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Pat Quinn, Governor

Department of Public Health
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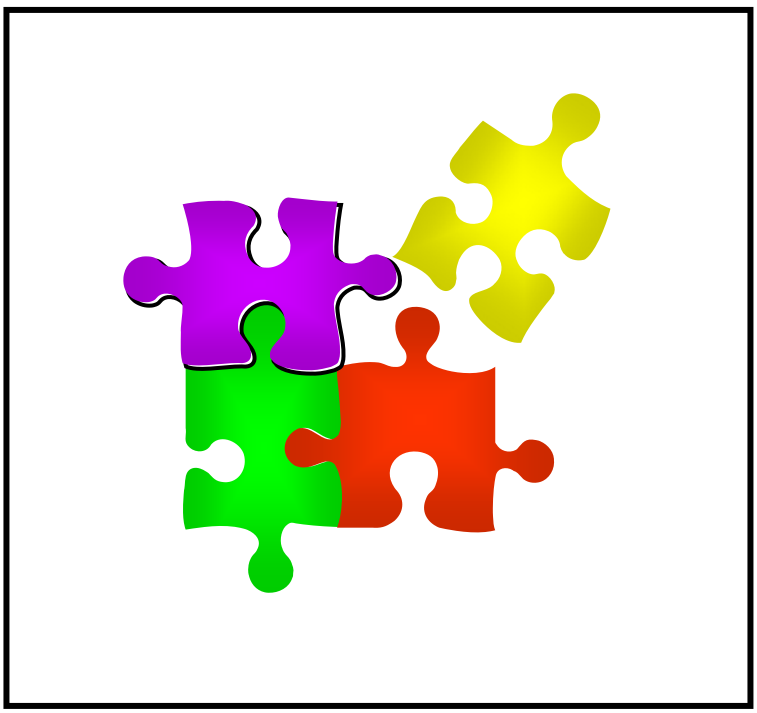
Developing and Implementing an Integrated Pest Management Program in Schools and Day Care Centers

Structural Pest Control

October 2009



Illinois Department of Public Health

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2008

Contents

Forward…………………………………………………………………………… 3

Part I – What is an Integrated Pest Management Program?
Definition of Integrated Pest Management(IPM)………………………….. 4
Concepts of an Integrated Pest Management Program…………………..... 5

Part II – Components of an Integrated Pest Management Program
Building an IPM Plan……………………….………………………….. 5
Developing an IPM Policy Statement………………………………….......5
Roles and Responsibilities………………………………………………..... 6
Setting IPM Objectives for Sites ..…………………….……………………8
Determining Tolerance and Action Thresholds of Pest Activity………….. 8
Determining Response Times………………………………………………9
Developing IPM Outlines for Specific Pest……………………………...9
Establishing Periodic Inspection, Monitoring, and Reporting System……..9
Following up, Evaluating, and Record Keeping…………………………... 11
Reviewing and Incorporating Other Documents and Procedures…………..12

Part III – Implementing a Successful IPM Program
Development…………………………………………………………….. 13
Communication………………………………………………………….. 13
Responsibilities Carried Out…………………………………………….. 13
Applying Preventive IPM Strategies ……………………………………… 13
IPM Strategies for Indoor Sites…………………………………..... 14
IPM strategies for Outdoor Sites……………………………………16
Inspect and Monitor ……………………………………………………….. 17
Identification, Action Thresholds and Response Times…………………… 17
IPM Outlines……………………………………………………………….. 17
Action……………………………………………………………………......18
Evaluate……………………………………………………………………..18

Part IV - Other Items to Consider
Applying Pesticides Judiciously…………………………………………… 18
Pesticide Storage ……………………………………………………….…….. 19
Notification Requirements…………………………………………………20
In-house IPM or Contracted Services……………………………….……...21
IPM Plan Updates……………………………………………………….. 22
Measuring Success…………………………………………………………22

Part IV – Conclusion and Resources
Conclusion………………………………………………………………..22
Technical Assistance……………………………………………………….22
Additional Resources……………………………………………………..23
Sources……………………………………………………………………...23

Appendixes

Appendix A Sample School Pest Management Policy Statement………..…24
Appendix B IPM Pest Tolerance Levels ………..…………….……………31
Appendix C Pest Response Times……………..……………………………37
Appendix D Sample Pest Outlines……………………………………….39
Mice and Rats…………………………………………………… 41
Cockroach…………………………………………………… 47
Pantry Pest…………………………………………………… 55
Bees/Wasps………………………………………………….... 56
Ants……………………………………………………………60
Bats…………………………………………………………… 65
Appendix E Sample Facilities Inspection Report………………………….. 70
Appendix F Sample Pest Trap Log………………………………………76
Appendix G Sample Pest Sighting Log…………………………………… 78
Appendix H Sample Record of Pesticide Application……………………...81

Forward

This manual is designed to help school officials and day care center owner/managers understand the principles of an Integrated Pest Management (IPM) program and to aid them in implementing those principles for pests in their facilities. It is not feasible to write an all encompassing IPM program because each school and day care facility is unique. Therefore individual facility managers, school officials and day care owner/operators should develop programs to meet the specific needs of the physical and socio-economic environments in which they operate.

Historically, successful pest control has relied on the basic concepts of IPM since human beings first attempted to protect their health and property from pests. The rapid development of modern residual pesticides during World War II made pest control very effective, economical, and easy to accomplish. These residual pesticides were so effective that in many instances when problems did occur the answer was simply to use more pesticides. There have been several consequences of this trend of accelerating pesticide usage. In a few instances, "super" pests have appeared that are resistant to common pesticides. Additionally, pesticides were being used as a short-term solution to a pest problem without addressing the root cause of the infestation. A growing segment of our population has become very concerned over the possibility that adverse health effects might result from the overuse of pesticides. Some of these worries were based on product misuse and negative publicity; other concerns appear to be substantiated by epidemiological studies.

In the past five decades, the research and development work done by governmental agencies, universities, and chemical manufacturers has greatly increased the knowledge of the biology and habits of pests. As this body of knowledge grew, our ability to control pests increased dramatically. Today, this expansion of our knowledge allows us to control pests more effectively with less reliance on pesticides.

Disclaimer

Part I – What is an Integrated Pest Management Program

Definition of Integrated Pest Management

Integrated Pest Management is an effective and environmentally sensitive approach to pest management that relies on a combination of common-sense practices. IPM programs use current, comprehensive information on the biology of pests and their interactions with the environment. This information is used to select the most appropriate pest control methods with the least hazard to people, property and the environment. IPM programs consider all available pest management options, including the justifiable and judicious use of pesticides.

Understanding pest survival needs is essential to implementing IPM effectively. Pests seek habitats that provide basic needs of moisture, food and shelter. Pest populations often can be prevented or controlled by creating unfavorable environments. This can happen by taking away those things required for pest survival or by simply blocking their access into buildings. In addition, persistent pests can be managed by using a variety of non-chemical and chemical methods as needed.

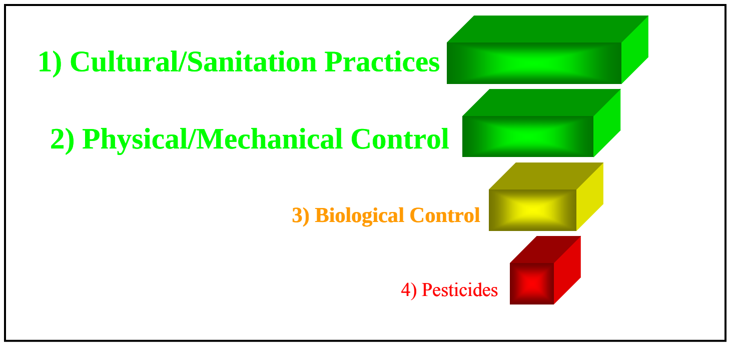
As defined by the Structural Pest Control Act (225 ILCS 235/3.24), IPM is a pest management system that includes the following elements whenever possible:

- Identifying pests and their natural enemies;
- Establishing an ongoing monitoring and record keeping system for regular sampling and assessment of pest and natural enemy populations;
- Determining the pest population levels that can be tolerated based on aesthetic, economic and health concerns, and setting action thresholds where pest populations or environmental conditions warrant remedial action;
- Preventing pest problems through improved sanitation, management of waste, addition of physical barriers, and the modification of habitats that attract or harbor pests;
- Relying to the greatest extent possible on nontoxic, biological, cultural or mechanical pest management methods, or on the use of natural control agents;
- Using chemical pesticides, when necessary, with preference for products that are the least harmful to human health and the environment; and
- Record keeping and reporting of pest populations, surveillance techniques and remedial actions taken.

Children have a higher potential for pesticide poisoning than adults. Proportionally, children have a higher respiratory rate and eat/drink more than adults. In addition, they have a natural tendency to put objects in their mouth, and spend more time on or near the ground than adults. A child's neurological system is still developing and is more susceptible to chemicals in their environment compared to adults. Implementing an IPM program reduces the chance of incidental exposure to pesticides. This proactive, rather than reactive, approach to managing pests provides better long-term control than that achieved by pesticides alone. Over time, an IPM program can cost less than conventional pest management practices by reducing the school or day care center's dependency on pesticides, possibly decreasing energy usage, and possibly increasing the life of structures.

Concepts of an Integrated Pest Management Program

An IPM program recognizes that not all pests need to be eliminated immediately. On the other hand, some insects, rodents and mammals can present a health hazard for the facility's occupants, and should be controlled as quickly as possible. Therefore, it is very important that management, staff, and the pest management professional establish well-understood guidelines for response to reports of pests in the facility. An efficient IPM program starts with the support of all levels of management and staff and incorporates the school's or day care center's management activities such as preventive maintenance, janitorial practices, landscaping, occupant education and staff training. A proper IPM program does **not** support **routine spraying** or **broadcast spraying** in the facility but rather a systematic approach using several possible practices and control tools to solve the pest problem.



Part II – Components of an Integrated Pest Management Plan

Building an Integrated Pest Management Plan

A well-written, easy-to-follow IPM plan provides staff and management with a written document on IPM procedures and policies for the facility. The plan should be a **living** document that is continually **updated** as new pest situations and new procedures or activities within the facility arise. This allows the facility to maintain a historical record of pest management procedures so the IPM coordinator can act on pest issues, with noted positive and negative experiences of their predecessors. With the social, economical, cultural, and environmental differences in this state, an IPM plan should be unique to each facility. A successful IPM plan outline, which can be tailored to a variety of facilities is illustrated in the nine following steps:

STEP 1: Developing an Official IPM Policy Statement

The transition from a conventional pesticide program to an IPM program goes beyond simply stating a commitment to support and implement an IPM approach. An official IPM policy statement acts as a guide for the IPM coordinator to use in developing a specific IPM program. This policy statement should state the intent of the school/ day care administration to implement an IPM program. It should briefly explain what is expected, the incorporation of existing services into an IPM program, and the education and involvement of students, staff and IPM coordinator. Appendix A gives examples of an IPM policy statement.

STEP 2: Identifying Roles and Responsibilities

Communication among those involved in a pest management system is the key to the success an IPM program. When the respective roles of everyone in the IPM program are identified and agreed upon, and when these people communicate with each other, more effective and less expensive protection of the site can be achieved with reduced risk to the environment and its occupants. The IPM program should be incorporated into existing school or day care staff responsibilities. Examples of IPM functions and responsibilities are listed below and should be outlined in the district/facility pest management plan.

Decision-Makers

Generally, persons who authorize the pest management program and control expenditures for pest management are those involved in the direct management (or administration) of the facility, such as a superintendent or assistant superintendent of schools or the owner/manager of a day care center. On other occasions, the purchasing agent or contracting officer for a school system or district may be a major decision-maker for a school site. At this level of pest management decision-making, concerns about costs, liability, time expended, method effectiveness, safety and customer or occupant satisfaction are foremost. These decision-makers also determine if the IPM coordinator is performing satisfactorily and if pest management objectives are being met. Management must hold staff, occupants, and contractors accountable for their actions or inaction involving all aspects of pest management. One way this can be done is by monitoring complaints from occupants and/or by observation of the site environment. Decision-makers also must provide the necessary level of financial commitment for any IPM program to succeed. It is important for upper management to communicate their commitment to the IPM program and to support the staff in their efforts to implement all aspects of the IPM Plan.

IPM Coordinator

The IPM coordinator observes and evaluates (or directs others to do so) the site and decides what needs to be done to achieve the site's pest management objectives. The IPM coordinator designs a pest management system that considers potential liability, applicator and occupant safety, costs, effectiveness, time commitment, and customer or occupant satisfaction. The IPM coordinator also performs or directs the necessary pest management actions to be taken. Since the IPM coordinator usually has the responsibility of keeping both the occupants and the decision-makers (management) informed, he or she has the greatest need for available information about the site, pest, and appropriate pest management methods. The site's program must achieve its goals within the limitations posed by safety, time, money, and material availability. The IPM coordinator keeps accurate records of the location, and dates of pest management activities to determine if actions taken are successful. The IPM coordinator is also the liaison between the facility personnel and the pest control technician.

Maintenance Staff

Proper building maintenance is essential to good pest control. Maintenance staff should be aware of their role in preventing pest infestations and supported in their efforts. Maintenance plays such an important role in the IPM program that a school or day care center may want to consider making the maintenance supervisor the IPM coordinator. Building repairs, sealing, screening, proper landscaping, and preventive maintenance can drastically reduce the number of pests found in a facility and make actions taken against pests more effective. The maintenance staff, at a minimum, needs to be aware of IPM procedures so they can facilitate the IPM process and work successfully with the IPM coordinator to eliminate pest problems.

Food Service Personnel

Most pest infestations in school and day care facilities occur in and around food preparation and storage areas. A commitment to proper sanitation, storage and inspection practices is essential for pest management in food preparation areas. If sanitation procedures are already in place, review them to ensure all elements of IPM have been addressed and incorporated into your IPM plan. An inspection procedure should be written and followed to address issues in an appropriate and timely manner. It is critical that food service personnel report pest sightings immediately to the IPM coordinator. Food service personnel should work closely with the local health department with regard to proper food handling, storage and cleaning practices in food preparation and storage areas, and the IPM program should be communicated to the local health inspector.

Students and Staff

Much of the prevention and reduction of pest infestations at a school or day care center depends on the cooperation between students and staff to properly maintain work and personal areas such as lockers, desks, storage areas, lounges and break rooms using proper sanitation practices. Reporting pest problems and sanitation issues immediately is key to controlling or eliminating infestations.

Parents/Guardians

Parents/guardians should be aware of IPM practices and prevent the transport of pests in notebooks, lunch boxes, backpacks, clothing and other personal items between home and the facility. Parents/guardians also should be aware of the IPM practices to include pesticide use in their children's schools so that they better understand the school’s pest management policies. Facilities should welcome questions from parents/guardians and inform them about IPM. Visible interest and concern from parents/guardians are valuable resources for the school or day care IPM programs. Interested parents/guardians should be invited to participate on IPM advisory or oversight committees.

A school IPM program should include a commitment to inform teachers, medical personnel, cafeteria employees, maintenance personnel, janitorial personnel, administrative personnel, students, and parents/guardians. All staff members should learn the basic concepts of IPM and how they are applied in the facility. Staff and students will need to understand how their own behavior can increase or reduce pest problems. School staff should encourage the parent-teacher association and student organizations to participate in the IPM program. Educating and training staff to function within the IPM context is important to the success of the IPM program. Specific personnel policies should be outlined. For example, staff should not bring and use pesticides at the facility, move sticky traps or other pest monitoring devices, or prop open unscreened windows or doors.

STEP 3: Setting Integrated Pest Management Objectives for Sites

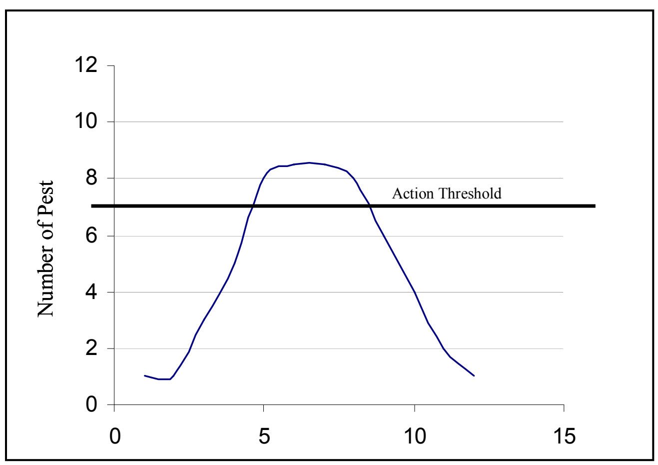
Pest management objectives differ between sites; therefore, a site's objectives and pest tolerance must be considered before establishing action threshold levels. Schools and day care centers should outline specific objectives in a pest management plan, such as:

- Prevent interference with the learning environment of the student;
- Eliminate injury to students, staff and other occupants; and
- Preserve the integrity of the school buildings or structures.

Public schools and licensed day care centers are to ensure that objectives are obtainable and realistic. For instance, a statement such as "remove all pests from buildings" is unrealistic and unattainable. Alternatively, "remove all cardboard boxes following weekly food shipments" is realistic and attainable.

STEP 4: Determining Tolerance or Action Thresholds of Pest Activity

A tolerance or action threshold is the point at which action is initiated for a given type of pest. It is determined by deciding how many pests can be tolerated and by the danger or public health threat posed by the pest. Action thresholds are set by the IPM coordinator and occupants and should reflect the site's pest management objectives. Remember, the presence of a pest does not necessarily require application of pesticides, but when pest populations exceed action thresholds, some corrective action should be taken. Customized recommendations to achieve specific results are an essential part of an IPM program. Custom recommendations, including an explanation of the benefits, should be based on the evaluation of available data obtained through inspecting, identifying and monitoring.



Determining tolerance or action thresholds along with response times is one of the keys to a successful IPM program. Appendix B gives some examples of action threshold worksheets.

STEP 5: Determining Response Times

Response to pest problems must be timely, **consistent**, and effective; however, the school/day care center staff must recognize that some pest problems are more serious than others. For example, the control of a pest that threatens the safety of students and/or staff should have a higher priority than the mere presence of a single non-threatening insect. Consequently, the IPM coordinator, administrators, and pest control contractors must agree on the response times for pests. Setting response times and properly communicating the intent of the action will allow the administration time to adhere to notification requirements as outlined in section 10.3 of the Illinois Structural Pest Control Act and section 3(C), (f) of the Lawn Care Products Application and Notice Act. An example of a response times can be found in Appendix C

STEP 6: Developing Outlines for Specific Pest

The IPM coordinator uses outlines as a guide to properly identify and manage specific pests. The outlines contain information on life cycles, breeding habits, favored habitats, conditions conducive to infestation, and treatment strategies for the pest. Furthermore, pest outlines should be from an authoritative source such as a university extension service or public health department. The U.S. Environmental Protection Agency (U.S. EPA) and the Illinois Department of Public Health have outlines available on pests that are commonly found at schools and day care centers. The Illinois Department of Public Health and the Illinois Department of Agriculture have staff available to advise schools and day care centers on pests and pest management issues. Appendix D gives examples of pest outlines as well as Web addresses to find pest outlines. Treatment strategies should incorporate IPM concepts using cultural/sanitation, physical/mechanical, and biological controls first, before the use of pesticides that pose the least hazard to human health and the environment are used.

STEP 7: Establishing Periodic Inspection, Monitoring and Reporting System

Inspecting

Periodic and thorough inspection of key areas combined with the evaluation of staff pest sighting reports are critical to a successful IPM program. All other IPM actions build upon this foundation. A staff member, specialist with the school district, or a structural pest control technician, may do the inspections. This person must:

- identify or obtain an accurate identification of any specimen;
- know the life cycle and habits of pests most likely found in schools;
- know where the signs of pests are most likely to be found in the facility;
- be familiar with the many ways pests enter the facility;
- have access to all areas of the facility;

- talk to the staff person who filed the pest sighting report, evaluate the information, and make a decision on any subsequent action to be taken;

- be familiar with pesticide safety procedures and respond to emergency situations as needed;

- make written recommendations for upgrading of the facility and for changing procedures to diminish the entry of pests and/or to find harborage areas in the facility;

- note and provide corrective actions for potential pest problem and harborage areas including water and food sources;

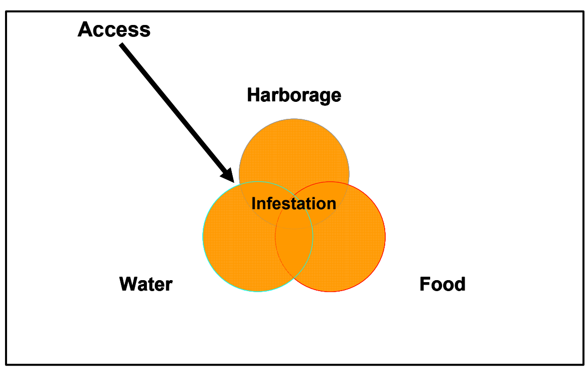
- follow up on the recommendations and/or changes in procedures to confirm that they have been completed; and

- provide a detailed written report for each month.

Inspections identify potential pest harborage areas, sanitation issues, and possible entry points for pests. An inspection program should be outlined in the IPM Plan and include who will be performing the inspection, when and where the inspection will take place, and how the inspection will be performed. Ideally, to prevent redundancy in inspection reports, several individuals should be trained to perform inspections and be rotated to different areas on a regular basis. An example of a facility inspection form can be found in Appendix E.

Monitoring

Routine inspection and accurate identification of pests are vital steps in IPM to ensure the effectiveness of control methods. Once a pest has been identified and the source of its activity pinpointed, actions such as habitat modification, primarily exclusion, repair and sanitation, can greatly reduce pest prevalence. Monitoring includes inspecting areas for pest evidence, entry points, food, water and harborage sites, **and estimating pest population levels**. This can be achieved using sticky traps, and physically observing pests or evidence of pests such as droppings, nests, or shed skins (exoskeletons). An example of a pest monitoring trap log is found in Appendix F. The information gained through monitoring is evaluated to determine whether the action threshold has been exceeded and what management methods will be employed. A monitoring program should be outlined in the IPM plan to include who will be performing the monitoring, when and where the monitoring will take place, and how the monitoring will be performed



Reporting

Staff members also need a way to report pest problems between inspection periods. A pest reporting procedure should be outlined so that staff members can promptly report pest sightings. The reporting form should be concise and require specific information so that the staff are not overburdened by a long form and the IPM coordinator is not inundated with extraneous information. The pest sighting report form should be filed with the IPM coordinator for investigation and possible corrective action. Again, if an IPM program is to succeed, response to a pest problem must be timely, consistent, and effective. An example of a pest sighting report can be found in Appendix G.

STEP 8: Following up, Evaluating, and Record Keeping

Following up Inspecting and Evaluating

To continually update the IPM plan, follow-up inspections must be completed and evaluated. Evaluations must be documented and the plan updated to prevent mistakes or failures from recurring. The IPM plan is a dynamic, constantly changing document and it is the evaluation of IPM procedures that allows the IPM coordinator to improve the plan. Consequently, all aspects of the school's pest management program must be periodically reviewed to determine if pest problems are chronic or temporary.

If a pest problem occurs repeatedly over a three-month period and several pest management techniques have been tried, the problem may be chronic. For example, mice repeatedly seen in the same area suggests they are entering from a harborage area like a hidden crawlspace. In contrast, temporary or seasonal problems may occur about the same time each year, but usually disappear in a few days.

The IPM program review or evaluation also can be used to determine if previous problems have been eliminated and if new problems are appearing or reappearing. Other changes in the school's operations can affect the functioning of the IPM program, such as:

- differences in use patterns like the addition of evening or summer classes;
- nearby excavation and construction causing an invasion of rats or American Cockroaches;
- seasonal invasion of mice from nearby fields following grain harvest; and
- high fly numbers from decaying material deposited by a recent flooding event.

It is important that communication between administrators, staff, and the IPM coordinator remain open in order to avoid misconceptions associated with the IPM program. The IPM program review or evaluation can open the lines of communication between all parties and outline successes and failures as well as the overall objectives of the program.

Record Keeping

A successful IPM program relies on accurate record keeping. It provides the documentation needed for the school to evaluate the results of current IPM practices to determine if pest management objectives have been met or if new objectives need to be established. Keeping accurate records also leads to better decision making and more efficient procurement. By keeping accurate records, results can be recorded showing actions taken in correlation to pest population reduction.

A complete and accurate pest management log should be maintained for each property and kept with the IPM plan. Pesticide application records also should be maintained in order to keep a historical account of pesticides used. An example of a pesticide use report can be found in Appendix H. The logbook should contain the following items:

- inspection sheets;

- pest surveillance sheets that record the type and number of pests or other indicators of pest population levels revealed by the monitoring program for the site. Examples include: date, number, location, and rodent species trapped or removed, as well as date, number and location of rat burrows observed;

- pest sighting forms and action taken;

- a diagram noting the location of pest activity including locations of all traps, trapping devices and bait stations in or around the site; and

- a copy of the current EPA-registered label and current Material Safety Data Sheet (MSDS) for each pesticide product used, where they were used, and the amount used.

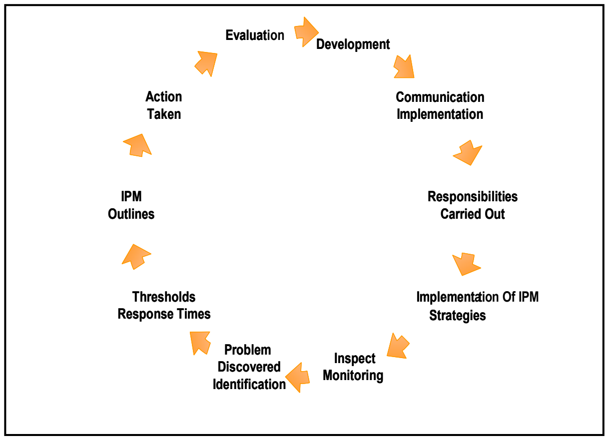
STEP 9: Reviewing and Incorporating Other Documents or Procedures

As stated previously, an efficient IPM program starts with the support of all levels of management and staff and incorporates the school or day care center's activities related to pest management, such as preventive maintenance, janitorial practices, landscaping, and occupant/staff training. Other procedures should be reviewed for compatibility with the IPM program and, in some instances, be incorporated into the IPM plan. The IPM plan should contain a diagram of the facility so accurate records of pest activity, monitoring devices, and corrective action procedures can be accurately documented. A diagram also will ensure that no areas go unnoticed and can point out key pest entry points such as gaps around utility lines and under doors, cracks and holes in the structure, and unscreened vents, windows and doors.

The steps above outline a suggested IPM plan that, over the years, has shown to be successful. A school or day care center may develop an alternative plan. In order to be considered compliant with section 10.2, b-3 of the Illinois Structural Pest Control Act, a public school or licensed day care center must meet all objectives outlined in section 3.25, 10.2, and 10.3 of the Illinois Structural Pest Control Act.

Part III – Implementing a Successful IPM Program

Development



In order to implement a successful IPM program, an IPM plan must be developed, supported and implemented from the top of the organization down. The IPM plan will provide staff and management a written document on IPM procedures and policies to follow and should outline the IPM program for the facility. Once the program is developed, communication of the plan is essential.

Communication

The IPM plan must be unilaterally communicated and individual roles should be understood by all staff, building occupants and contractors. For example, a company delivers and sets up new office furniture and desks and the discarding of the cardboard and packing materials is not discussed or written in the contract so the cardboard and packing material is left on site for several weeks while the equipment is being replaced causing an increase in cockroach populations harboring in the cardboard. The situation could have been avoided if the purchasing and contracting official had been aware of the IPM program and the procedures outlined in the plan.

Responsibilities Fulfilled

Even though the IPM coordinator oversees the IPM program, he or she may not be responsible for the actions of the staff, occupants or contractors. Management must work closely with the IPM coordinator and hold staff, occupants and contractors accountable for their action or inaction. Management must ensure that staff, occupants and contractors are aware of and understand their responsibilities under the IPM program.

Apply Preventive IPM Strategies

The next step in implementing an IPM program is to apply preventive IPM strategies. After a thorough inspection of the facility has been completed, pest-preventive measures can be instituted at the facility. Such preventive measures reduce the need for pesticide applications and include sanitation and structural repair, and the use of physical and mechanical controls such as screens, traps, air doors, etc. Some specific IPM strategies for schools and day care centers are provided below. IPM strategies should be customized to the specific needs of each school or day care facility.

IPM Strategies for Indoor Sites:

Typical Structure-infesting Pests: (mice, rats, cockroaches, ants, flies, wasps, hornets, yellow jackets, spiders, and termites. Stinging or biting species can be troublesome and hazardous to students and staff)

Entry Points: (Doorways, overhead doors, windows, holes in exterior walls, openings around pipes, electrical fixtures, ducts, etc.)

- Exterior doors should be self-closing. Doors should not be propped open for ventilation unless entry way is properly screened.

- Place weather stripping, kick plates and/or door sweeps on doors to ensure a tight fit. These items should be checked at least quarterly and replaced if worn.

- Seal openings in walls and around utility areas (e.g., pipe chases).

- Install or repair screens.

- Install air curtains.

- Keep outdoor lighting near entries to a minimum and use lights that minimize insect attraction. Mount outdoor lighting on poles away from the building. Position lights to illuminate the building to enhance security.

- Place screens on vents and windows to prevent pests from entering.

Occupied Rooms: (classrooms, laboratories, administrative offices, auditoriums, gymnasiums and hallways)

- Allow food and beverages only in designated areas and store food in containers that are inaccessible to pests.

- Keep indoor plants healthy. Periodically inspect indoor plants for pests.

- Keep areas as dry as possible by removing standing water and water damaged or wet materials. Repair any structural defect that permits water into the building or to accumulate near the outside of the structure. This includes leaking pipes, clogged gutters, misdirected downspouts and faulty grades.

- Store all animal foods in closed, pest-resistant containers. Clean animals cages and aquaria as often as needed. Clean up floor around cages daily.

- Keep storerooms clean and free of clutter. Store items in pest-resistant containers.

- Keep classrooms clean and free of clutter. Store items in pest- resistant containers

- Clean lockers and desks routinely.

- Vacuum carpeted areas frequently.

Food Preparation and Serving Areas: (dining room, main kitchen, teachers' lounge, family and consumer science kitchen’s, snack area, vending machines and food storage rooms)

- Store food in closed, pest-resistant containers. Containers must have tight-fitting lids and be made of plastic, glass or metal. Replace containers when lids no longer properly seal.

- Remove trash from within the facility at the end of each day. Use plastic can liners. Clean trash cans as needed.

- Ensure good stock rotation practices.

- Promptly remove cardboard from the facility.

- Use shelving made of metal or plastic with end caps to prevent pest harborage. The bottom shelf should be no less than 6 inches off the floor to allow for proper cleaning.

- Clean floor drains routinely and ensure covers are secured and in good condition. Keep water in active drains. Permanently seal unused drains.

- Remove food debris, fix dripping faucets and water leaks, and dry out wet areas as needed.

- Promptly clean food preparation equipment after use. Routinely remove grease accumulations from vents, floors, walls and kitchen equipment. Routinely inspect food preparation equipment for cleanliness and signs of pests. Seal cracks and crevices that allow pests access to harborage in wall voids.

- Consult with your local health department on proper food handling, storage and cleaning practices in food preparation and storage areas, and review inspection reports.

Rooms and Areas With Extensive Plumbing: (bathrooms, rooms with sinks, locker rooms, dishwasher rooms, swimming pools and greenhouses)

- Promptly repair leaks and correct other plumbing problems to deny pests access to water.

- Routinely clean floor drains, strainers and grates. Clean pipe chases regularly.

- Do not permit water to stand; keep areas dry. Increase ventilation as needed.

- Do not store paper products or cardboard boxes near moist areas, directly on the floor, or against the wall. Remove cardboard boxes promptly from the facility. Do not use cardboard for product storage.

Maintenance Areas: (boiler-room, mechanical room, mop closets, janitorial-housekeeping areas and pipe chases)

- Clean mops and mop buckets promptly following use. Hang mops vertically on a rack above a floor drain and dry mop buckets.

- Clean trashcans regularly, use plastic liners and secure lids.

- Keep areas as clean and dry as possible and remove debris as needed.

IPM Strategies for Outdoor Sites:

Typical Pests: rodents, stinging insects (wasps, bees, hornets, ants, and yellowjackets), and spiders, other pests that may enter structures from the outdoors and/or pose a threat to staff and occupants of the facility. Proper structure maintenance, exclusion (sealing) and sanitation of outdoor areas helps prevent outdoor pests from entering buildings. See "Entry Points" under Indoor Sites.

Playgrounds, Parking Lots, Athletic Fields, Loading Docks, and Refuse Dumpsters:

- Regularly remove all waste, especially food and paper debris. Routinely clean trash receptacles; pressure wash as needed. Remove waste daily when yellowjackets are present. Provide a receptacle with a swinging door lid or provide tight fitting lids.

- Regularly inspect soffits and gutters for wasp and bird nests and pest entry points.

- Routinely clean gutters to prevent standing water and debris build up.

- Repair cracks in pavement and sidewalks to minimize hard-surface degradation by weeds and ant colonies.

- Provide for adequate drainage away from the structures and on the grounds.

- Keep outdoor lighting near entries to a minimum and use lights that minimize insect attraction. Mount outdoor lighting on poles away from the building. Position lights to illuminate the building to enhance security.

- Keep grassy vegetation, shrubs and wood mulch at least one foot away from structures.

- Trim trees away from buildings and rooftops. Do not permit large branches to overhang structures.

- Ensure that the dumpster or compactor areas are clean and free of debris. Dumpsters or compactors must be stored on a smooth impermeable material such as concrete or machine laid asphalt and lids need to be kept closed and in good condition. Dumpsters should be stored away from the building.

- Remove all clutter (such as old equipment, construction materials, and other items) that could harbor pests.

Inspect and Monitor

After preventive strategies are in place, the IPM coordinator is responsible for monitoring the facility for potential pest problems. Monitoring should include walk-through visual inspections, monitoring traps, interviews with staff and occupants, and reviewing pest-sighting logs. If possible, incorporate IPM into the classroom curriculum to involve students in the IPM process. Proper monitoring allows an IPM program to be proactive in controlling pests rather than reactive.

Identification, Action Thresholds and Response Times

It is important to understand that insects and other pests will always be present so eliminating all pests from outside a facility is an unattainable goal. It is only when the required environmental conditions (food, water and harborage) are present and maintained that infestations can occur in a structure.

Insects and other pests will occasionally be found during the monitoring process. It is important to properly identify the pests and implement controls as soon as action thresholds develop. For example, various species of cockroaches live and thrive in different environments, making it important to identify the species to implement the proper response.

Review pre-determined action thresholds and response times when a pest population develops. If the pest poses a significant health or safety concern or if pest numbers exceed the action threshold, action should be taken within the timeframe specified on the response time sheet. See Appendices B and C.

IPM Outlines

IPM outlines are fact sheets giving the IPM coordinator information on specific pests so he or she can properly address the problem. The IPM coordinator should maintain a contact list of local, state and federal agencies to assist in explaining each pest and the IPM strategies to control it. There should be an IPM outline for each pest that has been encountered in the facility. If the situation warrants, the IPM coordinator should use the sheets to properly inform the occupants of the pest and to implement the proper IPM procedures.

Action

After discovering a problem, the IPM coordinator should look at the entire situation and concentrate on the symptoms of the infestation, not necessarily the pests themselves. He or she should consider the cultural/sanitation practices, physical/mechanical controls, biological controls, and least toxic pesticides such as baits, gels and traps available. Use of pesticides should be justifiable based on pest sighting logs, type of pest, and pest response to nonchemical methods. Pesticides should be a last resort technique with preference for products that are the least harmful to human health and the environment.

Evaluate

After an action has occurred, the IPM coordinator must perform an assessment in order to determine the root cause of the infestation and success or failure of the action taken. The evaluation will determine if further action is needed to meet the objectives and whether or not there are other areas in the building that may be vulnerable to infestation and need to be monitored or altered. After the evaluation and the IPM objectives have been met, the IPM plan should be updated to include any changes in procedure.

IV. Other Items to Consider

Applying Pesticides Judiciously

Many pesticides are available for use against urban and structural pests. Before application, the pest manager should consider the toxicity of the product and application techniques. Because excessive or improper application of pesticides can cause injury, these materials should be applied by qualified/state certified applicators in a manner to ensure maximum efficiency with minimal hazard.

Although the U.S. EPA registers pesticides for use within the United States, registration does not mean a particular pesticide is "safe" under all conditions of use. The following general recommendations should help reduce pesticide exposure to people and other non-target species:

- All pesticides used in Illinois must be registered by the U.S. EPA and the Illinois Department of Agriculture.
- Read and follow all label instructions.
- Ensure all notification requirements are met before applying pesticides.
- If possible, choose a target-specific pesticide that is labeled for the specific site and for the pest you are trying to control. Avoid using a broad-spectrum pesticide.

- Choose products with a “CAUTION” signal word whenever possible. Avoid using “WARNING” or “DANGER” products.

- Avoid the use of aerosol and liquid formulations. When possible, apply pesticides into cracks, crevices, and inaccessible areas. These treatments maximize the pest’s exposure while minimizing pesticide exposure to the occupants.

- In general, avoid using rodenticides in school and day care facilities. In unusual situations where rodenticide use is justified, baits should be placed for a limited time (e.g. one week) as a part of the IPM program. Place baits in tamper-resistant bait boxes. Place bait in the baffle-protected feeding chamber of the box and never in the runway of the box. Securely lock or fasten the lids of all bait boxes.

- Apply a pesticide product when occupants are not present or expected in the facility. Ventilate the room thoroughly as indicated on the pesticide label. Observe any re-entry time limits listed on the label. Remember some residues can remain long after application.

- Use label-specified proper protective clothing or equipment when applying pesticides.

- Keep copies of current pesticide labels, consumer information sheets and Material Safety Data Sheets (MSDS) accessible to occupants and parents.

Pesticide Storage

Store pesticides off-site or in buildings that are locked and inaccessible to unauthorized personnel. Provide adequate ventilation in the pesticide storage area. Do not store pesticides in places where flooding is possible. Store flammable liquids and pesticides in accordance with label, Occupational Safety and Health Administration (OSHA), state, and local requirements.

If pesticides are stored in occupied buildings, special care is necessary to ensure the safety of the occupants. Notices should be placed outside the designated storage area and the area must only be accessible by authorized personnel. All pesticides must be stored in their original containers and lids should be tightly secured. Even closed pesticide containers may volatilize toxic chemicals into the air. Therefore, pesticides should only be stored in spaces that are physically separated and closed off from occupied spaces and where there is adequate exhaust ventilation (i.e., the air is exhausted directly to the outside). In addition, precautions are needed to ensure the air in storage spaces has no chance of mixing with air in the structure’s central ventilation system.

The IPM coordinator is responsible for periodically checking stored pesticide containers for leaks or other hazards. To reduce pesticide storage problems, buy only enough of the pesticide for a specific task and mix only the amount of pesticide that is needed for immediate application.

Notification Requirements

The Illinois Structural Pest Control Act, the Illinois Child Care Act, and the Illinois Lawn Care Products Application and Notice Act requires prior notification of parents/guardians and employees when pesticides are to be applied.

Section 10.3 of the Illinois Structural Pest Control Act:

"School districts and day care centers must maintain a registry of parents and guardians of students and employees who have registered to receive written notification prior to application of pesticides to school property or day care centers or provide written notification to all parents and guardians of students before such pesticide application. Written notification may be included in newsletters, bulletins, calendars, or other correspondence currently published by the school district or day care center. The written notification must be given at least two business days before application of the pesticide application and should identify the intended date of the application of the pesticide and the name and telephone contact number for the school or day care center personnel responsible for the pesticide application program. Prior written notice shall not be required if there is an imminent threat to health or property. If such a situation arises, the appropriate school or day care center personnel must sign a statement describing the circumstances that gave rise to the health threat and ensure that written notice is provided as soon as practicable. For purposes of this Section, pesticides subject to notification requirements shall not include (i) an antimicrobial agent, such as disinfectant, sanitizer, or deodorizer, or (ii) insecticide baits and rodenticide baits."

Section 5.6b, of the Child Care Act:

"Notification required pursuant to section 10.3 of the Structural Pest Control Act may not be given more than 30 days before the a pesticide application of the pesticide in licensed day care centers."

Section 3(f) of Illinois Lawn Care Products Application and Notice Act:

School districts and day care centers must maintain a registry of parents and guardians of students who have registered to receive written notification prior to the application of pesticides to the grounds or provide written or telephonic notification to all parents and guardians of students before such pesticide application. Written notification may be included in newsletters, bulletins, calendars, or other correspondence currently published by the school district. The written or telephonic notification must be given at least 4business days before application of the pesticide and should identify the intended date of the application of the pesticide and the name and telephone contact number for the school personnel responsible for the pesticide application program. Prior written or telephonic notice shall not be required if there is imminent threat to health or property. If such a situation arises, the appropriate school personnel must sign a statement describing the circumstances that gave rise to the health threat and ensure that written notice is provided as soon as practicable.

In-house IPM or Contracted Services

IPM programs can be successfully implemented by "in-house" school employees or by contracting with a pest control company. A combination of in-house and contracted functions may be mixed and matched to the needs and capabilities of the school system. The Illinois Structural Pest Control Act, Illinois Pesticide Act, and the Illinois Lawn Care Products Application and Notice Act outline licensing and application requirements in Illinois and should be reviewed carefully before making a decision on whether to implement an in-house program, contracted service, or a combination of both. In all cases, the IPM coordinator, at a minimum, should be trained to:

- Understand the principles of IPM.
- Identify pests and associated problems and damage.
- Monitor infestation levels and keep records.
- Be aware that pest management can involve changing human habits that encourage pests through cultural/sanitation control methods as well as mechanical/physical, biological or other methods.
- Know how to minimize pesticide use as well as exposure to humans and other non-target organisms.
- Know the hazards of pesticides and safety precautions for storing, mixing and applying pesticides.
- Be familiar with the pesticide label's precautionary statements pertaining to exposure to humans and other non-target organisms.

Contracted Services

Communication between the pest control contractor and the school or day care facility is critical to the success of an IPM program. The pest control contractor must work with the IPM coordinator and all actions must be approved before being carried out. Using an outside pest control company can eliminate the need to hire or train in-house personnel to meet regulatory requirements, store and use pesticides, and to maintain specialized liability insurance. However, contractors must be made aware of and follow the IPM procedures outlined in the IPM plan. Contractors also can play a vital role in developing an IPM program.

The contract should specify the use of IPM principles and practices to meet pest management objectives and implement a successful IPM program. The pest management services contract should include IPM specifications, expected results, pest management objectives specific to the site, and special health concerns (such as those for older or younger persons, pets or individuals that may be allergic, etc.) along with pesticides that can be used and those excluded from use. Check with the local Better Business Bureau for complaints about the pest control vendors being considered. The Illinois departments of Public Health, Agriculture, and Natural Resources license and certify pest control businesses and personnel and can provide information on pesticide applicator or pest removal/trapping certifications. Examples of pest management contracts can be found on several of the Web sites referenced in the “Additional Resources” section on page 23.

IPM Plan Updates

The IPM plan should be reviewed at least yearly and updated to incorporate new techniques or strategies that have proven successful. The IPM coordinator must ensure that the root cause of any pest problem has been determined and pest populations have dropped due to actions taken, not because of seasonal changes or pest migration to different areas of the facility. All applicable records should be filed and maintained for future reference. Updating the IPM plan and keeping a historical record ensures consistency within the program and allows for a smooth transition between IPM coordinators and other key staff.

Measuring Success

The success of an IPM program is meeting and then exceeding objectives, damage prevention, and client satisfaction goals. The IPM coordinator must complete an evaluation to assess the treatment and to facilitate additional actions if the problem persists.

Initially, an IPM program will require more man-hours and possibly cause a spike in maintenance cost. Over time, most schools and day care centers, that have implemented a properly administered IPM program, have seen a decrease in pesticide usage, service calls, energy consumption, and maintenance costs. Success should be measured on multiple fronts and cost should be evaluated over a long period of time. Take into consideration the potential damage that may occur if maintenance issues were not addressed promptly and adequately or even overlooked without IPM inspections.

Part V– Conclusion and Resources

Conclusion

IPM is an effective and environmentally sensitive approach to pest management and is successful at controlling pests in some of the largest school districts in the United States. A school or day care center must establish an effective means of communication to ensure the successful implementation of an IPM program. Consistency within the program ensures staff and occupants that action will be taken and pests will be controlled in a manner that is least harmful to human health and the environment. Comments regarding this manual can be forwarded to the Illinois Department of Public Health, 525 West Jefferson St., Third Floor, Springfield, IL 62701 or e-mail dpi.ipm@illinois.gov.

Technical Assistance

Illinois Department of Public Health, Division of Environmental Health, 525 W. Jefferson St., Springfield, IL 62701, 217-782-5830, TDD (for the hearing impared ONLY) 800-547-0466, dph.ipm@illinois.gov, http://www.idph.state.il.us/

University of Illinois Extension, Office of Extension and Outreach, 214 Mumford Hall (MC-710) 1301 W. Gregory Drive, Urbana, IL 61801, 217- 333-5900, www.ipm.uiuc.edu

Illinois Pest control Association, 625 S. Second St., Second Floor, Springfield, IL 62704 800-975-9344

Additional Resources

National School Integrated Pest Management Source, University of Florida, http://schoolipm.ifas.ufl.edu

U.S. EPA, Integrated Pest Management in Schools, http://www.epa.gov/pesticides/ipm/index.htm

Center for Disease Control, Pectoral Keys, http://www.cdc.gov/nceh/ehs/Pictorial_Keys.htm

Sources

Illinois Department of Public Health, 1994, Integrated Management of Structural Pests in Schools.

Illinois Department of Public Health, 1999, A Practical Guide to Management of Common Pests in Schools.

U.S. Center for Disease Control, 1993, Pesticides in the Diets of Infants and Children, National Research Council.

U.S. Environmental Protection Agency, 1993, Pest Control in the School Environment: Adopting Integrated Pest Management.

APPENDIX A

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This policy statement is ***for information only****; it should* ***not*** *be considered to be* ***an "official"*** *Illinois Department of Public Health policy statement on IPM in schools.*

Example School Pest Management Policy Statement

SCHOOL PEST MANAGEMENT POLICY STATEMENT

Structural and landscape pests, as well as the pesticides used to control them, can pose significant hazards to people, property and the environment. It is known that children have a relatively higher risk from exposure to pesticides than do adults exposed at the same levels. Proportionally, they have a higher respiratory rate and eat/drink more than adults. In addition, children have a natural tendency to put objects in their mouth, and spend more time on or near the ground than adults. A child's neurological system is still developing and is more susceptible to chemicals in their environment compared to adults. With these cultural and biological differences, children have a higher potential for pesticide poisoning than adults. The district/facility is implementing this IPM program to effectively manage pests, while reducing the chance of accidental exposure of pesticides to children and staff. Over time, this proactive approach will control pests more effectively than just using pesticides alone. It is, therefore, the policy of this district/facility to utilize Integrated Pest Management (IPM) procedures for control of structural and landscape pests.

As defined by the Structural Pest Control Act (225 ILCS 235/3.24), IPM is a pest management system that includes the following elements whenever possible:

- identifying pests and their natural enemies;
- establishing an ongoing monitoring and record keeping system for regular sampling and assessment of pest and natural enemy populations;
- determining the pest population levels that can be tolerated based on aesthetic, economic and health concerns, and setting action thresholds where pest populations or environmental conditions warrant remedial action;
- preventing pest problems through improved sanitation, management of waste, addition of physical barriers, and the modification of habitats that attract or harbor pests;
- relying to the greatest extent possible on nontoxic, biological, cultural or mechanical pest management methods, or on the use of natural control agents;
- when necessary, using chemical pesticides, with preference for products that are the least harmful to human health and the environment; and
- record keeping and reporting of pest populations, surveillance techniques and remedial actions taken.

Pests

Pests include arthropods (insects, spiders, mites, ticks and related pests), wood- infesting organisms such as fungi, rats, mice, nuisance birds and any other undesirable organisms in, on or under structures, excluding bacteria and other microorganisms on or in humans or other living animals.

IPM Coordinator

The district/facility shall appoint an IPM coordinator who shall have primary responsibility for ensuring that this IPM policy is carried out.

Roles and Responsibilities

Specific roles and responsibilities for the development, implementation and maintenance of the IPM program will be established, communicated and enforced by the district/facility to ensure the proper implementation of the IPM program.

Pest Management Objectives

The objectives of the IPM program are:

- Manage pests found on school sites to prevent interference with the learning environment;
- Prevent injury to students, staff and other occupants;
- Preserve the integrity of school buildings or structures;
- Prevent pests from spreading in the community or to plant and animal populations beyond the site; and
- Enhance the quality of life for students, staff and others.

Integrated Pest Management Procedures

Integrated Pest Management is an effective and environmentally sensitive approach to pest management that relies on a combination of common-sense practices. IPM programs use current, comprehensive information on the life cycles of pests and their interactions with the environment. This information, in combination with available pest control methods, is used to manage pest damage by the most economical means, and with the least possible hazard to people, property and the environment. IPM programs take advantage of all pest management options available, including the judicious use of pesticides.

Understanding pest survival needs is essential to implementing IPM effectively. Pests seek habitats that provide basic needs such as air, water, food and shelter. Pest populations can be prevented or controlled by creating conditions that are not conducive to their survival. This can be accomplished through the removal of pests' basic needs or by simply blocking their access into buildings. Pests also may be managed by using a variety of non-chemical, as well as chemical methods, as needed, to reduce infestations to acceptable levels and minimize children's exposure to pesticides.

IPM procedures will determine when to actively control pests and whether to use mechanical, physical, chemical, cultural and/or biological means. IPM coordinators depend on current, comprehensive information on the pest and its environment and the best available pest control methods. Applying IPM strategies prevents unacceptable levels of pest activity and damage by the most economical means and with the least possible hazard to people, property and the environment.

The choice of using a pesticide will be based on a review of all available options and a determination that these options alone are not acceptable, feasible or adequate. Selected non-chemical pest management methods will be implemented whenever possible. It is the policy of this district/facility to utilize IPM strategies and IPM pest outlines as a guide to manage pest populations adequately.

When it is determined that a pesticide must be used to meet the IPM objectives, the least harmful to human health and the environment will be used judiciously. The application of pesticides is subject to the Federal Insecticide, Fungicide and Rodenticide Act (7 USC 136 et seq.), school district policies and procedures, U.S. Environmental Protection Agency (U.S. EPA) regulations in 40 CFR, Occupational Safety and Health Administration regulations, and state and local regulations.

This district/facility recognizes and adheres to the following procedures:

- Integrated Pest Management programs are designed to prevent pest problems whenever possible. This is done through monitoring, regular inspections, high standards of sanitation and pest-proofing measures, and modification of environmental conditions conducive to pest problems.

- The district/facility will establish periodic inspection, monitoring and reporting procedures. All personnel involved in these activities will be informed and trained to perform specific roles within the IPM program. Forms will be provided by the district/facility to aid staff and pest professionals in performing and recording actions.

- The district/facility will establish pest tolerance thresholds and response times for common pests. These thresholds will serve as indicators for the implementation of active control measures. Control measures will not be undertaken if pest damage or populations are below threshold levels unless special circumstances necessitate reduction of a pest population. In such cases a review of the tolerance thresholds will be conducted.

- When pests exceed tolerance thresholds, non-chemical pest control measures and IPM strategies as described in the IPM pest outlines will be practiced and action will occur within the specified response time.

- Pesticides will be used when appropriate, along with other management practices, when other pest prevention and non-chemical control measures have failed to reduce pests below tolerance thresholds. When a pesticide must be used, products that are the least harmful to human health and the environment will be used.

- Pesticides will be used only in containerized baits, or for spot treatments targeting insect infestations or problem areas where a minimal amount of material can be used. Routine spraying for pests is prohibited. Rodent baits shall not be used unless in tamper-resistant bait boxes. Bait boxes shall be inaccessible to children and secured when appropriate. Routine general spraying of non-target pests is prohibited.

- All pesticide applications must be approved by the IPM coordinator prior to application. All notification requirements will be met before the pesticide application. The school district/school/day care center will follow all applicable regulations requiring applicator licensing and all personnel will be licensed appropriately before being required to administer a pesticide. Pesticides shall be applied in minimum amounts and shall not be used when children and staff are present in the treatment area. Toys and other items mouthed or handled by children must be removed from the area before pesticides are applied. No one will return to the treated area within two hours after a pesticide application or as specified on the pesticide label, whichever time is greater.

- The application of pesticides is subject to the Federal Insecticide, Fungicide, and Rodenticide Act (7 USC 136 et seq.), U.S. EPA regulations, Occupational Safety and Health Administration regulations, and state and local regulations.

- Follow-up inspections and monitoring will be performed to determine the effectiveness of the IPM strategies applied. The IPM coordinator will continually update the IPM plan with the knowledge gained from the follow-up inspections.

- The IPM plan will be reviewed annually to ensure all activities that take place in the facility are addressed and that current IPM strategies are included.

Education

Staff, students, IPM coordinator, contractors, and the public will be informed about potential school pest problems and the IPM policies and procedures set in place to achieve the desired pest management objectives.

- Parents/Guardians will be informed annually about the IPM policy;
- Staff will receive information and/or training on their role in the IPM plan.

IPM Plan Updates and Review

The IPM coordinator will continually update the IPM plan with knowledge gained from the implementation of IPM strategies. The IPM plan will be reviewed annually to ensure all district/facility activities are included in the plan and the plan contains the most current IPM strategies.

Record Keeping

A complete and accurate pest management log will be maintained for each property and kept with the IPM plan. Pesticide use records also will be maintained to keep a historical account of pesticide use. The district/facility will keep a logbook containing the following:

- inspection sheets;
- pest surveillance data sheets that record in a systematic fashion the type and number of pests or other indicators of pest population levels revealed by the monitoring program. Examples include: date, number, location and rodent species trapped or carcasses removed; and date, number and location of new rat burrows observed;
- pest sighting forms and action taken;
- a diagram noting the location of pest activity including the location of all trapping devices and bait stations in or around the site; and
- a copy of the current EPA-registered label and Material Safety Data Sheet (MSDS) for each pesticide product used on the site, records of where each was used, and the amount applied.

Notification

The school/district/day care center takes the responsibility to notify students' parents/guardians and school staff upcoming pesticide treatments. Notification of antimicrobial agents such as disinfectants, sanitizers, deodorizers or pesticides in bait form is not required. The Illinois Structural Pest Control Act, the Illinois Child Care Act, and the Illinois Lawn Care Products Application and Notice Act require prior notification to occupants when pesticides are used. All applicable rules and regulations regarding notification will be adhered to.

Pesticide Storage and Purchase

Pesticide purchases will be limited to the amount authorized for use and safe storage during the year. Pesticides will be stored and disposed of in accordance with the US EPA-registered label directions and state regulations. Pesticides must be stored in an appropriate, secure site with proper ventilation and not accessible to students or unauthorized personnel.

Pesticide Applicators

Pesticide applicators must be trained in the principles and practices of IPM and the use of pesticides approved by this school district/school/day care center, and must follow all regulations and label directions. The school district/school/day care center will follow all applicable regulations requiring applicator licensing and all personnel will be licensed appropriately before being required to administer a pesticide.

*Precautionary statements are required on all pesticide labels. Signal words on each label indicate the level of acute toxicity of the pesticide product (see below). The chronic toxicity is not indicated on the label. Every label bears the child hazard warning: "Keep Out Of Reach Of Children."

DANGER - A taste to a teaspoonful taken by mouth could kill an average-sized adult.

WARNING - A teaspoonful to an ounce taken by mouth could kill an average-sized adult.

CAUTION - An ounce to more than a pint taken by mouth could kill an average-sized adult.

APPENDIX B

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IPM Pest Tolerance Levels

Integrated Pest Management recognizes that not all bugs are bad and need to be killed immediately. On the other hand, some insects and rodents can be very dangerous to the safety or health of the occupants of the facility, and must be eliminated as quickly as possible. Therefore, it is very important that the school staff and the pest control operator or school pest control technician establish well-understood guidelines of action in response to reports of pests present in the facility.

Tolerance of Pest Activity

Cockroaches. There should be no tolerance for roaches in any area of the facility. They can carry several pathogens that can cause health problems under certain circumstances. Problems can range from salmonella poisoning to severe asthmatic reactions in young children.

Sightings or Trap Count:

0	
1-2	
3-6	
7-15	
15+	

Cereal Pests. These infest flour and other cereal grain products, and should not be tolerated. Ingestion of insects or pathogens in infested grain products can cause illness in anyone who consumes the food.

Sightings or Trap Count:

0	
1-2	
3-6	
7-15	
15+	

House Flies. In nonfood areas, these are more of a nuisance than a threat to the health of the children and staff. Thus, an occasional house fly in a nonfood area should not be cause for alarm. If there are many flies in a nonfood area, this could be a sign of a sanitation problem that needs to be corrected. House flies in a food area cannot be tolerated. The pads on the feet of the flies are sticky and will pick up debris from wherever the fly lands. If the fly should land on garbage or animal feces and then fly into the kitchen and land on exposed food, some of that debris will be transferred to the food.

Sightings or Trap Count:

0	
1-2	
3-6	
7-15	
15+	

Other Flies. Flies such as the Cluster Fly or the Carrion Fly are often found throughout a school building. Small numbers do not constitute a health threat, but they can be a nuisance and should be treated as such. However, many flies in a room or area may indicate a problem that needs to be investigated.

Sightings or Trap Count:

0	
1-2	
3-6	
7-15	
15+	

Ants. In a food area they should be eliminated quickly as they may contaminate open food, although to a lesser degree than flies or roaches. In nonfood areas they are strictly a nuisance and should be handled as such. Ants outside a building that are *not* migrating into the building are more beneficial than detrimental and should be left alone.

Sightings or Trap Count:

0	
1-2	
3-6	
7-15	
15+	

Occasionally Invading Pests. These include such pests as crickets, spiders (except Brown Recluse and Black Widow spiders) Boxelder bugs, millipedes, Clover Mites (not Fowl Mites), Springtails, etc. These insects are not a health threat and only become a nuisance if they appear in large numbers or they are found near open food areas.

Sightings or Trap Count:

0	
1-2	
3-6	
7-15	
15+	

Stinging or Biting Insects. These can cause a serious health threat to some children and adults who are hyperallergic to stings or bites. For this reason, there should be no tolerance for these pests either inside or outside of the building. The most likely pests found in Illinois schools in this group are bees, yellowjackets and other wasps, Brown Recluse and Black Widow spiders.

Sightings or Trap Count:

0	
1-2	
3-6	
7-15	
15+	

Mice. There should be no tolerance in any area of the school for mice. They contaminate food by gnawing into unopened packages and by urinating or defecating on open food or food preparation surfaces. Their constant gnawing can cause damage to the building and, in extreme cases, may cause an electrical short and resultant fire. If a student or staff person attempted to pick up a mouse, he or she could receive a rather nasty bite.

Sightings or Trap Count:

0	
1-2	
3-6	
7-15	
15+	

Rats. There should be no tolerance for rats inside or outside of the school building at any time. Like mice, they can contaminate food through gnawing into packages and urinating or defecating on open food or food preparation surfaces. Their gnawing habits can cause damage to the building and they could cause a fire by gnawing into an electrical wire. A bite from a rat can be more serious than one received from a mouse.

Sightings or Trap Count:

0	
1-2	
3-6	
7-15	
15+	

Birds. In general, birds should not present a problem for a school. However, bird nesting on school buildings should be discouraged to prevent accumulation of droppings that may harbor pathogens and to prevent migration of pests such as Fowl Mites or Carpet Beetles from an abandoned nest into classrooms.

Sightings or Trap Count:

0	
1-2	
3-6	
7-15	
15+	

Raccoons. These are protected animals and can only be removed from a school by a specialist who is licensed by the Illinois Department of Natural Resources. Raccoons are nocturnal and normally would not come in contact with students or staff. However, they should be removed from the facility as they can be physically destructive to the building. They can get into garbage and create a mess that is attractive to flies and other pests. Additionally, they can carry fleas, and there have been a few isolated cases where children have been bitten by raccoons.
Sightings or Trap Count:

0	
1-2	
3-6	
7-15	
15+	

Bats, There should be no tolerance for bats in schools. These are protected animals and can only be removed from a school by a specialist Bats are known carriers of rabies and a buildup of their feces can carry the fungus that causes histoplasmosis.
Sightings or Trap Count:

0	
1-2	
3-6	
7-15	
15+	

Squirrels. These are protected animals and can only be removed from a school by a specialist who is licensed by the Illinois Department of Natural Resources. Squirrels can cause physical damage to a building and they carry fleas. They tend to be more "people tolerant" and will feed on food scraps found on the school grounds or in the garbage area during the daytime. This will increase the possibility of a student coming in contact with one.
Sighting or Trap Count:

0	
1-2	
3-6	
7-15	
15+	

Pest

0

1-2

3-6

7-15

15+

Pest

0

1-2

3-6

7-15

15+

Pest

0

1-2

3-6

7-15

15+

Pest

0

1-2

3-6

7-15

15+

APPENDIX C

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Pest Response Times

IPM pest response to a pest problem must be both timely and effective. However, the facility managers must recognize that some pest problems are more serious than others and pest problems that threaten the physical safety of students and/or staff should have a higher priority than the mere presence of a single nonthreatening bug.

Response by Pest Control Staff to Pest Problems

Response Time	Condition	Pest
Within four hours	Potential physical harm to students or staff	Rodents where students or staff are likely to contact them;
		Wildlife (raccoons, opossums, feral cats, bats, etc.) where students or staff are likely to contact them
		Stinging or biting insects
One working day	Potential medical harm to students or staff	Fleas, lice, bed/bat bugs and poisonous spiders
One working day	Potential for food contamination	Cereal pests, roaches, rodents, ants in kitchen or food storage areas and flies around food.
One to two working days	Sighting of large numbers of nonthreatening bugs	Ant or termite colonies in the building; movement into the building of millipedes, crickets, Boxelder bugs, etc.

APPENDIX D

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The following Web sites offer pest identification and prevention / control measures for specific pests:

1. Illinois Department of Public Health's Prevention and Control Informational Sheets

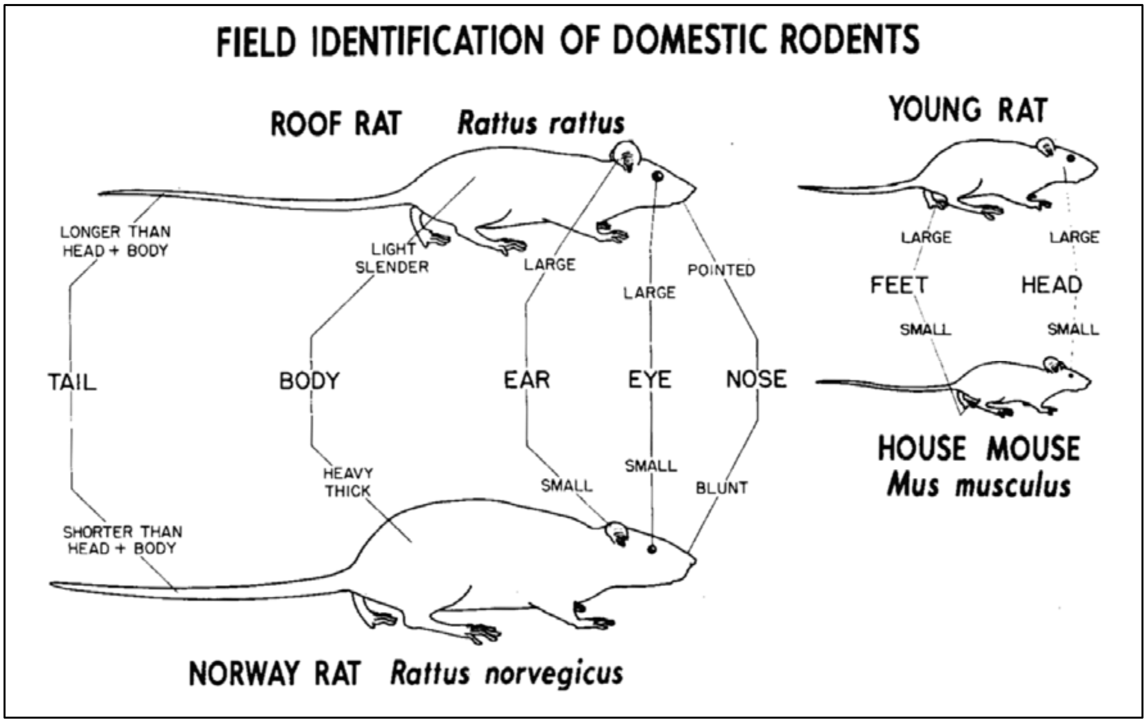
   http://www.idph.state.il.us/envhealth/entpestfshts.htm

2. Center for Desease Control's Pictorial Keys to Arthropods, Reptiles, Birds and Mammals of Public Health Significance.

   http://www.cdc.gov/nceh/ehs/Pictorial_Keys.htm

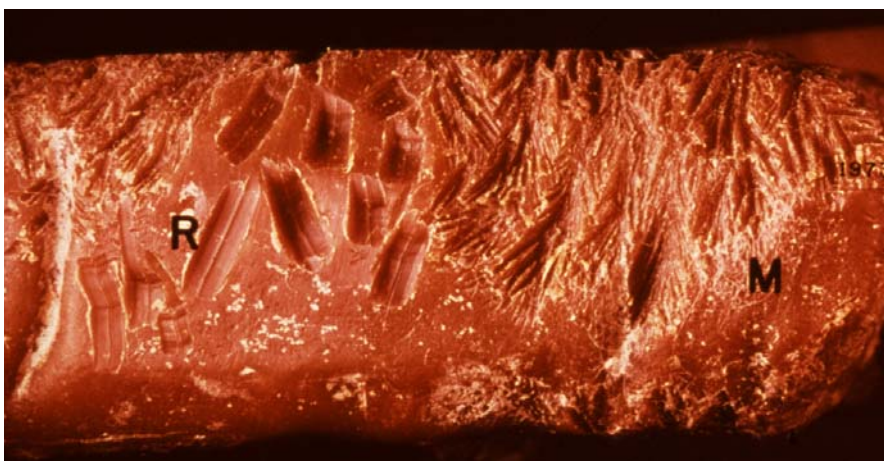
3. U.S. Environmental Protection Agency IPM in Schools: A How-to Manual

   http://www.epa.gov/pesticides/ipm/schoolipm/index.html



Rat – Gnaw marks, one-eighth of an inch long

House Mouse – Gnaw marks, one-sixteenth of an inch long



House Mouse	**Roof Rat**	**Norway Rat**
Feces have pointed ends, one-forth of an inch long, 50 droppings a day	Feces have pointed ends, one-half of an inch long, 180 droppings a day	Feces have pointed ends, three-fourths of an inch long, 30 to180 droppings a day

		WEIGHT	LENGTH (minus tail)	NEST LOCATIONS	HOME RANGE	YOUNG LITTER	LITTERS FEMALE
NORWAY RAT		7-18 oz 200-500 g	7-10 in 18-25 cm	Burrows	100-165’ 30-50 m	8-12	4-7
ROOF RAT		5-9 oz 10-250 g	6-8 in 16-20 cm	Walls, attics, trees	100-165’ 30-50 m	4-8	4-6
HOUSE MOUSE		.4-1 oz 12-30 g	2-4 in 6-9 cm	Walls, ceilings, burrows	10-35’ 3-10 m	4-7	8

	FOOD PREFERENCE	WATER REQUIREMENT	HABITS & BEHAVIOR
NORWAY RAT	Meats, fish, nuts	15-30 ml daily	Steady eater, Cautious
ROOF RAT	Fruits, vegetables	15-30 ml daily	Steady eater, Cautious
HOUSE MOUSE	Grain, cereals	<10ml/day or none	Nibbler, Curious

Tips for Effective Pest Management

House Mouse

The house mouse is the most successful rodent in adapting to life with people. It's found almost everywhere people are, feeding on human food, sheltering in human structures and reproducing at a rapid rate. The house mouse is the most troublesome and economically important vertebrate pest, contaminating millions of dollars worth of food, damaging property and causing electrical fires with its constant gnawing. Mice may enter a building from the outside and spread through a structure along pipes, cables and ducts. Although large numbers can build up in food service areas or trash rooms, one or a few mice can survive practically anywhere.

Many control failures against house mice are due to a lack of understanding of mouse biology and habits. A pair of mice can produce 50 offspring in one year. Because they seek food over a range of only 10 to 30 feet, traps, glue boards and bait must be placed close to the nest to be effective. *Remember that good inspections are critical for successful mouse control.*

Inspection
Sounds **-** Sounds are common at night where large numbers of mice are present; listen for squeaks, scrambling and sounds of gnawing.

Droppings **-** A house mouse produces many droppings per day; mouse droppings are frequently the first evidence that mice are present. However, be aware that large cockroaches and bats may produce droppings similar to house mice. Look along runways, by food near shelters and in other places mice may frequent.

Urine - House mice occasionally make small mounds known as "urinating pillars." These consist of a combination of grease, urine and dirt and may become quite conspicuous. Look for many small drops of urine using a blacklight. Urine stains will fluoresce under ultraviolet light. (Mouse urine spots are not as easy to detect as those made by rats.)

Grease marks - Like rats, mice produce greasy smears where dirt and oil from their fur mark pipes and beams.

Runways - Most mouse runways are indistinct trails free of dust and are not readily detectable.

Tracks - Look for footprints or tail marks on dusty surfaces or on mud; use a nontoxic tracking dust (like talc) to help locate mice within buildings.

Gnawing damage - Newly-gnawed areas on wood are light in color, turning darker with age. Look for small tooth marks and enlarged cracks beneath doors. Mice make wood chips with a consistency like coarse sawdust around baseboards, doors, basement windows and frames and kitchen cabinets.

Visual sightings - Mice are often active in daylight and this may not indicate a high population (as it does with rats). Use a powerful flashlight or spotlight at night to confirm mouse presence.

Nest Sites **-** Inspect garages, attics, basements, closets and other storage places for evidence of nests. Be alert to fine shredded paper or similar materials; these are common nest-building materials.

Mouse Odors **-** Mice produce a characteristic musky odor.

Estimating Numbers of Mice - The number of mice observed or food consumed is not reliable as a census technique with mice. Unlike rats (which may travel widely within a building leaving tracks on many patches of dust), mice do not range widely.

- Read natural signs such as droppings, urine stains, tracks and damage.
- Make nontoxic tracking patches of talc at 20- to 30-foot intervals throughout a building. The more tracks seen in each patch and the more patches showing tracks, the larger the population is. The percentage of patches showing tracks will reflect the extent of the local infestation.
- Tracking patches is also an excellent means to evaluate a control operation. Compare the number of tracks or patches with mouse tracks before and after a control program.

Control and Management

Control and prevention of mice is a three-part process, which includes sanitation, mouse-proofing and population reduction with traps or baits. Sanitation and mouse-proofing will help prevent mice from entering buildings. When a mouse population already exists, some kind of lethal control is necessary. Otherwise, mice, which reproduce rapidly and can find food almost anywhere, will continue to be a problem.

Habitat and Harborage Reduction

Sanitation - Good sanitation makes it easier to detect signs of mouse infestation. It also increases the effectiveness of baits and traps by reducing available food. However, the best sanitation will not eliminate mice; they require very little space and small amounts of food to survive and reproduce.

- Store bulk foods in mouse-proof containers or rooms. In storerooms, stack packaged foods in orderly rows on pallets so that they can be inspected easily. A family of mice can live in a pallet of food without ever having to leave the immediate area.
- Keep stored materials away from walls and off the floor. A 12-inch to 18-inch yellow or white painted band next to the wall in storage areas permits easier detection of mouse droppings. This band and the areas around pallets should be swept often so that new droppings can be detected quickly.

Mouse-Proofing - Completely mouse-proofing a building is difficult because mice are reported to be able to squeeze through an opening as little as one-forth inch high. To mouse-proof a building:

- Seal large holes to limit the movement of mice into and through a building.
- Plug holes in foundation walls with steel wool or copper mesh.
- Caulk and fit doors and windows tightly.
- Seal holes around pipes, utility lines, vents, etc., to make it difficult for mice to move in and out of wall and ceiling voids. (This limits mice to a smaller area and may make snap traps and glue boards more effective.)
- Do not prop open kitchen doors; install screen doors wherever possible.

Traps

Snap Traps. If used correctly, snap traps are very effective in controlling mice. They must be set in the right places, in high numbers and in the right position or mice will miss them entirely. *Always* place traps in areas that are inaccessible to students. Here are some tips to keep in mind when trapping mice:

- *Remember that mice rarely go further than 30 feet from the nest, only 10 feet in most cases.* If mice are sighted throughout a building, it means that there are many locations where you will have to set traps. Place snap traps not only wherever you see obvious signs of mice, but also in a three-dimensional sphere about 10 feet in diameter around those signs. Mice are good climbers and can be living above their main food supply in suspended ceilings, attics, inside vertical pipe runs and on top of walk-in coolers. Or they can be below, in floor voids, crawl spaces, or under coolers or other equipment.
- The best sites are those with large numbers of droppings since that means the mice are spending a lot of time there. Other good sites are along walls, behind objects, and in dark corners, particularly where runways narrow down, funneling the mice into a limited area.
- Successful trapping requires good mouse baits. Peanut butter, bacon, cereal and nuts are attractive to mice. Food baits must be fresh to be effective. Another bait is a cotton ball, which the female mice like to use for nest material. It must be tied securely to the trigger.
- Two or more traps placed next to each other will capture more mice than single traps.

- Probably the biggest mistake made in mouse trapping *is not using enough traps*. Use enough to quickly eliminate the mice.
- Great care must be taken to place traps out of the public view and to check them regularly.
- Mice can carry several diseases, so technicians should wash their hands after handling traps or other items that come in contact with mouse urine and feces. Use disposable latex gloves or tongs to handle dead mice. A bleach/water solution of at least three tablespoons household bleach per gallon can be used to sanitize traps.

Multiple-Catch Traps. Multiple-catch mouse traps catch up to 15 mice without being reset. Some brands are called "windup" traps; the windup mechanism kicks mice into the trap. Others use a treadle door. Live mice must be humanely killed.

Mice are curious and like to investigate new things. They enter the small entrance hole in the trap without hesitation. Odor plays a role too; traps that smell "mousy" catch more mice. Place a small dab of peanut butter inside the tunnel entrance to improve the catch.

- Mice are captured alive but may die in a day or two; dead mice may cause odors or attract insects. Some traps have a clear plastic end plate or lid so you can see if any have been captured.
- Check traps frequently; mice can get hung up in the mechanism and render the trap inoperative.
- Place the traps directly against a wall or object with the opening parallel to the runway, or point the tunnel hole toward the wall, leaving 1 or 2 inches of space between the trap and the wall.
- If mice are active, place many traps 6 to 10 feet apart. After the mouse infestation is eliminated, *maintenance traps* may be placed where mice have been numerous before. Additionally, traps also can be placed at potential entry points such as storerooms, loading docks, near utility lines and at doorways.

Glue Boards. Glue boards can be effective when other methods have failed against a “bait-shy” mouse or when food is abundant. As with other traps, placement is the key. Locations that are good for other types of traps are good sites for glue boards.

- Place glue boards in hidden locations away from areas where staff can view them. (One method is to place the glue board inside a tamper-resistant bait station.)
- Use the larger “rat-size” glue boards, which are more difficult for mice to escape from.
- Do not put glue boards directly above food products or in food preparation areas.
- Set glue boards lengthwise and flush against a wall, box, or other object that edges a runway.
- Move objects around; create new, narrow runways six inches wide to increase the effectiveness of glue boards.
- Put peanut butter or a cotton ball in the center of the board.
- Place the glue boards 5 to 10 feet apart in infested areas (closer if the population is large).
- If no mice are captured in three days, move the boards to new locations.
- If a trapped mouse is alive, kill it humanely before disposal. Replace the boards if they become covered with dust. Glue boards do not work well in cold areas.

Rodenticides

“Building out” mice and trapping are the most effective control methods. Rodent baits should be used only in emergency situations to supplement these methods. If there is a repeated need to use baits, it is likely that sanitation and mouse-proofing should be improved. Remember that rodent baits are poisons. Additionally, use of baits in schools represents special problems because of incidents where students have moved or tampered with rodent baits. In schools, baits should be used only after nonchemical control measures have been instituted.

Children, pets, wildlife and domestic animals must be protected by putting the bait in tamper-resistant bait boxes in inaccessible locations. *Using baits alone will not provide long-term control of mice.*

- Apply bait at several locations rather than relying on a few large placements.
- Use *fresh* baits labeled for mouse control. (*Never store baits with other pesticides; mice can detect tiny amounts of repellant chemicals that may cause mice to reject the bait.)*
- Place the baits in favorite feeding and nesting sites as determined by large numbers of droppings.
- Place the baits between hiding places and food, up against a wall or object to intercept the mice.
- Make bait placements 10 feet apart or closer in infested areas if they can be adequately secured.

- If bait is refused, try switching to a different type and replace the baits often.
- Use small bait stations which are more attractive to mice than the larger rat-type stations.
- Make sure that sanitation is such that no other food is readily available to mice.

Pest Management of Cockroaches

Cockroaches

Except for size, all cockroaches are relatively similar in overall shape and appearance. They are most active at night and stay in the dark whenever possible. (When they are seen in the open or in the light, it usually means that a large infestation is present.) Cockroaches also like to hide in cracks and crevices where their bodies can touch surfaces both above and below. As they grow to adulthood, they will seek hiding places (harborage) for their larger size. Cockroaches do not uniformly infest one room or all rooms. Knowing the basic biology of cockroaches give the pest control technician important clues to the source of a cockroach infestation. By considering the habits discussed below, one can increase the effectiveness of a cockroach management program.

The four most common kinds of cockroaches may be divided into two groups, depending on how they are managed. The "small" cockroaches include the German cockroach and the brown-banded cockroach; the "large" cockroaches are the oriental cockroach and the American cockroach.

- ***Management of Small Cockroaches -*** The German cockroach and the brown-banded cockroach are responsible for most pest complaints and pesticide use in public and commercial buildings. The degree of success of the control program depends not only on insecticides, but on management attention to good maintenance and housekeeping practices. Cockroaches and their egg capsules are being constantly introduced into buildings in packaging and boxes. *Consequently, both pest control staff and management must understand that an effective control program must include monitoring and inspection.*

- ***Management of Large Cockroaches -*** Although these large insects may wander along pipes throughout a building, in most parts of the county they live mainly at ground level or below. Prevention and treatment should focus on warm, moist areas such as basements, boiler rooms, pipe chases, sumps and elevator or sewer shafts.

MANAGEMENT OF SMALL COCKROACHES

The ***German Cockroach*** adult is one-half of an inch long with two black stripes behind its head on the "pronotum" (Appendix I). Young cockroaches (nymphs) are brownish black with a pale brown band down the middle of their back. The German cockroach is not only the most common cause of indoor pest problems, but also represents the largest number of control failures of any structural pest. It is most successful at infesting human structures and withstanding pest control activity. Successful cockroach control programs use several methods to bring the infestation under control.

Behavior and Harborage

Groups of cockroaches (aggregations) live in areas of high humidity and nearby food. They will find harborage (hiding places) into which they can fit closely. As the number of cockroaches increases and favorable harborage is filled, roaches are forced to leave the aggregation or remain in less favorable harborage. They are most active just before dawn and after dark.

To cockroaches, the most desirable harborage is in and around refrigerators, stoves, under sinks, and undisturbed cabinets, which provide both protection and food. Kitchen areas with high humidity, sink traps, leaking faucets, standing water and wet sponges are attractive to cockroaches. They also may be found in washrooms, because of their toilet bowls, sinks, wet wash cloths, and sometimes, water heaters.

While there is less food in washrooms, food areas are usually nearby or available through holes around plumbing pipes. These pipes provide additional harborage and areas where cockroaches can enter adjacent rooms.

In schools, German roaches are often found in student lockers or gym lockers. The two principle reasons for this are food left in lockers and roaches transported from home in the student's book bag or coat. In kitchen areas, roaches are most often brought in on supplies. What may be overlooked is that often nonfood supplies are a greater source of roach infestations than food supplies. Vending machines and recycling bins also can provide a frequently overlooked source of roach problems.

German cockroaches are not likely to leave favorable harborage unless conditions change. Such changes can be caused by:

- increase in the cockroach population,
- intensive cleaning,
- reduction of temperature or humidity,
- mechanical exclusion or
- pesticide applications.

If cockroaches find new locations with favorable conditions, they can move from one harborage to another, or develop new infestations. Outdoor infestations are found only outside heavily infested structures from which steady cockroach migrations occur and near dumpsters and garbage cans.

Control and Management

Inspection

With Flashlights - An active inspection with a bright flashlight is the most thorough method of locating cockroaches. The technician can search dark, undisturbed, or remote places of cockroach harborage that have not been properly inspected. Hand mirrors, magnifying hand lens or other small tools may be helpful to some technicians. *Identification of harborage is critical to an effective cockroach control program.*

With Traps - Use of sticky (glue) traps is a common inspection or monitoring method used for cockroach detection. Correct trap placement depends upon the technician's understanding of cockroach food-seeking (foraging) habits; place sticky traps behind kitchen appliances, in cabinets, supply rooms and similar locations.

Habitat and Harborage Reduction

Pest control technicians should explain to both staff and management that often changes in facility operations can reduce or eradicate the insect problem. These recommendations should include how staff can eliminate or restrict materials that support buildup of cockroach populations. *Site staff should understand that pesticide application alone will not control cockroaches satisfactorily.* Some specific actions that will reduce harborage include:

- Seal as many cracks and crevices in the kitchen and food storage areas as possible with a good silicone sealer. A review of monthly reports may indicate from time to time that other specific areas may need to be sealed.
- Repair holes in walls or floors and seal inaccessible areas that could become harborages for pests.
- Replace wood food storage shelves with wire shelves.
- Do not store infrequently used items in the same areas as frequently used items and food supplies.
- Repair all moisture problems.
- Do not keep recycled goods such as beverage containers, cans, paper, cardboard, etc. near the kitchen or food supply areas.
- Institute a good cleaning program. *Pesticide use without cleaning and sanitation will not produce long-term control of a pest infestation.*
- Recommend good lighting.
- Point out areas that need ventilation.

- Recommend reduction of clutter (particularly cardboard boxes) and excess product in cabinets or storage.
- Where practical, install air curtains to keep out flying insects.
- Recommend rotating stock.

Vacuuming as a Pest Control Method

A relatively new method of "cleaning out" a pest population is vacuuming. This is used to crash (greatly reduce) the cockroach population; it also removes dirt, food particles, etc. The "clean out" is followed by improved sanitation, pest prevention and, if needed, judicious use of pesticides. If vacuuming is used as a pest control method, be sure to use a vacuum cleaner with a HEPA (high efficiency particulate air) filter to avoid suspending materials in the air that can cause respiratory problems.

Pesticide Application

In attacking cockroaches, one should concentrate on monitoring the cockroach population and delivering pesticides into active harborage areas rather than "baseboard spraying."

- Many types of sticky traps are available to help the technician pinpoint sources of cockroach infestation. Sticky traps are *not* intended for control, but rather to detect infestations and to evaluate and target control measures. Place sticky traps behind kitchen appliances, in cabinets and supply rooms.
- Containerized and paste or gel baits should be the standard insecticide treatment for cockroaches in many buildings. The small, plastic bait containers should be placed as close as possible to harborage sites where the cockroaches are actually living. Place the bait stations behind refrigerators, in cabinets and along edges of walls and in corners. Do not place them where students can find them. The two most common mistakes in using containerized baits are (1) not eliminating nearby food sources and (2) not using enough bait stations. Paste and gel baits are most effective when applied in small dabs. Baits are most effective when the cockroach population is low or moderate in size. If there is a large population, the bait in the stations may be entirely eaten before the cockroaches are eliminated. *Bait stations should not be contaminated by sprays or dusts that may be repellant.*
- When a moderate to large cockroach population is present, crack and crevice insecticide application is sometimes the most practical and effective way to apply insecticides. Use a narrow diameter extension tube in infested cracks and crevices to provide a thorough application of residual insecticide. (A crack and crevice treatment implies that the stream of insecticide is never visible during the spraying process.) Treat cracks and crevices under furniture, drawers, sinks, around pipes and in high cabinets. First remove utensils and supplies in cabinets; do not treat shelf surfaces.
- Space treatments should only be used to knock down a *heavy* cockroach infestation quickly so that other control measures can be used effectively. *The need for repeated fogging at short intervals indicates the cockroach population is rising, not decreasing.* Space treatments (fogs or aerosol applications) flush cockroaches out of harborage, causing them to cross residual pesticide applications, or the insecticide droplets land on the insects, killing them by direct contact. Such treatments lack crack and crevice penetration. Fog treatments should not be used in areas where facility staff are present. Prior to treatment, all exposed food and food contact surfaces should be effectively protected against pesticide contamination. After the application, food preparation surfaces should be cleaned before they are used for food preparation.

Follow-up

When a cockroach population has been controlled, the technician should continue to monitor the area with sticky traps and interview staff to detect cockroach problems before they become worse.

The ***Brown-banded Cockroach*** is less commonly a problem in buildings, but they also can build up large infestations where they find favorable harborage. Adult brown-banded cockroaches are the size of German cockroaches, about one-half of an inch long. The brown-banded cockroach has two transverse light bands near the head of the insect.

Behavior and Harborage

Brown-banded cockroaches, like German cockroaches, build up the highest populations in kitchens.

However, their tendency is to increase in warm rooms. They can be common around high cabinets and areas near stoves and warm motors, such as those in refrigerators, electric clocks, light timers, televisions and radios.

Control and Management

Inspection
Inspection for the brown-banded cockroach is essentially the same as for German cockroaches. However, brown-banded cockroaches will be more scattered and less attracted to moisture.

Habitat and Harborage Reduction
Habitat and harborage reduction is essentially the same as for the German cockroach.

Pesticide Application

- Boric acid powders may be used in inaccessible areas. (Boric acid powders should NOT be over-applied so there is a visible residue.)
- Bait stations with a long active period are effective, but should not be contaminated by sprays or dusts that may be repellant. Place an adequate number in or near harborage. Do not use where students can find them.
- If baits do not control the cockroaches, use a crack and crevice application to provide a thorough application of residual insecticide: under furniture, drawers, sinks, around pipes and high cabinets. First remove utensils and supplies in cabinets; do not treat shelf surfaces.

Follow-up
The long egg hatching time of the brown-banded cockroach requires treatments to be monitored with sticky traps.

MANAGEMENT OF LARGE COCKROACHES

The ***Oriental Cockroach*** is often called the "waterbug." Adult oriental cockroaches are very dark brown or shiny black. The female is slightly longer than the male, about 1 1/4 inch to his 1 inch. Unlike other domestic cockroaches, the female does not develop wings, but produces only short triangular wing pads. The male has wings, but they are short and broad, leaving about one-fourth of the abdomen exposed.

Behavior and Harborage
Oriental cockroaches favor crawl spaces, spaces between the soil and building foundations, the undersides of stoops and sidewalks, landscaping mulches, water meters, basements and their floor drains and other such moist places. These cockroaches frequently live in floor drains that lead directly outside; these drains also are used as entrances to buildings. The oriental cockroach prefers starchy foods and may build up around garbage cans. They tolerate cooler temperatures, and they are usually found near humid areas.

Control and Management

Inspection
Search areas of high humidity, such as basements or areas near leaking pipes. Place sticky traps in basements to capture individual insects that may enter from floor drains.

Habitat Alteration

- Caulk all cracks around pipes and other areas where holes penetrate through ground level walls.
- Stop water leaks, screen equipment overflow drains and take overflow water away from buildings; keep drain traps full of water or capped.
- Remove rotting leaves from window wells.
- Replace mulch around the foundation with plastic porous ground cover and gravel.
- Move garbage cans away from wet areas.

- Stop erosion that causes soil voids around foundations.
- Ventilate moist enclosed spaces.

Pesticide Application
- Large bait stations or other baits are effective when properly placed in appropriate quantities. Particular attention must be paid to pesticide degradation due to moisture.
- If oriental cockroaches are entering from the outdoors, apply insecticides as outside barriers when they can be safely used in areas of known infestation. Use insecticide formulations that are not readily absorbed by porous surfaces (concrete floors, bricks, stones, soil, etc.). Apply them in cracks and crevices.

Follow-up
Numbers observed in the spring may appear low or under control but may build up by midsummer.

The ***American Cockroach***, like the oriental cockroach, is sometimes called the waterbug. Adult American cockroaches are large (1 1/3 to 1 1/2 inches) reddish-brown insects.

Behavior and Harborage
Large populations of American cockroaches live in warm moist habitats. They are most often found in boiler rooms or other harborage with water heaters, floor drains, water sumps and warm moist basements.

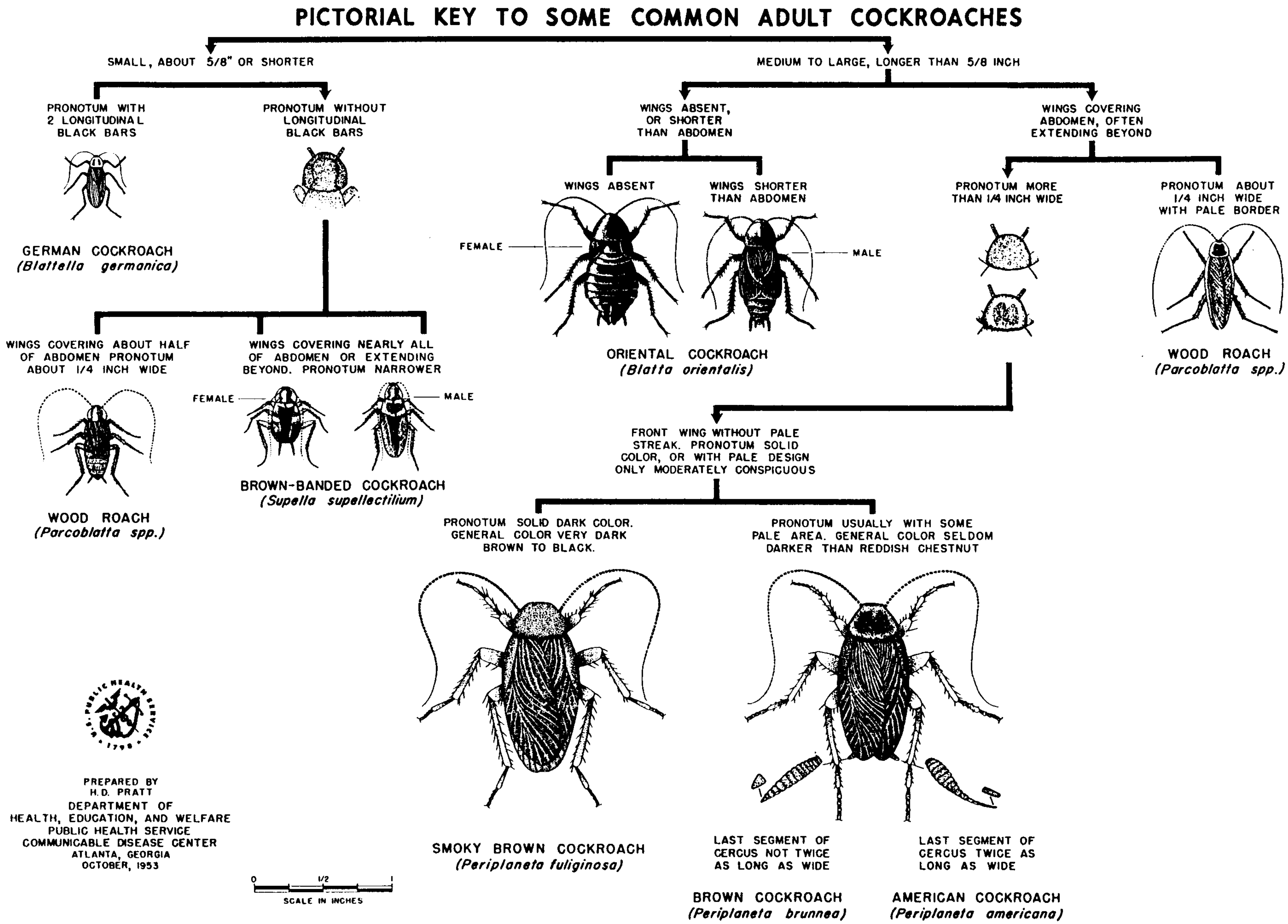
Control and Management

Inspection
Search areas that provide warmth and high humidity. Place sticky traps in areas where American cockroaches may enter a building.

Habitat Alteration
- Caulk cracks around plumbing and other penetrations in walls, screen equipment drains and floor drains. Keep drain traps full of water or cap them.
- Remove items stacked in attached garages, entry ways, etc.
- Replace mulch near doors and window wells with plastic porous ground cover and gravel.
- Ventilate humid places.

Pesticide Application
- Many of the methods that control the oriental cockroach also will control the American cockroach.
- If American cockroaches are entering from the outdoors, apply insecticides as outside barriers when they can be safely used in areas of known infestation. Use insecticide formulations that are not readily absorbed by porous surfaces (concrete floors, bricks, stones, soil, etc.). Apply them in cracks and crevices.

Follow-up
Ongoing monitoring with sticky traps is important due to the long life span of this cockroach.


PICTORIAL KEY TO SOME COMMON ADULT COCKROACHES
SMALL, ABOUT 5/8" OR SHORTER
MEDIUM TO LARGE, LONGER THAN 5/8 INCH
PRONOTUM WITH 2 LONGITUDINAL BLACK BARS
PRONOTUM WITHOUT LONGITUDINAL BLACK BARS
GERMAN COCKROACH (Blattella germanica)
WINGS COVERING ABOUT HALF OF ABDOMEN PRONOTUM ABOUT 1/4 INCH WIDE
WOOD ROACH (Parcoblatta spp.)
WINGS COVERING NEARLY ALL OF ABDOMEN OR EXTENDING BEYOND. PRONOTUM NARROWER
FEMALE
MALE
BROWN-BANDED COCKROACH (Supella supellectilium)
WINGS ABSENT, OR SHORTER THAN ABDOMEN
WINGS COVERING ABDOMEN, OFTEN EXTENDING BEYOND
WINGS ABSENT
WINGS SHORTER THAN ABDOMEN
FEMALE
MALE
ORIENTAL COCKROACH (Blatta orientalis)
PRONOTUM MORE THAN 1/4 INCH WIDE
PRONOTUM ABOUT 1/4 INCH WIDE WITH PALE BORDER
WOOD ROACH (Parcoblatta spp.)
FRONT WING WITHOUT PALE STREAK. PRONOTUM SOLID COLOR, OR WITH PALE DESIGN ONLY MODERATELY CONSPICUOUS
PRONOTUM SOLID DARK COLOR. GENERAL COLOR VERY DARK BROWN TO BLACK.
PRONOTUM USUALLY WITH SOME PALE AREA. GENERAL COLOR SELDOM DARKER THAN REDDISH CHESTNUT
SMOKY BROWN COCKROACH (Periplaneta fuliginosa)
LAST SEGMENT OF CERCUS NOT TWICE AS LONG AS WIDE
BROWN COCKROACH (Periplaneta brunnea)
LAST SEGMENT OF CERCUS TWICE AS LONG AS WIDE
AMERICAN COCKROACH (Periplaneta americana)
PREPARED BY H.D. PRATT DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE PUBLIC HEALTH SERVICE COMMUNICABLE DISEASE CENTER ATLANTA, GEORGIA OCTOBER, 1953
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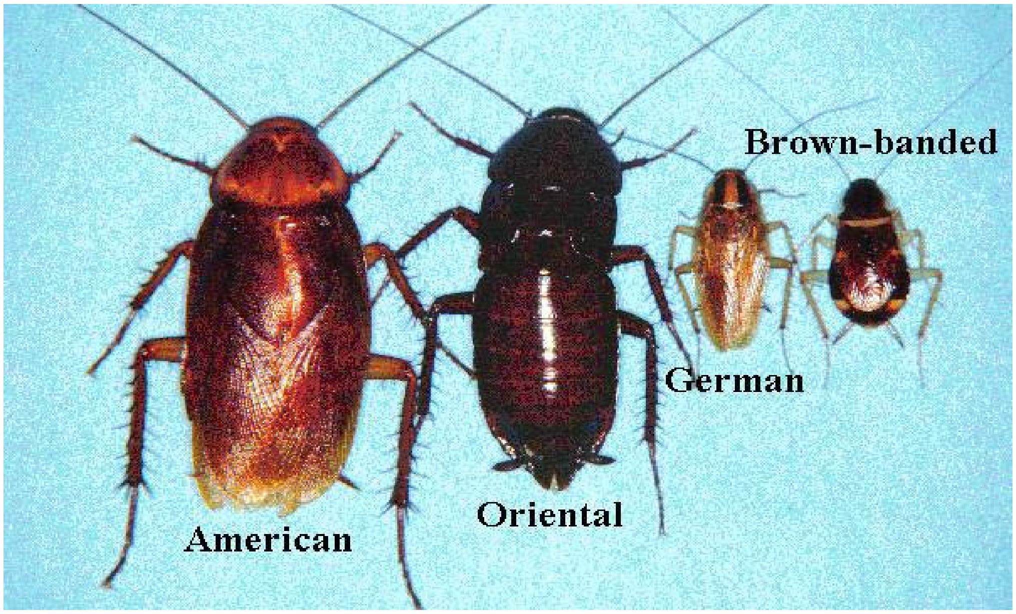
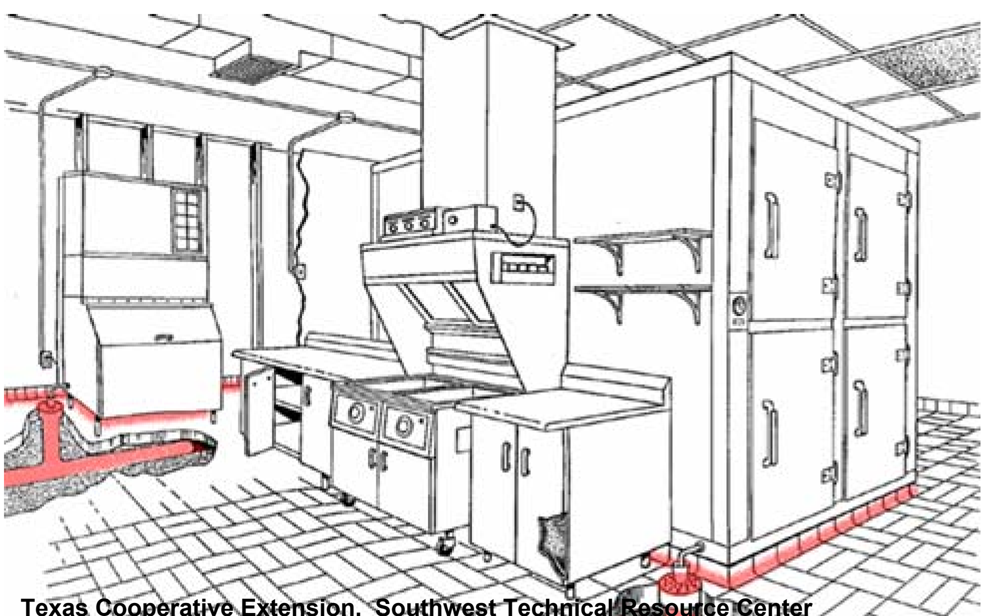


American Cockroach

•Identification:

- Reddish-brown with yellow band around pronotal shield
- 1 3/8 to 2 1/8 inches
- Ootheca black-brown without lateral indentations

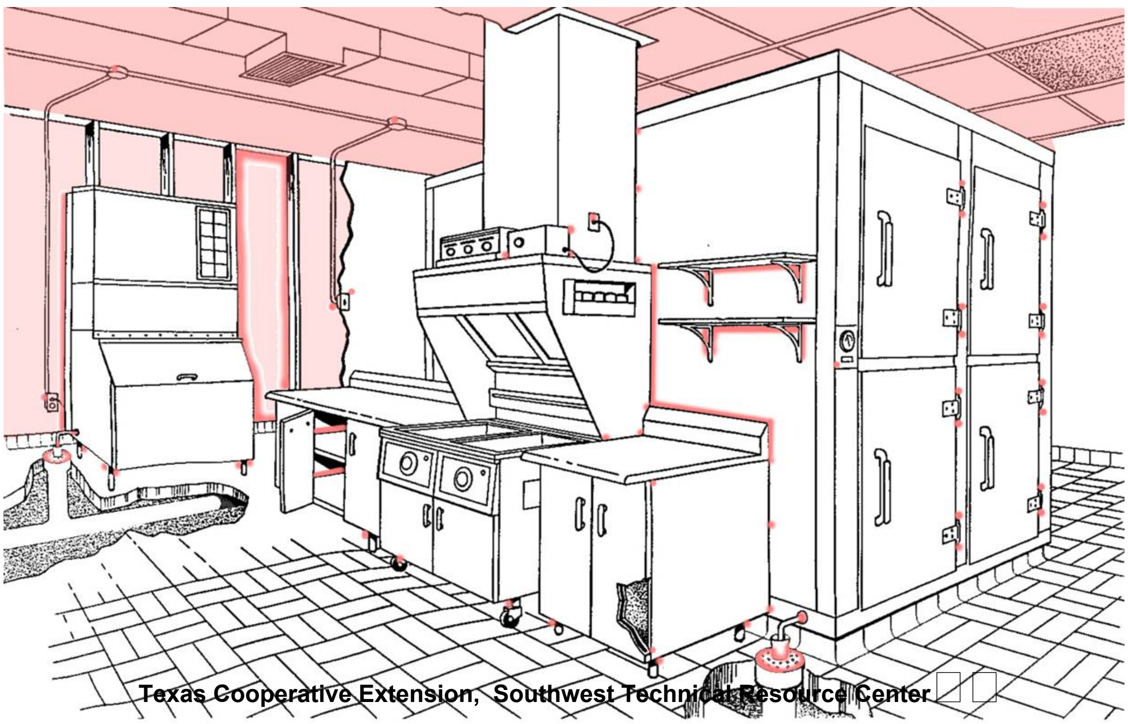
Treatment Areas for American Cockroach

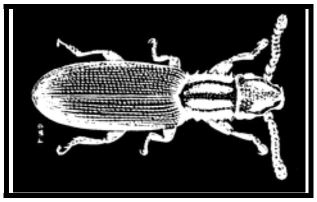


German Cockroach

- Identification:
  - One-half of an inch long
  - Two black stripes behind head
  - Very Prolific
  - Public Health Threat

Treatment Areas for German Cockroach





Pantry Pests

Many kinds of moth larvae and beetles attack cereal products, flour and other dry foods derived from plants. Flour beetles, saw-toothed grain beetles and Indian meal moths are some of the more common ones. These insects can be found in opened packages or containers of grains or plant materials and in the cracks and crevices of cabinets or cupboards. In schools or other public buildings, infestations often originate by means of food packages brought into the structure. Sometimes they may even gain entrance to unopened packages. Because most pantry pests are capable of flying, they may enter buildings that way. Once inside the building, these insects will spread through other food and the infestation will increase.

Habits and Damage

The young (larvae) and some adults of these insects feed on grains (rice, barley, corn, wheat, and bird seed), grain products (oatmeal, cornmeal, pasta, breakfast cereals, flour, cake mixes, pancake flour, and dry pet food), nuts, dried fruits, and other dried plant materials (dried flower arrangements, ornamental corn, seed displays and pictures made with seeds). Several types of beetles (cigarette beetles and carpet beetles and relatives) also will feed on spices.

All life stages (egg, larva, pupa, adult) of these insects may be present simultaneously in infested products. The adult beetles and moths are frequently seen in cupboards, on counters and cabinets and around windows. Beetle infestations frequently can be identified by the old larval skins left in the stored product. Indian meal moth larvae spin webbing threads throughout and over the surface of the infested product and the mature larvae frequently leave their food source to complete development to the adult. These migrating larvae are usually noticed as they crawl in cupboards and across walls and ceilings.

Prevention

To help prevent infestations:

- Whenever possible, buy food in small quantities so that it will not be stored for a long period.
- If foods are kept for long periods (a month or more), remove them from their original containers and store them either in airtight glass, metal, or plastic containers or in the refrigerator.
- Caulk cracks and crevices where food debris could accumulate.
- Clean up any spillage in cabinets immediately and thoroughly.
- Give food storage cabinets a thorough cleaning at least once a year.

Control and Management

Inspection

Inspections for pantry pests are essentially the same as for small roaches. In addition, you should check all packages of cereal products.

Habitat and Harborage Reduction

Habitat and harborage reduction for pantry pests is essentially the same as for small roaches. Additionally, you should check all packages of cereal products *and discard infested materials*. Sanitation is the primary method of population reduction where infested stored products are found.

Pesticide Application

- If an infestation is difficult to eliminate, insecticides registered for use in the infested area should be carefully applied to cracks and crevices.
- Reinspect problem areas frequently.

Follow-up

Ongoing monitoring and inspection plans should be put into effect in all kitchens and food-storage areas. A complete pest management program is recommended for these operations. Clear communication with staff is important. Cleaning and sanitation procedures should be monitored constantly.

Bees and Wasps

Of all insect species, the honey bee is perhaps the most beneficial. There is, of course, honey: about 200 million pounds of it is produced commercially each year. But the honey bee makes its greatest contribution by pollinating plants. More than one half of all fruit and vegetable crops are pollinated by honey bees. Wasps contribute by preying on many pest insects harmful to crops. Without bees and wasps, our menu would be very limited.

Unfortunately, bees and wasps can be a threat to human health. Each year, 50 to 100 people die from bee and wasp stings. Most die from an allergic reaction to venom within one hour of the sting. About 1 percent of the population is allergic to bee and wasp venom. Those allergic to stings should carry emergency epinephrine injection kits as directed by their doctors.

IDENTIFICATION

Though related, bees and wasps differ in important ways. Most wasps have a narrow "waistline" where the front portion of the abdomen tapers to become a small tube as it attaches to the middle body section, the thorax. Bees do not have this narrowing of the abdomen. Another difference is that bees feed nectar and pollen to their young (larvae), while wasps feed their larvae insects and spiders. Yellowjackets and hornets also scavenge food including fruit, sweets, meats and carrion.

One thing bees and wasps have in common is that some species are *solitary* and others are *social.* A *solitary* bee or wasp lives alone, making its own nest and raising its own larvae. Individuals of *social* species live together in colonies consisting of many "workers" and one or more "queens." The workers specialize in different tasks, and cooperate to raise the queen's offspring. These species should be considered a greater threat to humans than solitary species. This is because social species, such as honey bees and yellowjackets, will defend an entire colony, and have more individuals available to do so. Solitary species, such as mud dauber wasps, defend their nest alone.

BEES

Honey Bee (Apis mellifera)

The honey bee is a half-inch long, hairy, honey brown insect. They should not be confused with yellowjackets, which are black and bright yellow wasps. Honey bees live in extra large colonies of up to 50,000 individuals. Their colonies can grow this large because they survive winter, even in northern states. The nest consists of several tiers or "combs" made of beeswax. It is located in cavities of trees, rock formations and buildings. In spring, a colony may produce a “swarm.” This occurs when a newly produced queen flies off with about half the colony’s worker bees to establish a new colony. These swarms often come to rest on trees and houses while scout bees search for a good spot for a new nest. If possible, such swarms should be tolerated, as they are in transit and usually leave within two to four days.

Bumble Bee (Bombus spp.)

The familiar buzzing, fuzzy yellow and black striped bumble bee is unmistakable. Up to 200, one-half- to 1-inch long bumble bees inhabit nests in old rodent burrows, under porches and in wall voids.

Carpenter Bee (Xylocopa virginica)

This bee is a bumble bee look-alike that has a shiny, all-black abdomen, whereas the bumble bee’s abdomen is fuzzy, black and yellow. Unlike bumble bees, carpenter bees are solitary. Females chew one-half-inch diameter holes in wood and bore tunnels that run several inches into the wood. Inside, eggs are laid and the resulting larvae develop on a mixture of pollen and nectar. Males guard the nest by buzzing intruders, but their defense is a bluff: male bees cannot sting.

WASPS

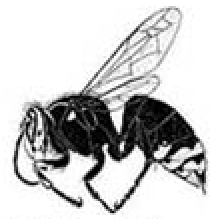
Paper Wasps (Polistes spp.)

Paper wasps are perhaps the most common wasps around structures. They are also known as “umbrella wasps” because their nests look like umbrellas hanging upside-down from eaves and overhangs. There are many species, but the typical paper wasp is up to three fourths of an inch long, reddish brown in color with a long, cylindrical abdomen. A paper wasp nest is a single comb of hexagonal cells made of a papery material the wasps form by chewing wood and mixing it with saliva. Larger nests can harbor up to 75 paper wasps including larvae and pupae developing within the cells. To feed the larvae, paper wasps capture insects, especially caterpillars. Late in the year, colonies of paper wasps, yellowjackets and hornets produce new queens that abandon the nest (it will not be reused) and seek shelter for winter. Many find their way into structures and are later seen crawling sluggishly across the floor when temperatures rise in late winter or early spring.

Yellowjackets (Vespula spp., Paravespula spp.)

More people are stung by yellowjackets than any other type of wasp or bee. Notoriously aggressive, the yellowjacket’s shiny yellow and black striped abdomen is an unmistakable warning. Often mistakenly called “bees,” yellowjackets are in fact wasps. They construct paper nests up to several feet across that contain combs arranged like the floors of a building covered by a papery envelope. As many as 3,000 (many more in warmer states) wasps can be present in the yellowjacket colony. Nests of the Eastern yellowjacket *(Vespula maculifrons)* are located in the ground, while the German yellowjacket *(Paravespula germanica)* nests in cavities including crawlspaces, attics and wall voids. Adults consume nectar and sweets, but feed the larvae on captured insects. When temperatures cool in late summer, yellowjacket numbers peak just as their insect food supply begins to decline. They scavenge more aggressively at this time, taking food from trash containers and picnickers. When disturbed, yellowjackets can sting repeatedly; their stingers are not barbed nor lost after stinging like those of honey bees.

Hornets (Dolichovespula maculata and Vespa crabro)



Bald-Faced Hornet

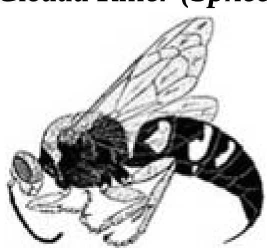
The so-called bald-faced hornet *(Dolichovespula maculata)*, about three-fourths of an inch long, black and white, with white face, is actually a larger yellowjacket species. Its nest is the familiar basketball-size papery oval hanging from tree limbs and sometimes structures. Colonies are relatively small, containing up to 700 wasps. An even larger wasp is the European hornet *(Vespa crabro)*. This is a true hornet, more than an inch long and reddish brown in color with dull orange stripes. Nests occur in trees and in attics and wall voids of structures near forested areas.

European Hornet

Mud Daubers (Sceliphron caementarium, Chalybion californicum, Tropoxylon spp.)

Mud dauber wasps are named for their habit of constructing tubular nests of mud plastered on the exterior surfaces of structures. Inside the nest, these wasps place spiders they have paralyzed by stinging, as food for their larvae. Mud daubers are solitary wasps about three-fourths of an inch long. Our common mud dauber *(S. caementarium)* is brownish-black with yellow markings. Its nests are about 2 inches long. Organ pipe mud daubers *(Tropoxylon spp.)* are black and construct nests that can be a foot long and resemble the pipes of a pipe organ. The blue mud dauber *(C. californicum)* is a shiny, dark blue wasp that lays its eggs in the nests of other mud daubers.

Cicada Killer (Sphecius speciosus)



Up to 1.5 inches long, this is the largest wasp in the Midwest. Cicada killers are mostly black with yellow markings on the abdomen. This solitary species nests in small burrows. The female searches trees for a cicada, stings it and tucks the paralyzed cicada under its body. The wasp either drags the cicada to its burrow, or launches itself from a tree and glides back to the burrow. Inside it lays an egg on the cicada, then covers the burrow with soil. The stingless male guards the nest. Larvae consume the paralyzed cicada and emerge as adult wasps the following spring.

MANAGING BEES and WASPS

The most important element of wasp and bee control is to *destroy the nest*. Aerosol "wasp and hornet" sprays can be used to knock down bees/wasps around the nest. Small amounts of pesticides (dust and wettable powder formulations work well) applied into the nests of carpenter bees and cicada killers provide good control. Nests of mud daubers also can be treated this way or by simply scraping them off structures. To prevent reinfestation, finishes (paint, etc.) can be applied to unfinished wood to discourage carpenter bees.

In some cases, attempting to destroy a nest becomes a greater health risk than simply tolerating and avoiding it. But nests, especially those of social species, should be destroyed if they are close enough to humans to pose a stinging threat. The nests of honey bees, bumble bees, yellowjackets and hornets should always be approached with caution, preferably at night when most of the workers are present but reluctant to fly. Try not to *carry* a light, as wasps and bees may fly toward it. Instead, set the light aside or cover it with red cellophane (insects cannot see red light). If there is direct access to the nest, a fast-acting dust or wettable powder formulation can be applied. If possible, inject the material into the nest. If you must approach these nests during daytime, a quick knockdown aerosol can be used to keep the bees/wasps at bay, while you treat the nest as above. Heavy clothing or a "bee suit" can be worn for added protection.

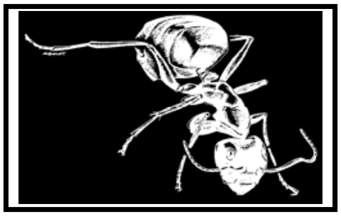
Sometimes, yellowjacket and honey bee nests occur in voids such as vents, attics, crawlspaces or hollow walls. Destroying nests in these locations can be difficult, often requiring the services of pest management professionals. Honey bee nests contain honey that must be removed after the bees are eliminated because it will rot and attract secondary pests. Also, be mindful that nests may be located several feet away from the point at which the bees/wasps are entering the structure. Simply applying pesticides into the entrance holes may not be sufficient. It may be necessary to drill into the structure to enable injection of pesticides directly into the nest. Entrance holes should never be plugged, even after treatment, because the bees/wasps will look for other ways to get out of the nest and have been known to chew their way into living quarters, endangering persons inside. Also, use extreme caution when performing bee/wasp control from a ladder.

Another special case occurs when large numbers of yellowjackets forage in public areas such as parks, schools and zoos. Attracted to human food, especially meats and sweet liquids, wherever it is being prepared, eaten or discarded, yellowjackets pose an increased threat to humans. Control is often difficult. When located in wooded areas, the nests can be difficult if not impossible to find and treat. Yellowjacket baits and traps can kill large numbers, but there can be a lot more where they came from and the problem may continue. Other types of pesticide applications for control of yellowjackets in outdoor recreation areas are rarely effective. Consequently, management of yellowjackets should focus on prevention, such as keeping food enclosed. Tight-fitting lids should be kept on outdoor trash containers and they should be moved away from people. In the end, not eating in infested outdoor areas may be the only sure way to avoid being stung.

NOTE: When pesticides are used, it is the applicator's legal responsibility to read and follow directions on the product label. Not following label directions, even if they conflict with information provided herein, is a violation of federal law.

For more information, contact the Illinois Department of Public Health, Division of Environmental Health, 525 W. Jefferson St., Springfield, IL 62761, 217-782-5830, TTY (hearing-impaired use only) 800-547-0466.

Ants



It is important to note that of the ants found indoors, only a few species are responsible for the majority of infestations. Identification of the ant helps the technician identify possible sites of the infestation. However, baits can be placed in infested areas while the technician is having the ants identified.

If ants are found in a building, an important first step is to determine whether the ants are from a colony located ***inside*** or ***outside*** the structure.

*Indications that a colony is **inside** are when:*

- ant workers are consistently found inside over a long uninterrupted period
- nest building is observed inside (Look for wood shavings of carpenter ants, "dumping" of materials by ants, etc.)
- the colony is located in the upper floor of a building, or
- inside swarming is observed.

*Indications that a colony is **outside** are when:*

- ants inside can be "trailed" outside
- ants outside can be seen coming inside
- nesting sites outside are near the structure with an inside infestation - look for mounds next to the foundation, or trees with large carpenter ant colonies touching an infested portion of the building or
- ants nest under slabs or swarm inside, but workers do not forage inside.

Whether the colony is inside or outdoors, ants that are known to tend aphids for the sweet liquid (“honeydew”) that they produce often seek food inside before this food is available outdoors. After populations of aphids and similar insects increase (in late spring), ants may disappear. They may return in dry weather seeking moisture, but often will not be seen until the next spring. When pest control efforts occur during this period, it is often difficult to tell whether the pest management methods are effective or whether the ants left the building because of other food sources.

Control and Management

Inspection

- Get all information possible by talking to the staff.
- Observe ant worker movement and plot on a diagram if need be. Try to target “hot spots” of the infestation.
- Use traps baited with a grease and a sugar or syrup or other ingredients like peanut butter and cookie crumbs.

Inside - Inspect holes and cracks where workers enter, old or new moisture stains, food accumulations (such as bird seed or food for classroom pets), activity near appliances (dishwasher and washing machines), near showers, in drawers, adjacent rooms or rooms above and below activity.

Outside - Inspect for workers behind vines, shrubs, other plants near the building, expansion joints, slabs, patio blocks, bricks, boards, plant pots, under and inside wooden columns and pillars, outside door and window frames, window wells, where telephone wires and air-conditioning refrigerant pipes enter building walls, trees that harbor colonies and provide access to buildings by overhanging limbs that touch, water meters and storm drain inspection manholes. Outside of ground-level rooms, inspect plants for aphids being tended by ants.

Habitat and Harborage Reduction

- Caulk where pipes enter walls and seal masonry cracks. Check utility lines, air conditioning, refrigerant pipes, phone lines, etc.
- Tighten door and window frames.
- Repair water leaks.
- Trim vegetation so it does not touch the building.
- Remove items stacked close to buildings such as boards, stones, etc. that encourage ant nests; screen openings in hollow pillars, columns and ventilators

Pesticide Application

- Whenever possible, baits should be used to control ant colonies. Use baits with slow-acting stomach poisons or with insect growth regulators. Baits are excellent in sensitive areas, such as computer rooms. When using baits always remember that students will not leave baits alone if they know where they are located. *Do not spray or dust around baits - ants and other insects can detect tiny amounts of repellant chemicals.* Never store baits or bait materials where they can be contaminated with any other odors, especially fumes of pesticides.

- If the nest is located indoors, use the "crack and crevice" treatment method; use dust in wall voids or canned pressurized liquid pesticides fitted with a tube for crack and crevice application. (Tubing can be obtained in long lengths and can be threaded through construction elements to treat areas distant from the pressurized can.)
- Apply wettable powder or microencapsulated spray formulations where pesticides may be absorbed into porous surfaces.
- Drill holes where practical into areas such as false floors in sink cabinets, window frames, wall panel grooves and other voids to deliver the pesticide where it is needed.
- Outdoors, use bait stations designed for outdoor use or insecticide granules labeled for control of ants outside.

Follow-up
Reinspect the facility or contact staff with troublesome ant control problems within one week to 10 days depending on the control strategies. If using insect growth regulators (IGRs), remember that IGRs take longer than dusts to show results. Remember, pesticide treatments can repel ants and make them active in other areas. Colonies with multiple queens may break up into several colonies.

Black Carpenter Ant

The large, black workers range in size from one-fourth of an inch to almost one-half of an inch. (Carpenter ants are usually entirely black, but some carpenter ants may be reddish-black.) Outside workers can be confused with field ants, which do not enter structures. Workers will search for food 30 feet or more from the colony.

The colony may be found in wood (such as a fallen log, tree hole, stump or a structure wall). When carpenter ant workers dig nest tunnels, they chew out small pieces of wood. Unlike termites, they do not eat the wood; they drop it out of the nest area or pile it in one place. This pile of carpenter ant shavings, called sawdust, is very soft and is made up of pieces like a fine chisel would make. (Gritty construction sawdust in attics or on sills can be left over from construction or repairs and may be mistaken for carpenter ant shavings.) Carpenter ants do not put mud into their tunnels like termites; carpenter ant tunnels have very smooth sides. A nest or colony might harbor several thousand ants. Large colonies of carpenter ants can cause structural damage, but the colony more likely will be found partially in structural wood and partially in void spaces (such as between roof boards, between studs under windows or between subflooring and shower bases).

Black carpenter ant workers forage for sweet foods (such as honeydew from aphids and juices from ripe fruit) and insects. Indoors, they like sweets, meats, fruit juices and moist kitchen refuse.

Control and Management

Inspection
A thorough inspection is critical to successful control of carpenter ants. It is important to discover whether carpenter ants are nesting inside or outside. If ants are nesting inside:

- their presence usually indicates a moisture problem in the building and
- they have excavated tunnels (galleries) for harborage in structural wood.

Carpenter ants are often found near a roof leak or other damp wood. In many cases, Carpenter ants make their nests in wood that has been wet and infested by a brown rot fungus. Dark fungus stains on the wood are an indication of the presence of such moisture. Moisture in wood can be caused by

- improper attachment of wooden additions, dormers and hollow wooden columns that absorb moisture
- porch floors, door sills, down spouts or areas where water collects or drains toward the building
- regular gutter overflow pouring rainwater down the side of the building as well as back onto roof boards and soffits, etc.
- leaking roof valleys
- improper flashing, especially around chimneys, vents and skylights
- improper roofing or holes in the roof
- window sills directly exposed to rain, or
- lack of ventilation in any area where moisture accumulates, such as around any leaking plumbing or drains (especially shower drains), unvented attics and crawl spaces, or unvented dishwashers, washing machines, ice machines, etc.

The many nesting sites, foraging entrances and food and moisture sources offer clues for inspection and location of the nest. The area where the majority of ant activity is seen may identify a nest site if entry from the outside can be ruled out. Carpenter ants are more active at night, so inspecting the area with the aid of a flashlight may be helpful.

Habitat and Harborage Reduction

- Where nests are located inside, remove and replace infested structural wood.
- Repair or seal areas where moisture dampens wood.
- Wherever possible, caulk and screen area where ants can enter the building.
- Ventilate indoor spaces where moisture accumulates, grade soil so water drains away from the building where necessary and repair roofing, guttering etc.
- Trim trees where branches touch a structure or overhang roofs.

Pesticide Application

Eliminating colonies and nesting sites is a primary way to eliminate carpenter ant infestation.

- Place baits in areas where foraging ants can discover them. *Carpenter ants are more difficult to control with baits than other species.* Place baits in areas inaccessible to students**.**
- Remember to use enough bait stations to control the colony.
- Use pesticidal dust or pressurized canned aerosols when nests are found in wall voids. Sprays are less effective.
- Avoid using flushing agents because hundreds of ants may remain unaffected and can relocate the colony in a matter of hours or less to trunks, storage boxes, furniture drawers and other voids.
- Aphids or other honeydew producing insects should be treated with pesticides, such as oils or soaps, that will not eliminate beneficial predators and parasites.
- If a tree with rotted areas is present, one should contact a professional who can determine if it should be removed.

Follow-up

Carpenter ant infestations often cannot be controlled in one visit. Thorough inspection is needed to make management effective. Monthly inspections also assure that necessary repairs have been made.

Pavement Ant

The Pavement ant is brown or black and about one-eighth of an inch long. Pavement ants nest outside under rocks, at the edge of pavement, door stoops and patios. They commonly move their colonies inside between the foundation and sill plate. Outside, pavement ants tend honeydew-producing insects and feed on other insects and seeds.

Pavement ants store debris in certain areas of the colony or nest. When this area is needed to enlarge the nest, workers remove materials such as sand, seed coats, dead insect parts and sawdust from the building construction and dump them outside the colony. Colonies located on foundation walls drop debris over the side in a pile on the basement floor.

Control and Management

Inspection

- Inspect along the sill plate in the basement and around heat ducts and baseboards in areas where ant workers are active.
- Look for foraging in the kitchen; such activity may indicate a nest in the basement below or just outside.
- Outside, look for tiny mounds next to the building near windows and doors or nest openings under stones.

Habitat and Harborage Reduction

- If ants are a chronic problem in the building, remove stones that shelter ant colonies.
- Improve indoor sanitation, including the elimination of moist garbage in dry weather.
- Caulk observed ant entrance points.

Pesticide Application

Inside:

- Place baits in areas where foraging ants can discover them. *Always* place baits in areas that are inaccessible to students.
- If baits do not eliminate the colony, apply dusts or sprays in cracks and crevices of baseboard molding where activity is noticed. ***Continue to search for the nest***.
- Treat cracks around kitchen sinks and cabinets.
- Treat cracks along foundation walls, under sill plates and cracks near heat ducts.
- Be careful not to contaminate heat or air-conditioning ducts.
- Treat cracks in slab foundations as well as the base of outside door jambs.

Outside:

- If baits applied inside fail to control the colony, treat nests.
- Treat cracks and entry points.

Follow-up

Follow-up is usually not needed, but where control is unsuccessful, an intense inspection is required.

Odorous House Ant

The odorous house ant is brownish-gray in color and around one-eighth of an inch long. The body of the odorous house ant is relatively soft and can be easily crushed. When this occurs, a foul odor is released. Outdoor nests are shallow and are located under stones and boards. Inside, a colony can nest in many types of cavities. The workers trail each other. Outside they actively tend honeydew-producing insects and take flower nectar. Inside, workers seem to prefer sweets.

Control and Management

Inspection

- Begin by investigating locations where ant activity is observed.
- Always inspect outside close to the location of inside activity. Look under stones and boards for colony openings and activity.
- Do not use sprays with pyrethrins (which irritate but may not kill), causing the colony to split itself and relocate, as with the pharaoh ant.

Habitat and Harborage Reduction

- Remove stones and boards harboring odorous house ant colonies.

Pesticide Application

- Bait stations with a long active period are effective, but should not be contaminated by sprays or dusts that may be repellant. Place an adequate number in or near harborage. *Always* place baits in areas inaccessible to students.
- If baits do not eliminate the colony, use dusts or residual sprays applied in cracks and crevices in the area of entering worker trails. Ant colonies should be sought outside as well as inside, unless its location inside prevents its reaching the outside.
- Control populations of honeydew-producing insects on plants near the building. Use pesticides registered for insects on plants. To maintain predator and parasites of these plant insects, use low-toxicity pesticides such as insecticide soaps and oils.

Follow-up

Impress the staff with the need to control honeydew insects on plants and to eliminate nest harborage near structures.

Pharaoh Ant

The pharaoh ant is a tiny ant, dull-yellowish to light-orange in color and not much more than 1/16 inch long. Ants prefer warmer buildings and warm areas (80 F to 85 ^{o} F.) in buildings for nesting. These ants are active year-round in large buildings. Nesting sites include wall voids, cracks in woodwork, stacks of paper, envelopes, harborage in desk drawers, etc. It is common to find many colonies in one building and, perhaps, several in one room. Colonies have multiple queens and increase by dividing: one portion of the colony going with each queen. No swarms have been recorded, so new infestations are apparently transferred by moving infested objects.

Pharaoh ants trail each other and are attracted to grease, meats, insects and sweets. These harborage and food preferences bring it to coffee areas, kitchens, paper and other supply storage, office equipment, medical storage, laboratory benches and many kinds of biological cultures.

Control and Management

Inspection

- Inspect where sanitation needs improvement.
- Ants are found where food is available, particularly sugars: where coffee is made, lunches eaten and in desks where snacks are stored.

- Inspect storage room spills, laboratory media, unwashed cups, areas near vending machines and kitchens.
- Pharaoh ants are easily baited. Use small, nontoxic disposable peanut butter baited cups to demonstrate where ants are seen (such as desk drawers and opened food boxes).
- Look at sources of water. These ants are attracted to dripping faucets; they drown in standing water or other liquid held overnight. Floating ants are frequently the first sign that these ants are present.

Habitat and Harborage Reduction

- Reduce stored supplies.
- Clean, rearrange and rotate supplies to expose nests.
- Clean food areas before the end of the work day and empty water containers that stand overnight.

Pesticide Application

- *Spraying can cause pharaoh ant colonies to break up into several smaller colonies and spread the infestation; baits are the most effective way to control these ants.* Several baits are available for pharaoh ant control. Place a bait station where every positive monitoring trap was located. *Always* place baits in areas that are inaccessible to students.
- Set commercial bait stations. One that uses a stomach poison well accepted by ants and a grain-based bait that includes ground insects are specifically manufactured for pharaoh ant control.
- Use a commercial bait of mint apple jelly and boric acid. Inject small dabs of the material into cracks and crevices where ants are observed.

Follow-up

Reinspect by monitoring bait cups. When sprays or dusts are used, or when colonies are disturbed by inspection or habitat alteration, colonies may move or split.

Bats and Bat Exclusion

Bats are among the most unique and fascinating of all animals. No other mammals can fly. Bats use echolocation to find flying insects at night much like sonar helps ships locate objects under water. Bats also have good night vision. They are not blind, as myth would have it.

While Midwestern bats feed exclusively on insects, consuming many pest species, they prefer to expend the least amount of energy to obtain the most food. Thus, bats typically capture larger insects, such as night-flying moths, and do not live up to their reputation for controlling mosquitoes.

Correctly considered beneficial animals, in certain situations, bats, however, pose a threat to human health. **Histoplasmosis** is a disease associated with bat guano and bird droppings. When droppings accumulate for years, a fungus (*Histoplasma capsulatum*) can grow and produce spores that may cause histoplasmosis when inhaled. Where bat or bird droppings accumulate, in an attic for example, care should be taken to avoid contracting this disease. Clean up generally involves wetting the droppings before removal and wearing personal protective equipment, including a HEPA-equipped respirator or self-contained breathing apparatus (SCBA). Removal of large amounts of guano or droppings from structures should be left to experienced professionals familiar with proper removal procedures. For more information on histoplasmosis and clean-up procedures see the following Web sites:

http://www.idph.state.il.us/health/infect/reportdis/histo.htm

www.cdc.gov/niosh/tc97146.html

Perhaps the greatest health risk from bats is rabies. In Illinois, rabies is found in bats more than any other wildlife species. Yet it should be noted that typically less than 5 percent of bats *tested* for rabies are found to be rabid. In the bat population as a whole, the percentage of rabid bats is much smaller – less than 1 percent.

Rabies is a viral disease causing encephalitis (brain inflammation) in humans and animals. Humans can become infected when bitten by a rabid bat. Transmission also can occur when an infected bat's saliva (but not blood, urine or feces unless these are mixed with spinal fluid – as can happen when a bat is beaten or crushed) comes in contact with a person's eye, nose, mouth, a scratch or wound. Contact with aerosolized bat saliva, especially where large numbers of bats are roosting, also can transmit rabies to humans, although this type of transmission is quite rare. For further information on rabies, contact your local health department or visit:

www.idph.state.il.us/health/infect/reportdis/rabies.htm

Of less importance are parasites associated with bats. Fleas, lice, mites and bat bugs can infest bats, birds and other animals. Some may transmit diseases to humans. If the host animals are killed or leave their nests or roosts, the parasites look for alternate hosts and may wander into the living spaces of structures. They may bite people and domestic animals, but most parasites cannot live long away from their preferred hosts. Control can often be accomplished by simply vacuuming the parasites and carefully discarding the vacuumed material. Sometimes, bat parasites such as bat bugs may have to be eliminated by application of pesticides labeled for this purpose.

HANDLING BAT EMERGENCIES

Bats flying outside at night pose little risk. However, bats flying outside in daytime, flopping around on the ground, landing on or near someone, or roosting in accessible locations should be avoided, as should any bat found indoors. Bats typically enter structures in spring. Buildings, where bats may be roosting, should be inspected at this time. During daylight hours, inspect attics, rafters, walls, chimneys, porches and cellars for roosting bats, bat guano, crystallized urine or musty ammonia odor. Also inspect for exterior openings that will allow bats to enter the structure.

If a bat is found indoors, the structure should be thoroughly inspected for the presence of roosting bats. S tructure-infesting bats pose a health risk and must be prevented from entering occupied rooms. When bats are found roosting inside a structure, the building should be inspected for routes by which the bats might gain access to the living quarters. Such passageways might include ductwork, false ceilings, attic doors, chimney, holes in walls, and gaps around pipes and wiring. Every effort should be made to seal openings large enough for bats to squeeze through (see exclusion procedures below).

Rabid bats may exhibit no obvious abnormalities, so all contact with bats should be avoided. Where there is a likelihood of encountering bats, such as at children's outdoor camps, people should be instructed not to touch bats. Similarly, *people should NOT be allowed to occupy a room in which bats are found*, until it is certain that no bats remain in the room and that the room has been sealed to prevent their re-entry.

Any bat suspected of having physical contact with a person should be captured and submitted for rabies testing. Bats can be captured using gloves, by netting, or by covering them with a box or can, then sliding a piece of cardboard or other stiff material under the container to trap the bat inside. It is advisable to wear heavy leather gloves to avoid bites and scratches. Your local health department, animal control office or veterinarian can assist you with submitting the bat to a laboratory for rabies testing. If the bat tests negative, rabies treatment can be avoided.

If a bat bites or has physical contact with a person, the wound or contact area should be washed immediately with soap and water. Unfortunately, bat bites and scratches are small and may go unnoticed. In certain situations it may be impossible to know if contact with a bat has occurred. These situations occur when a bat is found in the same room with a sleeping person, infant or young child, persons with diminished sensory or mental capacity, or persons under the influence of alcohol or drugs. *Whenever a bat has physical contact with a person, or is suspected of coming in contact with a person, the bat should be captured, if possible, and the incident should be reported immediately to a physician and local health authority to assess the need for rabies treatment.*

The incubation period (time from exposure to appearance of symptoms) varies from days to years, but is usually one to three months. The initial symptoms of rabies in humans may be flu-like and progress to anxiety, confusion, agitation, insomnia, hallucinations, delirium and other abnormal behavior. To be effective, treatment should begin as soon as possible after exposure. Once symptoms appear, rabies is almost always fatal, although a recent experimental treatment appears promising.

BAT EXCLUSION

Like most birds and other wildlife, all 12 species of bats inhabiting Illinois are protected by law. Species most commonly found in structures include the little brown bat (*Myotis lucifugus*) and big brown bat (*Eptesicus fuscus*). These species have a wingspan of less than 12 inches and weigh one-half ounce or less. Four other species are classified as endangered species. It is unlawful to harm or kill a bat. Only under special circumstances are permits to kill bats granted by the Illinois Department of Natural Resources.

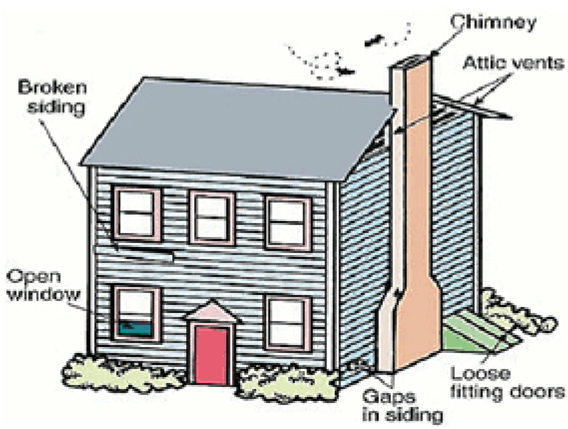
Big Brown Bat

Popular “home remedies” for eliminating bats are temporary, ineffective, and/or illegal. No pesticides are registered for bat control. Moth crystals (naphthalene) can be temporarily effective, but the typical attic requires 3 to 5 pounds to be used and changed every few weeks. Other types of repellents may not be registered for use as bat repellents and, therefore, cannot legally be used to harm or repel bats. Bright lights, as well as fans and air-conditioners (used to cool down the roosting area), may be effective but temporary controls. In addition, ultrasonic and electromagnetic devices do not effectively repel bats, rodents or insect pests, despite advertising claims.

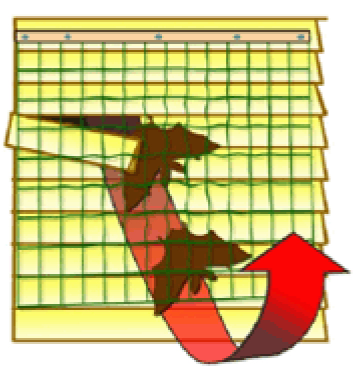
Exclusion remains the best way to prevent and control bats in a structure. Bats can be excluded by sealing exterior openings larger than one-half-inch, using caulk, expandable foam, plywood, mortar, metal flashing, steel wool or one-fourth-inch mesh screen or netting. Make sure doors, windows and vents have screens and are securely framed; chimneys are capped; and gaps around utility lines are plugged.

In May and June, one or two “pups” are born to pregnant bats in Illinois. By the end of July, the young bats have taken wing, though they will continue to nurse until able to feed themselves exclusively on insects. Most bats, especially those in northern Illinois, leave their roosting places in September and early October to migrate south, where they will overwinter in caves, rocky ledges and cliffs, and occasionally accessible walls and attics. Therefore, bat entry points in structures are best sealed during the months of September through April, when no bats *are present*. Proper exclusion at this time will prevent bats from entering the structure in spring. Only at certain times can exclusion be performed while bats are roosting within the structure. This involves sealing openings after the young bats are old enough to fly (August or later in Illinois).

Some skill is required to identify all entry points and to apply exclusion materials to openings. Openings through which bats are entering and exiting a structure may be identified from inside the structure by entering the roosting area, an attic for example, on a sunny day when light can be seen through the openings. Another method is to turn on a bright light in the attic at night and look for light escaping through the openings on the building's exterior. Dark stains may be seen around and beneath openings used by bats. These result from bat guano and from "rub marks" where oils and dirt accumulate as bats pass through the openings. Yet another method of finding bat entry points is to watch for bats leaving the structure at dusk to make their evening feeding flights.



When all openings are identified, a "one-way valve" can be applied to each opening. One-way devices are those that allow bats to leave the structure, and prevent them from reentering. These can be as simple as a sheet of plastic or plastic bag attached above the opening and allowed to hang flush against the building's exterior. The plastic should be wider than the opening and long enough to hang at least one foot below it. The sides (but not the bottom) of the plastic can be attached to the building by staples or duct tape, to prevent wind from lifting the flap. At dusk, the bats will find their way out beneath the plastic flap, but will not be able to lift the flap to reenter the structure.



Similar devices can be constructed from screening or polypropylene netting of one-fourth-inch mesh, or a short length of PVC pipe can be positioned in the opening. A tube sock should be fitted around the outside end of the pipe and allowed to hang down with the toe cut out. Bats will exit the pipe and crawl through the sock to get out but will not be able to reenter through the collapsed opening in the toe of the sock. Once all resident bats have exited the structure, the one-way devices can be removed and the openings immediately sealed as described above. Again, this type of exclusion should NOT be performed when young bats, incapable of flying, are present (typically May-July).

Although exclusion is the best way to rid structures of bats, knowledge and timing are critical for effective "bat proofing." Especially in older construction, there may be several bat entry points that can be difficult to discover. If all openings are not found and sealed, bat problems will continue. Installing sealing materials and one-way devices also can be difficult because bat entry points are often several feet off the ground, requiring the use of ladders (note that falling is a much more common accident than being bitten by a rabid bat). For these reasons, bat exclusion may be best left to professionals. A list of wildlife control specialists, who may be familiar with bat exclusion procedures, can be obtained from the Illinois Department of Natural Resources (217-782-6384).

Illustrations courtesy of Penn State University and the University of Missouri.

For more information, contact the Illinois Department of Public Health, Division of Environmental Health, 525 W. Jefferson St., Springfield, IL 62761, 217-782-5830, TTY (hearing-impaired use only) 800-547-0466.

APPENDIX E

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Facilities Inspection Report

Date: ______________

Facility: ______________________________ Inspector: ______________________________

Facility Address: ____

Exterior

	Yes	No	NA
1. Area free of pest activity:	☐	☐	☐
2. Facility clear of pest harborage areas:	☐	☐	☐
3. Dumpster or compactor area clean:	☐	☐	☐
a. Adequate storage:	☐	☐	☐
b. Stored on a smooth impermeable material such as concrete or asphalt:	☐	☐	☐
c. Lids closed:	☐	☐	☐
d. Refuse removed from grounds in a timely manner:	☐	☐	☐
4. Adequate rodent/insect-proofing:	☐	☐	☐
a. Adequate caulking around windows:	☐	☐	☐
b. Utility entries properly sealed:	☐	☐	☐
c. Screening properly secured and in good condition:	☐	☐	☐
5. Gutters properly draining and in good condition:	☐	☐	☐
6. Water properly draining away from buildings:	☐	☐	☐
7. Landscaping and trees do not touch buildings:	☐	☐	☐
8. Landscaping around buildings are properly spaced:	☐	☐	☐
9. All exterior doors are tight fitting and self closing:	☐	☐	☐
10. Proper exterior lighting to prevent attracting insects:	☐	☐	☐
11. Areas free of clutter, debris piles or other possible harborage areas:	☐	☐	☐
12. Other pest issues not mentioned: ______________________	☐	☐	☐

Comments:

Food Storage and Preparation Areas

Food Preparation Areas

	Yes	No	NA
1. Area free of pest activity:	☐	☐	☐
2. Floors clean and in good condition:	☐	☐	☐
3. Ceilings clean, free of water stains, and in good condition:	☐	☐	☐
4. Walls clean and in good condition:	☐	☐	☐
5. Areas free of clutter or other potential harborage areas:	☐	☐	☐

	Yes	No	NA
6. Trash removed daily and container/dollies clean:	☐	☐	☐
7. Adequate caulking and sealing to prevent harborage:	☐	☐	☐
8. Floor drains clean and covers secured:	☐	☐	☐
9. Voids under and behind equipment clean:	☐	☐	☐
10. Counter surfaces above, below and under rims clean:	☐	☐	☐
11. Enclosed areas on equipment accessible and clean:	☐	☐	☐
12. Plumbing not leaking and in good condition:	☐	☐	☐
12. Proper food stroage:	☐	☐	☐
13. Good housekeeping practices: no spillage or food debris:	☐	☐	☐
14. Minimum cardboard used as product storage:	☐	☐	☐
15. Other pest issues not mentioned: ______________________	☐	☐	☐

Dish Wash and Cleaning Supply Areas

	Yes	No	NA
1. Area free of pest activity:	☐	☐	☐
2. Floors clean and in good condition:	☐	☐	☐
3. Ceilings clean, free of water stains, and in good repair:	☐	☐	☐
4. Walls clean and in good condition:	☐	☐	☐
5. Areas free of clutter or other potential harborage areas:	☐	☐	☐
6. Trash removed daily and container/dollies clean:	☐	☐	☐
7. Adequate caulking and sealing to prevent harborage:	☐	☐	☐
8. All utensils and equipment in dish wash area cleaned at the end of the day:	☐	☐	☐
9. Plumbing not leaking and in good condition:	☐	☐	☐
10. Area free of pooling water at the end of the day:	☐	☐	☐
11. Floor drains clean and covers secured:	☐	☐	☐
12. Voids under and behind equipment clean:	☐	☐	☐
13. Mops stored clean and off the floor at the end of the day:	☐	☐	☐
14. Mop buckets stored clean and dry at the end of the day:	☐	☐	☐
15. Other pest issues not mentioned: ______________________	☐	☐	☐

Dry Goods Storage Areas

	Yes	No	NA
1. Area free of pest activity:	☐	☐	☐
2. Floors clean and in good condition:	☐	☐	☐
3. Ceilings clean, free of water stains, and in good condition:	☐	☐	☐
4. Walls clean and in good condition:	☐	☐	☐
5. Areas free of clutter or other potential harborage areas:	☐	☐	☐
6. Stock rotation practices in place:	☐	☐	☐
7. Bottom shelf a minimum of 6 inches off the floor:	☐	☐	☐
8. Metal or plastic shelving with end caps:	☐	☐	☐

	Yes	No	NA
9. Minimum cardboard used as product storage:	☐	☐	☐
10. Good housekeeping practices: no spillage or food debris:	☐	☐	☐
11. Adequate caulking and sealing to prevent harborage:	☐	☐	☐
12. All food stored a minimum of 6 inches off the floor:	☐	☐	☐
13. Other pest issues not mentioned: ____________________	☐	☐	☐

Refrigeration and Freezer Area

	Yes	No	NA
1. Area free of pest activity:	☐	☐	☐
2. Floors clean and in good condition:	☐	☐	☐
3. Ceilings clean, free of water stains, and in good condition:	☐	☐	☐
4. Walls clean and in good condition:	☐	☐	☐
5. Areas free of clutter or other potential harborage areas:	☐	☐	☐
6. Good housekeeping practices: no spillage or food debris:	☐	☐	☐
7. Adequate caulking and sealing to prevent harborage:	☐	☐	☐
8. Compressor area clean:	☐	☐	☐
9. Area free of pooling water at the end of the day:	☐	☐	☐
10. Other pest issues not mentioned: ____________________	☐	☐	☐

Employee Lunch Rooms and Public Dining Areas

	Yes	No	NA
1. Area free of pest activity:	☐	☐	☐
2. Floors clean and in good condition:	☐	☐	☐
3. Ceilings clean, free of water stains, and in good condition:	☐	☐	☐
4. Walls clean and in good condition:	☐	☐	☐
5. Areas free of clutter or other potential harborage areas:	☐	☐	☐
6. Good housekeeping practices: no spillage or food debris:	☐	☐	☐
7. Adequate caulking and sealing to prevent harborage:	☐	☐	☐
8. Tables, seats, and under booths clean:	☐	☐	☐
8. Trash containers clean:	☐	☐	☐
9. Other pest issues not mentioned: ____________________	☐	☐	☐

Vending Machine Areas

	Yes	No	NA
1. Area free of pest activity:	☐	☐	☐
2. Floors clean and in good condition:	☐	☐	☐
3. Ceilings clean, free of water stains, and in good condition:	☐	☐	☐
4. Walls clean and in good condition:	☐	☐	☐
5. Areas free of clutter or other potential harborage areas:	☐	☐	☐
6. Good housekeeping practices: no spillage or food debris:	☐	☐	☐

	Yes	No	NA
6. Other pest issues not mentioned: ______________________	☐	☐	☐

Comments:

Interior Common Areas (Hallways Gymnasium etc.)

	Yes	No	NA
1. Area free of pest activity:	☐	☐	☐
2. Floors clean and in good condition:	☐	☐	☐
3. Ceilings clean, free of water stains, and in good condition:	☐	☐	☐
4. Walls clean and in good condition:	☐	☐	☐
5. Area free of cluter or other potential harborage areas:	☐	☐	☐
6. Proper lighting near exits to prevent attracting pests:	☐	☐	☐
7. Trash removed daily:	☐	☐	☐
8. Adequate caulking and sealing to prevent harborage:	☐	☐	☐
9. Floor drains clean and covers secured:	☐	☐	☐
10. Other pest issues not mentioned: ______________________	☐	☐	☐

Comments:

Class Rooms and Storage Areas

	Yes	No	NA
1. Area free of pest activity:	☐	☐	☐
2. Floors Clean and in good condition:	☐	☐	☐
3. Ceilings Clean, free of water stains, and in good condition:	☐	☐	☐
4. Walls Clean and in good condition:	☐	☐	☐
5. Areras free of cluter or other potential harborage areas:	☐	☐	☐
6. Trash removed daily:	☐	☐	☐
7. Adequate caulking and sealing to prevent harborage:	☐	☐	☐
8. Food items properly stored:	☐	☐	☐
9. Plumbing in in good repair and not leaking:	☐	☐	☐
10. Other pest issues not mentioned : ______________________	☐	☐	☐

Comments:

Administrative Office Areas

	Yes	No	NA
1. Area free of pest activity:	☐	☐	☐
2. Floors clean and in good condition:	☐	☐	☐
3. Ceilings clean, free of water stains, and in good condition:	☐	☐	☐
4. Walls clean and in good condition:	☐	☐	☐
5. Areas free of clutter or other potential harborage areas:	☐	☐	☐
6. Trash removed daily:	☐	☐	☐
7. Adequate caulking and sealing to prevent harborage:	☐	☐	☐
8. Food items properly stored:	☐	☐	☐
9. Plumbing in in good repair and not leaking:	☐	☐	☐
10. Other pest issues not mentioned: ______________________	☐	☐	☐

Comments:

Janitorial Closets, Utility Areas, and Restrooms

	Yes	No	NA
1. Area free of pest activity:	☐	☐	☐
2. Floors clean and in good condition:	☐	☐	☐
3. Ceilings clean, free of water stains, and in good condition:	☐	☐	☐
4. Walls clean and in good condition:	☐	☐	☐
5. Areas free of clutter or other potential harborage areas:	☐	☐	☐
6. Trash removed daily:	☐	☐	☐
7. Adequate caulking and sealing to prevent harborage:	☐	☐	☐
8. Plumbing in in good condition and not leaking:	☐	☐	☐
9. Other pest issues not mentioned: ______________________	☐	☐	☐

Comments:

Summery:

APPENDIX F

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PEST TRAP LOG

YEAR:___________________ BUILDING, WING, OR OTHER SPECIFIC LOCATION:____

			JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
TRAP #	LOCATION	PEST												

			JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
TRAP #	LOCATION	PEST												

			JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
TRAP #	LOCATION	PEST												

			JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
TRAP #	LOCATION	PEST												

			JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
TRAP #	LOCATION	PEST												

APPENDIX G

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Pest Sighting Report

Date: ______ Specific location of pest sighting: ______

Name of person reporting: ______

Pest sighted: ______

Action taken: ______

Follow-up

Date: ______ Person conducting follow-up: ______

Action taken: ______

Work order request number: ______ Referred to pest contractor: ☐ Yes ☐ No

---

Pest Sighting Report

Date: ______ Specific location of pest sighting: ______

Name of person reporting: ______

Pest sighted: ______

Action taken: ______

Follow-up

Date: ______ Person conducting follow-up: ______

Action taken: ______

Work order request number: ______ Referred to pest contractor: ☐ Yes ☐ No

Pest Sighting Log

Date: Room #: Pests: Date action taken: Issue close date: Work order#:

Action taken:

Action taken by:

Date: Room #: Pests: Date action taken: Issue close date: Work order#:

Action taken:

Action taken by:

Date: Room #: Pests: Date action taken: Issue close date: Work order#:

Action taken:

Action taken by:

Date: Room #: Pests: Date action taken: Issue close date: Work order#:

Action taken:

Action taken by:

Date: Room #: Pests: Date action taken: Issue close date: Work order#:

Action taken:

Action taken by:

APPENDIX H

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Record of Pesticide Application

A. School/Licenced Day Care Center Information

School/Day Care Center Name:

Address

City State ZIP Code

B. Pesticide Applicator Information

Pesticide Company Name:

Address

City State ZIP Code

Buisness Licence Number:

Applicator Name:

C. Date and Areas of Application

Date of Application:

Areas to be treated to include room numbers, wings, etc.

Date of Notification :

Notification Requirements are covered in section 10.3. of the Structural Pest Control Act, section 3 (f) of the Lawn Care Products application and Notice Act and section   Ensure all notification requirements are met before application.

D. Pesticides used

Pesticide	EPA Reg. Number	Areas Used	Exclusion Time

Printed by Authority of the Sate of Illinois
P.O. #559444 5M 3/09