

# What's The Buzz About?

There's many differences between wasps and bees. Here's good ways to help others understand.

Jennifer Berry

Humans often associate the “buzzing” of insects with that of a bee: Why not a wasp, or a June bug, or a robber fly . . . Nope, only a bee! More often than not when any airborne insect is out buzzing about, people identify it as a bee. Why is this? Perhaps our early teachings that cows go moo, pigs go oink, and bees go buzzzzzzzz are to blame. If so, then maybe these early teachings should also include that a flying cockroach or a long horned beetle goes buzzzzzzzz as well. Ok, maybe that's going a bit too far (though they do buzzzzzzzz). Alternatively, perhaps this auto-assumption initiates deep within our subconscious, a likely result from the years of the media's relentless pairing of words like “bee” and “buzz”? As a child one of my favorite breakfast foods was Honey Nut Cheerios. I'll never forget the image found in every commercial and on every box of this tasty breakfast treat – a friendly fun-loving bee named “buzz.” I wonder if this insulted Mr. Aldrin?

The general public commonly associates ‘buzzing’ with ‘bees,’ ‘bees’ with ‘stinging,’ and ‘stinging’ with ‘pain.’ Therefore, it seems only logical that they might also associate bees with pain. This explains why, when you're relaxing on a blanket in the park with friends or family, all of a sudden, buzzzzzzzz, that noise rings in your ears and simultaneously a neuron fires in your brain communicating that a **bee** is in the vicinity. The potential for physical harm causes fear to ooze from your brain, overtaking your ability for rational thought, so naturally you stand-up and take off running, swatting the air wildly until you reach the safety of your car

or until your energy gives out. Apiphobia, the *irrational* fear of bees, doesn't seem *so irrational*, huh?

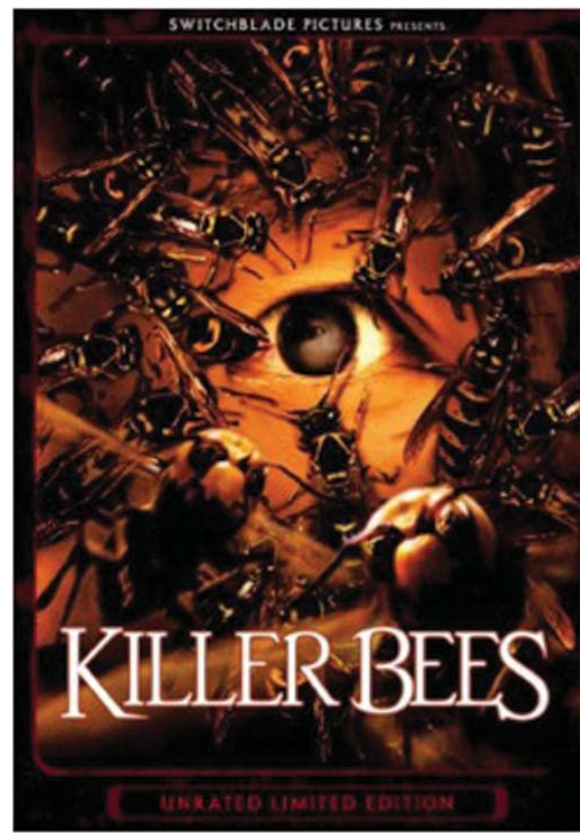
Bees in general, though honey bees especially, have been given a bad rap. I guess it's the lack of knowledge about all the other stinging “bugs” scampering about this planet. But during the Summer month's, the reputation of bees is especially susceptible to slander. Hot, dry spells, like we usually experience from June to October here in Georgia, lend to very few blooming plants and shrinking water holes. Therefore, foragers of all kinds are attracted to just about anything sweet and watery. There tends to be large amounts of sugary beverages consumed in the Summer, and the remains are tossed in trash cans scattered about in parks and other public areas. The syrupy substance found in these partially consumed beverages attracts not only ants but also wasps, yellow jackets, and occasionally honey bees.

Calls usually start around July 1<sup>st</sup>. People upset that their hummingbird feeders are covered in bees, or that they can't enjoy the picnic areas because of all the bees flying around the trashcans – *all* of which are scaring the children. My initial response is to calm the distressed caller, and convince them to put down the can of Raid, and then try to get an idea of what is actually happening. Usually, the “killer bees” that are causing such havoc, aren't bees at all but instead, those annoying little creatures we call yellow jackets. Not to be confused with the other pesky critters associated with Georgia Tech, (sorry, state rival). And yes, admittedly, bees resemble wasps, which

the general public apparently doesn't care enough to find out that there is a difference.

While doing some research for an Africanized bee presentation, I came across the cover art for a movie titled “Killer Bees”. There were three different images, with the same insect, all of which were not bees, but wasps. You would think the artist would have at least researched this a little better, considering it was the cover art for a movie.

Another example, Dr. Delaplane was being interviewed by Bill O'Reilly several years ago. Apparently there was a stinging incident at a park, where a group of school children were “attacked” by yellow jackets. Why this made national news, I don't know. Anyway, they contacted ⇨





Red wasp.

Dr. Delaplane and he was rushed to Atlanta to be interviewed about bees. During the show, while reference was being made to bees, not wasps, they continued to run stock footage of wasps. ARGHHHHHHH!!!! So there you have it; to most folks, wasps are bees, hornets are bees, all stinging things are bees.

### Differences between bees and wasps: Part I

Living things are classified into groups depending on their similarities or relatedness. The animal kingdom is divided into a number of phyla (singular *phylum*) with each phyla divided into classes, classes into orders, orders into families, families into genera (singular *genus*), and genera into species. Bees, wasps, sawflies and ants belong to the **Phylum**, *Arthropoda*; **Class**, *Hexapoda* (Insecta); and order **Hymenoptera**, which is one of the largest orders of insects consisting of over 130,000 species. Other than *Isoptera*, the order to which termites belong, *Hymenoptera* is the only other order to have evolved complex social systems with a division of labor. This order is by far the most beneficial to mankind because it contains not only the pollinators of plants (bees) but parasites and predators of insect pests. But what put them together in the same order to begin with?

Bees, wasps and alates (winged reproductive ants) have two pairs of wings, as opposed to flies which have only a single pair of wings. These wings contain hamuli, tiny hooks in a row that connect the forewing to the hindwing during flight. All members have chewing mouthparts, mandibles, and antennae with usually 10 or more segments. The stinger is a modified ovipositor, hence only the females can sting, and is used

for defense and offense. Metamorphosis is complete with the larvae being grublike and pupae formed in a cocoon. Fertilized eggs develop into females, whereas unfertilized eggs usually develop into males. Behaviorally they are categorized into parasitoid, social and solitary.

Even though bees and wasps belong to the same order and share many morphological/behavioral characteristics, there are equally as many (if not more) key differences which separate them. Some of the more obvious physical differences – bees are usually hairy, with robust bodies, while wasps tend to be more slender with shiny, smooth, exteriors. Additionally, wasps have a narrow “waist” connecting the thorax to the abdomen whereas bees look as if the two are fused. The legs of each insect differ as well. Wasp legs are more long and cylindrical (better to catch its prey with) where a bee’s legs are stouter and flattened, especially the back legs. Why the difference in body types? Well it’s all about what they eat.

Bees are technically vegans since they consume absolutely no animal products. No cheese, no milk, no eggs, not even yogurt infused with honey. Pollen and nectar are their sole food sources. Pollen supplies the protein, minerals, amino acids, vitamins and everything else except the carbohydrates, which come from the nectar. Stepping back a moment, actually more like 96 million years, angiosperms, or the flowering plants, co-evolved with bees. Flowers, with their brightly colored petals and enticing nectar depend on bees and other pollinators to distribute their pollen to other like-minded flowers, while bees depend on the pollen and nectar for food. I guess it is fair to say that both would not survive without the other. So which came first, the pollen or the pollinator? Ok, that’s a whole different story and a long standing debate; back to why bees are fuzzy.

Bees must visit numerous flowers in order to collect enough pollen to feed their baby sisters back at the hive. As a result they have evolved stout, hairy bodies to which the tiny pollen grains adhere to. Pollen covered bees begin to “wipe” themselves clean of the pollen that has collected on their head, body and forelegs. The pollen is moistened with nectar



Wasp.

during this process and moved to a specialized structure called the pollen basket or for you master beekeepers, the corbicula. Located on the hind legs, it’s a slightly concaved section surrounded by spiky hairs which helps to hold the pollen in place. Over time, the collected pollen forms a sphere. There are other bees with such structures – bumble bees, stingless bees, sweat bees and orchid bees to name a few. It’s always an exciting moment to witness a season’s first load of pollen being brought in because you know that spring is just around the corner.

Wasps on the other hand are omnivores, meaning they eat both plant and animal food – first like us. But they are predominately carnivorous, and they eat mostly insects. Depending on how they collect their food and whether or not they share it, determines how wasps are categorized. There are three arenas – parasitoid, solitary hunter, or social – to which wasps may belong. Bees on the other hand are categorized as either social or solitary. We will explore the complicated “social” world of both bees and wasps in Part II. For now lets begin with the first two arenas in which wasps are grouped.

Parasitoid wasps, which range in size and color, can be a gardener’s best friend. However, unless you are looking for them, they probably go completely unnoticed, as most of them are quite tiny. These particular wasps lay an egg or eggs inside or on the surface of their prey. These eggs hatch into larvae and consume the parasitized insect from the inside out or outside in. Not the most lovely mental image but, if you have numerous, fat, hornworms devouring the leaves on your tomato plant, or aphids sucking out precious nutrients, then I imagine you would

welcome these wasps to your garden to wreak havoc upon these pests, no matter how cruel. Having these wasps in the vicinity also keeps one from having to expose yourself and your garden to toxic and expensive insecticides.

Parasitoid wasps are usually host-species specific. For instance, the small braconid wasp, *Cotesia congregata*, only preys on tomato hornworms, and the tiny *Encarsia formosa* only whiteflies. This superfamily of wasps are viewed as beneficial since they control a whole array of agricultural pests – aphids, whiteflies, beetles, flies, scales, caterpillars and true bugs. For instance, when an aphid has been parasitized it becomes motionless, stops eating and eventually turns brown and appears swollen. These are called aphid mummies. If you look closely you may eventually see a hole appear in the abdomen where the adult wasp has chewed its way out.

Another type of wasp are the solitary hunters. These wasps hunt for a particular prey, sting it in order to paralyze it, then transports it home and stuffs it into a nest. The nest may be a hole in the ground, or a tube made out of mud, or a hollowed out plant. Once the nest is constructed and the nest provisioned with enough food, the wasp will lay an egg and seal the nest. The larva eventually emerges and consumes the food its mother has provided. These solitary hunters include many of the more common wasp species. Mud daubers, which love to construct tubes of mud along side your home, under eaves, inside your garage or bee equipment, are one example of this large group. If you've ever broken open a nest, then you may have seen either a half consumed spider or perhaps a very lethargic, motionless spider.

This particular category also contains one of the scariest looking wasps out there, the Cigar Wasp, often called the Cicada Killer. This wasp is roughly two inches long with a thick yellow and black body. Not only are they big, but when one flies by you it sounds like a helicopter. However, they are gentle giants, maybe not to cicadas. You practically have to force them to sting. They are not aggressive and fun to watch. They dig a hole in the ground, fly off in search of their prey and return and stuff the paralyzed cicada into the hole.

Carpenter bee.



Years ago we got a call here at the lab from a “terrified” woman telling me how her yard had been invaded with these large, pterodactyl looking “bees” that would not allow her or her children to exit their home. “Please come save them”, she whimpered. When I arrived on the scene there were 20 or so cicada killers flying around in their backyard. They had found the perfect nesting ground: sandy, loam soil, on a slight incline. As I approached the nesting location, it was a bit intimidating to have these large wasps flying around my head, but I quickly realized they were apathetic to my presence in their territory. Actually, one landed on my arm, just taking a breather I guess. The lady and her children’s faces were pressed up against the window, with mouths agape as they watched me put one of the wasps in my hand. They couldn’t believe I was actually in the midst of these killer “bees” and not writhing in pain from all the stings I was receiving. After much persuasion, I was able to lure the children out into the yard to see these fascinating wasps, but mom continued to refuse. Once the initial fear had dissipated, the kids loved observing these creatures up close and personal. They even saw one wasp fly in with a cicada and spend about 10 minutes trying to stuff it, pull it, drag it down the hole that had been excavated earlier.

Another very common solitary wasp is the velvet ant, aka, cow killer. These furry, brightly colored, mostly red to orange, wingless, female wasps resemble large ants. You will notice them running along in search of the immature stages of ground nesting

bees. The female will enter the nest and lay an egg. The immature wasp larvae are external parasites on the developing bees. But don’t be fooled by their “ant” like appearance. These wasps can deliver a painful sting if threatened.

As mentioned before, bees are grouped into two camps, social and solitary. Solitary bees, as the name implies, work on their own to raise their young and are valuable pollinators. They make a nest either by taking over one that already exists, digging burrows in the ground, or excavating nests in wood or plants. Digger bees, sweat bees, orchard mason bees, and carpenter bees are some examples of solitary bees. In this group, all females are fertile and provision their nest with food for the developing brood. These bees are rarely aggressive and if provoked their sting is very mild. Folks that usually do get stung are popped while working in the yard by a very common but tiny (4-10 mm) bee, the sweat bee. Sweat bees, as the name implies, are attracted to salt from human perspiration. They usually sting when trapped between folds of skin or aggressively handled. These beautifully marked or colored bees (metallic gold, blue, or green) can be observed wherever flowers are blooming.

Carpenter bees are probably the most annoying of all the bee species. First off, females excavate holes in the wood-boards around our homes, barns, garages, and sheds. These ‘galleries’ are the nesting sites for future generations. Even though they are considered to be pests, they do pollinate open-faced flowers, though they struggle with flowers with narrow,



*Cicada Killer.*

deep corollas, like, blueberry flowers. So, they've figured out a creative way they get around this by biting the side of the flower at the base, exposing the nectaries, and then extract the sweet substance they secrete. If you have carpenter bees in your area, check the base of your flowers and you may see these slits.

The males, which have yellow dots on their foreheads, are also a bit intimidating. During the early spring months, they become very territorial and will hover in the air just waiting for anything to come close. If something does enter the zone, they swoop down and make several passes around the intruder, sometimes even making physical contact. They will also fight tooth and nail with other

males to protect their nesting site. But don't be afraid, these males, like all males in the Hymenopteran order, have no stinger and therefore can not inject a painful sting. But they can be somewhat annoying.

Speaking of stings, honey bees and wasps are different in this arena as well. When a wasp stings its victim it doesn't die, and can sting multiple times, which makes for a bad day when one stumbles into a yellow jacket or bald face hornet's nest. When a honey bee stings she will die and it all has to do with the stinger. Honey bees are unique since they are the only member of Hymenoptera that carries a barbed stinger. Once the stinger embeds into the skin and the bee flies away she leaves behind the sting, the venom sac and the muscles that pump venom and push the sting further into the skin. Because of this physical insult she will die, but she seldom dies in vain.

I've yet to mention one of the biggest differences between bees and wasps; wasps don't make the honey that goes on my biscuits or in my tea. We'll continue next time with more morphological differences and the complex world of sociality in Part II.

See Ya! **BC**

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