

HOMEOWNER Guide to

by Edward Bechinski, Frank Merickel, Lyndsie Stoltman, and Hugh Homan BUL 854

# Bees





“... new thinking is that what really matters is how **quickly** you remove the sting, not **how** you remove it. The embedded sting continues pumping venom into the skin, so the sooner you remove it, the less pain you will experience.”

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**HONEY BEE**, *Apis mellifera*, forages for nectar and pollen. Four strains or races of European honey bees difficult for non-experts to distinguish occur around home landscapes in Idaho. **Nest:** Hives managed by bee keepers, or wild bees nest in home wall voids or inside hollow landscape trees. **Picnic pest:** Not unless picnic is near hive or feral hive. **Sting:** Bees sting painfully when defending their hive but do not deliberately or aggressively attack people. Act of stinging kills the honey bee. Photo from *thethoughtspot.com*



**AFRICANIZED HONEY BEES**, *Apis mellifera scutellata*, do not occur in Idaho because they cannot survive cold winters. Only experts can distinguish them from slightly larger European honey bees. **Nest:** Hives or feral nests similar to European cousins. **Picnic pest:** Mainly if hive/nest is disturbed. **Sting:** Delivers similar amount of venom as European honey bee, but thousands may attack if hive is disturbed. Photo by Scott Bauer/USDA-ARS



**BUMBLE BEES**, *Bombus* species, are robust, hairy, yellow-and-black relatives of the honey bee. They are non-aggressive and a benefit to home gardens. **Nest:** Nests of wax cells are built in old rodent burrows; sometimes in house wall voids and attics. **Picnic pest:** No. **Sting:** Can sting repeatedly and painfully; usually limited to unintentional contacts such as bare feet on grass. Photo from Ken Gray slide collection, Oregon State University



**SWEAT BEES**, *Agapostemon* species, are among solitary bees—beneficial pollinators that may resemble honey bees. **Nest:** Burrows in bare areas next to building foundations or at yard edges. **Picnic pest:** Mainly if nest is disturbed. **Sting:** Relatively mild. Bee is not aggressive. University of Idaho photo

MANY YELLOW AND BLACK BUZZING INSECTS—variously referred to as yellowjackets, hornets, wasps, and bees—are feared for their stings. Although stings from these insects indeed can be painful and even cause life-threatening allergic reactions in the most sensitive people, the bees that forage for nectar and pollen from flowers around residential landscapes normally pose a minimal sting hazard to people.

Except when highly allergic people regularly encounter bees around home landscapes, bees generally should be protected as beneficial pollinators of wild plants and cultivated fruits and vegetables.

This publication describes the biology and sting threat posed by honey bees, bumble bees, and their commonly encountered relatives. Also see companion publications by the University of Idaho Extension: BUL 852, Homeowner Guide to Yellowjackets, Bald-Faced Hornets, and Paper Wasps and BUL 853, Homeowner Guide to Minor Stinging Insects.

## COMMONLY ENCOUNTERED SPECIES

### HONEY BEES, MANAGED INSECTS

Honey bees, *Apis mellifera*, are the familiar medium size (about 3/8-inch-long) stout, black-grey bees with broad orange-brown bands around their bodies (Figure 1). Fine fuzzy, golden-white hairs cover their bodies, particularly the thorax—the middle section of the body where wings and legs attach.

Honey bees are social insects. Social means that they live together as a cooperating colony rather than as solitary individuals. Honey bee colonies consist of a single reproductive egg-laying **queen**, several hundred reproductive males called **drones**, and tens of thousands of sterile female **workers**. It is the worker honey bees that are encountered around Idaho homes, and these almost always are managed insects.

Managed means they are tended by bee keepers who maintain colonies of 30,000 to 50,000 workers in human-made hive boxes for honey production and commercial pollination services (Figure 2). These bees are the descendants of countless years of human selection among European honey bees for reduced



**Figure 1.** Honey bee forages for nectar and pollen. Photo by Dennis Schotzko, University of Idaho

aggressiveness, enhanced flower foraging, or increased honey production.

Honey bees are not native to North America but originated in Africa, Asia, and Europe. Four different strains or races of European honey bees occur around home landscapes in Idaho. These formally are designated as subspecies of *Apis mellifera* and include the Italian honey bee, *Apis mellifera ligustica*; Carniolian honey bee, *Apis mellifera carnica*; Caucasian honey bee, *Apis mellifera caucasica*; and dark honey bee, *Apis mellifera mellifera*. Races

differ only slightly in body color and hairiness and so are difficult for non-experts to distinguish.

Honey bees sting painfully when defending their hive but do not deliberately or aggressively attack people. Workers are alerted into stinging by vibrations next to their hives. Visual disturbances (such as dark, moving silhouettes) around hive openings also can induce stinging attacks. Don't block the return flights of foraging workers by standing in front of hives; workers may interpret your presence as a threat.





**Figure 2.** Bee keeper tends artificial hive boxes that house a honey bee colony. Almost all honey bees encountered around a home landscape are human-managed insects, not wild bees. Photo by R.L. Stoltz, UI



**Figure 3.** Honey bee swarms appear as clumps of hundreds of bees clinging to backyard trees. They'll usually depart on their own within a day or two. Or call a beekeeper to move them (swarm is the large oblong shape at right.) Photo by Paul Moorhead, University of Georgia, [www.insectimages.org](http://www.insectimages.org)



#### HONEY BEE QUICK FACTS

Honey bees sting painfully when defending their hive but do not deliberately or aggressively attack people. After stinging once, a honey bee dies.

- **AVOID VIBRATIONS** near hive: Workers are alerted into stinging by vibrations next to their hives.
- **DARK VISUAL DISTURBANCES** (such as dark, moving silhouettes) around hive openings can induce stinging attacks.
- **DON'T BLOCK RETURN FLIGHTS** of foraging workers by standing in front of hives; workers may interpret your presence as a threat.

**Sting anatomy.** Each honey bee only can sting one time because the act of stinging always kills the insect. The needle-like sting is tipped with tiny hooks that embed within the victim and cannot be retracted by the honey bee; the sting instead is ripped from the insect's body and left with the associated venom-producing gland in the victim's skin. Multiple stings per human victim are possible because several dozen workers respond to hive disturbances.

Encounters with stinging yellowjackets and paper wasps often are blamed on honey bees. Paper wasps and yellowjackets have smooth, barbless stings that allow an individual wasp to sting many times.

Individual worker honey bees foraging for nectar and pollen on flowers are docile. Flower beds may be visited simultaneously by dozens of honey bees, but they do not respond to human disturbance by coordinated mass-stinging. That only happens when the hive itself is threatened. Sting encounters around the home almost always are limited to an individual bee defensively stinging when accidentally stepped on with bare feet or trapped against bare skin.

**Dealing with swarms.** People sometimes are alarmed to find thousands of honey bees clinging together in a cluster on landscape shrubs. These are honey bee swarms (Figure 3). Bees swarm during spring if colonies get too big for available hive space. The queen flies off with part of the workers to start a new hive (usually after she produces a new queen that remains with the rest of the workers at the old hive). Worker bees cluster around the old queen until scout bees find a new, bigger hive site.

Swarms do not require any control action. Workers in swarms are less likely to sting than when encountered around their hive, but common sense dictates keeping your distance. Swarms naturally disperse to new nest sites in a day or two, or you can contact a local bee keeper who can capture and move the living swarm to a new site. See below.

Unless hypersensitive people are present, honey bee control in home landscapes only is warranted where colonies of feral or wild honeybees repeatedly come in contact with humans or pets. Control is not justified for workers foraging in landscape flowers.

#### IDAHO STATE DEPARTMENT OF AGRICULTURE MAINTAINS A REGISTRY OF IDAHO BEEKEEPERS

Contact the Idaho State Department of Agriculture (ISDA) Division of Plant Industries in Boise at **208.332.8620**. Someone there will assist you in locating a beekeeper who can capture and remove a honey bee swarm.



**Figure 4.** Honey bee nest and worker bees are exposed within a home wall void. Nest removal from buildings is a job for professional pest control services. Photo by Timothy Haley, USDA Forest Service, [www.insectimages.org](http://www.insectimages.org)

#### WILD HONEY BEES

Wild honey bee colonies rarely occur around homes in Idaho, but when they are encountered, control is a job best left to a professional. This is especially true for hives inside homes (Figure 4). If you repeatedly find numerous live honey bees around windows of one particular room or trapped inside ceiling light fixtures, there may be a hive in the attic or in the space between the exterior and interior walls.

It is not enough to simply kill colonies when they occur inside homes; hives must be physically removed, often by removing walls. Unless the hive is removed, dead bees will generate an intolerable stench, and stored honey might seep through walls into living quarters. Feral hives inside hollow landscape trees pose hazards when vibrations and other human disturbances provoke defensive stinging.

#### AFRICANIZED HONEY BEES—A THREAT IN IDAHO?

Africanized honey bees, *Apis*

*mellifera scutellata*, do not occur in Idaho. It seems unlikely they will permanently establish here because they cannot survive cold winter temperatures and because of scarce nectar during winters.

Africanized honey bees are the offspring from matings between European honey bees (*Apis mellifera*) and African honey bees (*Apis mellifera scutellata*). They are called “Africanized” because they have some traits typical of African honey bees. Aggressive sting behavior especially sets these bees apart from their more docile European relatives, earning Africanized bees the sensationalized name “killer bees.”

All Africanized bees in the U.S. are the offspring of 26 swarms of African honey bees that accidentally escaped into Brazil in 1957 during breeding studies to improve honey bee survival in the tropics. The escaped swarms rapidly reproduced and steadily dispersed, interbreeding with European honey bees and reaching the U.S. during 1990. Current U.S. distribution is



#### BEWARE OF AGGRESSIVE STING BEHAVIOR

Although Africanized bees do not occur in Idaho, honey bees that respond to disturbances with massive, sustained sting attacks should be considered suspect. Notify your local University of Idaho County Extension Office if you encounter honey bee hives that show these signs of unusual aggressive sting behavior.

Find the office for your county at <http://www.extension.uidaho.edu/find.asp>.

the southwestern states from the southern half of California, eastward through southern Nevada, Arizona, New Mexico, Texas, and western Oklahoma, with detections during 2005 in Arkansas, Louisiana, and Florida. Nests in these states have been found in just about any natural or artificial cavity big enough to protect the colony, including tree holes, crevices under rocks, stacked firewood, home utility boxes, and wall voids.

Africanized bees cannot survive cold winter temperatures. They also do not store as much honey as European honey bees and so are limited to regions where year-round flowers provide a nectar food source. Scientists think that permanent, year-round colonies will be restricted to the southern third of the U.S. More northern states like Idaho periodically could see temporary colonies that die out during the winter. It is difficult to precisely predict the northern limits of overwintering survival. That will depend in part on the degree of cold-hardiness that hybrid offspring inherit from their European parents.



**Figure 5.** Bumble bees are robust, hairy, yellow-and-black relatives of the honey bee. They are non-aggressive and a benefit to home gardens. Photo © Musat/dreamstime.com

### Physical look, sting differences

Africanized honey bees are nearly physically identical to European honey bees. Only experts can recognize the minute differences in body features between the two. The sting venoms of European and Africanized honey bees likewise are nearly identical. In particular, Africanized bees do not produce more “poisonous” venom than European bees. Both types of honey bees also deliver the same amount of venom per sting. If anything, Africanized bees inject less venom per sting because they are slightly smaller than European honey bees. Both types additionally are similar in that each individual bee only can sting one time before it dies.

The significant difference between Africanized and European honey bees is stinging behavior. While 50 or fewer European honey bees typically respond to hive disturbances, thousands of Africanized bees respond to hive disturbance. Once provoked, Africanized bees remain agitated for hours, stinging any perceived threat to their hive and chasing any intruder up to 1/4-mile. In contrast, European bees stop pursuit within

30 feet of their hive. Africanized bees also are more sensitive to disturbance; they can sense people up to 50 feet from the hive and vibrations from lawn mowers and weed trimmers up to 100 feet away.

### BUMBLE BEES NEST IN GROUND, HOUSE WALLS, ATTICS

Like honey bees, bumble bees (*Bombus* species) are familiar to everyone with a backyard flower garden. They are the large (up to 1 1/4-inch long), heavy-bodied black colored bees that are densely covered with fuzzy yellow (or sometimes orange) hairs (Figure 5). Bumble bees also are social insects.

They build nests of wax cells in old rodent burrows and sometimes in house wall voids and attics. Nest control and removal inside buildings should be handled by professionals. Nests house anywhere from a few dozen to a few hundred workers and their queen (Figure 6). Nests die out each year; only the mated queen bumble bee survives the winter.

Like honey bees, bumble bees are highly beneficial pollinators that should be protected unless nest



**Figure 6.** Bumble bees build underground nests that consist of round wax cells. Photo from Ken Gray slide collection, Oregon State University

location puts bees in routine contact with sensitive people. Bumble bee nests in secluded spots at safe distances from human activities do not require control action; these nests can be left to naturally die out during fall. **Insecticidal control is warranted only in those rare circumstances where people repeatedly disturb nearby nests.** Table 1 lists recommended insecticides for use by homeowners.

**Sting behavior.** Bumble bees are relatively docile around residential landscapes; stinging mainly is limited to unintentional contacts with bees foraging for nectar and pollen on flowers. Barefooted children sometimes are stung by bumble bees (and honey bees) in lawns with blooming clover. The sting of the bumble bee is barbed, but not to the degree of the honey bee, so each individual bumble bee can sting repeatedly and painfully.

### SWEAT BEES AND OTHER GROUND-NESTING SOLITARY BEES: NOT AGGRESSIVE

Several types of small-to medium-sized bees sometimes are seen flying in and out of burrows from bare areas next to building foundations or exposed cuts of dry soil along the edges of yards (Figure 7). Some species resemble honey bees, others are metallic blues and greens (Figure 8), and still other types look like small slender wasps. Ground-nesting bees especially cause concern around homes when favorable sites





**Figure 7.** Several different types of ground-dwelling solitary bees dig nests in bare soil around home landscapes, leaving small mounds of soil around each nest burrow. The head of a bee is barely visible within the nest opening at the pointing finger. Photo by Edward Bechinski, University of Idaho

allow hundreds of bees to build nests next to each other. Although they appear to be a single colony, they instead work independently as individuals to dig and provision nests where they rear their young.

Ground-nesting solitary bees are beneficial pollinators that deserve protection. They can sting but seldom pose a hazard that justifies control action. None is aggressive. The sting of many (such as the familiar sweat bee) is relatively mild.

**Best control strategy—grow something.** If ground-nesting solitary bees routinely nest in your yard, the best control strategy is to permanently eliminate bare, dry patches of soil. Re-seed nest sites during the spring before bee activity begins by planting grass or vine ground covers or by covering the ground with fabric weed barrier and several inches of landscape mulch.

Insecticides are a control measure of last resort to be applied only when solitary bees pose unavoidable sting threats. Insecticides that can be applied to nests of solitary bees around home landscapes are listed in Table 2.



**Figure 8.** Sweat bees (*Agapostemon* species) are one of many commonly encountered ground-nesting solitary bees in Idaho. Photo © Websubstan/dreamstime.com

## REACTIONS TO BEE STING VENOMS

“Sting” and “bite” commonly are used—but incorrectly—as equivalent terms. Biting literally is use of mouthparts. Some wasps really do bite; they defend themselves by nipping at attackers with their jaws. But the painful welt that results from bee or wasp attack properly is called a sting, not a bite.

Stinging insects deliver venom into their victims by means of a needle-like apparatus—the sting (colloquially, stingers)—located at the tip of the abdomen. Only female insects can sting. This is because the sting is a highly modified egg-laying tube (technically called the ovipositor) that through the course of evolutionary time became modified for injecting venom. Males cannot sting; they obviously lacked an egg-laying device that evolutionary selection could alter into a sting.

**Localized reactions to bee stings**  
Pain associated with stinging insects comes not from the sting itself but

rather from the venom it delivers. Bee venoms are complex mixtures of proteins and other organic chemicals. Some venom chemicals cause intense pain, others kill cells and cause swelling, and still other chemicals spread the venom beyond the initial sting site.

Most people react to sting venoms with moderate to intense pain, itching, redness, and swelling immediately surrounding the sting site. In the majority of cases, symptoms go away without treatment in a few hours to several days. Sometimes delayed reactions (such as hot, red swelling of a leg or arm) can last a week.

### Toxic reactions from multiple bee stings

Multiple simultaneous stings can deliver enough venom to cause toxic injury even in people not considered “sensitive” to venom. Human deaths from mass stinging are physiologically possible but extremely rare. The fatal dose of honey bee venom in humans is estimated as about 8 or 9 stings for every pound of a person’s body weight. To put the actual hazard



in perspective, an adult could sustain many hundreds of stings without approaching the lethal threshold. Proportionally fewer stings are potentially hazardous to children, the elderly, and the chronically ill.

### Allergic reactions to bee stings

Systemic (whole-body) allergic reactions to sting venoms occur in 1 to 3 percent of the population and cause about 50 deaths annually in the

United States. Allergic reactions to stings involve the body's immune response and require at least two sting episodes: the first sting episode sensitizes the person, and the next sting event causes a dangerous over-reaction of the person's immune system.

Venoms contain foreign proteins (antigens) that cause a body to produce its own protective proteins—antibodies called immunoglobulin E

or IgE for short—that occur on certain body tissues. After the first sting, the body “remembers” the venom and more quickly produces IgE. Venom antigens bind together with IgE antibodies, causing certain body tissues to release histamines and other chemicals into the blood stream. Histamines cause blood vessels to open wider, capillary walls to become more permeable to fluids (so as to flush the venom away), and

**Table 1.** Insecticides for directed application to **bumble bee nests** in home landscapes include liquid and dusts. Liquid sprays applied into the nest opening generally are more effective than dry dusts because sprays can quickly drench the entire nest; they also can be applied from greater distances and so pose reduced sting hazard. Regardless, only apply insecticides to nests from a safe distance during the night when bumble bees are less active. Remember that insecticidal control is warranted only in those rare circumstances where people repeatedly disturb nearby nests.<sup>1</sup>

ACTIVE INGREDIENTS AND PRODUCT NAMES	MANUFACTURER	FORMULATION	LABEL <sup>3</sup> SIGNAL WORDS
<b>DELTAMETHRIN</b>			
Bonide Termite & Carpenter Ant Dust	Bonide	0.05% RTU <sup>2</sup> dust	caution
Bonide Termite & Carpenter Ant Killer	Bonide	0.02% RTU spray	caution
Green Light Roach, Ant & Spider Control	Chemsico	0.02% RTU spray	caution
Hi-Yield Kill-A-Bug II	Voluntary Purchasing Groups	0.02% RTU spray	caution
<b>DELTAMETHRIN + BIOALLETHRIN</b>			
Pro Exterminator Residual Crawling Insect Killer Plus	Waterbury	0.02% + 0.05% RTU spray	caution
<b>PERMETHRIN</b>			
Bonide Home Garden & Pet Dust	Bonide	0.25% RTU dust	caution
Bonide Spider & Ground Bee Killer	Bonide	0.25% RTU dust	caution
Bonide Total Pest Control	Bonide	13.3% liquid concentrate	warning

<sup>1</sup> Table 1 ONLY lists homeowner insecticides that specifically name on the label “bee nests in home landscapes” as pesticide application sites. Many additional insecticides are available as perimeter sprays around home exteriors or as directed sprays to nests of wasps and other stinging insects hanging from buildings, but those products are NOT included here.

NOTES with Tables 1 and 2:

<sup>2</sup> RTU = Ready-to-Use without any measuring or mixing.

<sup>3</sup> Label signal words identify the comparative acute toxicity of pesticides if ingested, inhaled, or contacted on the skin:

- CAUTION = slightly toxic
- WARNING = moderately toxic
- DANGER-POISON = highly toxic
- DANGER (without the accompanying word POISON) designates corrosive pesticides that can cause permanent eye and skin injury.

**Table 2.** Insecticides for application to **ground-dwelling solitary bee nests** in lawns and around landscape plants.<sup>4</sup>

ACTIVE INGREDIENTS AND PRODUCT NAMES	MANUFACTURER	FORMULATION	LABEL <sup>3</sup> SIGNAL WORDS
<b>PERMETHRIN</b>			
Bonide Home Garden & Pet Dust	Bonide	0.25% RTU <sup>2</sup> dust	caution
Bonide Spider & Ground Bee Killer	Bonide	0.25% RTUdust	caution

<sup>4</sup> Table 2 ONLY lists homeowner insecticides that specifically name on the label “ground bee nests in home landscapes” as pesticide application sites. Many additional insecticides are available as perimeter sprays around home exteriors or as directed sprays to nests of wasps and other stinging insects hanging from buildings, but those products are NOT included here.



### GENERAL FIRST AID FOR BEE STINGS

Always consult your physician about pain medicines and other first-aid advice. Information presented here does not substitute for professional medical recommendations.

Immediately confer with your physician or emergency medical services if the victim:

- Is stung around the head and neck or inside the mouth
- Is stung several times
- Already has been stung during the previous week
- Is very young or very old
- Cannot breathe easily, has difficulty swallowing, or feels dizzy
- Develops hives that spread over the body; or has a very large swollen welt
- Has a known hypersensitivity to stings

If you have been stung by a honey bee, immediately remove the sting and the attached poison sac. It seems that everyone has advice about the right way to remove bee stings, but new thinking is that what really matters is how quickly you remove the sting, not how you remove it. The embedded sting continues pumping venom into the skin, so the sooner you remove it, the less pain you will experience. Other aids:

- Apply ice compresses to reduce swelling and pain;
- Over-the-counter oral pain medicines and antihistamines provide relief from pain and itching;
- Wash the sting area with soap to reduce the chances of subsequent infection; confer with your physician if reddish streaks develop from the sting; this may be a sign of secondary infection.



Photo © Tuan/dreamstime.com

lung air passages to constrict.

For most people, the allergic reaction is local swelling and itching around the sting site. The same immune reaction occurs in hypersensitive people, but they quickly release large amounts of histamines throughout their entire body, lowering blood pressure and causing respiratory distress. Hypersensitization to venom proteins only requires a single sting. "Hay fever" allergens do not sensitize people to bee venoms.



#### WARNING!

Anyone who has ever suffered an allergic reaction to any stinging insect should consult with his/her physician about allergen testing and venom desensitizing immunotherapy.

Sting venom of honey bees differs enough chemically from sting venoms of yellowjackets and paper wasps to generate its own specific allergic reaction, so even hypersensitive people usually (but not always) are only allergic to honey bees or only to yellowjackets and their relatives. Sting venoms of yellowjackets, bald-faced hornets, and paper wasps share enough chemical similarities that some people have allergic cross-reactions to all these species.

**To Order more copies** of this publication, or *BUL 852 Homeowner Guide to Yellowjackets, Bald-faced Hornets, and Paper Wasps*, or *BUL 853 Homeowner Guide to Minor Stinging Insects*, contact the University of Idaho College of Agricultural and Life Sciences Publications Warehouse at (208) 885-7982, or e-mail [calspubs@uidaho.edu](mailto:calspubs@uidaho.edu).

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#### **PESTICIDES DISCLAIMER**

ALWAYS read and follow the instructions printed on the pesticide label. The pesticide recommendations in this UI publication do not substitute for instructions on the label. Due to constantly changing pesticide laws and labels, some pesticides may have been cancelled or had certain uses prohibited. Use pesticides with care. Do not use a pesticide unless both the pest and the plant, animal, or other application site are specifically listed on the label. Store pesticides in their original containers and keep them out of the reach of children, pets, and livestock. Trade names are used to simplify the information; no endorsement or discrimination is intended.

#### **Pesticide Residues**

Any recommendations for use are based on currently available labels for each pesticide listed. If followed carefully, residues should not exceed the established tolerances. To avoid excessive residues, follow label directions carefully with respect to rate, number of applications, and minimum interval between application and reentry or harvest.

#### **Groundwater**

To protect groundwater, when there is a choice of pesticides, the applicator should use the product least likely to leach.

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