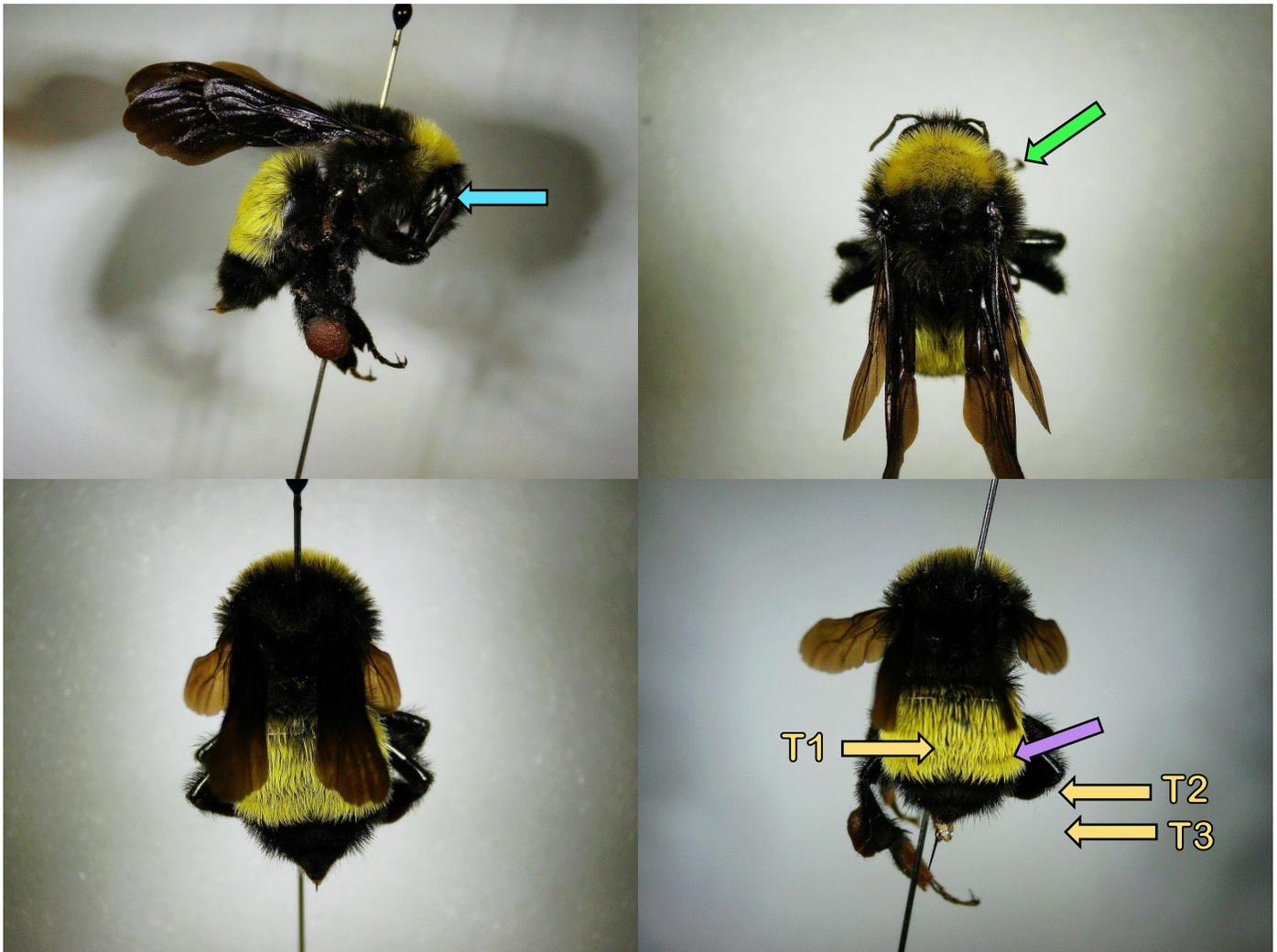
- Yellow hairs on top of head (→)
- Thorax mostly black; scutum yellow; large black band between wings and scutellum partly black, usually with the bottom (caudal edge of thorax) rimmed with yellow
- T1 black, T2-T3 yellow (→), T4-T6 black
- T1 may occasionally have yellow restricted to sides, but will never be all across bottom of T1 (→)

MALES

- Extremely large eyes
- Thorax mostly yellow, with black dot between wing bases
- T1-T3 yellow, T4-T7 black



American Bumble Bee – *Bombus pensylvanicus*



- Dark wings
- Black hairs on top of head (⇨)

FEMALES

- Scutum yellow (⇨)
- Black between wing base and black scutellum
- T1 black, with bottom edge of T1 being yellow (⇨); yellow extends across entire bottom edge of segment, unlike *B. auricomus*
- T2-T3 yellow (⇨)
- T4-T6 black

MALES

- Thorax has large black band between wing bases, scutellum yellow
- T1-T4 yellow, T5-T7 black; T7 often with orange



Comparing *B. auricomus* and *B. pensylvanicus*



While both have yellow T2 and T3:

- *B. pensylvanicus* will have some yellow extending up into the bottom of T1
- *B. auricomus* typically has no yellow extending into T1, BUT if it does, it will be constricted to the sides of T1 (will never extend across the whole segment)

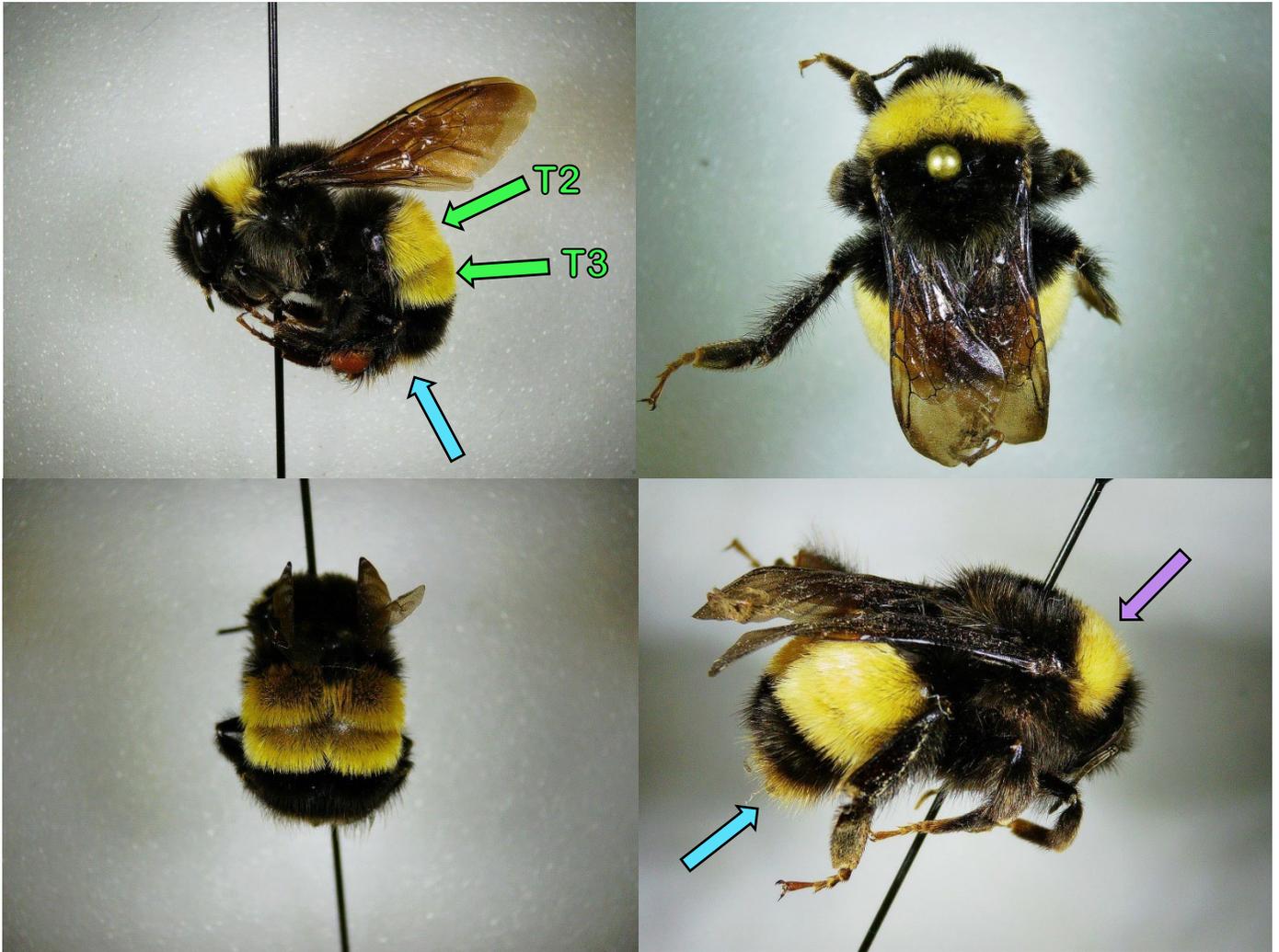


Key that will always hold true:

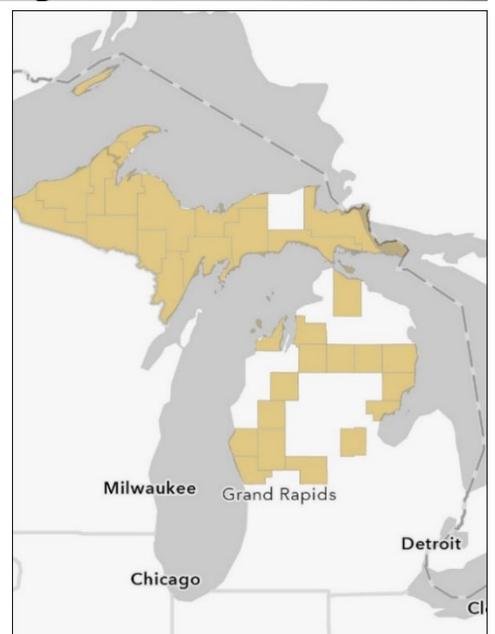
- *B. auricomus* ocelli well below top of eyeline
- *B. pensylvanicus* ocelli in line with top of eyeline

***NOTE – must be looking at bee's head from this angle (hard to tell looking straight on)**

Yellow Banded Bumble Bee- *Bombus terricola*



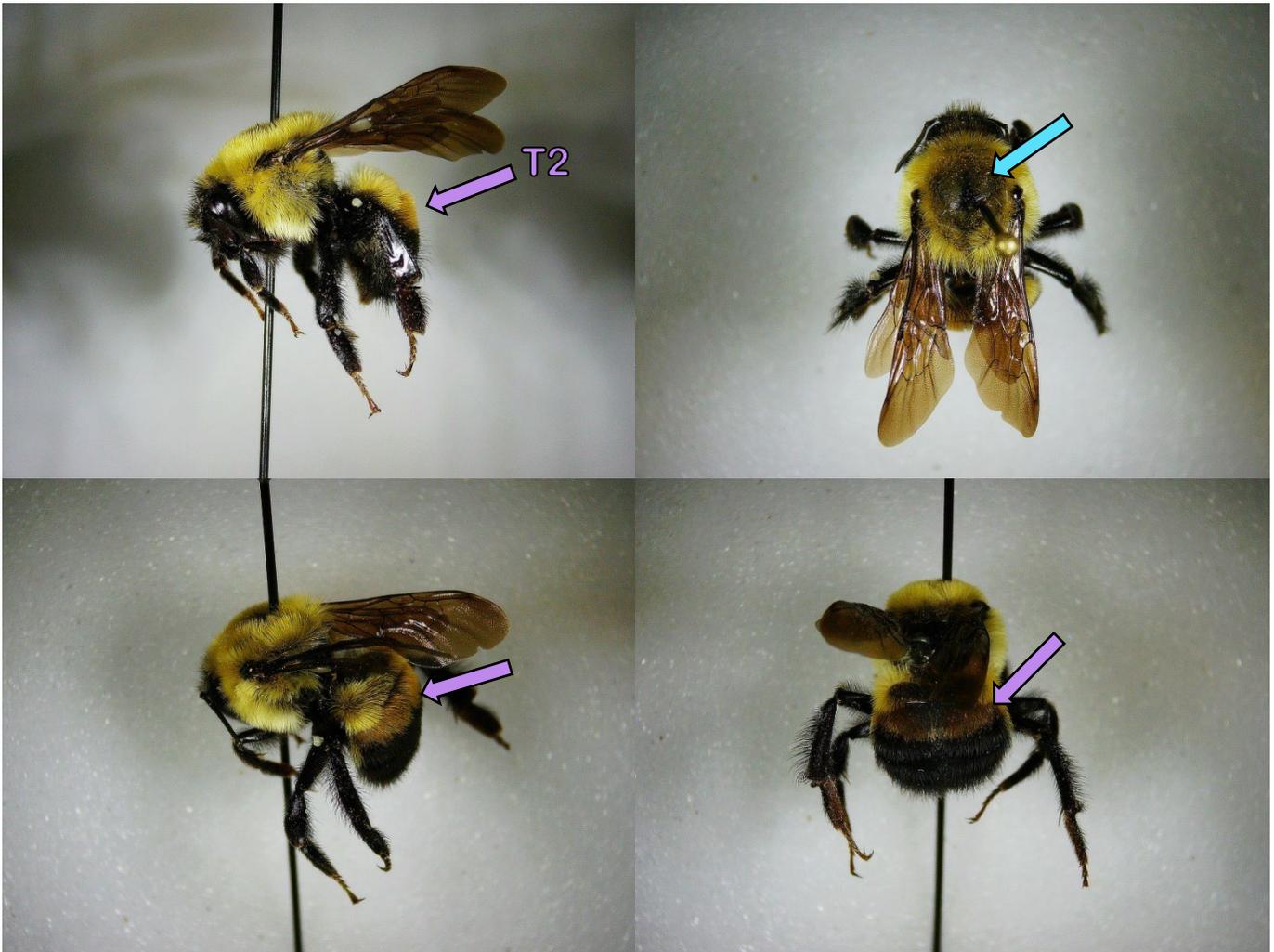
- Very round body shape
- Short malar space
- Thorax with black band between wing base and black scutellum
- Some yellow on scutum (→)
- T1 black, T2-T3 yellow (→), T4 + black
- T5 having white / pale orange fringe of hairs (→)



Brown on Mid-abdomen

Brown Belted Bumble Bee- *Bombus griseocollis*

Brown-belted Bumble Bee – *Bombus griseocollis*



- Dark wings
- Short malar space
- Thorax mostly yellow, black circle between wing bases (→)
- Very short hairs on thorax gives very “groomed” appearance
- T1 yellow
- T2 with brown, half-moon swoosh on upper half (→); bottom half being black
- T3+ black
- **Males** have extremely large eyes and noticeably round thorax

*Note – sometimes will see characteristic swoop on T2 being very yellow. Be careful not to mix up with *Bombus bimaculatus*



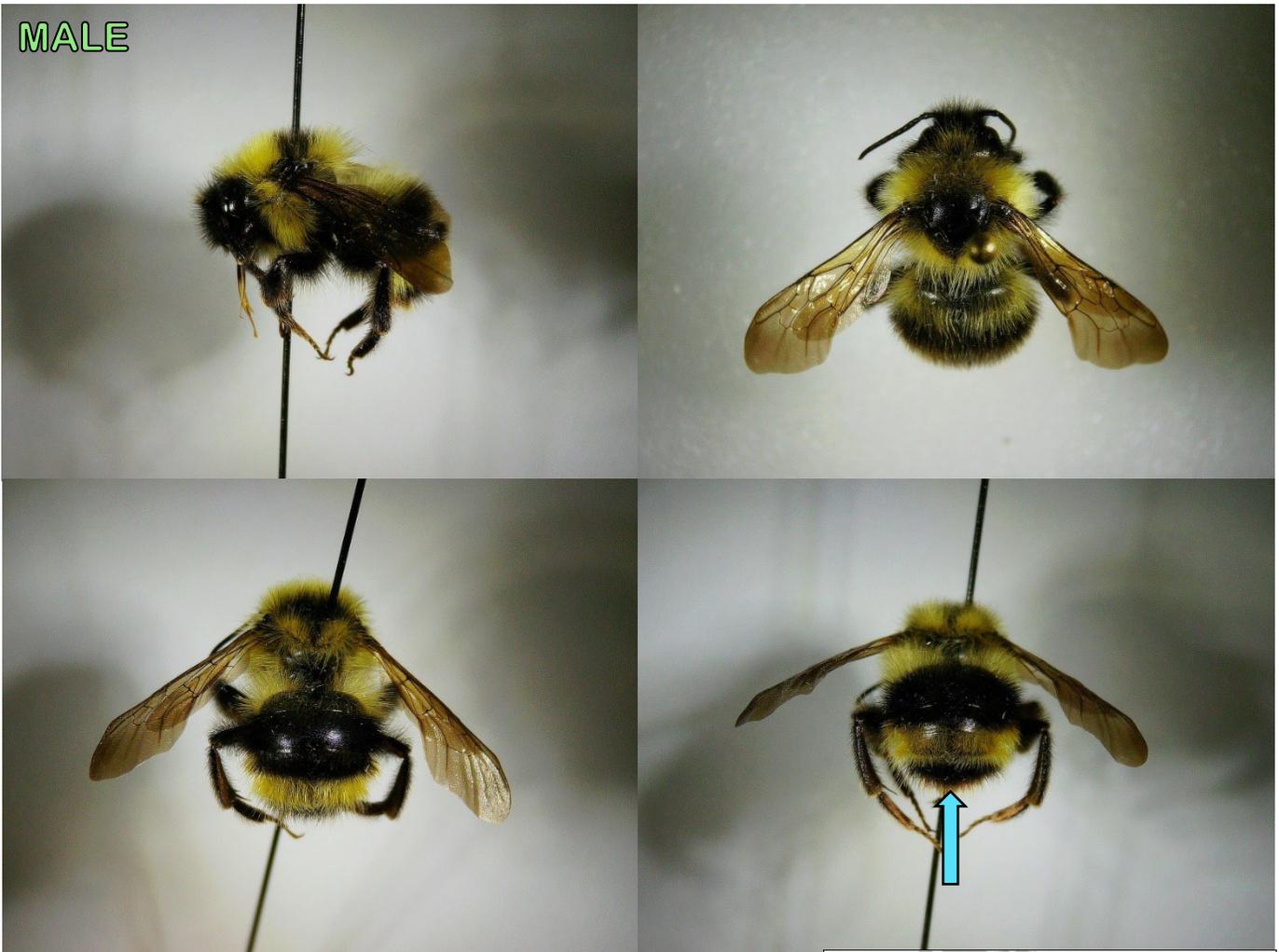
Miscellaneous

Fernald's Cuckoo Bumble Bee- *Bombus flavidus*

Indiscriminate Cuckoo Bumble Bee- *Bombus insularis*

Frigid Bumble Bee- *Bombus frigidus*

Fernald's Cuckoo Bumble Bee – *Bombus flavidus*



- Parasitic bumble bee; parasite of *B. terricola*, *B. rufocinctus*, and *B. fervidus*
- Body size small; variable coloration
- Hooked abdomen

FEMALE

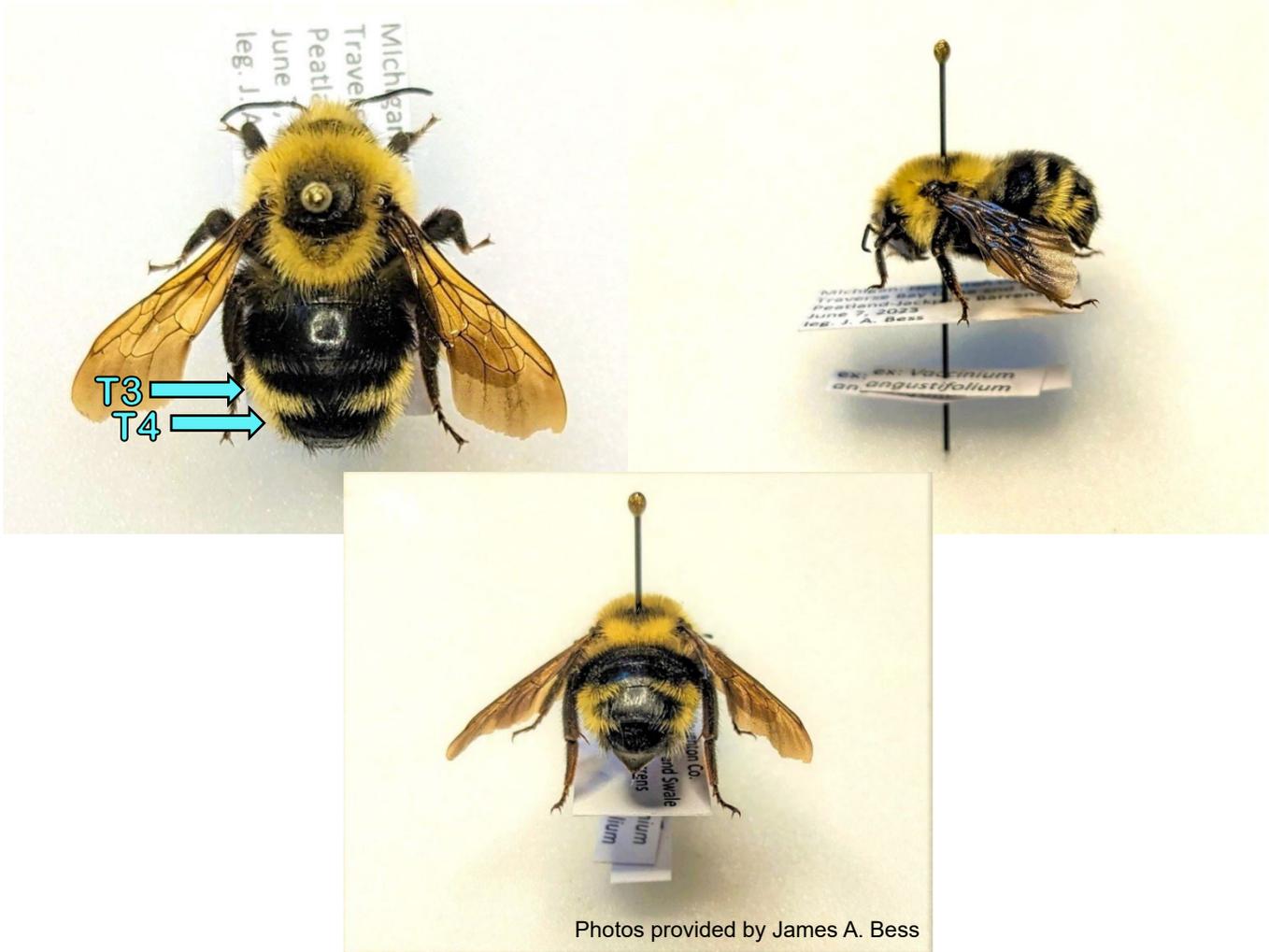
- Thorax variable, either black band between wing base or lower 2/3 thorax black with yellow scutum
- T4 of abdomen yellow

MALE

- Some T1-T4 fully yellow; some T1 yellow, T2-3 black, T4 yellow; some variation in between
- All will have black T5; T7 orange (sometimes extends up into T6) (→)



Indiscriminate Cuckoo Bumble Bee – *Bombus insularis*



Photos provided by James A. Bess

- Parasitic bumble bee of *B. fervidus* and *B. ternarius*
- Hooked abdomen

FEMALE

- Fuzzy yellow head
- Sides of thorax yellow at front, but black on back
- Upperside of thorax with black circle OR band between wings, black sometimes also extending down into scutellum
- T1 and T2 black, T3 and T4 partially yellow (constrained to sides) (⇨)

MALE

- T1-T4 yellow, sometimes coloration similar to females



Frigid Bumble Bee – *Bombus frigidus*



Photograph by Laurence Packer
Accessed on discoverlife.org



Photograph by Sheila Colla
Accessed on discoverlife.org



Photograph by
Sheila Colla
Accessed on
discoverlife.org



Photograph by Laurence Packer
Accessed on discoverlife.org

- Long hair
- Thorax with black band between wing bases
- T1-T2 yellow
- T3 black
- T4-T5 red/orange
- Some **males** may have fully yellow thorax

Acknowledgements

Additional resources that contributed to our knowledge to be able to create this guide:

Bumble Bees of North America by Paul Williams, Robbin Thorp, Leif Richardson, and Sheila Colla

2022 Midwest Bumble Bee Identification course taught by Elaine Evans and Zach Portman of the University of Minnesota

Special thanks to James Bess for his contribution of photographs of *Bombus insularis*

Special thanks to Sheila Colla and Laurence Packer for their photographs of *Bombus frigidus*, which were accessed on DiscoverLife.org