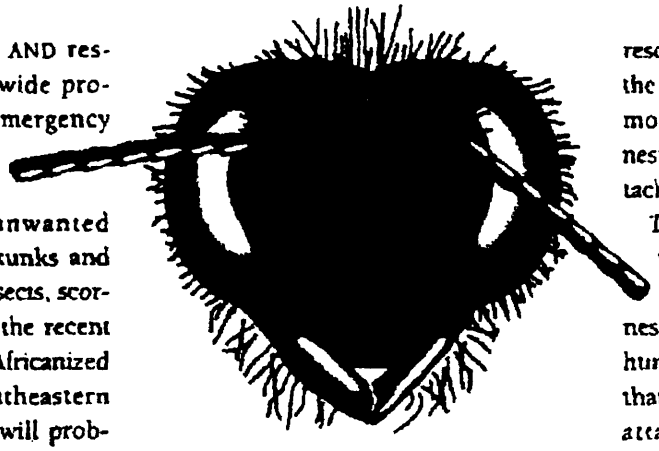
The Buzzzzzz on Subduing Bees and Wasps

By Eric H. Erickson and John B. Estes



FIRE DEPARTMENTS AND rescue squads nationwide provide a variety of emergency and community services, including the removal of unwanted wildlife, such as skunks and snakes, as well as venomous insects, scorpions and spiders. Now, with the recent migration of "killer bees," or Africanized honey bees (AHBs), into southeastern Texas, emergency responders will probably be asked to remove honey bee swarms and wasp nests as well. The possibility also exists for responders to have to rescue and treat victims who are being or have been attacked by these insects.

But lest responders outside of Texas become too complacent, problems may also be encountered in subduing or removing troublesome populations of wasps and indigenous honey bees (which, incidentally, may be misidentified as AHBs; to the naked eye, AHBs are indistinguishable from other honey bees).

Unfortunately, most fire departments, rescue squads and ambulance companies do not provide their personnel with either the training or the specialized equipment needed to handle large populations of stinging insects. This shortcoming is particularly acute among the nation's many rural and volunteer fire departments, which are most likely to be called on for assistance with bee and wasp problems.

Take, for example, a case that occurred in Johnson City, Tenn., in June 1991, in which a beekeeper was attacked by his own honey bees after suffering a diabetic seizure. The attacking bees prevented paramedics from administering aid for more than 30 minutes until they found a way to protect themselves by wearing aluminum hazardous materials (hazmat) suits. As a result, 50 percent of the victim's body was covered with embedded stingers, and he vomited up several bees following admission to the hospital.

While these paramedics are to be commended for the manner in which they solved a relatively unknown and perplexing problem, the delay in treatment could have been avoided had they previously been taught how to use their equipment to protect themselves and how to repel attacking honey bees. For just as the Johnson City paramedics discovered at that scene, equipment and materials typically carried on fire trucks, ambulances and hazmat response vehicles can—with only slight modification—be used to ensure both victim and rescuer safety.

How to Avoid Being Stung

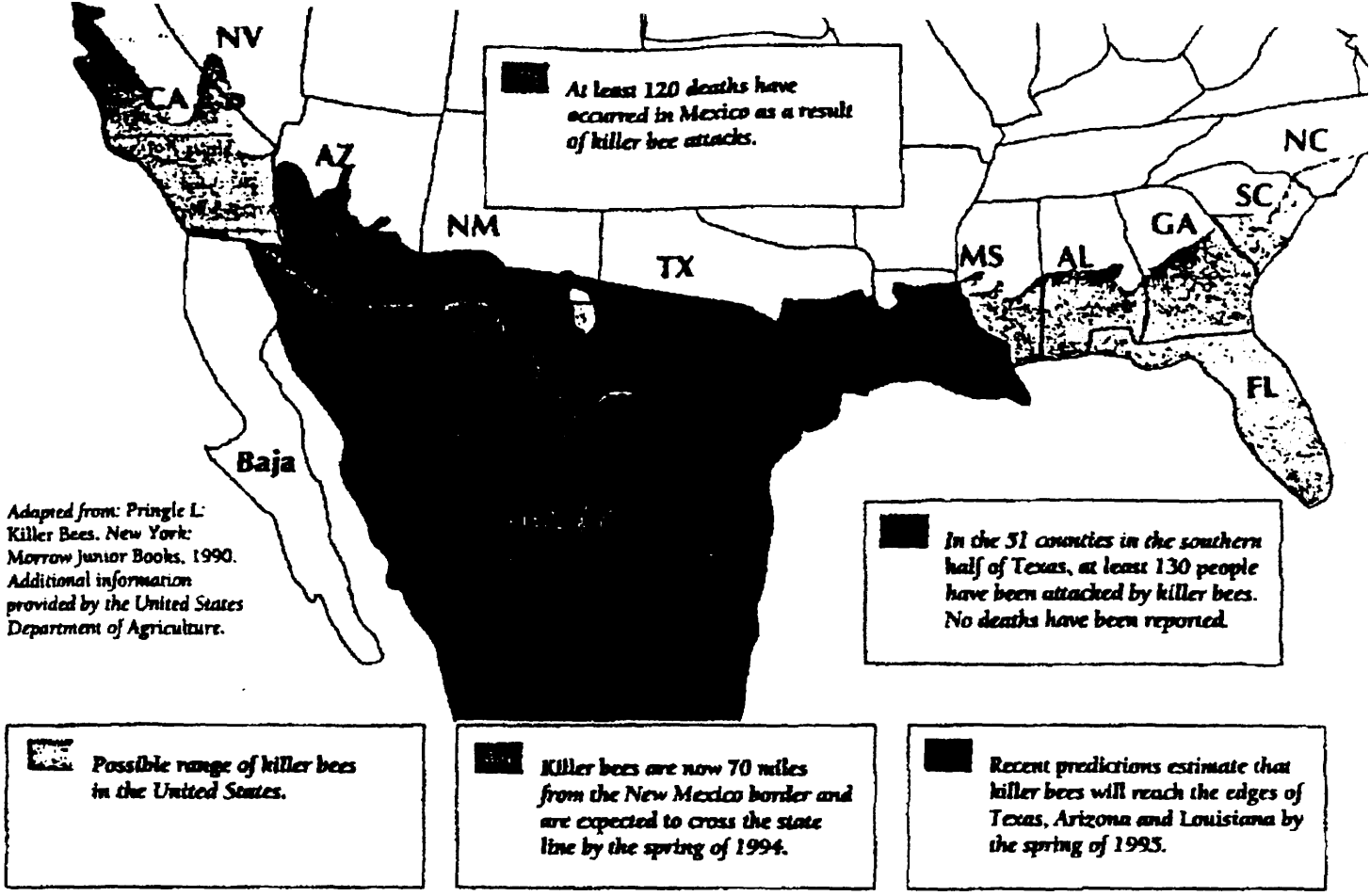
There are three different problems involving stinging bees or wasps that fire and rescue personnel are likely to encounter: the removal of honey bee swarms, the removal of honey bee colonies and wasp nests, and the rescue of victims being attacked by large numbers of bees or wasps.

The bees and wasps of greatest concern to rescue personnel are the social species that sting in defense of their nests. Such nests usually contain several hundred to several thousand adult insects that, while not normally aggressive, can attack in large numbers, particularly when their nests are disturbed. Although they have poor eyesight, these insects perceive motion more readily than do humans. They also learn quickly and have excellent memories. Thus, they become familiar with their surroundings and easily detect intrusions into their "space." Disturbances that may evoke a defensive response are detected either by the presence of a foreign odor, by the detection of unusual sounds or nest vibration, or by both.

Fortunately, the following measures can reduce the responder's likelihood of being stung by bees or wasps:

- *Clothing*—Wear light-colored cotton or polyester clothing (dark colors tend to evoke a defensive response). Avoid floppy clothing, such as loose shirt sleeves and tails, and tuck pants into boots. The ankles are frequently stung when shoes and socks are dark blue or black, so again, wear light colors. Remove shiny objects, such as rings, wristwatches and sunglasses, as they attract attention and accent motion.

Furry animals, such as skunks and bears, are bees' natural enemies. Thus,



Adapted from: Pringle L. Killer Bees. New York: Morrow Junior Books, 1990. *Additional information provided by the United States Department of Agriculture.*

Flight of the Killer Bee

like dark colors, leather, wool and fuzzy fabrics evoke a defensive response. Also, keep pets out of the way. They often provoke honey bees because of their resemblance to natural enemies.

- *Motion*—Bees detect motion and are threatened by rapid movement. When moving about in the presence of bees, try to work at a moderate pace and in a sure-handed fashion. Avoid rapid or jerky movements, and do not swat at flying bees. Furthermore, do not stand in front of a colony entrance or block a flight path.
- *Body Odors*—The scent of many perfumes, soaps, after-shave lotions, cosmetics and hair treatments may be offensive to bees and therefore may provoke them to attack. Use these items sparingly or use scent-free products when bees are likely to be encountered, such as when bee swarms have been spotted nearby or bee attacks have occurred a few days earlier.

Certain people seem to be singled out by attacking bees, and there is some suspicion that personal body odor, perhaps even that undetectable by humans, may be responsible for this. People who have had repeated problems with honey bees should make every effort to avoid contact with them.

- *Vibration*—Do not bump, disturb or otherwise harass colonies of honey bees or wasps, and avoid dropping heavy objects near their nests. Machinery and loud noises often produce substrate vibration that can arouse these insects.

Removing an Embedded Bee Stinger

When wasps attack, they first insert and then withdraw their stinger. They may do this several times in rapid succession as they crawl, leaving a short trail of miniscule puncture wounds before they fly away with their stinger intact.

Unlike wasps, which have a smooth stinger shaft, honey bees can sting only once. This is because their stinger has eight to 10 barbs at the tip, which become embedded in the skin (see Figure 1a). When the honey bee pulls away after stinging a victim, it leaves behind its stinger with the venom sac attached, rendering itself partially disemboweled (see Figure 1b). Although the bee may remain near the victim in an act of further intimidation, it dies soon after. However, the stinger and its white, translucent venom sac, with its essential nerves and muscles attached, continue to pulsate for a minute or more, pumping additional venom into the wound. Therefore, it is important for the victim's well-being that honey bee stingers be removed as quickly as possible.

Proper removal of the stinger involves simply scraping it away with a fingernail, credit card or similar instrument (see Figure 1c). The caregiver should never pinch, tweeze or otherwise attempt to pull the stinger out, as this will inject the remaining contents of the venom sac into the injury site.

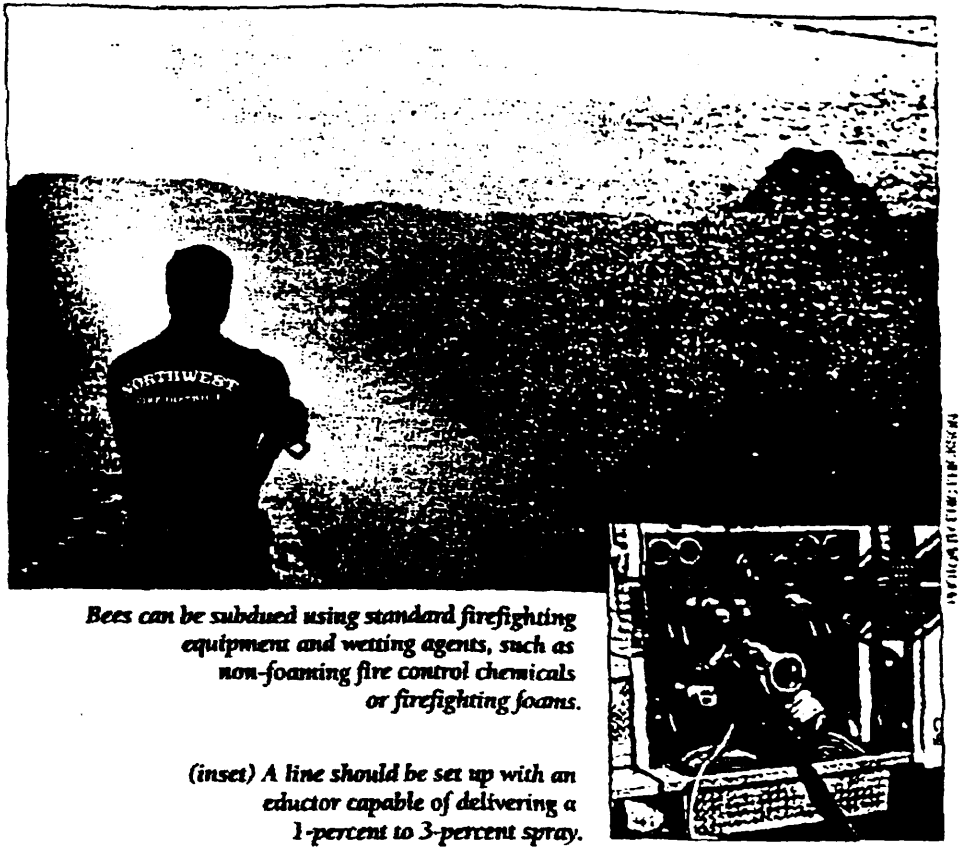
Protective Measures

Most—but not all—beekeepers choose to work with their bees while wearing full protective apparel. This outfit includes zippered white coveralls (usually cotton), boots, gloves and a hat with a net veil.

Pants are tucked into boots, and any gaps or seams through which bees might enter are sealed with duct tape or something similar. This provides nearly complete (but never 100-percent) protection; bees can sting through one or more layers of fabric but rarely do so. A double layer of clothing affords a small amount of additional protection, which is considered desirable when confronting *AHBs*.

Firefighter turnout gear or hazmat suits are acceptable alternatives to beekeeper coveralls, as they provide adequate protection for all areas of the body except the head and neck. Be aware, however, that leather areas of this clothing and leather gloves may antagonize bees and wasps; plastic or rubber gloves are best.

Veils, the only article of protective apparel not normally issued to firefighters, are essential and should be included as part of the standard equipment on rescue vehicles. While bee veils are readily available from beekeeping supply houses,



Bees can be subdued using standard firefighting equipment and wetting agents, such as non-foaming fire control chemicals or firefighting foams.

(inset) A line should be set up with an eductor capable of delivering a 1-percent to 3-percent spray.

mosquito veils are an acceptable alternative and can be obtained from military surplus and sporting goods stores. Whichever type is used, the veil must be sealed at the top and bottom with string or duct tape. Tape also should be used as a seal around the waist, wrists and ankles and to close any gaps between clothing.

Disposable hazmat suits, such as those made of Chemrel, Saranex and Tyvek, provide adequate protection, especially when donned over street clothing or uniforms. Reflective aluminum suits, such as those used by the Johnson City firefighters, are also adequate but may limit movement. Again, veils and tape must be used in conjunction with these suits.

Swarm and Nest Removal

Honey bee colonies multiply through a process known as swarming. During times of plenty, a colony's population increases, a new queen is reared and, ultimately, a swarm of several thousand bees leaves the parent colony with the old queen. The swarm may land temporarily at one or more locations as it travels in search of a new cavity to inhabit, such as a hollow tree or rock pile. When the swarm takes up residence in the new cavity, it becomes a new colony.

Most emergency calls for assistance with stinging insects are made following the sudden appearance of a swarm of honey bees. Most common in the spring and early summer, swarms exhibit an impressive level of activity yet are usually quite docile. Thus, they represent only a minor threat unless they are disturbed. If the swarm is in an area known to be inhabited by AHBs, however, extra caution should be taken.

While established honey bee colonies may precipitate calls for assistance throughout the year, the methods of dealing with swarms and established colonies are usually quite different.

Honey bee swarms are relatively easy to capture or kill. A beekeeper or other person with some bee experience can usually cut down or scoop up the swarm and put it in a box or bag for removal. If this is not possible or if immediate action must be taken to prevent human endangerment, one of several wetting or foaming agents or soap solutions can be sprayed directly on the swarm. A relatively gentle spray with a fine mist is most effective; it prevents flight and causes the bees to fall to the ground, where they crawl around before eventually suffocating and dying. Once immobilized, the insects may be scooped up, bagged and disposed of.

Established honey bee colonies are difficult to remove because they normally inhabit cavities deep within walls, hollow living trees, rock outcroppings and other similar protected spaces. Their removal usually requires the assistance of an experienced pest control operator or beekeeper.

In the fall, calls for assistance usually involve wasp nests or groups of foraging wasps. Wasps are almost always highly defensive and should be approached with caution, even while wearing protective clothing.

Most wasp nests are suspended from bush or tree branches or from the eaves of structures. Such a nest can be removed at dusk by gently slipping a large plastic bag up and over the nest and quickly tying it shut before cutting off the branch. Alternatively, a gentle stream of water containing a wetting agent, or surfactant, can be directed at the nest entrance until no more wasps emerge. The nest is then bagged.

Insects are easily immobilized and killed by wetting agents. Thus, a non-toxic water and surfactant barrier should be established quickly at the scene of an emergency involving bees or wasps by fire/rescue units responding with standard firefighting equipment. While the wetting agent may simply be a commercial liquid dishwashing detergent, environmentally compatible wetting agents, such as non-foaming fire-control chemicals, and firefighting foams with surfactant characteristics, such as aqueous film-forming foams (AFFFs), are equally effective.

While it was not possible to test all commercially available foaming/wetting products, most—if not all—such agents are equally effective.[1] For instance, a 1-percent solution of such products is sufficient to immediately immobilize honey

bees and kill them within 60 seconds of exposure. A 0.1-percent solution is deemed inadequate, since it merely causes a temporary disorientation from which most bees recover after a few minutes.

If there is doubt about a particular chemical's efficacy and further testing is deemed necessary, rescue personnel should find it relatively easy to enlist the aid of a local beekeeper. Clearly, toxicity to humans and animals must be of paramount consideration in product choice. For information on the toxicity of certain compounds, consult the product's accompanying material safety data sheets.

Victim Rescue

Obviously, victims of multiple stinging attacks should first be removed from further harm. However, this is seldom easy to accomplish without the proper equipment. Once the victim is "marked" by alarm odors (chemical components of the insect venom), additional bees or wasps will follow and find the victim unless they encounter some kind of barrier.

Also, while the victim may be carried into an enclosure such as a house, van or ambulance, numerous insects will follow and be trapped inside once the doors are closed, continuing their attack. When this happens in a house, the only option is to vacuum up any bees around the windows, where they fly because they are attracted to the light. When in a vehicle, the best thing to do is drive away with the windows rolled down and then chase the insects out.

However, the safe extrication of a victim of a mass bee or wasp attack is possible and requires only thoughtful planning and the use of a few materials carried on most fire/rescue vehicles. To begin, rescue personnel at the scene should remain in their closed vehicles to assess the situation. They should then retreat several hundred yards and put on their protective clothing, as described above. Onlookers should then be moved to a similar safe distance.

Two things must be done as soon as possible after rescue personnel are properly protected: First, an adequate insect barrier must be established, as previously mentioned, and the alarm odor must be neutralized. Both of these objectives can be accomplished by implementing a single procedure that establishes a physical barrier.

Using standard firefighting procedures, a line should be set up with an eductor capable of delivering a 1-percent to 3-percent spray of a foaming/wetting agent and a nozzle capable of delivering a wide fan pattern. A light initial application of a non-toxic foaming/wetting agent to the victim will terminate the attack by most insects on or near the victim within 60 seconds. These insects, now unable to fly, will begin to suffocate and can quickly be brushed aside.

Then, if an obvious line of insect flight can be determined, a vertical wall of spray aimed 20 to 30 feet in the air should intercept further flight activity. Alternatively, the nozzle can be inverted near the

victim to provide a curtain of safety. Using the liquid barrier, the victim can be moved to an enclosed vehicle or structure for treatment or transport. Once the victim is protected, the stingers should be removed quickly with the scraping motion described earlier. Removal of the victim's outer layer of garments may facilitate this process, as any stingers embedded through the fabric will be dislodged.

While only a small percentage of the population is allergic to the venom of stinging insects, the potential of anaphylaxis should not be overlooked. If the patient begins to develop clinical manifestations of anaphylaxis, such as urticaria, angioedema, asthma, laryngeal edema or hypotension, treat according to local protocol and transport. Typically, such treatment includes oxygen administration, ventilatory assistance, airway management, administration of epinephrine or diphenhydramine, and cardiac monitoring.

Conclusion

Rescue and EMS personnel should make an effort to familiarize themselves with the normal activities of the stinging insects indigenous to their area. Also, every fire department should develop a close working relationship with a local bee expert or beekeeper. These professionals can provide invaluable advice and assistance, particularly when unusual situations arise. All states have active beekeeper organizations, as do many local communities, which usually welcome requests for assistance. Furthermore, many such organizations would likely be willing to assist rescue personnel in developing relevant training exercises.

Entomophobia is the all-too-common fear of insects. With heightened awareness of the migrating AHB, the general public is sure to react more vigorously to the presence of stinging insects even if they are domestic in origin. Thus, fire/rescue departments can expect increasing numbers of requests for assistance from people faced with such dangers—whether real or perceived. With proper information and training, rescue personnel will be able to handle future bee and wasp incidents and attacks, such as the one in Johnson City, safely and expeditiously.

Authors' Note: Use of trade names or proprietary products in this article does not constitute endorsement by the U.S. Department of Agriculture for their use over that of any other product. The authors wish to thank William McKenna, MD, for clinical assistance with this article.

Reference

1. Erickson, EH, Estes JB: "Firefighters and paramedics can easily subdue attacking bees." *American Bee Journal*, August 1992.

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