IPM for Yellowjackets and Hornets in Schools

INTRODUCTION

Yellowjackets and hornets are both beneficial and problematic wasps. They are important predators and scavengers, helping to manage pests and recycle organic materials, but they also can sting humans and their pets. Although often grouped together with bees, yellowjackets pose a more serious threat to people. Yellowjackets can sting repeatedly, while a bee can sting only once. Multiple stings from yellowjackets are common, because they aggressively defend their nest when it is disturbed.

IDENTIFICATION AND BIOLOGY

"Yellowjacket" and "hornet" are the common names given to wasps in the genera *Dolichovespula*, *Vespula*, and *Vespa*; but for the sake of simplicity, the term "yellowjacket" will be used. Note that these common names are not reliable indicators of whether or not they are pests.

Yellowjackets are relatively short and stout, and hold their legs closer to their bodies than other wasps do. Paper wasps are more slender and have long dangling legs. All yellowjackets are either black and white or black and yellow. They are rapid fliers, and are more aggressive than other types of wasps. Their nests are always enclosed with a papery envelope and can be found in the ground, hanging from eaves or tree branches, and occasionally in wall voids.

The queen begins her nest by building a small comb of chewed wood. She lays eggs in the cells and, after the eggs hatch, tends the larvae herself. Once the larvae develop into adult workers, they expand the nest into tiers, built one on top of the other. In the late summer or early fall, males and new queens are produced. After mating, the queens seek a sheltered place to spend the winter and all the workers die. The nest is not reused and eventually disintegrates.

Early in the warm season, colonies are small and yellowjackets are usually not a problem. Later in the season, when colonies are at their peak, these insects become pestiferous. In their search for protein and carbohydrate sources, they are attracted to garbage cans, dumpsters, lunch counters, and playgrounds, where they scavenge for food.

TABLE 9.

Distinguishing Among Bees, Wasps, Yellowjackets, and Hornets

Name	Appearance	Habits	Nests	Feeding Behavior
Bees	Hairy, stout bodies with thick waists; workers and reproductives are winged	Noisy flight; sting mainly while defending nest; foraging workers seldom sting	In hives, trees, or buildings	Collect pollen and nectar; feed pollen to young and share food with other adult bees
Solitary wasps	Thin- or thick-waisted	Visit flowers and other vegetation; relatively docile	In mud, or in holes in ground	Predators; provision nests with prey for young to feed on
Yellowjackets and hornets	Stout, colorful; mostly black and yellow or black and white	Rapid fliers; aggressive individuals capable of inflicting multiple stings; social in large colonies, which they defend vigorously	Multilayered, papery nests mostly in ground, although some aerial or in structures; nests have an outer papery covering called an "envelope"	Mostly beneficial predators, but scavenger species become pestiferous
Paper (umbrella) wasps	Long bodies with thin waists, long dangling legs	Social; search vegetation for prey; visit flowers for nectar; not particularly aggressive	Single layered, papery nests without an envelope; attached to fences, eaves, boards, branches; shaped like an umbrella	Beneficial predators; feed prey to developing young in nest

Adapted from the *IPM for Schools: A How-to Manual*. United States Environmental Protection Agency. EPA 909-B-97-001. March 1997.

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STINGS

Insect stings are the leading cause of fatalities from venomous animals in the United States. The people who die from yellowjacket or bee stings are people who experience large numbers of stings at once or who suffer severe allergic reactions to the inflammatory substances in the insect venom. These allergic reactions include soreness and swelling, not only at the site of the sting, but also on other parts of the body that may be distant from the site. Other symptoms include fever, chills, hives, joint and muscle pain, and swelling of the lymph glands and small air passageways. In severe cases, the individual may suffer a sudden drop in blood pressure and lose consciousness. While many individuals who experience allergic reactions have become sensitized over time by previous stings, half of all fatalities occur in individuals stung for the first time.

Ordinary reactions to stings include localized pain, itching, redness, and swelling for hours to a day or two after the event.

NEST DISTURBANCE

Yellowjackets that are foraging for food usually will not sting unless physically threatened, such as being squashed or caught in a tight place. But if they feel their nest is in danger, they will vigorously defend it. All wasps defend their colonies, but some yellowjackets are more sensitive to nest disturbance and more aggressive in their defense. Disturbing a yellowjacket nest can result in multiple stings. This can occur when someone accidentally steps

Avoiding and Treating Stings

Children should be taught to stay calm when confronted by a foraging yellowjacket, because quick, jerky motions will frighten wasps and make them more likely to sting. Stillness, or slow, gentle movements, will greatly decrease the probability of being stung. Slowly and carefully brushing off a yellowjacket that has landed on someone, or waiting until it flies off, is better than hitting or constraining it since aroused yellowjackets will sting. Avoid smashing yellowjackets, because when crushed they give off an alarm pheromone that can cause other yellowjackets to attack.

If soft drinks or fruit juices are being consumed on school grounds where there are many yellowjackets, warn children to look into their cups or cans before each sip, because someone can accidentally drink in a wasp and get stung in the mouth or throat. Tell them not to panic if they find a wasp taking a drink. Ideally, all sweet drinks should be in containers with secured lids, and the children can use straws for drinking. It may become necessary to prohibit eating and drinking outside during the peak of the yellowjacket season.

First Aid for Stings

- If the sting is to the throat or mouth, medical attention must be sought immediately, because swelling in these areas can cause suffocation. *Dial 911 immediately* and give the victim an ice cube to suck.

For hypersensitive individuals

- Anyone who is hypersensitive or who experiences difficulty breathing, wheezing, fainting, dizziness, or color changes (turning blue) should be treated by the school nurse and taken to a hospital emergency room immediately. The nurse should have an emergency kit containing preloaded syringes of epinephrine for use with hypersensitive individuals.
- Keep the affected portion of the body below the level of the victim's heart.

For all others

- Wash the area around the sting with soap and water and apply an antiseptic. Washing can help remove the venom from the wound, which will help reduce the pain and swelling from the sting.
- As soon as possible, treat the sting either with ice contained in a cloth or plastic bag or with com-mercially available products for easing the pain of wasp or bee stings. Ice will help reduce the swelling, and the commercial products will relieve both pain and swelling. Some people claim a paste made of meat tenderizer helps reduce swelling and pain.
- Antihistamines given every few hours, according to label directions, also can prevent pain and swelling.

Have the victim rest.

Do *not* administer sedatives.

on an underground nest opening or disturbs a nest in a shrub or building. Sometimes merely coming near a nest, especially if it has been disturbed previously, can provoke an attack.

Underground nests can be disturbed simply by vibrations. Thus, mowing lawns or athletic fields can be hazardous, and operators may need to wear protective clothing when mowing during the late summer season when colonies are large. It can be very frightening to be the victim of multiple wasp stings. If there are only one or two wasps, back slowly away from them until they stop attacking you. Otherwise, it is best to run away from a colony rapidly, protecting your face and eyes as much as possible.

It is important to educate children about the beneficial role of these wasps (they feed on pest insects, particularly caterpillars) and to remind them repeatedly of ways to avoid stings. Since problems with yellowjackets are most common in late summer and fall, teachers can be provided with this information at the beginning of the fall term. See the box on page 117 for tips on avoiding and treating stings.

DETECTION AND MONITORING

If there is a chronic problem with yellowjackets around outdoor lunch areas or school athletic fields, inspect the area methodically to locate the nests. Nests can be found in the ground, under eaves, and in wall voids of buildings. Ground nests are frequently—but not always—located under shrubs, logs, piles of rocks, and other protected sites. Entrance holes sometimes have bare earth around them. Nest openings in the ground or in buildings can be recognized by observing the wasps entering and leaving.

MANAGEMENT OPTIONS

The objective of a yellowjacket management program should be to reduce human encounters with the wasps, but not to eliminate them from the entire area since they are beneficial predators of insects. The two most productive and least environmentally destructive ways to do this are to modify the habitat to reduce yellowjackets' access to food in the vicinity of human activities, and to use physical controls such as trapping and nest removal. Area-wide poison baiting should be used only as a last resort when other methods have failed and stings are frequent.

Physical Controls

Habitat Modification

Garbage containers on school grounds should have tight-fitting lids. The cans should be emptied frequently enough to prevent the contents from impeding the closure of the lid. The lids and cans should be periodically cleaned of food wastes. Disposable liners can be used and replaced when soiled or damaged.

When these practices are not followed, school garbage (and the flies around it) becomes a food source for yellowjackets in the area. If a large number of wasps are around garbage containers, students may be afraid to get close enough to place garbage all the way inside, and spilled food will attract more wasps.

Dumpsters should be cleaned frequently by washing them with a strong stream of water. If the dumpster service company has a cleaning clause in their contract, make sure it is enforced.

To limit yellowjacket infestations inside the school buildings, repair windows and screens and caulk holes in siding. Building inspections for yellowjackets can be done at the same time as inspections for other pests, such as rats, mice, and termites. Inspections should be conducted monthly to ensure that developing nests are found before they get large enough to be problematic.

Trapping

Trapping with a sturdy trap and an attractive bait can significantly reduce yellowjacket numbers if a sufficient number of traps are used. There are a variety of traps on the market. In general, cone-type traps are more useful for long-term trapping that will last many weeks. In some schools, unbaited yellow sticky traps (like those used to catch whiteflies) affixed to fences near underground nests have provided sufficient management to protect children from stings.

A homemade, cone-type fly trap can be used to catch yellowjackets simply by using the captured flies inside the trap as bait. (See page 62 for instructions on making the fly trap). The yellowjackets enter the trap to get the flies and become trapped themselves (see Tips on Trapping Yellowjackets in a Homemade Cone-Type Fly Trap on page 119). If you use baits such as dog food, ham, fish, or other meat scraps, or fermenting fruit and jelly, **make sure the traps are placed in areas inaccessible to students, because large numbers of yellowjackets may be attracted to the baits.**

However, the traps should be placed near the nest if it can be found, and/or near the area where the yellowjackets are troublesome. Teachers can be instructed to make a short presentation on the purpose of the traps to satisfy the curiosity that students will undoubtedly have. Show students the traps, explain how they work, and try to impress upon them the importance of the traps in maintaining the safety of the playground. Then be sure to move the traps to an area inaccessible to students.

When traps are full they can either be placed in a freezer for a day to kill the wasps or enclosed in a heavy-duty plastic garbage bag and placed in the direct sun for several hours. A third way of killing the wasps is to submerge the traps in a bucket of soapy water until the wasps drown.

The traps should be out only during the period that yellowjackets are a problem, usually late summer and early fall. When the traps are taken down for the year, they should be cleaned with soap and water and stored.

Tips on Trapping Yellowjackets in a Homemade Cone-Type Fly Trap

Yellowjackets can be caught in a cone-type fly trap using only the trapped flies as bait. The following tips will help improve yellowjacket trapping:

- Use this trapping method where students cannot gain access to the traps or at a time when students are not in school.
- Mix the fly bait according to the instructions on pages 63 and 64.
- Set up the fly trap with the fly bait in the area where the yellowjackets are a nuisance.
- If the trap is still attracting only flies after a day or two, move the trap to a new spot around the perimeter of the nuisance area.
- If your trap stops catching yellowjackets at some point, but is still catching flies, try switching to a sweet bait such as fruit punch or jam.

Note: To avoid being stung, you should replenish the fly bait or move the trap in the cool parts of the day—early morning or late evening. To kill everything in the trap before emptying, put the trap into a large plastic garbage bag and seal the bag. Place the bag in direct sunlight for several hours or in a freezer overnight.

Nest Removal

A nest can be destroyed through physical removal (vacuuming) or by using a pesticide (see Chemical Controls). Either way, great care must be exercised, because any disturbance around a nest can cause multiple stings. It is best to have a pest management professional or other experienced person remove the nest. Nest removal should take place at night, when the children are out of school and the yellowjackets are in the nest. When illumination is needed, use a flashlight covered with red acetate film so it will not disturb the wasps.

Adequate protective clothing and proper procedures can minimize problems and stings. It is important to wear protective clothing when removing wasp nests. Complete body coverage is essential, because yellowjackets and other wasps can find even the smallest exposed area. Use clothing made for beekeepers. This includes:

- A bee veil or hood that either contains its own hat or can be fitted over a light-weight pith helmet or other brimmed hat that holds the veil away from the head. A metal-screen face plate that extends around the head is a desirable feature. Check the veil carefully for tears before each use.
- A bee suit or loose-fitting, heavy-fabric coverall with long sleeves. This is worn over regular pants and a long-sleeved shirt to provide extra protection from stings.
- Sturdy, high-topped boots. Secure pant legs over the boots with duct tape to prevent wasps from getting into trousers.
- Gloves with extra-long arm coverings so sleeves can be taped over them to protect the wrists.

Vacuuming

Vacuuming out entire nests is not recommended unless it is done by a pest management professional experienced in handling stinging insects.

Vacuuming is particularly effective when nests occur in wall voids, in emergencies where nests have already been disturbed, and in environmentally sensitive areas where nests should not be treated with insecticides.

Some pest management professionals in some cities will perform this service for free so they can collect the wasps to sell to pharmaceutical companies for their venom. If the school is interested in this option, take time to find a company that will perform this service for you.

Chemical Controls

If nonchemical methods prove insufficient to solve the problem, then integrating a pesticide into your management program may be warranted.

Pesticides must be used in accordance with their EPA-approved label directions. Applicators should always wear protective gear during applications. All labels and Material Safety Data Sheets (MSDS) for the pesticide products authorized for use in the IPM program should be maintained on file. **Pennsylvania law allows pesticide applications in schools only by certified applicators, registered technicians, or by non-certified applicators or non-registered technicians under the direct supervision of a certified applicator. Notification must be given to all staff and parents or guardians of students who request it 72 hours**

prior to pesticide use. Warning signs must also be posted in the vicinity 72 hours prior to and for 48 hours after the application. The law also mandates a 7-hour reentry period for common access areas whenever pesticides are applied.

When an insecticide is considered necessary for the management of yellowjackets, the best approach is to confine it to the nest itself. Anyone applying insecticides should use special clothing that protects against the chemical as well as against wasp stings. Insecticides should be applied in the evening or very early morning when children are absent, the wasps are inside the nest, and cooler temperatures reduce insect activity.

A number of insecticides are registered for use against yellowjackets. The following are most appropriate for use in schools:

Silica Aerogel and Pyrethrins

Silica aerogel combined with pyrethrins is an effective insecticidal dust that can be used to destroy an underground nest or a nest in a wall void. Silica aerogel is made from sand and works by abrading the outer waxy coating on insect bodies. Once this coating is damaged, the insects cannot retain water and die of dehydration.

Products with Components That "Freeze" Wasps

Pyrethrins can be used to quickly knock down guard wasps at the nest entrance and to kill yellowjackets in an aerial nest when they must be destroyed in the daytime. These aerosol products are designed to project a stream of spray 10 to 20 feet and contain highly evaporative substances that "freeze" or stun the yellowjackets.

Do Not Use Gasoline

Gasoline should never be poured into underground nest holes. This dangerous practice creates a fire hazard, contaminates the soil, and prevents the growth of vegetation for some time. A ground application of gasoline poses greater harm to children and the environment than a yellowjacket nest.

Avoid Area-Wide Control Measures

Mass control measures are seldom, if ever, necessary, and they are expensive due to the labor involved in the frequent mixing and replacement of bait. The effectiveness of bait mixtures is also questionable, since the baits face considerable competition from other food sources that are more attractive to scavenging yellowjackets.