

Safety and Health Tech Tips

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Insect Stings and Bites: Basic Information About Bees, Wasps, and Ants

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First aid kits purchased by the Forest Service, U.S. Department of Agriculture (USDA), no longer contain epinephrine, a medication used by persons allergic to insect stings and bites (Forest Service Manual, FSM 6700, chapter 6723). Forest Service employees need to know what they should do if they are allergic to insect stings and bites or if they will be working with someone who is. This tech tip describes ways employees can prevent insect stings and bites, provide first aid for insect stings and bites, and recognize the warning signs of an allergic reaction. Although rare, the most serious allergic reaction, anaphylaxis, can be fatal.

Highlights...

- Awareness is the key to preventing insect stings and bites. Forest Service employees need to recognize stinging and biting insects and know where they're most likely to be encountered.
- Forest Service first aid kits no longer contain epinephrine to help control allergic reactions to insect stings or bites.
- Allergic reactions to insect stings or bites can be life threatening.
- People who know they are allergic to insect stings or bites should get a prescription so they can carry epinephrine when working in the field.

Preparing for the Field

Before venturing outdoors, anyone who is allergic to insect stings or bites should inform their supervisor and coworkers about their condition and the possible danger if they were to be stung.

It's important to distinguish an allergic reaction from the normal reaction to insect stings and bites. Swelling, redness, and itching around the sting or bite are normal. Itching and hives far from the sting or bite are signs of an allergic reaction.

Forest Service employees should identify the potential for insect stings and bites in a Job Hazard Analysis (JHA) before going to the field. The JHA should advise anyone who is allergic to insect stings or bites and has experienced allergic reactions to visit a doctor, get a prescription for epinephrine, carry the epinephrine at all times, and be aware of the expiration date. An autoinjection delivery device, such as an EpiPen, allows people to give themselves a shot of epinephrine (figure 1). Use the JHA to document the exceptional case where epinephrine can be carried in a crew's first aid kit.



Figure 1—Field-going employees who know they are allergic to insect stings or bites should carry an autoinjection device to give themselves a shot of epinephrine.



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Coworkers should know where the kit is in case they need to provide first aid. During regularly scheduled safety meetings, employees should be told that all workers may be at risk for an allergic reaction to an insect sting or bite—even if they have never before suffered an allergic reaction. Employees should know the warning signs of an allergic reaction and monitor any employee who is stung or bitten. It is okay to ask whether anyone has ever had an allergic reaction to insect stings or bites.

Tips To Prevent Being Stung or Bitten

Knowing about stinging and biting insects may help you avoid them. Stinging and biting insects usually attack

when they're defending their territory. Be aware of your surroundings. If you are close to a nest (figure 2), remain calm and quiet while moving away slowly. Remember, some insects nest underground.

Some tips include:

- Avoid wearing brightly colored clothes or perfumes, lotions, or other scented products that may attract insects.
- Be alert for insects when you are eating, drinking, or cooking; the scent of food attracts insects.
- Wear pants that seal at the ankle and shirts that seal at the wrist to prevent insects from getting inside your clothing.
- Do not swat or crush insects; when some insects are injured, they send chemical signals that incite other insects to attack.



Figure 2—Watch where you walk. This wasp nest was built on a low-growing shrub. Courtesy of Whitney Cranshaw, Colorado State University, <http://www.insectimages.org>.

If You're Attacked

If you're attacked by a swarm of stinging insects—run away! Insects are probably protecting their nest and view you as an intruder. The longer you stay, the more likely you are to be stung. Pull your shirt or jacket over your head to protect your face and airways. Keep running until the insects stop chasing you or you reach a safe area, such as a vehicle or building. Check for stings and remove any venom sacs and stingers. Monitor yourself for signs of an allergic reaction and seek medical attention if necessary.

The color and size of individual insects may vary widely; when possible bring the insect with you for identification if you're seeking treatment.

Recognizing Stinging and Biting Insects

The stings or bites of a number of insects might trigger an allergic reaction that could lead to life-threatening shock. Becoming aware of these insects and learning to avoid them is the first step to preventing stings and bites.

The insects that are most likely to trigger an allergic reaction are:

- Wasps
- Bees
- Fire ants

Wasps (such as yellow jackets and bald-faced hornets) have a straight stinger that they can use again and again (figure 3). Bees (such as honeybees and Africanized honeybees) have a barbed stinger that becomes embedded in the skin, preventing them from stinging more than once.

Fire ants can pivot as they bite, leaving a circular cluster of bites (figure 4). The following information from the EpiPen Web site (<http://www.epipen.com>) may help you identify stinging and biting insects and their nests in your work area.



Figure 4—In less than 10 seconds, an unwary scientist was stung over 250 times on one leg when he carelessly knelt on a collapsed fire ant mound. The pustules (similar to blisters but filled with pus) developed to this stage in 3 days. Courtesy of Daniel Wojcik, <http://www.insectimages.org>.

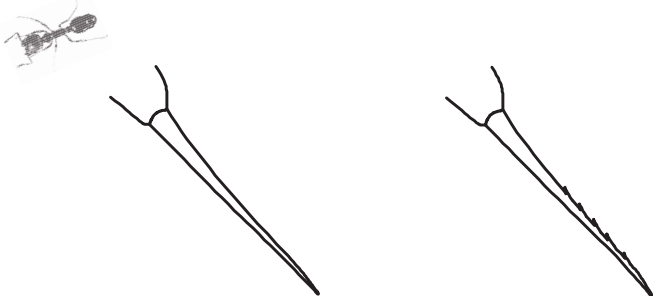
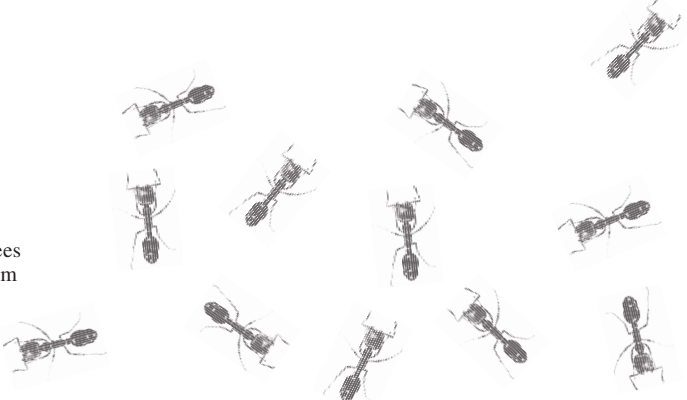


Figure 3—Wasps have a straight stinger they can use again and again; bees have a barbed stinger that becomes embedded in the skin, preventing them from stinging more than once.



Wasps (figure 5)

- Appearance:** Elongated bodies up to 1 inch long; black, brown, or red with yellow markings.
- Nests:** Exteriors of buildings, woodpiles, and shrubs.
- Range:** Throughout North America.
- Behavior:** Aggressive, but not as easily provoked as fire ants or Africanized honeybees.
- Stings:** Can sting repeatedly.



Figure 5—An adult wasp at a nest. A wasp chews wood fibers from weathered wood (inset photo). Courtesy of David Cappaert, Michigan State University, and Whitney Cranshaw, Colorado State University (inset photo), <http://www.insectimages.org>.

Yellow Jackets (figure 6)

- Appearance:** $\frac{1}{2}$ to $\frac{3}{4}$ inch long; black with yellow markings.
- Nests:** Papery nests in the ground or in wall crevices.
- Range:** Worldwide.
- Behavior:** Versatile and persistent pests. Not as easily provoked as fire ants or Africanized bees, but highly aggressive—particularly as weather cools in the late summer or early fall.
- Stings:** Can sting repeatedly.



Figure 6—A western yellow jacket sunning on a leaf. Yellow jackets rebuilding a damaged nest (inset photo). Courtesy of Whitney Cranshaw, Colorado State University and Edward L. Manigault, Clemson University Donated Collection (inset photo), <http://www.insectimages.org>.

Bald-Faced Hornets (figure 7)

- Appearance:** Up to 1 inch long; black or brown with hints of yellow, white, or orange.
- Nests:** Brown or gray football-shaped hives of a papery substance high above ground level.
- Range:** Throughout North America.
- Behavior:** Extremely protective of their nests; more aggressive than honeybees, but not as feisty as fire ants or Africanized bees.
- Stings:** Can sting repeatedly.



Figure 7—A bald-faced hornet sipping sap from a tree wound. A bald-faced hornet nest still under construction (inset photo). Courtesy of Jerry A. Payne, USDA Agricultural Research Service and Howard Ensign Evans, Colorado State University (inset photo), <http://www.insectimages.org>.

Honeybees (figure 8)

- Appearance:** ½ inch long; rounded, hairy, dark brown body with bright yellow markings.
- Nests:** Hives in beekeepers' boxes, bushes, trees, building niches.
- Range:** Worldwide.
- Behavior:** Not terribly aggressive; sting only when challenged directly.
- Stings:** Can sting only once; they lose their stinger and die.



Figure 8—A honeybee on a honeycomb. A honeybee nest (about a foot wide and 1½ feet deep) on a tree limb in an overgrown thicket, well protected from the elements (inset photo). Courtesy of Jack Dykinga, USDA Agricultural Research Service and Timothy Haley, USDA Forest Service (inset photo), <http://www.insectimages.org>.

Africanized Honeybees (figure 9)

- Appearance:** ½ inch long; rounded, hairy, dark brown body with bright yellow markings like honeybees.
- Nests:** Honeybee hives, or any partially protected site (old farm machinery, fences, house exteriors).
- Range:** Spreading from the Southwest to more populated areas.
- Behavior:** Very aggressive, temperamental, easily provoked, and fiercely protective of territories up to half a mile from their nest.
- Stings:** Can sting only once, like the honeybee, but they attack in swarms.



Figure 9—An Africanized honeybee (left) and a European honeybee on a honeycomb. Africanized honeybees surround a European queen honeybee, marked with a pink dot (inset photo). Courtesy of Scott Bauer, USDA Agricultural Research Service, <http://www.insectimages.org>.

Fire Ants (figure 10)

- Appearance:** Usually ¼ inch long; bright reddish-brown in color, can be dark brown to black.
- Nests:** Mounds up to 18 inches high, 3 feet wide aboveground, with underground tunnels.
- Range:** As far north as Nevada in the West and Washington, DC, in the East.
- Behavior:** Very aggressive territorial behaviors; attack in swarms with little warning or provocation.
- Stings:** Can sting up to seven or eight times, causing burning, itching, and pustules.

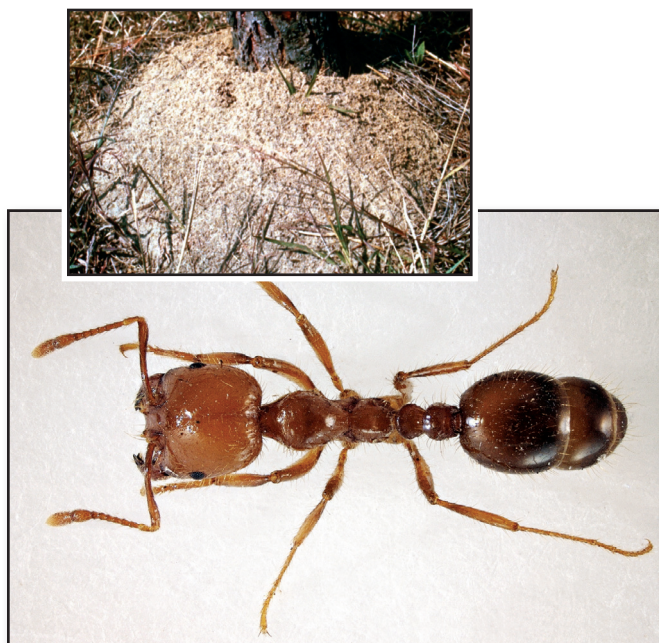


Figure 10—The color and size of fire ants can vary, from an entirely black body to a red-orange brown body with a brown head. Length ranges from 3 to 5 millimeters. A fire ant mound at the base of a pine tree (inset photo). Courtesy of Pest and Diseases Image Library and University of Georgia Archive, University of Georgia (inset photo), <http://www.insectimages.org>.

General Treatment for Insect Stings and Bites

All individuals suffering from insect stings and bites should be watched for signs of an allergic reaction (see sections discussing allergic reactions).

General treatment for insect stings and bites includes:

- If you've been stung by a bee, look for the barbed stinger and venom sac that may be embedded in your skin. The stinger will look like a little black dot in the center of the wound. Do not use your fingers or tweezers to remove it. Doing so might pinch the venom sac, forcing venom into the wound. It's best to remove the venom sac and stinger by scraping the area with a straight-edged object, such as a credit card or driver's license. If you've been attacked by fire ants, brush them off. Take off rings and tight-fitting jewelry.
- Wash the area of the sting or bite with soap and water or with an antiseptic wipe.
- Elevate the affected area and use ice or a cold compress to reduce swelling and pain.
- If needed, apply a topical steroid ointment or take an over-the-counter oral antihistamine, such as Benadryl or Chlor-Trimeton to help reduce swelling, itching, and redness. An anesthetic spray containing benzocaine, such as Solarcaine, may provide some pain relief. Hydrocortisone cream or calamine lotion applied to the skin may help relieve itching and swelling. Be sure to follow all labels and instructions on the medications. If you've been bitten by fire ants, do not break the pustules (figure 11).



Figure 11—Damage from a fire ant bite. Courtesy of USDA Animal and Plant Health Inspection Service, Plant Protection and Quarantine Archive, <http://www.insectimages.org>.

- Monitor yourself or the patient for symptoms of anaphylaxis (see the “Anaphylaxis” section).
- Get emergency medical help immediately if you (or someone else) are stung or bitten and begin showing signs of an allergic reaction.

Allergies to Stinging and Biting Insects

People who suffer allergic reactions can be unaware of their allergy until after they have been stung or bitten. Current estimates of the United States population at risk of suffering an allergic reaction range from 0.5 to 5 percent, or about 13 million people. Each year about 100 people die in the United States from anaphylaxis due to insect stings or bites. Fire ants cause half of the deaths.

Some persons don't develop allergies to insect stings or bites until late in life. In some cases, allergic reactions can become more severe with each additional reaction.

Causes of Allergic Reactions

When someone is stung or bitten, the body produces an antibody called immunoglobulin E (IgE). The average adult should be able to withstand hundreds of stings; but even one sting may be life threatening for someone with an allergy to the venom. People who are allergic to insect stings and bites produce more IgE than needed, triggering the release of histamine and other chemicals that may cause anaphylaxis, a severe allergic reaction affecting the entire body.

Anaphylaxis

Anaphylaxis is a serious and potentially life-threatening medical situation that requires immediate emergency treatment. Someone with allergies usually will begin to show signs of a reaction within 1 to 15 minutes after an insect sting or bite. Sometimes a reaction may not begin for up to 4 hours.

The normal reactions to a sting or bite include pain, swelling, and redness around the bite. Stings or bites near the mouth or nose may cause swelling that interferes with breathing, even in individuals who are not suffering an allergic reaction.

Allergic reactions can vary from mild to severe and from individual to individual. The EpiPen Web site (<http://www.epipen.com>) and other sources list symptoms of an allergic reaction that may lead to anaphylaxis:

- Itching and hives far from the bite
- Red, itchy, watery eyes
- Swelling of the throat or tongue/difficulty swallowing
- Difficulty breathing
- Dizziness
- Severe headache
- Stomach cramps
- Diarrhea
- Nausea
- A sharp drop in blood pressure
- Loss of consciousness or shock
- Anxiety, feeling of “impending doom”

If You're Allergic to Insect Stings or Bites

If you've been stung or bitten and know you are allergic, seek immediate medical treatment.

- Make sure your coworkers know that you've been stung or bitten and that you may suffer an allergic reaction.
- Have your coworkers contact emergency services or your dispatch center immediately to make them aware of the potentially life-threatening situation.
- If you have been prescribed epinephrine by your doctor, administer the proper dose. Antihistamines may provide some relief, but they are no substitute for epinephrine.
- Remain clam; anxiety increases blood flow and can worsen the situation.

- Take steps to prevent shock. Lie flat with your feet about 12 inches higher than your head. You may need a blanket or coat to keep warm.
- Go to an emergency room in case additional treatment is necessary, especially if you've administered epinephrine to yourself.

If you're assisting someone who loses consciousness, check the airway, breathing, and circulation. Begin rescue breathing and cardiopulmonary resuscitation, if necessary.

The Fine Print

This tech tip provides general information, but does not substitute for an employee's visit with a doctor to discuss insect stings or bites, allergic reactions, or appropriate treatments. Medications have been identified only as examples, not as endorsements. Other effective brands of medication also may be available. Your physician can prescribe or recommend medications that are best for you.

Additional Information

For additional information on allergies, anaphylaxis, and treatment options, contact your physician. The following Web sites may also be helpful:

- Africanized honeybees: <http://www.fs.fed.us/t-d/pubs/htmlpubs/htm00672313/> (Username: t-d, Password: t-d)
- American Academy of Allergy, Asthma & Immunology: <http://www.aaaai.org/>
- Anaphylaxis: <http://www.anaphylaxis.com/>
- EpiPen: <http://www.epipen.com/>
- Healthline: <http://www.healthline.com/>
- Merck & Co. Inc.: <http://www.merck.com/mmhe/sec16/ch185/ch185i.html>
- WebMD, LLC: <http://www.webmd.com/allergies/guide/insect-stings>

About the Author

Bob Beckley received a bachelor's degree in political science from the University of Montana in 1982. He began his Forest Service career as a timber technician for the Nez Perce National Forest. Beckley was a smokejumper when he came to the Missoula Technology and Development Center in 1990. He assists in the explosives program and works as a project leader and public affairs specialist.



Courtesy of Scott Bauer, USDA Agricultural Research Service, <http://www.insectimages.org>.

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Forest Service first aid kits no longer contain epinephrine to help control allergic reactions to insect stings or bites. Persons who know they are allergic to insect stings or bites should get a prescription for epinephrine and carry an epinephrine kit when working in the field. This tech tip includes other information that can help Forest Service field employees reduce the chance that they might be stung or bitten and help them provide first aid for insect stings and bites.

Keywords: allergies, anaphylaxis, epinephrine, EpiPen, fire ants, first aid kits, hornets, identification, safety at work, wasps, yellow jackets

Additional single copies of this document may be ordered from:

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Electronic copies of MTDC's documents are available on the Internet at:

<http://www.fs.fed.us/eng/t-d.php>

For additional information about insect stings or bites, contact Bob Beckley at MTDC:

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Forest Service and Bureau of Land Management employees can search a more complete collection of MTDC's documents, CDs, DVDs, and videos on their internal computer networks at:

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