
BEE AND WASP STINGS

Integrated Pest Management for Home Gardeners and Landscape Professionals

Nearly everyone has been stung by an insect at one time or another. It's an unpleasant experience that people hope not to repeat, but for most people the damage inflicted is only temporary pain. Only a very limited portion of the population—one to two people out of 1,000—is allergic or hypersensitive to bee or wasp stings. Although this publication is about stings from bees and wasps, the information pertains to stings from fire ants as well.

Stinging insects are limited to the order Hymenoptera, which includes wasps, bees, and ants. The stinger is a modified egg-laying apparatus, so only females can sting. Most hymenopterans live solitary lives, and their behavior is more likely to be flight than fight. Social hymenopterans—including yellowjackets (Fig. 1), honey bees (Fig. 2), bumble bees (Fig. 3), and fire ants—have individuals in the colony whose task it is to defend the nest. If the nest is disturbed, these individuals will defend it vigorously. In addition, foraging members of the colony also will sting if they are disturbed or injured as they go about their activities. Some, such as the yellowjacket, are much more likely to attack than others. For more information on the behavior, biology, and management of this insect, see *Pest Notes: Yellowjackets and Other Social Wasps* listed in References.

The Africanized honey bee is closely related to the European honey bee, which is used in agriculture for crop pollination and honey production. The two types of bees look the same, and their behavior is similar in many respects. Neither is likely to sting when gathering nectar and pollen from flowers, but both will sting in defense if provoked.

An individual Africanized bee can sting only once and has the same venom as the European honey bee. However, Africanized honey bees are less predictable and more defensive than European honey bees. They are more likely to defend a greater area around their nest, and they respond faster and in greater numbers than the European honey bee.

SINGLE STINGS

Stingers are effective weapons because they deliver a venom that causes pain when injected into the skin. The major chemical responsible for this is melittin; it stimulates the nerve endings of pain receptors in the skin. The result is a very uncomfortable sensation, which begins as a sharp pain that lasts a few minutes and then becomes a dull ache. Even up to a few days later, the tissue may still be sensitive to the touch.

The body responds to stings by liberating fluid from the blood to flush venom components from the area. This causes redness and swelling at the sting site. If this isn't the first time the person has been stung by that species of insect, it is likely that the immune system will recognize the venom and enhance the disposal procedure. This can lead to very large swelling around the sting site or in a whole portion of the body. The area is quite likely to itch. Oral and topical antihistamines should help prevent or reduce the itching and swelling. Try not to rub or scratch the sting site, because microbes from the surface of the skin could be introduced into the wound, resulting in an infection.

When the sting is caused by a honey bee, the stinger usually remains in the



Figure 1. Yellowjacket.



Figure 2. Honey bee.



Figure 3. Bumble bee.

skin when the insect leaves because the stinger is barbed. Remove the stinger as quickly as possible because venom continues to enter the skin from the stinger for 45 to 60 seconds following a sting. Much has been written about the proper way to remove a bee stinger, but new information indicates it doesn't matter how you get it out as long as it is removed as soon as possible. Fingernails or the edge of a credit card are both effective tools. If a stinger is removed within 15 seconds of the sting, the severity of the sting is reduced.

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After the stinger is removed, wash the wound and treat it. Several over-the-counter products or simply a cold compress can be used to alleviate the pain of a sting. Aerosol or cream antihistamine preparations that contain a skin coolant also can help. If the sting is followed by severe symptoms or if it occurs on the neck or mouth, seek medical attention immediately, because swelling in these areas of the body can cause suffocation.

Anaphylaxis

A small percentage of the population is allergic to wasp or bee stings. If you suspect that you or a family member might be allergic or is developing an allergy, go to a physician or allergist for testing. Allergic reactions to bee or wasp stings can develop anywhere on the body and may include non-life-threatening reactions such as hives, swelling, nausea, vomiting, abdominal cramps, and headaches. Life-threatening reactions such as shock, dizziness, unconsciousness, difficulty breathing, and laryngeal blockage resulting from swelling in the throat require immediate medical care. Symptoms can begin immediately following the sting or up to 30 minutes later and may last for hours.

In allergic persons, venom components circulating in the body combine with antibodies that are associated with mast cells resting on vital organs. The mast cells release histamine and other biologically active substances. This results in a leakage of fluid out of the blood and into the body tissues. Blood pressure drops dangerously low, and fluid builds up in the lungs. If this response isn't reversed within a short time, the patient may die of anaphylactic shock.

Anaphylaxis, if treated in time, usually can be reversed by the effects of epinephrine (adrenaline) injected into the body. Individuals who are aware that they are allergic to stings should carry an epinephrine injection device whenever they think they may encounter stinging insects. Epinephrine is obtainable

only by prescription from a physician. Antihistamines potentially have value in combating non-life-threatening reactions but should be used according to a physician's instructions.

Another method of combating anaphylaxis is desensitization. In this approach, the patient is subjected to injections of the venom to which he or she is allergic in increasing doses over a period of time. Like hay fever shots, the tactic is to build up a protective concentration of antibodies in the blood that will intercept and tie up the venom components before they can reach the antibodies on the mast cells. Desensitization with pure venom works about 95% of the time.

MULTIPLE STINGS

Mass Envenomation

Occasionally a person becomes involved in a situation where he or she is stung many times before being able to flee from the nesting site. Depending on the number of stings, the person may just hurt a lot, feel a little sick, or feel very sick. Humans can be killed if stung enough times in a single incident. With honey bees the toxic dose (LD₅₀) of the venom is estimated to be 8.6 stings per pound of body weight. Obviously, children are at a greater risk than adults. In fact, an otherwise healthy adult would have to be stung more than 1,000 times to be in risk of death. Most deaths caused by multiple stings have occurred in men in their 70s or 80s who were known to have poor cardiopulmonary functioning.

Renal Insufficiency

A second, potentially life-threatening result of multiple stings occurs days after the incident. Proteins in the venom act as enzymes; one dissolves the cement that holds body cells together, while another perforates the walls of cells. This damage liberates tiny tissue debris that normally would be eliminated through the kidneys. If too much debris accumulates too quickly, the kidneys become clogged and the patient is in danger of dying

from kidney failure. It is important for persons who have received many stings at one time to discuss this secondary effect with their doctors. (Wasp stings are as potent in this respect as bee stings.) Patients should be monitored for a week or two following an incident involving multiple stings to be certain that no secondary health problems arise.

AVOIDING STINGS

Bees and wasps can be attracted to, or may react to, odors in the environment. It is best not to use perfume, cologne, or scented soaps if you are going into an area of bee and/or wasp activity. Unless someone accidentally collides quite hard with or swats at a bee or wasp, it is not likely to sting. Avoid going barefoot in vegetation, especially clover and blooming ground covers. Also avoid wearing brightly colored or patterned clothing. If you remain calm when a bee or wasp lands on your skin to inspect a smell or to get water if you are sweating heavily, the insect eventually will leave of its own accord. If you don't want to wait for it to leave, gently and slowly brush it away with a piece of paper. When swimming in pools, watch out for bees or wasps trapped on the surface of the water. If you find bees or wasps in the water, it's best to remove them to avoid being stung.

Stinging incidents often occur when nesting areas of social insects are disturbed. Be observant of the area around you. If you see insects flying to and from a particular place, avoid it. If you are going to be in an area where disturbing a nest is likely, wear long pants and a long-sleeved shirt. It might be a good idea to carry a military surplus, collapsible mosquito/gnat veil with you. Stinging insects often fly around the top of their targets. Because stings in the face can be disorienting, put on the veil, or pull a portion of your shirt over your head, and run away. Be sure that you can see where you are going. Insect repellent applied to your skin or clothing won't deter these stinging insects.

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For more information, contact the University of California Cooperative Extension office in your county. See your telephone directory for addresses and phone numbers, or visit <http://ucanr.org/ce.cfm>.



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REFERENCES

Ebeling, W. 1978. *Urban Entomology*. Oakland: Univ. Calif. Agric. Nat. Res. Also available online, <http://www.entomology.ucr.edu/ebeling/>.

Mussen, E. R. May 2011. *Pest Notes: Yellowjackets and Other Social Wasps*. Oakland: Univ. Calif. Agric. Nat. Res. Publ. 7450. Also available online at <http://www.ipm.ucdavis.edu/PMG/PESTNOTES/pn7450.html>.

Russell, F. E. 1991. Venomous arthropods. *Vet. Hum. Toxicol.* 33(5):505–508.

Schmidt, J. O. 1992. Allergy to venomous insects. In J. Graham, ed. *The Hive and the Honey Bee*. Hamilton, IL: Dadant & Sons. ❖

WARNING ON THE USE OF CHEMICALS

Pesticides are poisonous. Always read and carefully follow all precautions and safety recommendations given on the container label. Store all chemicals in the original, labeled containers in a locked cabinet or shed, away from food or feeds, and out of the reach of children, unauthorized persons, pets, and livestock.

Pesticides applied in your home and landscape can move and contaminate creeks, rivers, and oceans. Confine chemicals to the property being treated. Avoid drift onto neighboring properties, especially gardens containing fruits or vegetables ready to be picked.

Do not place containers containing pesticide in the trash or pour pesticides down the sink or toilet. Either use the pesticide according to the label, or take unwanted pesticides to a Household Hazardous Waste Collection site. Contact your county agricultural commissioner for additional information on safe container disposal and for the location of the Household Hazardous Waste Collection site nearest you. Dispose of empty containers by following label directions. Never reuse or burn the containers or dispose of them in such a manner that they may contaminate water supplies or natural waterways.

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