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Visual Guide to Common Wild Bees in Apple Orchards in North Georgia

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Wild bees are effective pollinators of crops, native flowers, shrubs, and trees. They are naturally present and can supplement honeybees in apple pollination. Boosting their numbers by habitat development and conservation can be of considerable commercial and ecological value to producers and consumers. This guide shows common wild bees found in commercial apple orchards in North Georgia based on sampling in the 2010 growing season (March through October) in four orchards: Mercier Orchards, Hillside Orchards, Mountain View Orchards, and Tiger Mountain Orchards. These bees comprised 128 species in 28 genera in five families.

Mining Bee

The "Georgia Apple Bee," *Andrena crataegi.*

Among the common bees found in apple orchards in Georgia, there are more than 50 species of *Andrena*, most of which are only active in the spring (***vernal***). They range from small to slightly

larger than a honeybee. Most have black ***integument*** (the body exterior), with a range of white, blond, orange to dark body hair. Female bees have facial ***fovea*** (depressions covered with minute hairs, like vertical eyebrows, visible next to the large compound eyes). They collect pollen in specialized hairs (***scopa***) on their body and upper legs. Male bees have hairs that look like a mustache. Wings are clear to dark.

One species, *Andrena crataegi*, dubbed the "Georgia Apple Bee," was the most common bee found in apple orchards. Mining bees made up 30% or more of wild bees during apple bloom. The emergence of overwintering adults from their nests underground coincides with the crop flowering.

A. crataegi, male (left), female (right).

- Flight season: Early spring (most species), summer to fall
- Size relative to honeybee: 0.3–1.2X
- Diet: Generalists (female bee gathers pollen from many plant species) and specialists (female bee gathers pollen from few plant species)
- Nest: Ground

Large Carpenter Bee

Female Eastern carpenter bee (left), and male (right).

These are large, bumble-like bees with shiny black or bluish-black abdomen and a thick covering of hairs on the ***thorax*** (middle part). There are two species in Georgia. The males have a yellow or white spot on their face below the antennae. Females excavate nests in wood. The Eastern carpenter bee (*Xylocopa virginica*) was present in high numbers in most apple orchards and were three times more numerous than other bees. They interact and pollinate the apple flowers at a high frequency.

- Flight season: Spring through fall
- Size relative to honeybee: 1.5–2X
- Diet: Generalists
- Nest: Cavity

Bumblebee

Corbicula (specialized pollen carrying structure on female *Bombus* legs shown with pollen load).

This is a widespread bee group—there are 17 species in Georgia. The integument is black and covered with thick, pale or yellow hairs. Female bees have a flat, shiny spot on the lower part of their hind legs (***corbicula***), where they collect pollen in a moist-looking pollen ball. The color of the pollen is indicative of the flower from which it was gathered. Male bees have mustaches on their faces. Wings can be clear or nearly black. Queens overwinter and use abandoned rodent burrows or other cavities. Large queens are the first to fly in search of early spring floral/food resources. Later, they spend most of the time in the nest, laying eggs which hatch and produce the workers. Most of the bees seen after the early spring queens are workers. Males emerge late in the season, mate with the new queens, and die off. Then, the newly mated queens overwinter belowground.

- Flight season: Spring to fall
- Size relative to honeybee: 1.5–2X
- Diet: Generalists
- Nest/soil: Variable

Mason Bee

Female *Osmia*, note scopa on her underbelly (left), and *Osmia* mating (right).

These are metallic blue medium-sized bees with 19 species in Georgia. They have white or orange body hair. Female bees have pollen-collecting hairs on their underbelly. Male bees have hairs that look like a mustache. Their wings are clear. These bees are fast-flying. Mason bees are solitary; each female provisions her own nest.

- Flight season: Spring to early summer
- Size relative to honeybee: 0.5–1X
- Diet: Generalists and specialists

- Nest: Cavity

Leafcutter Bee

Male *Megachile* on leaf, note hair on face (left), and female *Megachile*, note scopa on her underbelly (right).

These are medium-sized bees with more than 36 species in Georgia. Most species have black integuments with white hair bands across the abdomen. Female bees have pollen collecting hairs on their underbelly; when the pollen load is heavy, they will often curl up their abdomen. Male bees have hairs that look like a mustache. Wings are clear to dark. These bees are fast-flying. Leafcutter bees are solitary; each female provisions her own nest. Their name is derived from the habit of the females to line their nests with cut leaves.

- Flight season: Summer through fall
- Size relative to honeybee: 0.5–1X
- Diet: Generalists
- Nest: Cavity, ground (depending on species)

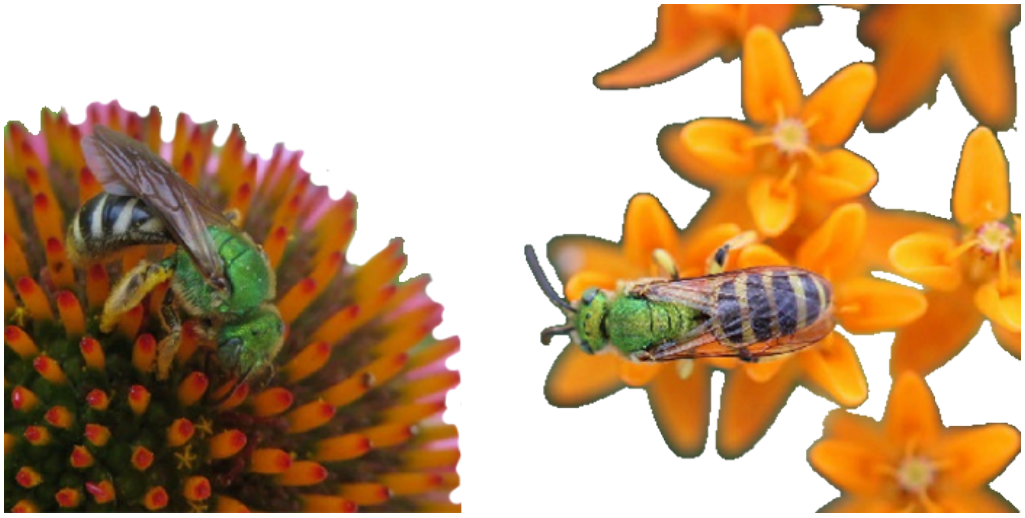
Small Sweat Bee

Male small sweat bees, note the long antennae (left), a female small sweat bee with pollen on her legs (front center), and a small sweat bee on hand, lapping salts and moisture (back center).

This is a species-rich group of small-sized bees: they are abundant in a wide variety of habitats. They were the second most numerous genus in the apple orchards. Many species are brown with metallic highlights or metallic green/blue, while some species have reddish abdomens. Females collect pollen on their hind legs. Males have long antennae. Sweat bees derive their name from their attraction to moist skin, where they lap the moisture and salts. They are often observed in the apple flowers. Some species have a queen and female workers.

- Flight season: Spring through fall
- Size relative to honeybee: 0.3–0.75X
- Diet: Generalists (most species)
- Nest: Ground

Green Sweat Bee



Female green sweat bees.

These are small- to medium-sized bees with 12 species in Georgia. All are metallic green; males of the larger *Agapostemon* have black- and yellow-striped abdomen and yellow legs. Females collect pollen on their hind legs.

Agapostemon (female left, male right).

- Flight season: Summer through fall
- Size relative to honeybee: 0.4–0.85X
- Diet: Generalists
- Nest: Ground/rotting wood (*Augochlora*)

The above are the most encountered bees in apple orchards, but it is by no means an exhaustive list. For more information on bees in Georgia, visit https://native-bees-of-georgia.ggc.edu/.

Bee Habitat

Female *A. crataegi* at her nest entrance.

Many wild bees nest in the ground near their host plants. Like many mining bees, *Andrena crataegi*, "the Georgia Apple Bee," is a communal nesting bee, meaning that females share a nesting site. The bees have been observed in tree rows, nesting under the apple trees. The apple trees shade the ground underneath the canopy, leaving bare patches of soil. Since farmers do not till the soil in apple orchards, the ground is left undisturbed, a practice which makes it ideal for bee habitat. Exposed soil is important for mason bees; they collect mud to build their nests. Sweat bees also nest in bare ground, with many individuals sharing nest entrance(s).

A. crataegi nests below an apple tree.

For producers, it is important to leave edge habitat where flowering plants, shrubs, and small trees can provide pollen and nectar resources from March (or earlier) through October. Edge habitat also provides hollow stems and other cavities for refuge and nesting. Native forbs such as mints, peas, sunflowers, goldenrods, thoroughworts, asters, vines and shrubs such as jessamine, buttonbush, summersweet clethra, and small trees such as willows, cherries, and cherry laurel are excellent floral resources. Edge habitats on farms could host a wide variety of wild bees near the main crop. It has been shown that bumblebees are more abundant in smaller apple orchards, especially those with natural edges.

Flowering plants at farm edge.

References

Schlueter, M. A., & Stewart, N. G. (2015). Native bee (Hymenoptera: Apoidea) abundance and diversity in North Georgia apple orchards throughout the 2010 growing season (March to October). *Southeastern Naturalist, 14*(4), 721–739. https://doi.org/10.1656/058.014.0416

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