SCHOOLS INTEGRATED PEST MANAGEMENT (IPM) FOR WASPS AND BEES

Important Note

According to the Virginia Pesticide Control Act (Section 3.1-249.53), in order to apply ANY pesticide (including Raid®, Round-Up®, and other over-the-counter pesticides) in public areas of ANY educational institution, the applicator must first be certified by the Virginia Department of Agriculture and Consumer Services. In other words, it is illegal for uncertified teachers, staff, administrators, or contractors to apply pesticides on school grounds.

INTRODUCTION

Wasps and bees are both beneficial and problematic. Wasps, being predators, play an important role in the control of other pest insects. Bees are essential pollinators of plants and producers of products such as honey and wax. Both vigorously defend their nests and utilize stinging as their primary defense mechanism. Although the sting of a bee or wasp is painful, it is usually not life threatening. However, some individuals are extremely sensitive to the sting's venom and may experience fatal allergic reactions.

BIOLOGY AND IDENTIFICATION

Bees and wasps are grouped together into the same order of insects, Hymenoptera. For the purposes of this publication the term "wasps" refers to hornets, yellowjackets, paper wasps, mud daubers, digger wasps, cicada killers, and any other wasp species that frequently are a problem around structures. The term "bees" refers to honey bees, bumble bees, and carpenter bees.

All bee species and most wasp species are winged. Bees can be distinguished from wasps by their stout, hairy bodies. Wasps, on the other hand, have relatively smooth, slender bodies. Another important difference between bees and wasps is their stinger. Bees have barbed stingers. Therefore, bees can only sting once, leaving the stinger within the victim. Wasp stingers lack the barb so wasps can sting multiple times in defense of their nest.

Bees and wasps experience "complete metamorphosis". This means that they pass through four different life stages: egg, larva, pupa, and adult (see Figure 1). Individuals that are newly hatched are termed "larvae". Larvae are blind and legless. After the larval stage, they become pupae. The pupal stage is a non-feeding, immobile stage wherein the larvae transform into adults. Finally, the bees and wasps emerge from the pupae as fully developed adults.

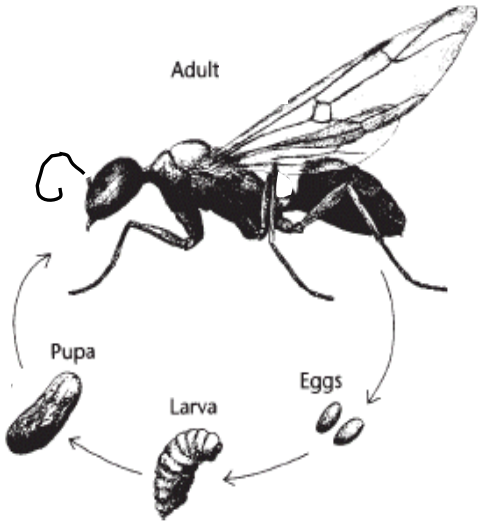

Figure 1. The Life Cycle of a Bee or Wasp

Wasps and bees display various levels of social behavior ranging from non-social, solitary mud-daubers to highly social honey bees. The social species of wasps and bees live together in highly organized communities where they share food resources and cooperate in raising the young. Most pestiferous wasps live in these types of large, organized colonies. Ground-

nesting wasps, such as yellowjackets, often build subterranean paper nests. Other species of wasps build aerial paper nests in trees, under eaves, or within wall voids (see Figure 2). These nests can contain thousands of individuals, all with the ability to sting. Some solitary species, such as mud-daubers, construct galleries of mud wherein they stash paralyzed spiders and other prey. Upon laying an egg within the gallery, the female seals it shut, thus leaving a plentiful food supply for the next generation. Solitary wasps will sting if provoked.

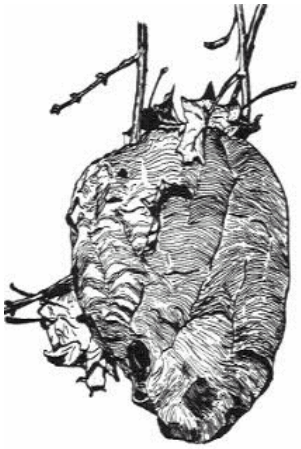

Figure 2. Hornet Nest in a Tree

Bees and wasps become increasingly abundant and active from spring through fall as the temperature rises and food sources become more available. Bees feed on nectar and pollen from flowering plants. Wasps feed primarily on protein sources, such as spiders and insects, but will also readily feed on sugar sources. Wasps, because of their food preferences often scavenge around humans. Human activities provide a ready supply of protein and sugar.

Bees and wasps will usually avoid humans if possible. Foraging individuals will normally refrain from stinging unless threatened. Yet, if the colony is threatened these insects will vigorously defend their nest. Disturbing a colony can occur when someone accidentally steps on or mows over an underground nest opening, agitates a tree or bush containing an aerial nest, or even walks past a previously agitated nest.

If bees or wasps or their nests have become a nuisance, remember that control can be a hazardous undertaking and should only be done after considering all safety precautions. If nests are large, it may be advisable to have professional pest control operators handle the situation.

PREVENTION

Bees or wasps often can be kept from becoming a nuisance by limiting their access to nesting sites and food and water supplies. The best way to accomplish this goal is through sanitation and maintenance. This may require time and effort but can be a permanent fix to the problem if done correctly. Below are some of the most effective methods of prevention using sanitation and maintenance:

1. Keep all outside trash receptacles tightly covered.
2. Remove trash from within all receptacles frequently. This will assure that trash will not prevent the lid from closing securely over the receptacle.
3. Clean dumpsters frequently.
4. Remove any dependable water source near the structure. Repair leaky outdoor faucets. Direct air conditioner drainage to areas where water will not pool. If you have depressed areas where water pools after a rain, level the areas to prevent future pooling.
5. Caulk any holes and cracks in the building that can be used by bees or wasps to gain access into the structure. Bees and wasps may use these as entryways to establish nesting sites within the structure.

MONITORING AND INSPECTION

Detection and monitoring are important in controlling bee and wasp problems. Killing individual bees or wasps will not solve the problem; entire nests must be destroyed or

removed. In order to treat a nest, one must first find it.

Nests can be found underground, under eaves, in wall voids, and in trees. Inspect bushes, logs, rock piles, and other protected sites for the presence of nests. In order to determine the continued success of your management plan and to locate new nests, continue monitoring on a regular basis throughout your integrated pest management (IPM) program.

Regularly inspect the premises during the spring and early summer. Inspecting during the spring and early summer will allow you to detect incipient nests. Incipient nests are easier to remove than mature nests.

LEAST TOXIC CONTROL METHODS

The purpose of integrated pest management is to reduce two things: the pest population and the amount of pesticides needed to accomplish that goal. With the exception of emergency situations, all other available control methods should be used prior to using a pesticide. Below are some of the most effective and least toxic methods available for ant control.

One suggestion that is applicable in most bee and wasp situations is to perform the control measures at night. Nighttime removal reduces the risk of being stung since the insects are slower and may have a more difficult time finding the source of the disturbance. In addition, at night wasps and bees are not foraging but are in their nests. Finally, at night children are not present on school grounds, reducing the risk that a stinging event will occur.

Physical Removal

Due to their stinging nature, the physical removal of bees and wasps is difficult. Yet, if careful action is taken physical removal is possible. It is advisable to wear protective clothing or to simply ask a professional pest control operator to physically remove the pests. Listed below are several effective recommendations for removing bees and wasps:

1. Trapping for wasps (particularly yellowjackets) can be an effective tool for reducing foraging wasps in an area. Several traps on the market utilize bait to attract wasps. Other traps, such as sticky traps, use colors (especially yellow) to attract the wasps. Trapped wasps die when placed in a freezer for a few hours.
2. Nest removal is also possible if the proper precautions are taken. If the nest is in an accessible area (like hanging from a tree branch) a strong plastic bag can be used to enclose the nest. The base of the nest or branch can then be severed and the nest removed.
3. Vacuuming out entire nests is another option. We recommend that only a professional do this. Vacuuming can be particularly useful when bees or wasps are found within a wall void or found in an environmentally sensitive area where pesticides can not be used. If a vacuum is used, it is well to remember that once the vacuum is turned off, the wasps will be able to find their way out of the vacuum. Therefore, it is important that the vacuum bag is quickly sealed and removed from the vacuum cleaner. Wasps die upon placement of the bag within a freezer for a few hours.

Chemical Management

Sometimes sanitation, maintenance, and physical removal alone may not be enough to control an existing bee or wasp problem. If bees and wasps persist or if an emergency situation warrants immediate control of a problem, chemical pesticides may be needed. Remember that Virginia law requires that all pesticides applied on school grounds must be applied by a certified applicator. All pesticides should be applied according to labeled directions. Applicators must wear protective clothing. Pesticides

should never be applied where they might runoff into storm drains or sanitary sewers.

Whatever the control method you choose, it is imperative that you keep clear, accurate records of all actions taken. Some pesticides are more environmentally friendly than others. Below are listed different chemically based management options. They are listed in the order of most environmentally friendly to least environmentally friendly.

1. Aerosol sprays can be used to quickly knockdown and kill individual nuisance bees and wasps. Only a small amount of spray is needed to kill the individual. Aerosols can also be used once a nest has been removed and placed into a bag. A small amount of the insecticide can be sprayed into the bag, providing the necessary lethal dosage.
2. Silica aerogel dust can be applied along with aerosol sprays to destroy underground nests. The pyrethroid acts as a quick knockdown agent and the silica aerogel acts as a long-term insecticide. The silica aerogel works by absorbing the outer waxy layer on insect bodies. Without the waxy layer, insects dehydrate relatively quickly.
3. Do NOT use gasoline in any situations. Gasoline is highly flammable and volatile. In addition, gasoline renders the treated soil infertile. Soil often absorbs the gasoline before it contacts the nest. The resulting fumes, instead of having the desired effect, actually irritate the wasps and may worsen the problem. Using gasoline is a very dangerous procedure.

RECORD KEEPING

Protect yourself against liability. Record all chemicals applied in a pesticide application IPM logbook on the facility's premises. Include the name of the applicator, the date of the application, the formulation, and the brand name of the chemical used. Be sure to also document the location of application and the pest problem that initiated the chemical treatment.

Prepared by Marc L. Fisher, School IPM Training Program Assistant, and Dr. Dini Miller, Assistant Professor of Entomology, Department of Entomology, Virginia Tech