Urban Pests and Pest Management[1]

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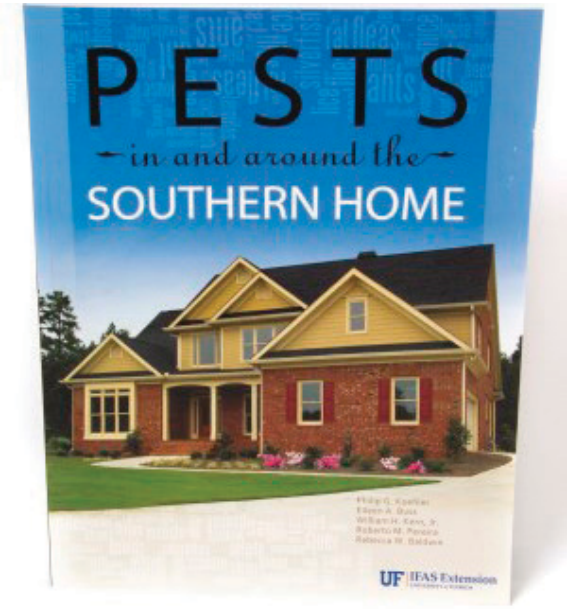

This fact sheet is excerpted from SP486: *Pests in and around the Southern Home*, which is available from the UF/IFAS Extension Bookstore. http://ifasbooks.ifas.ufl.edu/p-1222-pests-in-and-around-the-southern-home.aspx
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Urban Pests

The warm southern states provide an ideal environment for a wide variety of pests. Some of these pests live and reproduce inside structures. However, many live outdoors and only occasionally invade the home or workplace. Because almost everyone has problems with pests, most urban areas are sprayed with pesticides. Most pesticide applications are unnecessary and can result in environmental contamination and human exposure to pesticides. Approximately 30% to 40% of pesticide use is in urban areas.

Considering the high concentration of human population and the sensitive environment, safety and risk of exposure to pesticides is disproportionate in our fragile urban ecosystem. Do not apply control measures until a pest population is present and damage is beginning to occur. Judicious use of pesticides and the implementation of integrated pest management practices are of utmost importance.

Pest Management

Pest management is a decision-making process that involves locating and monitoring pests, establishing thresholds for action, and selecting pest control methods. To do this, the habits and life cycles of many pests must be understood and appropriate measures to solve pest problems must be implemented.

One important integrated pest management practice commonly used in the urban environment is prevention of pest problems. Managing pests through prevention is usually less expensive than trying to control a pest population that has already become established. Furthermore, pest prevention reduces the chance for substantial economic loss or irreversible damage. Prevention avoids some of the disruption associated with control efforts that may be needed after pests become established.

1. This document is SP486A, one of a series of the Entomology and Nematology Department, UF/IFAS Extension. Original publication date October 2013. Revised February 2022. Visit the EDIS website at https://edis.ifas.ufl.edu for the currently supported version of this publication.

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Once a pest becomes established, the most common pest management goal is to eliminate it. Elimination can only be successful if the conditions that originally favored the pest can be modified, or pest entry can be completely blocked. Once the established pest infestation is eliminated, it is important to look at the potential factors that allow that pest to get established, and make a concerted effort to eliminate these factors to prevent future infestations.

Locating and Monitoring Pests

Decisions to use pesticides and other control methods should be based in part on pest detection and monitoring results. Visually inspecting an area where pests or their damage is observed is the most common method of detection. Inspection involves careful and thorough searching for signs of the pest and conditions that favor pest buildup. Monitoring is a systematic method of observing pests or pest signs over a period of time. Monitoring may help you detect unwanted pests and determine where pests are coming from and where they are living. Monitoring is also helpful in evaluating control programs. Special devices and tools are available to detect and monitor certain types of pests.

Visual inspection. The purpose of a visual inspection is to search for evidence of pests. During an inspection, look for: (1) conditions that favor pests; (2) signs of pest damage, entry, or presence; and (3) the pest itself.

When doing an inspection, it is helpful to prepare sketches of the structure, lawn, or garden. Observe any conditions that may cause problems during pest control operations. Note areas that you were unable to inspect because they were inaccessible. Show the locations of trees, shrubs, trash and garbage storage, water sources, and other features of the surrounding area that may attract or harbor pests or promote pest buildup.

Detection and Monitoring Devices

Different types of simple devices can assist you in detecting and monitoring many of the pests found in structures. These include pheromones and other attractants, light traps, flypaper, and sticky traps.

Pheromones and other attractants. Pheromones are chemicals normally produced by certain insects and other animals to affect the behavior of individuals of the same species. Pheromones are used by insects for mating, aggregation, feeding, trail following, and recruitment. Synthetically made pheromones mimic the action of pheromones produced by some pest insects. These are useful for monitoring the adult forms of pest moths, certain beetles and weevils, and some species of flies and fruit flies. Certain other materials are also used as trap attractants. For example, ammonium carbonate attracts many different species of flies; food odors attract certain insects.

For monitoring, pheromones and other attractants are used in sticky traps or rodent spring traps, and in other traps, including new models that are monitored remotely via electronic and wireless communication. Inside a building where food is stored, you can use these attractant traps to locate sources of infestation. The effectiveness of attractant traps is influenced by the number of traps used and where they are placed.

Check traps regularly. For insects, check traps once or twice per week at a minimum, and remove all captured insects. Clean or replace sticky surfaces whenever they become covered with debris. Modern technology made it possible for traps to be monitored remotely using electronic communication. This allows the pest control operator to know exactly which trap has captured the pest and at what time that occurred. New monitoring technology allows a more precise pinpointing of the infestation location and the peak activity time for pests in a specific location.

Record the number of target insects removed from traps each time they are checked. Plot trap catches on a per-day basis. This will allow you to perceive changes in the insects' activity and verify the success of control measures. Compare this activity with activity in traps in other locations. For traps that are monitored electronically, comparison procedures are facilitated by computer technology, and results of control activities can be demonstrated in a shorter time. Monitoring of the data provided by electronically-monitored traps can be easily integrated into artificial intelligence systems that may allow a more robust and precise pest prevention system.

Light traps. Traps equipped with ultraviolet lights, or black lights, attract several species of flying insects. These traps usually have a container with a funnel-shaped entrance that allows insects to enter easily but blocks their escape. Some light traps have an electrically charged grid that kills insects as they approach the light. Electrocutor traps are usually not used for insect monitoring.

Flypaper. You can use flypaper for monitoring flying insects within confined areas. Some manufacturers add a fly pheromone to the sticky coating to make it more effective.

Examine the captured insects to determine their identity. Keep records of the numbers and species of pests that were caught and use this information for selecting and evaluating control methods.

Sticky traps. For monitoring cockroaches, place glue boards along travelways next to intersections of walls and floors. Place them in cabinets and next to major appliances in the kitchen.

Establishing Thresholds for Action

Pest control decisions are influenced by health or safety dangers created by the pest, by legal restrictions on pest infestation, and by levels of pest tolerance. Occasionally a pest control decision depends on the costs involved to control a pest weighed against the benefits received. On the basis of any of these factors, a threshold for action can usually be established to determine what type of control is needed and when control should begin.

Health and safety threshold. Health or safety threats commonly require fast, extensive, and sometimes costly pest control measures. Several pests have the potential for causing injuries to people (mosquitoes, biting bugs, fleas, spiders, bees, and wasps, for example) or transmitting disease to people or animals (rats and mice, cockroaches, fleas, flies, and mosquitoes). Some others, such as termites and wood-boring beetles, cause the type of damage that makes structures unsafe or reduces their value.

Decisions to control pests are based on knowledge of the potential harm they can cause. If serious injury or damage may result, the control threshold must be very low. For instance, one rat chewing on electrical wiring can cause a serious fire.

Legal thresholds. Public safety codes often require control of pests in public buildings, commercial housing, food service facilities, and other public structures. Building and safety standards address the control of structural pests as well as the repair of damage caused by them. These legal thresholds dictate when pest control methods must be used, even though in some cases control methods cannot be economically justified or the pests may not be causing a hazard to public health or safety.

For information on laws that regulate pest infestation in certain buildings and on foods, contact state and local health departments and housing and community development offices. The Bureau of Entomology has information on laws that apply to the control of structural pests. Federal marketing orders list allowable tolerances of specific pests or pest damage in fresh and stored food items. This information can be obtained from the US Department of Agriculture, Agricultural Marketing Service.

Pest acceptance threshold. People have different degrees of acceptance of pests that they are willing to tolerate in and around their homes. Pest acceptance thresholds may be high because of social or cultural factors or because of concerns about the costs or hazards of pest control methods used. A pest acceptance threshold can be extremely low due to a person's revulsion or fear of the pest. Acceptance thresholds may sometimes be modified if you can provide factual information about specific pests, the potential for pest damage, and methods of pest control.

Economic threshold. In certain instances, the cost of control measures may need to be justified. Economic thresholds may apply if there are no health and safety, legal, or tolerance thresholds that need to be considered. An economic threshold is a level of pest abundance at which the potential loss caused by pest damage is expected to be greater than the cost of controlling the pest.

Pests can be prevented, through sanitation and habitat modification, or they can be controlled by trapping, pesticide use, and in some instances, biological control. Pests in structures are usually more effectively controlled when a combination of compatible control methods can be used.

Sanitation and Habitat Modification

Habitats are areas within the larger environment that are suitable for a pest's survival. Habitats provide a pest with some or all of its necessary living requirements. A habitat can only accommodate a maximum number of pests due to limitations of one or more of these requirements. This maximum number is known as the carrying capacity. Where large quantities of food are available and shelter and other requirements are ample, the carrying capacity is high. Such a habitat can support an almost unlimited number of individuals of a pest species. If the carrying capacity is limited, however, the population tends to remain fixed in size. If you remove individuals from a habitat through pest control measures or if they die off due to natural causes, these individuals will be replaced by others, usually soon, unless the carrying capacity is reduced at the same time. Population size is maintained at the carrying capacity by increased reproduction among remaining individuals or by new individuals migrating in.

Habitat modification usually involves improving sanitation practices. Sanitation includes removing food, water,

breeding sites, and shelter used by pests. Outdoors, you may need to trim or remove dense, pest-harboring vegetation near buildings, clean up trash, keep garbage in closed containers, provide for drainage of standing water, clean up animal wastes and spilled animal feed, and eliminate items that attract pests. Inside, sanitation includes storing foods and food wastes in tightly closed containers, cleaning up spills and residues, removing trash and other materials that can be used for nests, and thorough vacuuming and dusting on a regular basis. The cleaning of surfaces may also improve the effectiveness of pesticides by removing grease, oils, dust, and other contaminants that interfere with their function. To assist in good sanitation, make sure interior areas are well lighted to simplify cleaning and easy detection of pests and pest damage. Sweepings and other waste should be taken to a disposal area outside of the building.

Other sanitation practices include removing dirt mounds, wood pieces, and other cellulose debris from areas beneath buildings to keep from promoting termite problems. Provide adequate ventilation to areas beneath buildings to reduce moisture.

Outdoor lights placed near entrances to buildings attract many flying and crawling insects at night. If possible, locate light fixtures away from entrances. Otherwise, modify the type of light being used. Sodium vapor lights are better than mercury vapor lights or standard incandescent lights for outdoor use because they emit a spectrum of light that is less attractive to insects; yellow "bug" bulbs work on the same principle.

A program of sanitation and habitat modification requires cooperation. All people living or working in a building must keep food, food waste, and trash in pest-proof containers and store other items in designated places where they cannot attract pests. Inhabitants should promptly report pest problems. Housekeeping and landscape maintenance workers can help by keeping interior and exterior areas free of trash, nesting sites, and other items that might be attractive to pests; they should provide containers for wastes and specify locations for storage of other materials. Buildings must be monitored on a regular basis to ensure that sanitation conditions are maintained and to spot new problem areas as they occur. Tenants and persons responsible for housekeeping and landscape maintenance must be notified of conditions that promote pest buildup so they can take corrective action.

Exclusion

Exclusion is a type of habitat modification useful for keeping fleas, ants, cockroaches, stored-product pests, termites, and other pests from entering buildings. The design and construction of a building may either promote pests or exclude them. Pestproof design and construction should be an important consideration when planning new structures and remodeling older ones.

Check building exteriors for ways that insects or other pests can enter. Obvious entrances for many types of pests are doorways and windows. These must be fitted with tight-fitting screens or doors. Properly installed weatherstripping eliminates small cracks that provide access for some pests. Also, check attic and foundation vents to ensure that they are tight and screened. Look for foundation or wall cracks, gaps in siding or joints, and areas where pipes, wires, or other objects pass through walls. Fill openings with concrete or another suitable patching material. Inspect chimneys and roof vent pipes for adequate screening.

The publication "Pest Prevention by Design", by Chris A. Geiger and Caroline Cox, published by the San Francisco Department of the Environment and available online at http://www.sfenvironment.org/sites/default/files/fliers/files/final_ppbd_guidelines_12-5-12.pdf, offers detailed information on design guidelines for pest prevention, with the objective of excluding pests from buildings. The publication offers various principles that can be applied in order to exclude pests.

Inspection

Inspect items brought into a building for pest infestation. For example, firewood may harbor carpenter ants, spiders, cockroaches, wood-boring beetles, termites, or similar pests, as well as eggs of some pests. Furniture, rugs, and other items moved from an infested building can be contaminated with cockroaches, carpet beetles, or fleas. Dogs and cats bring in fleas and ticks.

Trapping

Traps include sticky traps, pheromone traps, and light traps, some of which can be monitored remotely, so that only traps that are triggered by the presence of a pest need to be observed and/or replaced. Beside their benefits as monitoring devices, traps are used to kill pests or to catch pests so they can be removed from an area. Many types of pests can be controlled through trapping. Traps do not require the use of potentially hazardous chemicals, and the user can easily view the success of the trapping program. However, successful trapping programs require skill, time, and attention to develop workable techniques. Even so, trapping

may not always work well enough under some conditions to satisfactorily control target pests. Trapping techniques that are successful in one situation may not always work as well under different conditions or at other locations.

Biological Control

Biological control is gaining more importance as a pest control method for certain insects in structures. Cockroach populations have been successfully reduced in certain locations by introducing parasitic wasps. Biological control techniques either augment other control practices or replace more disruptive or hazardous methods.

Pesticides

The application of pesticides is the most common pest control method used in and around buildings, enclosed areas, and vehicles. Some pesticides provide chemical barriers to prevent insects from getting in. Pesticides are also used to treat soil, wood, fabrics, and other items to prevent pest damage.

Pesticides are available as baits, tracking powders, desiccants (inert dusts or sorptive powders), liquids, dusts, and gases. The type of pesticide used and the kind of formulation selected, are based on the life habits of the pest, its density, and its location.

Summary

This manual on pests in and around the home is a compilation of information on biology, identification, and pest management practices for urban pests. By learning about these specific pests, it should be possible to reduce pesticide use in the home. The reduced pesticide use should improve the health and safety of our families and the environment.