

Managing Wasps, Hornets, and Yellowjackets in Turfgrass Settings

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Wasps, hornets, and yellowjackets are a common nuisance and hazard on golf courses and in outdoor landscapes. Numerous people die each year from an allergic response to their painful stings. These insects are far more dangerous and unpredictable than honeybees. **Worker wasps foraging away from the nest usually are not aggressive, but the process of eliminating nests should be undertaken with great care and in a specific manner.**

General Biology and Habits. Wasps, hornets, and yellowjackets are social insects that live in nests or colonies. Mated queens overwinter under bark or in other sheltered locations. They emerge in the spring and begin constructing a small nest in which the first eggs are laid. The nest is made of paper-like material consisting of chewed wood fibers and salivary secretions. The first brood of wasps matures in about a month, emerging as nonreproductive females called workers. The workers assume all nest activities except egg-laying. Thereafter, the nest is enlarged and the colony grows rapidly, reaching maximum size by summer's end. Males and new queens are produced in the early autumn. After mating, the young queens seek out overwintering sites and the main colony dies off.

These insects generally are beneficial because they prey on other insects, including pests. There usually is no need to control a hornet nest located high in a shade tree or a paper wasp nest on a remote eave of a clubhouse. If the nest doesn't pose an immediate hazard, the best option usually is to leave it alone. The colony will die off naturally once the weather turns cold, and the paper nest disintegrates during the winter. Nests are not reused the following season. Control may be warranted, however, when the nest is located near areas of human activity.

Medical Importance. Wasps, especially hornets and yellowjackets, will sting if the nest is disturbed. Attacking wasps release a chemical "alarm pheromone" that causes nest mates to swarm to the defense. Unlike honeybees, the stinger is barbless so that each wasp can inflict multiple stings. In most people, stings result in localized redness and swelling. Treatment involves washing the wound to prevent infection, using an ice pack and/or oral pain relievers to reduce pain, and taking oral antihistamines. In the case of large, local reactions, elevation of the affected limb and rest also may be needed.

Some people are hypersensitive to wasp and bee venom, so that stings can be life-threatening. **People who have been stung and who experience a general allergic reaction (e.g., hives or rash) away from the site of the sting, dizziness, or difficulty breathing or swallowing should seek immediate medical attention.** Such persons may be in danger should they receive additional stings, regardless of whether these occur weeks, months, or even years later. Sting-allergic persons should ask their doctor about prescribing a kit containing syringes with epinephrine. In the case of a sting, they can give themselves an injection that may well save their life. Allergic persons also should consider immunotherapy, a series of injections to increase their tolerance to insect venom.

Paper Wasps. Paper wasps typically build their umbrella-shaped nests under eaves and ledges of buildings, or sometimes in shrubs or hedges. Adults are narrow-bodied, brownish with yellow or reddish markings, and about 5/8 to 3/4 in. (15–20 mm) long. **Paper wasps are less aggressive than hornets or yellowjackets. They're fairly easy to eliminate with the wasp and hornet sprays sold at grocery or hardware stores.** These products often can be sprayed from as far away as 20 ft (6 m). Although it is safest to treat all wasps at night, paper wasps can be controlled during the daytime *provided that you do not stand directly under the nest during treatment.* Most wasp sprays cause the insects to drop instantly, so standing under the nest increases the chance of being stung. Wait a few days after treatment to ensure that the wasps have been killed, then scrape or knock down the nest.

Hornets. Hornets are far more dangerous and difficult to eliminate than paper wasps. Baldfaced hornets, the most common species, are 5/8 to 3/4 in. (15–20 mm) long and black, with white markings on the face, thorax, and end of the abdomen. Hornet nests are made of gray, paper-like material and resemble a large bloated football. Nests are typically built in trees or shrubs, on overhangs, or attached to the outside of sheds or other structures. Hornet nests may contain thousands of wasps which become highly aggressive when disturbed. The nests are often located out of reach. **When deemed necessary, their removal is best accomplished by a professional pest control firm.**

Hornet nests should be treated only at night when most hornets are inside the nest and the colony is less

Continued on page 5

...Wasps, Hornets...

Continued from page 4

active. Wear a full wasp suit, secured at the wrists, ankles and collar. Hornet nests have a single opening, usually at the bottom of the nest, through which the wasps enter and exit. Apply an aerosol-type wasp and hornet spray, or a dust formulation of carbaryl (Sevin®) or bendiocarb (Turcam®) directly into the nest opening. An extension pole that allows application of the dust or aerosol from the ground or from some distance away gives added safety to the applicator. **Only background lighting should be used (do not shine a flashlight into the nest opening during treatment).** Be especially careful not to break the nest, as this will cause the angry wasps to scatter in all directions. Following treatment, wait several days to ensure that all of the wasps are dead before removing the nest. If active hornets are still observed, the application may need to be repeated.

Yellowjackets. These are likely the most dangerous stinging insects in turf and landscape settings. The common name is based on their distinctive black and yellow color pattern. Like hornets, yellowjackets become extremely aggressive when their nest is disturbed. Nests often are located underground in old rodent burrows or beneath rocks or landscape timbers. Yellowjackets also build nests in rock walls, or in walls, attics, crawlspaces, garages, sheds, or other structures. **If the nest can be located, the colony usually can be eliminated by applying an aerosol wasp spray into the nest opening.** Dust formulations (e.g., carbaryl or bendiocarb) also are effective provided that a hand duster or similar-type applicator is used to puff the insecticide into the nest opening. A dry, empty detergent bottle filled no more than halfway with dust, and shaken before dispensing works well. A few pebbles can be added to the bottom of the container to prevent caking.

Elimination of colonies should be done only at night, when most of the yellowjackets are in the nest and less active. Locate the nest opening during daylight so that you'll know where to direct the treatment after dark. **As with hornets, a full protective wasp suit should be worn.** Approach the nest carefully, using indirect light. Do not shine your flashlight into the nest opening as this will startle the wasps. If possible, place the light on the ground, to one side, rather than holding it because the angry wasps tend to fly toward light. A long string attached to the handle is helpful for recovering the flashlight when the job is done. If access to the nest is difficult, it's usually best to call an experienced pest control operator.

Yellowjackets' tendency to scavenge for food causes them to become pests around outdoor food concessions, picnic sites, and similar areas. Contact with humans peaks in late summer and autumn, when the colonies are nearing maturity and thousands of workers are out foraging

for food for the developing queens. At that time, feeding preferences shift in favor of sugary foods which include fruits, beer, soft drinks, and other sweets. Golf superintendents and grounds managers can take steps to reduce hazards of people being stung.

The best way to reduce problems with foraging yellowjackets is to limit their access to attractive food sources. Equip trash cans with a tight-fitting (preferably self-closing) lid, fitted with a plastic liner, and empty and clean them often. Dumpsters and trash cans should be located away from concession and picnic areas to the extent that it is practical. Clean up spills and leftovers promptly. Maintaining good sanitation earlier in the summer will make areas less attractive to foraging yellowjackets later on. A dilute solution of ammonia—6 oz of ammonia per gallon of water (50 mL per liter)—sprayed in and around trash cans, and sponged onto outdoor tables and food preparation surfaces may help to repel yellowjackets from these areas. Use household ammonia, not bleach.

People eating outdoors should keep food and beverage containers covered. Yellowjackets foraging away from the nest usually are not aggressive and will seldom sting unless provoked. People should resist the urge to swat at the wasps—and be careful when drinking from beverage cans that may contain a foraging wasp. Diet drinks seem to be less attractive to wasps than drinks with sugar.

Cicada Killers and Sand Wasps. Cicada killers are very large wasps, up to 1-5/8 in. (40 mm) long, that resemble gigantic hornets or yellowjackets. They have a rusty red head, amber-yellow wings, and a black abdomen with pale yellow stripes. **These wasps attract attention because of their menacing appearance, burrowing habits, and buzzing flights that alarm golfers and homeowners.** Fortunately, they rarely sting unless handled, stepped upon with bare feet, or otherwise provoked.

Cicada killers prefer to nest in areas of full sun, scant vegetation, and coarse-textured, sandy, well-drained soils. The female wasp digs numerous burrows about 1/2 in. (12.5 mm) across, 6–9 in. (15–23 cm) deep, and vertical or slightly angled, with several secondary tunnels, each ending in a brood chamber. Excess soil is pushed out of the burrow, forming a U-shaped mound around the entrance. Each female excavates numerous burrows which are provisioned with cicadas that she hunts down and incapacitates with her sting. She drags the paralyzed cicada into the burrow, lays an egg on it, backs out, and seals the cell.

Cicada killers may form aggregations with numerous individuals nesting in the same area. However, each female digs and provisions her own burrows. Males usually emerge first and patrol the nesting area, awaiting emergence of virgin females and driving away any rival males. They buzz-bomb any intruder, sometimes hovering about

Continued on page 6

Heat Stress...

Continued from page 2

example, raise the height to from 5/32 to 3/16 in. (4.0–4.8 mm), being sure to lower the cutting height to the original level once the heat stress has subsided.

Mower Selection. On putting greens, switch to a walking greensmower from a triplex unit during the severe heat stress period and/or change to a solid roller to lessen wear stress when shoot growth recovery is impaired by heat stress.

Syringing for Heat Stress Avoidance. Syringing is the application of a very light amount of water in which only the leaves are wetted and few water droplets move off the leaves. It can be used for the purpose of cooling the turf canopy. It has the potential of reducing temperatures in the order of 10°F (5.5°C), if applied 1.5 to 2 hours before maximum mid-day temperatures, which typically occur around 2:00 p.m. A low atmospheric humidity adjacent to the turf canopy maximizes the evapotranspirational cooling. In hot, arid regions, such as Arizona, syringing during mid-day heat stress has been used to maximize heat avoidance through high evapotranspiration rates. Unfortunately, this method of heat avoidance may be of limited benefit in humid climatic regions during periods of high humidity. Syringing also is used to correct a developing tissue water deficit, thereby avoiding stomatal closure and subsequent elevation of tissue temperatures to lethal levels.

Enhanced Air Movement. Air stagnation on putting green sites, especially when surrounded by trees in the direction of the prevailing wind, accentuates the stratification of higher temperatures and higher humidities near the turf canopy. This in turn accentuates heat build-up in both the turfgrass canopy and root zone, plus the environment for certain disease pathogens is more favorable.

If a tree-shrub barrier is the primary problem, then **cutting an opening in the direction of the prevailing wind usually proves beneficial.** Air stagnation also can be significantly reduced through the mixing action achieved by mechanical fans, especially in hotter climates. This author conducted the first research in the late 1950s demonstrating the value of fans in reducing heat levels on bentgrass putting green turfs. A 14°F (7.8°C) cooler turf temperature was achieved by the use of a fan that produced a 4 mph (6.4 km hr⁻¹) air movement.

Fans may be used around selected putting greens where the surrounding trees and shrubs and/or low site placement with higher surrounding hills cause serious restrictions in air movement. The development of the best possible mechanical fan design is still evolving. Some criteria to consider in selecting fans include:

- Noise level generated—a 54-in. (137 cm) diameter fan is 50% more quiet than a 48-in. (122 cm) unit, due to a lower blade velocity.
- Effective distance—a longer effective distance allows placement of the fans from 40 to 50 ft (12–15 m) away from the perimeter of the putting green.
- Effective pattern—the wider and longer the better, up to an associated air velocity of 4.5 mph (7.2 km hr⁻¹).
- Relative obtrusiveness—color, distance from green, height above turf, and bulk size all influence just how harmoniously fans blend with the surrounding environment.

Fans also will become more frequently used in sport stadia constructed with an erect, tall, fully enclosed seating design. 

...Wasps, Hornets...

Continued from page 4

or flying into a person's head or back. Fortunately, males cannot sting, and the females are quite docile and do not defend their burrows. **However, the mounds themselves are unsightly and can smother patches of grass.**

Sand wasps are similar to cicada killers, but smaller. These fast-flying wasps are about 13/16 to 1 in. (20–25 mm) long and dark-colored, often with pale-green markings. Sand wasps nest in sandy areas, usually in colonies, and stock their nests with various kinds of insect prey. Unlike cicada killers, their brood burrows are not completely provisioned before egg-laying, and the young are fed as they grow. Although the wasps aren't aggressive, they're quite a distraction when they nest in golf course bunkers, playground sand boxes, sand-based volleyball courts, and similar sites.

Like most wasps and bees, cicada killers and sand wasps are highly susceptible to carbamate insecticides. Small infestations can be controlled by dusting the burrow openings with carbaryl or bendiocarb to kill the females as they engage in nesting activities. Broadcast applications are effective when many nests are present. Cruising males can be whacked with a tennis racket, which may suffice to end complaints by golfers. 

Daniel A. Potter is Professor of Turf and Landscape Entomology at the University of Kentucky. This article is adapted from a section of his new book, "Destructive Turfgrass Insects: Biology, Diagnosis, and Control," which is available from Ann Arbor Press.