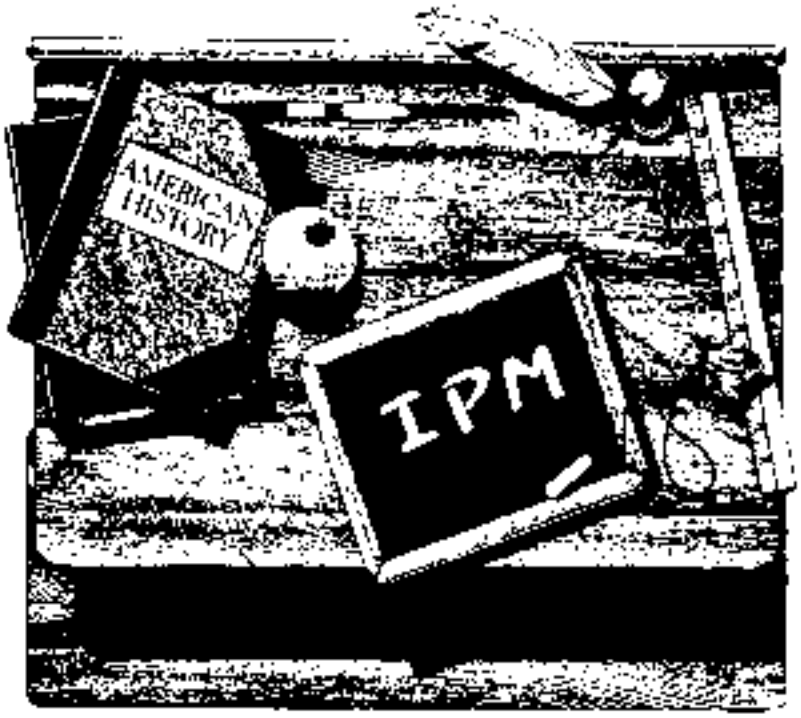
Integrated Pest Management in Schools

IPM Training Manual



MARYLAND DEPARTMENT OF AGRICULTURE
Pesticide Regulation Section
50 Harry S. Truman Parkway
Annapolis, MD 21401

ERRATA SHEET
AND
IMPORTANT NOTICE CONCERNING
IPM TRAINING MANUALS AND INFORMATION SHEETS

BACKGROUND

Legislation was enacted in 1997 mandating that Maryland Public Schools (Grades K-12) develop and implement Integrated Pest Management (IPM) plans for managing pests in public schools. The legislation also mandated schools to develop and implement methods for providing notification to parents and or guardians, as well as, school staff of pesticide use in school buildings. In 1999, this legislation was expanded to require public schools to develop and implement IPM plans and notification of pesticide use on school grounds.

In an effort to assist schools in the initial development and implementation of IPM plans and notification and posting formats, the Maryland Department of Agriculture (MDA) produced several manuals and contracted with the University of Maryland to write four additional manuals. These documents were intended for use by the schools for information and guidance. The documents were never intended to supplant the IPM and notification law and regulations but rather to facilitate implementation of the law. However, there are statements in these documents that incorrectly state the requirements of the law. The Department does not have the funds to republish the manuals and therefore has disseminated this errata sheet to all public school systems in Maryland to ensure that all schools are complying with the law.

Please note that the IPM in School manuals contain additional statements or information other than the examples listed below that do not uniformly incorporate and provide detail of the statutory mandate of Maryland's IPM and notification of pesticide use in public school buildings or on school grounds law and regulations. Therefore, if you are reading these manuals for training/guidance purposes or when performing pest control services, make sure you adhere to the definition of Integrated Pest Management found in Maryland's Integrated Pest Management and Notification of Pesticide Use in a Public School Building or on School Grounds law and regulations. For more information or questions, please contact the Maryland Department of Agriculture's Pesticide Regulation Section at 410-841-5710

ERRATA SHEET

PLEASE NOTE AND BE AWARE OF THE FOLLOWING:

1. The IPM in Schools manuals produced by MDA and the University of Maryland contain statements that incorrectly state that IPM is an alternative to pesticide application. An example of such a statement can be found in the Preface of the *Integrated Pest Management in Schools: IPM Training Manual,* where it states "Integrated Pest Management (IPM) is an alternative to pesticide use." This statement is incorrect. IPM **is not an alternative** in Maryland's Public Schools (Grades K-12); **it is the required method** of pest control under Maryland's IPM- in-Schools law and regulations."

2. The IPM in Schools manuals produced by MDA and the University of Maryland contain statements that fail to uniformly affirm the statutory mandate that pesticides be used only when "nontoxic options are unreasonable or have been exhausted." Examples of statements that fail to affirm the statutory mandate can be found 1) on page 6 of the manual entitled *Guidelines for Integrated Pest Management in Schools,* where it states "Pesticides are a component of an IPM program…" 2) on App. A, page 7 on the manual entitled *Contracting Guidelines for IPM Services in Maryland Public Schools* where it states "A broad definition of IPM is a pest control program that… incorporates different methods of pest control such as…and pesticides, when warranted…" and 3) in same manual on p. 17 where it states that "Pesticides play a limited, but important role in and IPM program." These statements do not reflect the statutory mandate that pesticides may be used only when nontoxic options are unreasonable or have been exhausted. In fact implementing an IPM program with a proper focus on pest prevention may result in a pest management program that does not include the use of any pesticides.

3. The IPM in Schools manuals produced by MDA and the University of Maryland contain some language that fails to provide the correct notice requirements mandated by the IPM-in-Schools law and regulations. An example of such a statement can be found on page 8 of the manuals entitled *Guideline for Integrated Pest Management (IPM) in Schools,* which states "A voluntary registry of individuals with medical problems or conditions who could be adversely affected by exposure to pesticides shall be maintained at the school health or administrative offices, as well as by the contact person." **Prior notification is not a voluntary option for schools, nor is it limited to individuals with medical problems or conditions.** Both the law and regulations regarding IPM and Notification in public schools buildings and on school grounds **mandate notification** to all parents, guardians and school staff for elementary schools. Middle and High schools may choose to either notify all parents, guardians and staff members or establish a list of parents, guardians and staff members who wish to be notified of pesticide use. The law requires that all parents, guardians and staff be informed of the notification list so they can opt-in.

4. The IPM in Schools manuals produced by MDA and the University of Maryland contain confusing statements regarding a school's legal obligations. An example of such a statement can be found on page 4 of the manual entitled *Contracting Guidelines for IPM Services in Maryland Public Schools.* The statement reads "In addition, the Governor's Pesticide Advisory Council has issued the following policy statement regarding IPM in schools…" This statement references a Council that no longer exists and a policy that is not in law or regulation

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Preface

The practice of routinely using pesticides where children study, eat, and in play in has raised public concern whether this is the best approach to controlling pests in schools. As a result, legislation was enacted mandating that all of Maryland's public school systems (K-12) develop and implement Integrated Pest Management (IPM) Plans for managing pest in school buildings or on school grounds. The legislation also mandated the school systems to provide notification to parents, guardians and school staff prior to the application of a pesticide in a school building or on school grounds. The legislation that was enacted defines IPM as a managed pest control program in which methods are integrated and used to keep pests from causing economic, health-related, or aesthetic injury through the utilization of site or pest inspections, pest population monitoring, evaluating the need for control, and the use of one or more pest control methods, including sanitation, structural repair, nonchemical methods, and when nontoxic options are unreasonable or have been exhausted, pesticides, in order to: minimize the use of pesticides; and minimize the risk of human health and the environment associated with pesticide applications.

This manual is written for pest control technicians, custodial staff, and others who will be managing structural pests using IPM. It is not designed to teach you everything you need to know to control pests safely and effectively, nor does it substitute for pesticide applicator training. For more information on pests, the safe use of pesticides, and other pest control related topics, consult the training and reference materials listed in the appendix.

We suggest that after reviewing this manual you keep it as a reference guide when working on school IPM programs.

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IPM Training Manual

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Table of Contents

Chapter One:
Why Integrated Pest Management (IPM)?

We, as a society, have become increasingly sensitive to our environment; less willing to accept health risks, even very small ones, from contaminants in the food we eat, the water we drink, the air we breathe or in the buildings we occupy. We are especially sensitive about our children's health and well being.

These concerns are changing the way we live. Pest control, too, is changing with the times. What was common and accepted practice a decade ago is no longer seen as acceptable to many people. A new approach to pest control has evolved. It is called integrated pest management or IPM. It reduces the risks from pesticides and improves the quality of pest control. A concerned public is asking, and sometimes demanding, that IPM be used instead of traditional pest control service, particularly in sensitive sites such as schools.

Reducing Pesticide Exposure

Formerly pesticides were regularly applied in and around schools to control unwanted pests such as cockroaches, rats, ants, landscape pests, and weeds. These pesticides are toxic (poisonous) by their very nature, since most are designed to kill pests. They also can harm other living organisms that are exposed to them at sufficiently high levels.

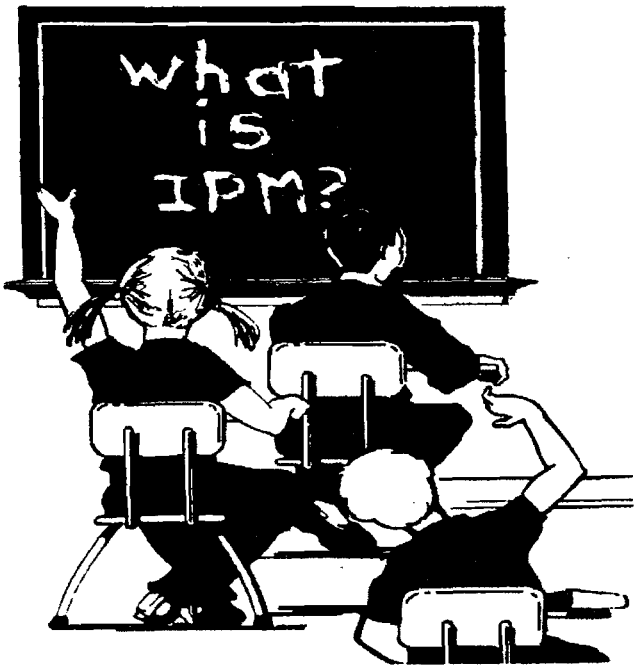
In the past, pest control programs in many schools depended on a regular schedule of insecticide treatments. Hallways, bathrooms, locker rooms, and cafeterias were sprayed, fogged, or dusted with insecticides every month. Classrooms and other rooms where pests had been reported may have also been treated, even if the pests could not be found and the source of the pests was not known.

Such regular use of insecticides and other pesticides around children, or in areas where children play or study, troubles many parents, teachers, and administrators. Children may be more sensitive to pesticides, and so are more likely to become ill from improper application or excessive exposure than are adults. Young children in particular are more likely to be exposed to pesticides by crawling on the floor or by transferring pesticide residues from application sites to their mouths.

What is IPM?

Integrated pest management, or IPM, is a system of controlling pests that does not depend on automatic application of pesticides. Instead, pests are monitored by regular and careful inspections. The inspections also identify conditions contributing to pest problems. The IPM technician then decides what actions are necessary, if any, based on the biology and habits of the pests involved.

Priority is given to nonchemical pest management techniques, particularly those that can prevent a recurrence of the problem. Pesticides are used when nontoxic options are unreasonable or have been exhausted and only in a way that minimizes exposure to people and the environment. Records are kept to track problems, prevent recurrences, and evaluate the results of pest management actions.



Developed by university researchers, and refined by over a decade of practical use in the field, IPM is really just good common sense. Schools that have adopted IPM programs not only report a reduction in their use of pesticides, but a significant improvement in their level of pest control. IPM forces you to look at the big picture and to analyze the problems that caused pest populations to grow in the first place. IPM has proven to be the best alternative to traditional pesticide-based services. It provides effective, long-term control of landscape and structural pests, while protecting the health, environment, and quality of life of our children.

A Typical IPM Service Visit

The procedures followed by an IPM technician are different from those followed by someone doing traditional pest control. As an IPM technician, you will spend far more time inspecting the school and communicating with school workers than you will in simply applying pesticides. You will be making many more decisions about what specific control measures to take. You will need to be better at identifying pests, and know more about pest biology and habits. And you will be filling out and reading more paperwork. In other words, you will be using your eyes, ears, mouth, and brain far more than in traditional pest control.

Here is the way a routine service visit might go. Your first task would be to review the ***IPM Logbook*** (or books) to see if staff had reported any pest problems, and to review what had been done at the last few service visits. Perhaps you would check in with certain staff members to discuss special pest problems or conditions.

Next you would conduct a walk-through visual ***inspection*** from room to room, area to area, both indoors and out, looking for pests and evidence of pest problems, checking sticky traps and other monitoring devices. You would also ***communicate*** with staff members by asking questions and discussing pest problems. You would ***identify*** any pests you found, and decide if their numbers were above a predetermined ***action threshold*** level, which would require some kind of control action.

For each pest problem, you would make a ***decision*** about what control tactics to use given the identity of the pest, the extent of the problem, and the sensitivity of the site. You must use ***nonchemical pest management*** tactics, whenever possible. For example, you might set traps for rodents, use a vacuum to remove cockroaches and their droppings and body parts, and caulk openings around pipes to prevent pests from moving between rooms. On the other hand, you might ***make recommendations*** that

other hand, you might ***make recommendations*** that the school take certain nonchemical pest management actions such as changing food storage procedures to reduce spillage, or repairing a hole in the wall that is allowing pests to enter.

You might decide that a ***pesticide application*** was necessary if nontoxic options were unreasonable or had been exhausted. If so, you would be sure to choose a pesticide product that posed the ***least hazard*** to people and the environment. You would apply it in a way that minimizes risks, particularly to school children, and you would never apply it when students were present.

Before completing your service, you would ***evaluate*** the work that you had done at your last service visit to see if it was successful or if further actions were required. Lastly, you would fill out your *IPM Service Report*, make entries in the *IPM Logbook*, prepare any *Sanitation Notices* to the school, and complete other **recordkeeping** requirements.

As an IPM technician working in a school, you are far more than simply a pesticide applicator. You are an inspector, an identifier of pests, a communicator, a recordkeeper, a decision-maker, and, what is most important, a guardian of the well-being of students and staff. It is a big responsibility.

Chapter Two: Monitoring Pests

An IPM program consists of a cycle of monitoring, control, and evaluation. The monitoring component of an IPM program is essential to its success. ***Monitoring is a documented, systematic inspection conducted at regular intervals.*** *It keeps you informed about all aspects of the pest situation and conditions at the site. Monitoring includes the following:*

- *Identifying and locating pests*
- *Identifying areas of critical sensitivity (classrooms, infirmary, etc.)*
- *Estimating size of pest populations*
- *Identifying the factors that are contributing to the pest problem (poor sanitation, improper storage, holes in walls, etc.)*
- *Reporting management practices that could affect pest populations or pest management activities (trash pickup, lighting, evening classes, construction, etc.)*
- *Identifying nontarget species that could be killed or injured*
- *Assessing natural enemies and potential secondary pests*
- *Assessing environmental conditions (temperature, humidity, weather or seasonal changes)*

Action Thresholds

Does a pest, say a single fly, demand immediate action? Not necessarily. In many situations, there may be a specific level of pests (or damage) that can be reached before action is taken. One house fly in a classroom would not normally trigger control. On the other hand, a cockroach in a cafeteria would require a very careful inspection to find out if other cockroaches were present, and probably some kind of control action.

To decide when to take a control action and when to simply continue monitoring you need to understand the **action threshold.** *An action threshold is the point at which action must be taken.* Action thresholds depend on the site and the pest. An occasional beetle in a hallway can be tolerated. A mouse in a classroom requires immediate action.

Action thresholds change from site to site and even month to month. For example, a couple of ants in a basement storage room might not require any action but ants in the infirmary would.

Different levels of a pest may generate different control actions. For example, if you find three cockroaches in a storage room, you might place a couple of cockroach baits stations. But if you find 30 cockroaches, you might require that the storeroom be extensively cleaned, and all cracks and crevices carefully caulked.

In a new IPM program, a practical approach is to establish an arbitrary action threshold for the major pests in each type of room (classroom, cafeteria, etc.). If it is your job to set the action thresholds, just use your common sense and experience as a guide. In some situations, you might want to consult with someone at a higher level within the school. Later in the program, the action levels can be revised up or down

based on continued observations and experience at a given site.

How to Conduct Inspections

Frequent and thorough inspections allow you to get the jump on newly arrived pests, before they can become a serious problem. There are three basic components to a typical inspection:

(1) walk-through visual inspections of all areas of the building including outside,

(2) use of various types of monitoring traps, and

(3) information from school personnel, including review of the logbook. *All occupants should be encouraged to report pest activity.*

Visual Inspection

Use blueprints or create a floorplan of the school showing all rooms, sensitive areas, points of entry, etc., and become familiar with the entire structure. Certain areas are more prone to pests than others and will require more intensive inspections. Examples include cafeterias and snack rooms, food storage areas, staff lounges, home economics rooms, classrooms or labs with live animals, art rooms, locker rooms, recycling collection points, and loading docks.

Use a bright flashlight and a magnifying glass (hand lens) during your inspection. Do not look just for the pests themselves, look for other evidence of pests such as droppings (especially from cockroaches and rodents) and frass (from wood borers), gnawing, tracks, and grease marks (from rodents), damage (such as powderpost beetle exit holes), and shed insect skins. The presence of feeding debris or frass is an indication of infestation.

Examine window sills regularly as many pests fly or crawl towards light. Also check inside ceiling light fixtures. Pests may be found behind baseboards, under furniture, behind moldings, in cracks in floors, behind radiators, or in air ducts. Check around door jambs for cockroaches and spider webs. Spiders often spin their webs across gaps around doors to capture insects trying to enter.

Look, too, for conditions that might lead to pest problems. Check for moisture problems, both indoors and out, which may lead to moisture related pests such as carpenter ants, termites, or mold. Look out for damaged screens, doors, and walls, which could allow pest entry. Note any sanitation problems. Be aware that fresh flowers and other plant materials may be infested with insect pests.

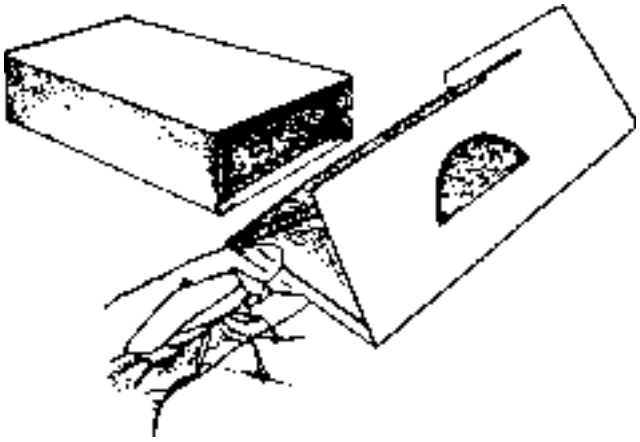
Inspect outdoors, also. Heavy landscaping near the foundation and plants such as ivy growing on walls increases the risk of outdoor pests moving inside. Moisture problems around the foundation, gutters, or air conditioning units can favor moisture-related pests. Bright exterior lights may be attracting insects to the outside of the building, and these insects may be finding their way indoors.

Poor management of trash may be attracting rodents, which could find their way inside through utility lines or other openings.

Monitoring Traps

There are currently three major types of monitoring traps: sticky traps, which use an adhesive to capture insects; pheromone traps, which use chemical attractants to draw certain species of pests into the trap; and insect blacklight traps, which use ultraviolet light to lure and capture certain flying insects.

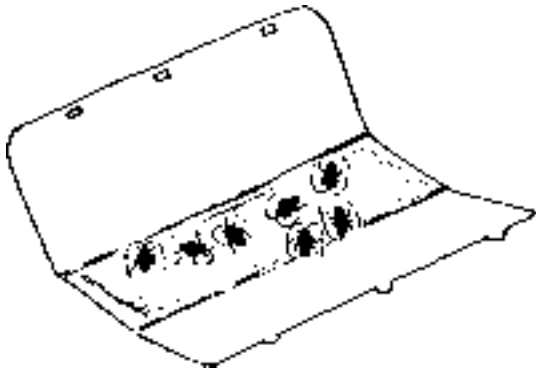
Sticky traps are the most common monitoring tools in use today. These glue-covered traps are most often used to trap cockroaches, but they are useful in monitoring for all kinds of crawling insects, and particularly those that are active at night.



Insect sticky traps

Here are some tips for monitoring with sticky traps:

- Place sticky traps where school children are not likely to find them. They will be especially useful in cafeterias and food storage areas.
- Avoid placing the traps in the open, since most pests avoid open areas. Place them inside cabinents, in back corners, in drawers, under sinks and stoves, under furniture, near (but not directly on) water or heat sources, on window ledges (for pests attracted to light), and on food storage shelves.



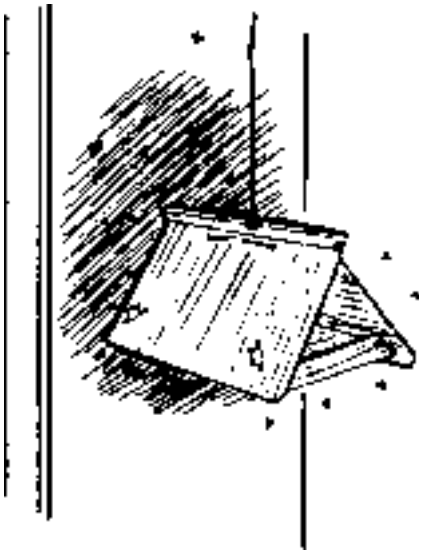
Check traps regularly

- Initial and date the traps and map their locations on a floor plan. Traps should be checked at each inspection, and any pests should be identified and recorded.
- Replace the traps whenever they have captured pests or if they become contaminated with dust or debris.
- Try to use the same brand of trap each time. Different trap designs catch different numbers of insects, and you want to be able to compare catches.
- Check the traps after the same number of days so that you can accurately compare catch numbers from visit to visit.
- Choose a trap that is easily opened to make counting easy.
- When possible, avoid placing traps right after a pesticide application. First, because most

pesticides require a few days to show control. Second, because many pesticides cause insects to "flush" out into new areas.

- Be consistent in how you use the traps to get an accurate picture of any changes in pest status.

Pheromone traps are valuable tools for monitoring certain pests, particularly "stored product pests"such as cigarette beetles, drugstore beetles, sawtoothed grain beetles, Indianmeal moths, and warehouse beetles (*Trogoderma*) that infest food. Much of what these insects do is directed by certain chemical odors. The odors tell them where to find food, or a mate, or others of their own kind. Pheromones are the natural scents insects use to communicate with each other. Science has discovered how to isolate or mimic some of these pheromones and incorporate them into traps. Certain pests are strongly attracted to the traps, providing an extremely effective early warning system.



Pheromone trap for flying insects

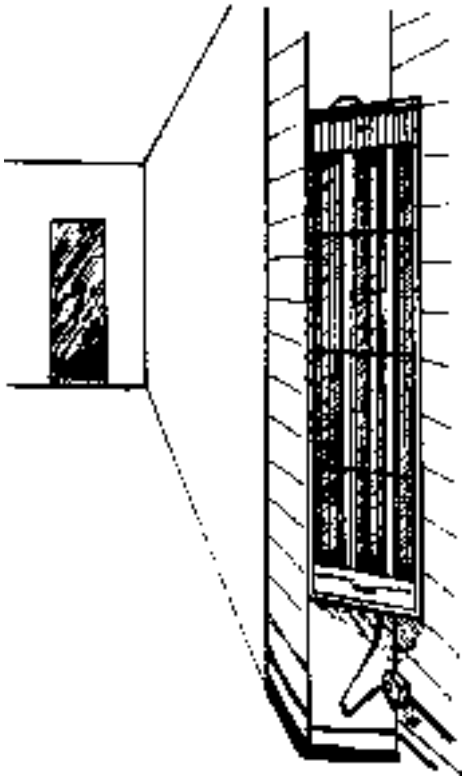
There are many different styles of traps, the most common being hanging traps. These have a sticky surface and a small lure that contains the pheromone to attract certain flying insect pests. Another common type of trap is the pitfall, which lures crawling insects into a container filled with oil. In a school, pheromone traps can be used in food storage areas to identify infested food products.

Here are some tips for monitoring with pheromone traps:

- Most pheromones only attract a particular type of pest. Make sure that you have the right lures for the pests you are monitoring.
- Do not place traps near windows and doors where you might lure insects in from outside.
- In large storage rooms, place traps in a grid pattern about every 50 feet. To pinpoint an infestation, place traps more closely around any trap containing insects.
- Inspect traps every week, twice a week if an infestation is found.
- Replace pheromone lures as recommended since the pheromone becomes less attractive through time.

Insect light traps (also called ILTs, insect electrocutors, and electronic insect traps) are useful for detecting and controlling occasional flying insects. The traps emit ultraviolet light ("black light") that is very attractive to certain insects, particularly to flies and moths. The insects are drawn into the trap and are either "zapped" (electrocuted on a grid) or fall onto a glue board. Flies can see lights from about 25 feet away, moths up to 100 feet away, depending, of course, on the ambient light present in a room. Only industrial grade traps should be used, not the backyard "bug-zappers" sold in retail stores.

In schools, insect light traps are most effective in narrow hallways or 15-25 feet inside main entry points. Traps that are low to the ground usually capture more flies than do ceiling-hung traps. Ceiling-hung traps capture more moths. Use insect light



Insect light trap (ILT)

traps indoors only. When placed outdoors, they mostly capture nonpest insects.

Be sure to check and empty the light trap periodically or the dead insects will themselves attract dermestid beetles and other scavengers. Bulbs must be replaced at least annually. Although it appears normal, a blacklight bulb loses about 50 percent of its effectiveness after one year.

Information from School Staff

During inspections, ask staff members if they have seen any pests. School staff should know what to do and who to contact if pests or evidence of pests are seen. Whenever such evidence is discovered, it should be reported and recorded in the *IPM Logbook.*

Other Components

The following items should be considered for use in any school IPM program:

Floor Plan

Maps, blueprints, graphs, or floor plans are extremely helpful in monitoring in and around school buildings. They should note all pertinent factors including high pest risk areas and sensitive areas.

Use working copies of the floor plan during each inspection. You should have access to all areas. Mark any evidence of pests, and related information that may prove useful (sanitation problems, overflowing trash cans, torn screens, moisture problems, etc.).

Pest Identification

Correct identification of the insect or other pest and its life stage is critical. Without it, you cannot make an informed decision about how best to control the pest, and if control is necessary at all. To learn how to identify pests, and to obtain information on a pest's biology and habits, refer to the books and resources referenced in the appendix.

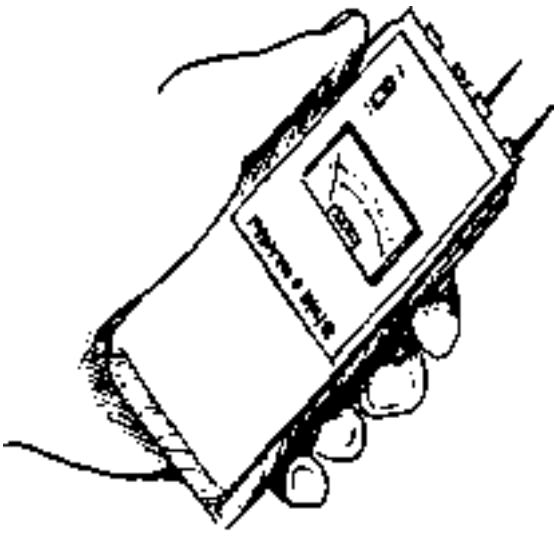
Recordkeeping

Good records help you solve pest problems, give you a historical perspective of pests at the school, and let you anticipate seasonal pest problems. All evidence of pests should be thoroughly documented. Note what was found—species and life stage, where it was found, the day and time it was found, and whether it was found alive or dead. Keep careful records of inspection results, trap catches, etc. to identify seasonal risk factors and areas with a high frequency of problems. Recordkeeping is discussed in chapter six.

Inspection and Service Kit

You might want to put together an inspection kit to be carried in a small tool box or other portable container. Depending on the site to be monitored, it might include such items as --

- Flashlight or headlamp and extra batteries
- Plastic bags, vials, and tweezers to collect samples of insects and other specimens
- Pad of paper and pencil/waterproof marker to make notes and labels to place inside sample containers
- Transparent tape to capture insects or mites too small to pick up with tweezers
- Hand lens or small portable microscope
- Screwdrivers, knife, and small hammer
- Mechanic's mirror to look under heavy objects, inside drop ceilings, etc.
- Caulk and steel wool
- Duct tape
- Sticky traps
- Soap/hand cleaner
- Clean rags/paper towels
- Stethoscope or electronic listening device
- Hand-held moisture meter to find areas of high wood moisture
- Rubber gloves
- Polaroid camera to record problem areas
- Borescope for looking inside walls and other voids



Hand-held moisture meter

Chapter Three: Education and Notification

Probably the least expensive nonchemical control method is education of staff, students, and interested parents about potential pest problems, their causes, and the IPM solutions. Simply having informed individuals who will spot and report pest problems can go a long way toward managing pests in a school. Notification is informing students, staff, and others about pesticide applications.

Education

Building maintenance and grounds personnel should understand pestproofing and other steps they can take to keep pests from entering buildings. Housekeeping staff can learn to find and give special attention to areas with sanitation problems. Food service workers should understand the connection between inadequate sanitation and pests. Students can even help by regularly cleaning leftover food out of their lockers and picking up trash paper.

This education process can take place in many ways: features in the school newspaper, notes sent home to parents, presentations at school assemblies, PTA and staff meetings. Science teachers may even be persuaded to teach students about IPM, perhaps including hands-on experience.

Involving students in the IPM program

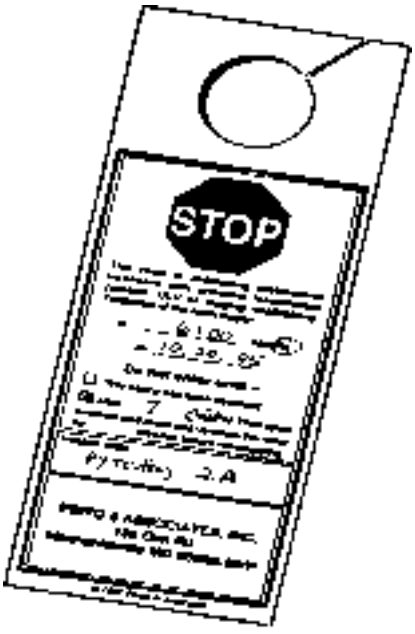
The idea is not simply to teach people about pests, but to involve them in the pest management program. Students, parents, and staff should understand that the success of the IPM program is in their own best interest.

Notification and Posting

Maryland law requires that schools notify all appropriate parties in advance of any pesticide application. Elementary Schools must send notices home to parents or guardians and also notify staff members before any pesticide application. For both middle

school and high school, schools are required to notify those individuals who have registered for advance notification. send notices home to those parents who wish to be informed before pesticide application. A school may have a registry of students and staff who are sensitive to pesticides. These people must be notified before pesticides are applied.

After treatment, reduce the risk of exposure to those who may not be aware of your treatment by posting written warnings. Use door hangers, warning notices, and instructional sheets to warn staff and students that an area was treated, to identify the pesticide applied, to tell them when they may reenter the room, and to provide other instruction and warnings. The more specific the warnings, the better. Use the pesticide label as your guide. Be prepared to provide additional information on pesticides. Maintain a set of product labels and material safety data sheets (MSDS) for all pesticides used. File at least one set in the logbook, along with telephone numbers of poison control centers and emergency personnel. This information should be available to any individual upon request. The MSDS sheet must also serve as the primary source of information for the mandatory notices sent to parents, guardians and staff.



Chapter Four: Nonchemical Pest Management

When a pest problem requires action, look first to those methods not requiring the use of pesticides. Pest control practices such as trapping, caulking, power washing, and vacuuming are control measures you can use with a high degree of safety. Ideally, you should concentrate first on those methods that work over the long term, or that prevent pests in the first place; methods such as pest-proofing (exclusion) or operational changes that improve sanitation. Often, nonchemical measures are combined for the most effective results, and sometimes used together with limited pesticide application. Common nonchemical pest management methods are discussed in this chapter.

Sanitation/Housekeeping

Poor sanitation makes life easy for cockroaches, flies, ants, mice, rats, and other pests that need nothing more than a little spilled food, a drippy faucet and a place to hide.

Removing available food for pests is the most obvious, and probably the most important, sanitation step to reduce pests. However, cleaning up clutter is important, too. Stacks of papers or closets jammed full of "stuff" provide harborage (living and hiding places) for pests.

Good sanitation is a nonchemical pest management measure that does not require specialized training or equipment. All that is needed is an understanding of the connection between food, standing water, clutter . . . and pests.

Vacuuming

Vacuuming is an important part of a sanitation program since thorough and frequent vacuuming removes food particles and other debris that pests feed on. Vacuuming also can be used to control pests directly. Pest control companies are increasingly using industrial-type vacuums to suck up cockroaches, flies, ants, spiders, and other pests.

For many pest problems, a vacuum may be all that is needed. A group of cockroaches living under a rabbit cage can best be removed simply by lifting the cage and vacuuming them up. For other pest problems, a vacuum may be the only control method that is acceptable. An example is ants living inside an oven.

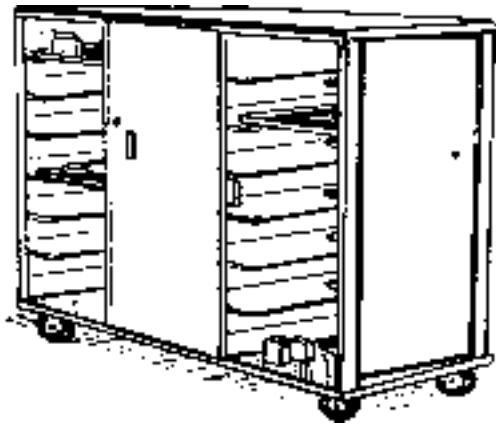
Pest control companies and cleaning services often use specialty backpack vacuums equipped with filters that can remove even tiny allergenic particles. Special attachments allow vacuuming under appliances and around sensitive equipment like computers. After vacuuming, the vacuum bag should be dropped into a sealable plastic bag and discarded.

Power Washing

Various types of power washing equipment use a high-pressure stream of water to remove accumulated debris, grease, and other potential food and harborage for pests. Candidates for power washing include the following sites:

- Food carts/tray carts
- Drains
- Trash rooms
- Trash cans/dumpsters

- Compactors
- Loading docks
- Bird roosting area (droppings)



Tray carts can be power washed

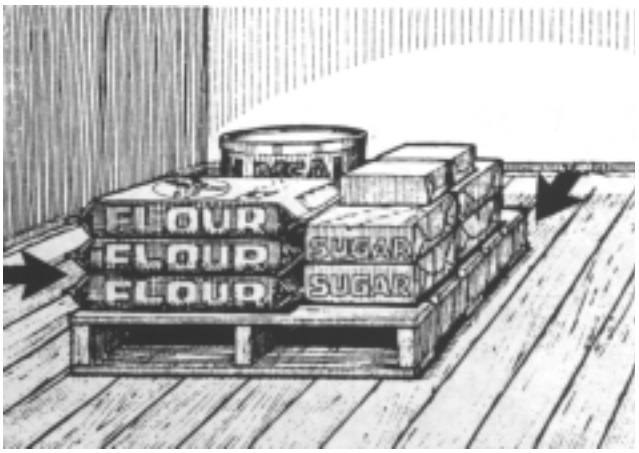
Power washing equipment comes as hot water units or cold water units, built-in units or portable units, gasoline-powered or electric-powered. Power washing is usually done by school staff, but may be a separate service provided by a contractor, sometimes the pest control contractor.

Sanitation in Food Service Areas

Schools should allow food and beverages only in certain designated areas. *(Note: Food and beverages should be prohibited in computer rooms and in similar pest-sensitive sites.)*

In the main kitchen and cafeteria, food preparation surfaces should be cleaned promptly after use. Grease should be cleaned regularly from ovens, exhaust filters, and grease traps. Power washing is a good way to remove grease and spillage and to flush floor drains. Garbage cans should include plastic liners. The cans should be cleaned regularly, and garbage removed daily. Catch trays in insect light traps should be emptied regularly.

Stored packaged foods should be stacked on pallets or on shelves that are away from the wall to allow inspection and cleaning. The policy of "first in, first out," ensures that foods do not remain in storage for too long. Empty boxes, cans, and any damaged packages should be promptly discarded. Opened foods should be stored in tightly sealed containers.



In secondary food areas like lounges, snack areas, and the home economics classroom, stoves, refrigerators, and sinks should be kept clean. Leftover food should not be stored for long periods. Spills under and behind vending machines, microwaves, and coffee makers should be cleaned up promptly.

Sanitation in Other Indoor Areas

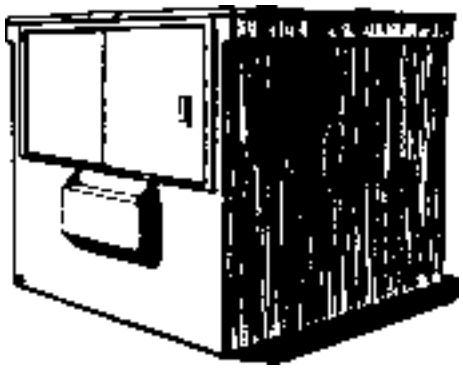
In the science lab or animal rooms, animal cages should be cleaned and bedding replaced regularly. Spilled feed and animal feces should be removed daily. Animal feed should be stored in tightly sealed containers.

In rest rooms, locker rooms, and janitorial closets, floor drains and shower drains must be cleaned routinely. Mop buckets should be emptied after use and wet mops and rags cleaned and hung to dry.

In lockers and desks, regular inspections should look for conditions that attract pests like forgotten bag lunches, discarded candy wrappers, or wet clothing.

Sanitation and Waste Disposal

Garbage cans and recycling containers should have lids that close and should be emptied and cleaned out regularly. The trash room should have a concrete floor with a floor drain so that it can be hosed down or power washed.



Keep dumpster lids closed

The dumpster and compactor should be washed out regularly using high pressure and a degreasing solution. After cleaning, the dumpster's drain plug should always be replaced. Sliding doors or lids on the dumpster should be kept closed. Spilled trash around the dumpster should be picked up daily. Trash cans on playgrounds and in other outside areas should be emptied daily and cleaned regularly.

Sanitation Outside the Building

Trash on the grounds, especially trash that accumulates around the foundation and under shrubbery, should be picked up. Fruits and vegetables that are lying on the ground should be removed to discourage rodents, yellowjackets, and other pests that feed on decaying vegetation.

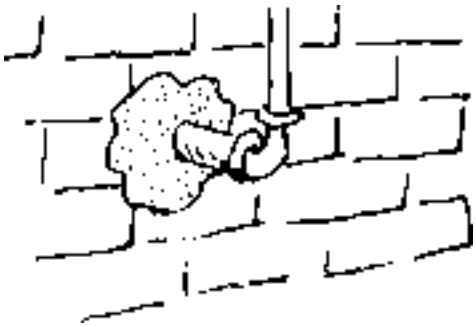
Roof gutters should be cleaned, and stagnant water in containers and playground equipment should be emptied.

Pestproofing

A straightforward pest control solution is simply to change the conditions that allowed the insect or animal to become a pest in the first place. One way to do this is to make physical or mechanical changes that will make the location less attractive to pests or that will keep them from entering buildings. Pestproofing can be as simple as repairing screens and caulking cracks or as sophisticated as landscaping with pest- and disease-resistant plants. Some physical alterations can be expensive and time-consuming but they usually are permanent solutions. You may do some pestproofing yourself, and you may make pestproofing recommendations to school administrators, maintenance staff, or outside contractors.

Pestproofing Buildings

- Install weather stripping or door sweeps on doors. Inspect them regularly and replace as needed.
- Repair screens on windows and doors and make sure they fit tightly.
- Screen floor drains and outside vent openings.
- Install air curtains over loading docks and other open doorways.
- Seal cracks and crevices in interior and exterior walls.
- Caulk, stuff, or seal openings around pipes and conduits where they enter the building.
- Caulk crevices around doors, windows, vents, plumbing fixtures, equipment, cabinets, and counter tops.
- Repair grout around wall and floor tiles in restrooms, locker rooms, and other sites.
- Repair leaks in the roof, which may attract carpenter ants, fungus beetles, and other moisture-loving pests.



- Repair leaky plumbing in restrooms, kitchens, and laboratories.
- Install porcupine wire, pin and wire, or similar commercial products to keep birds from roosting on window ledges and other building surfaces.

Pestproofing on the Grounds

- Install a concrete pad under the dumpster or garbage pickup area to make it easier to clean the site and to prevent rodents and other pests from burrowing or nesting underneath.
- Make sure that all trash cans on the grounds have closing lids to discourage yellowjackets and flies.

"Porcupine wire" strip

- Pull organic mulch away from the building's walls. Wood mulch invites termites and moisture-loving pests like millipedes, sowbugs, and earwigs. Instead, install a 2-3 foot wide mulch-free band around the perimeter. Leave the area bare or fill it with pea gravel, crushed stone or shell.
- Thin or remove dense shrubbery and ground covers around the building's foundation. Dense vegetation provides good cover for rodents and makes it difficult to inspect and treat burrows.
- Trim tree branches that touch the building and remove vines on the building. Ants, squirrels, and roof rats especially, often follow branches or vines to enter a building.
- Remove plants that are hosts to specific invading pests and replace them with pest- and disease-resistant varieties. For example, boxelder bugs feed on the female boxelder tree, often moving into buildings in the fall. Removing these trees from the area will eliminate problems with boxelder bugs. Keep ornamental plants and lawn healthy and pest-free through proper watering, fertilizing, and pruning.
- Fill or drain low spots to eliminate standing water that breeds mosquitoes and other flies. Align downspouts so that water drains away from the building.
- Remove piles of wood, stone, or other materials or stack them off the ground and away from building foundations.

Trapping

Traps for insects, mice and rats are nontoxic and easy to use. They have the added advantage of containing the pest for disposal so that there is no concern about odors from dead rodents inside wall voids or in other sites. The one disadvantage in a school setting is that school children will often investigate and interfere with traps that are visible and accessible.

Traps for Insects

The traps commonly used indoors to capture insects are sticky traps, pheromone traps, and insect light traps. These traps are discussed in detail in *Chapter Two: Monitoring Pests.*

Jar traps capture certain insects, particularly yellowjackets and flies. Yellowjacket traps are useful in the fall when yellowjackets are foraging around human food, drinks, and garbage.

Traps for Mice and Rats

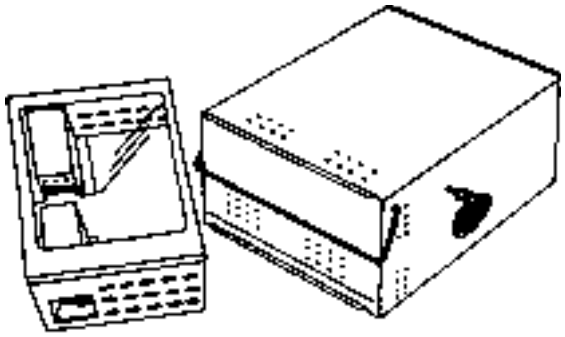
Traps used to catch mice and rats are glue boards, snap traps, and multiple-catch or repeating mouse traps. In addition, there are small mouse traps that will capture individual mice alive to be disposed of or relocated, and there are specialty live traps for capturing larger animals like raccoons or skunks. Before trapping animals other than rats and mice, be sure you understand what you are doing and have the proper license or permit.

The common snap trap for mice or rats can be baited with a food bait such as peanut butter, or with cotton balls or other nest material, or left unbaited. Snap traps with an expanded trigger design usually are more effective.

Multiple-catch or automatic repeating mouse traps are larger, metal traps that are capable of catching up to 20 mice without having to be reset. Mice are usually captured alive.

Glue boards for rodents are similar to insect sticky traps but are usually larger with more adhesive. Mice or rats that walk onto the board are captured.

Placement of Rodent Traps. Traps should be placed in rodent runways. Rodents usually travel along baseboards or edges of walls or other objects. Place snap traps perpendicular to the wall with the bait pedal against the wall. Place glue boards parallel to the wall. For mice, traps should be placed about every 10 feet. For rats, place traps approximately 20 feet apart.



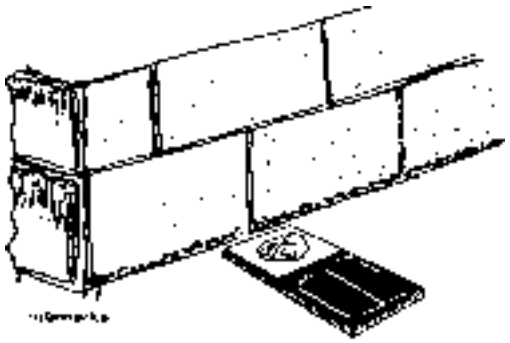
Multiple-catch mouse traps

Place traps (and glue boards) where they will be inaccessible to children, pets, or other animals. Otherwise, place them inside a tamper-resistant bait station secured so that it cannot be lifted.

Traps can be placed outdoors around the perimeter of the building as well. Put them inside tamper-resistant bait stations to keep them away from children and animals, and to keep them dry and dust-free. Locate the bait stations in inconspicuous locations such as behind shrubbery or inside dumpster enclosures.

Check traps daily and remove captured rodents. Wear gloves when handling dead rodents and dispose of them immediately in a sealed plastic bag. Used glue boards should be disposed of, rodent and all, and replaced. Snap traps and multiple-catch traps can be emptied and reset.

Number the traps or glue boards and record their location on a map of the building or grounds. Also record on a service sheet when traps are checked, emptied, and/or replaced. Move traps that have had no activity to a new location.



Light Management

Certain flying insects will congregate wherever there is bright exterior lighting such as around doorways, parking lots, loading docks, or ball fields.

When bright lights around the perimeter of a building draw insects, pest problems can result: (1) Dead and dying insects can accumulate around doorways and windows, (2) some of these insects may find their way inside through crevices, faulty screening, etc., and (3) insects flying around lights attract predators, like spiders, that feed on insects.

There are four factors that determine whether insects will fly to a light: (1) its brightness or wattage, (2) its ultraviolet (UV) output, (3) its heat output, and (4) whether there is competition from other lights nearby.

Bright lighting around schools is an important security measure, especially when students are present for nighttime activities. But there are several ways to reduce the problem of insects flying to lights without sacrificing outdoor lighting.

- Wherever possible, replace high wattage bulbs with lower wattage (less bright) bulbs or yellow insect bulbs.
- Mercury vapor lamps and fluorescent lamps have a high UV (ultraviolet) output which attracts insects. Instead, substitute sodium vapor lamps or others with low UV output. In general, yellowish, pinkish, or orange lights are less likely to attract insects.
- Replace bulbs that put out a high amount of heat (such as halogen lamps and incandescent floodlights) when possible.
- Direct or shield outside lights so that the light shines only where it's needed. When possible, install lights 15 to 20 feet away from the entryway, but facing toward it, rather than placing lights directly above doorways.
- When possible, set lights so that they do not turn on until one hour after sunset. This will avoid many insects that fly only at dusk.
- Tighten screens, caulk gaps, and use door sweeps, double doors and other measures to keep insects from entering buildings. Closing curtains or blinds on inside windows at the end of the day will keep interior lights from drawing insects to the building.

Chapter Five: Using Pesticides in IPM

Pesticides may be used in school IPM programs. However, they should not be applied automatically or on a schedule, but only when nontoxic options are unreasonable or have been exhausted against identified pests. What is most important, use them in ways that minimize risk to people, particularly to children.

This chapter presents some guidelines to help you use pesticides in schools. It is not a complete review. More detailed information on using pesticides can be found in the ***Maryland Pesticide Applicator Training Series Core Manual*** *and in other reference materials listed in the appendix.*

Pesticide Hazards

A pesticide is any chemical used to control pests. It may be called an insecticide, or a rodenticide, or a herbicide, depending on the target pest. Every pesticide is toxic and poses some risk to people and the environment. People exposed to excessive levels of a pesticide may suffer short-term or long-term health effects, depending on the toxicity of the pesticide and the degree of exposure. Children are especially susceptible to certain pesticides.

People can be exposed to pesticides in several ways. The most common exposures occur during mixing and application. People can also be exposed by entering treated areas too soon after application, before sprays have dried, dusts have settled out, or airborne residues have disappeared. People may be exposed to small but continuous doses if they work, live, or play in rooms with pesticide residues on rugs, furniture, food preparation surfaces, etc., or by inhaling volatile residues in the air. Small children may be exposed by touching, licking, or eating pesticide residues. Spills caused by accident or carelessness can cause dangerous pesticide exposures.

Two documents supply information on handling and use, on storage and disposal, and on hazards to people and the environment for a particular pesticide product. The ***pesticide label*** provides instruction telling how to correctly use the product. It tells you where you can use the product and what pests are controlled, has specific directions for mixing and application, tells you how toxic the pesticide is to people, and discusses ways to reduce risks (precautions). The label is the law regarding the use of the product. *It should be read each and every time you use a pesticide.*

The ***material safety data sheet***, called an ***MSDS*** for short, is a guide to the hazards of a pesticide. Although an MSDS has some of the same information that you can find on a pesticide label, it provides more technical details on (1) identification and ingredients, (2) potential hazards, and (3) safety recommendations.

Always use pesticides with caution

These two documents, the pesticide label and the MSDS, are the primary sources for information on pesticide toxicity and how to use pesticides safely. This information including potential adverse effects and the US EPA statement that "whenever possible sensitive populations such as children (under the age of two) and pregnant women should avoid unnecessary exposure to pesticides" must be included in the notices sent to parents, guardians and staff. Additionally, copies should be kept in each logbook.

Choosing the Right Pesticide

There are many factors to consider when choosing a pesticide for use in a school. You want it to be effective, of course. But in a school setting, particularly in rooms used by students, you want to be sure to choose pesticides that pose the least hazard to people. Some schools may limit your choices to a predetermined list of permitted pesticides. Whenever you get to choose a pesticide, be sure to consider the following characteristics:

Toxicity

Toxicity is a property, just like boiling point or color, used to describe a chemical. Toxicity is the capacity of a chemical to cause illness or injury. Pesticides are grouped into categories depending on how toxic they are to people. The more toxic pesticides cause injury at smaller doses and are therefore more hazardous to use. Special identifying words, called ***signal words,*** are printed in large letters on every pesticide label.

Signal words give you a relative measure of the toxicity of the pesticide concentrate or mix *in the container.* In other words it tells you how hazardous a pesticide is if it is swallowed, inhaled or absorbed straight out of its container or while mixing.

DANGER means highly poisonous
WARNING means moderately toxic
CAUTION means slightly toxic or relatively nontoxic

However, the toxicity of the ***end-use product*** (for example, the spray applied to a surface after being diluted) may be much less. Two pesticide products with the same signal word may pose different risks to people (such as students and teachers) in the treated area if, say, one is designed to be used full strength and

the other to be mixed with water and diluted to a 1 per-cent solution.

As a general rule in schools, when choosing between similar pesticide products, choose the one whose end-use product (the material that is actually applied) is the least toxic to people.

Volatility

This is the measure of how fast a pesticide vaporizes (turns into a gas) when exposed to the air. The lower the volatility, the less insecticide vapor in the air after treatment. Information about a pesticide's volatility can be found on the MSDS.

Sometimes a pesticide with high volatility is a good choice: when doing space treatments (fogging), for example. In most circumstances, however, it is best to choose a product with low volatility to minimize the level of airborne pesticide residues present after treatment.

Formulation

Also consider how a pesticide is formulated, whether as a wettable powder, dust, emulsifiable concentrate, pressurized aerosol, bait, or other form, when deciding which pesticide to use. For certain uses, the type of formulation is very important to the issue of safety. For example, insecticide dust, while a good choice for application into a wall void, would be a poor choice for application into a drop ceiling, where vibration might cause the dust to drift down on those below.

An IPM technician should choose low toxicity insecticides and formulations, and methods of application that reduce potential exposure, particularly in areas that students may enter. Products should have low volatility, be nonirritating, and specifically labeled for the site of application.

Insecticide Application

Use low-exposure application techniques. Most bait, crack and crevice, and void treatments put insecticides where cockroaches and many other indoor pests spend most of their time, *and where children are least likely to contact the insecticide.* These are also the techniques and sites least likely to generate indoor air residues.

Insecticide Baits

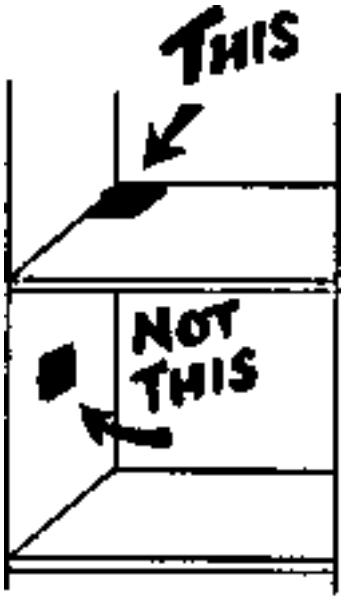
Insecticide baits are among the best choices to reduce potential chemical exposure, since they are normally enclosed inside bait stations or else applied into cracks, crevices, and voids. They also have low volatility, meaning they do not easily vaporize or produce airborne residues.

Insecticide Bait Stations. Insect bait stations are available to control both cockroaches and ants. Their advantages for use inside schools are that the insecticide is enclosed inside a plastic station, the bait remains effective for long periods, and they are very easy to apply. A disadvantage is that they are

often visible, and school children may collect and play with them. When used, they should be hidden inside cabinets, equipment, and other infested sites.

Note: *Baits do not attract cockroaches over long distances. To be effective, baits must be placed where cockroaches live or travel. Since cockroaches prefer to travel along edges,* ***place bait stations along edges and in corners.*** *The more edges a bait station touches, the better it will work. Do not place bait stations in the middle of open areas. They will be ineffective.*

Pastes, Gels, and Other Injectable Baits. There are now a variety of bait formulations for use inside cracks and crevices and in small spots inside hidden areas. Insecticide bait may be packaged inside tubes or syringes that you squeeze to apply, or designed to be applied by various types of bait "guns" or with a small spatula or putty knife. As a rule, baits are odorless, produce no vapors, have low human toxicity, and last for long periods.



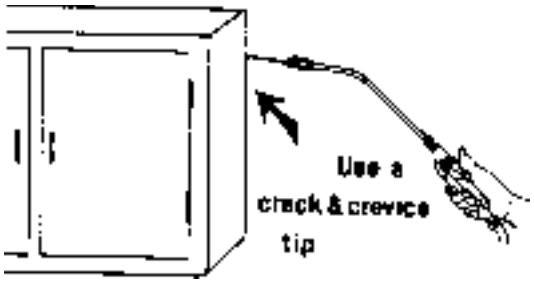
Placing cockroach bait stations

To control German cockroaches, place spots or beads of bait in or near dark, protected harborages or aggregation sites. Concentrate on edges, corners, cracks and crevices, and any place you see "spotting," feces, egg cases, or body parts of cockroaches.

Crack and Crevice Treatment

Crack and crevice treatment is the application of small amounts of chemical directly into cracks and crevices where insects hide or enter. It is particularly effective against German cockroaches, which spend over 90 percent of their day hidden away in dark, quiet cracks, crevices, and voids.

You cannot do a proper crack and crevice treatment with a fan spray or pin stream nozzle on a compressed air sprayer. There is too much splash-back, too little penetration, and too many residues left outside. Instead, use an injector tip to inject the insecticide, whether a liquid, dust, or aerosol, into insect hiding places.



A typical crack and crevice treatment

Void Treatment

Void treatment is the application of insecticide into an empty space inside a wall or ceiling, behind a kickplate, inside a table leg, or in any other void. The application is usually done through an injector tip. Insecticide residues are out of the reach of people, and inside prime harborage sites for cockroaches, ants, and other pests.

There is some risk with void treatments that the insecticide may blow through the void and escape through other holes and "drift" into nontarget areas. Do not overapply or use too high a pressure when treating a void.

Spot Treatment

The application of an insecticide residue to a limited area, not to exceed two-square feet, is called a spot treatment. These areas may occur on floors, walls, and the undersides of equipment. Avoid spot treatments in sites where school children might contact the insecticide.

Other Types of Treatment

There are other types of treatment used to control pests. Some are not suitable for use in schools except in rare instances.

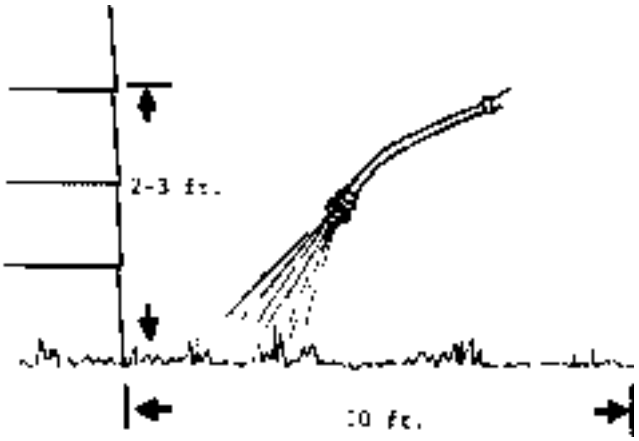
Fogging is applying a fine aerosol mist of insecticide into the air. Avoid fogging, directed space treatments, or extensive "flushing" with pressurized aerosols or "foggers." Apply such treatments only as a last resort for emergency knockdown of a large pest population. Clear the room and surrounding areas beforehand and ventilate the room extensively, preferably overnight, before allowing people to return. Avoid applying insecticide residues to surfaces that might be contacted by children.

If you must "fog" or treat accessible surfaces, you are required by law to reduce the risk of exposure to students and staff by notifying them one week prior to the pesticide application. In addition, w*arn* them where you have treated and what you have treated with, and *inform* them when they may reenter an area or begin using a room. The more specific the warning, the better. Make sure your warnings are at least as tough as those on the pesticide label. Use written warnings (door hangers, notices, instructions, etc.) when possible, particularly when people might enter an area unaware of your treatment.

General treatment is the application of insecticide to broad expanses of surfaces. Examples include the treatment of carpets and furniture for flea control and lawn insecticide applications. Avoid these types of treatments whenever possible. If general treatment is necessary, do it when students won't be present for a few days. The area should be posted to warn people of the treatment.

Perimeter treatment is an application of a barrier of insecticide to prevent the entry of pests. Typically, a liquid insecticide is applied in a coarse spray around the foundation treating soil, mulch, and lower vegetation from the foundation out 6-10 feet and up the foundation wall 2-3 feet. Additional treatment is made around doorways, windows, and other points of pest entry.

Perimeter treatments have the advantage of putting the insecticide outside to prevent pests from coming inside, thus reducing the need for controls in school rooms. But they have the disadvantage of putting a pesticide residue where small school children might contact it during play. Use perimeter treatments with care and only when other control methods prove ineffective.



Exterior perimeter treatment

Rodenticide Application

There are four major formulations of rodenticide used against rodents: food baits, water baits, tracking powders, and fumigants.

Food Baits

Rodenticide baits combine a poison with a food bait attractive to rodents. Baits may be packaged in large bulk tubs, in individual place packs containing less than one ounce of bait, or anything in between. Baits come in pellets, granules, or paraffin blocks. For safety, some baits include chemicals that are extremely bad-tasting to humans, but not to rodents.

Some baits kill rodents after a single feeding, and some require multiple feedings. Some are anticoagulants, meaning they cause rodents to bleed to death, some affect respiration, and some have totally different modes of action. Some are only slightly toxic to people or pets, some are moderately toxic, and some are very toxic.

Always review the label before using a rodenticide, no matter how many times you have used the product before. Labels change and products change and memory fades.

First and foremost, children, pets, wildlife, and domestic animals must be protected from eating the bait. All rodenticides have warnings on the label telling the applicator to place the bait "in locations not accessible to children, pets, wildlife, and domestic animals, or in tamper-resistant bait stations."

Each rodenticide product has different characteristics and you must review the label and supporting information that comes with each product to use it safely.

No one can give you a list of safe, inaccessible areas in and around a school. Whenever you are using a rodenticide bait in or near a school, ask yourself—Is it possible for a child to get at the bait? Do everything possible to prevent that from happening. Place baits deep inside active rodent burrows or inside tamper-resistant bait boxes.

A tamper-resistant bait station is designed so that a child or pet cannot get to the bait inside, but a rodent can. *(Note: A bait tray is NOT a tamper-resistant*

An example of a tamper-resistant bait station

bait station.) Tamper-resistant stations differ in the type and quality of construction, but they are usually metal or heavy plastic with a locking lid. Rat boxes are larger than those used for mice. Most are not considered truly tamper-resistant unless they can be secured to the floor, wall, or ground, and the lid can be locked into place.

Bait stations should be clearly labeled with a precautionary statement. Check them periodically to see if the bait is being taken and if the bait is fresh.

Place bait only where rodents are active as shown by droppings and other signs. Put bait stations outside near burrows and along travel routes. Put place packs or loose bait *inside* burrows. If a site is damp, such as inside sewers and storm drains, use paraffin bait blocks secured so that they cannot be dragged away or washed away.

Water Baits

Water baits are specially formulated rodenticides mixed with water. Various liquid dispensers are available. The best dispensers are custom designed for toxic water baits. Some tamper-resistant bait stations include compartments for water baits. *Do not use standard "chick-founts" or other animal watering devices for liquid baits unless they can be made inaccessible to children, pets, and wildlife.*

Water baits can be extremely effective, particularly against rats. However, water baits are attractive to other animals *and to small children,* and so can be particularly hazardous in a school environment.

Tracking Powders

Rodents groom themselves by licking their fur. Tracking powder makes use of this behavior. This formulation is simply a rodenticide combined with talc or powdery clay. It is applied into inaccessible areas where rats and mice live and travel. The powder sticks to their feet and fur, and is swallowed when the animals groom themselves. The major advantage to tracking powders is that they can kill rodents even when food and water are plentiful, or if rodents have become bait or trap-shy.

Tracking powders are usually applied with hand-operated bulb or bellows dusters. Apply the powder more heavily than you would apply an insecticide dust, but never more than 1/8-inch deep.

The rodenticide active ingredient in tracking powders is generally 5-40 times more concentrated than that in baits. Because of the risk to children, application of tracking powders at schools, when used at all, would be limited mostly to the inside of dry burrows outdoors. *(Note: not all tracking powders are labeled for this use.)*

If you need to use a tracking powder indoors, apply it inside wall voids, around rub marks, along pipe and conduit runs. *Never use tracking powders in suspended ceilings, around air ventilators, or near food or food preparation areas.* The powder can become airborne and drift into nontarget areas.

Fumigants

Several fumigants are available for outdoor burrow fumigation including aluminum phosphide, carbon bisulfide, and carbon dioxide. All fumigants are extremely hazardous. They should only be used by those properly trained, licensed, and certified.

- General Guidelines for Using Pesticides in Schools -

- Pesticide may only be applied when nontoxic options are unreasonable or have been exhausted.
- Don't apply pesticides when school children are occupying a room or area.
- Don't apply pesticides in classrooms, hallways, cafeterias, and other common areas during school hours.
- Don't apply insecticide sprays or dusts in infirmaries, nursing stations, and other medical areas except in severe infestations. If such treatment is necessary, notify medical personnel in advance.
- Choose pesticide products that pose the least risk to people, particularly to children.
- Choose an insecticide application from those listed below rather than space treatments (fogging) or general treatment of floors, walls, or furniture.
    - insecticide bait stations
    - insecticide paste, gel, or granule baits applied in cracks and crevices
    - insect growth regulators
    - application of insecticides into cracks, crevices and voids
- Place rodenticides where children cannot get to them, or put rodenticides in tamper-resistant bait stations. Where possible, hide bait stations from view.
- Follow notification and posting guidelines required by State law and regulation.

Chapter Six:
Keeping Records and Evaluating Results

The ongoing IPM cycle of monitoring, control, and evaluation demands good communication between all parties, and detailed records to track pest trends and problems. It also requires a way to periodically evaluate whether the IPM program is succeeding, or whether changes are required.

Communication

For IPM to work, there has to be two-way communication between those conducting the IPM program and those at the school. Much of this communication involves the IPM technician directly. The communication takes many forms:

- Talking with staff members about pest sightings, discussing ways to reduce pests by improving housekeeping or making repairs, and soliciting staff cooperation.
- Explaining to staff, students, and sometimes even to parents how IPM differs from regular pest control service, and answering questions about the IPM program.
- Reporting pest sightings and control actions in a logbook and reading entries made by staff.
- Providing written reports and recommendations.
- Notify parents, guardians and staff before pesticides are used

Recordkeeping Requirements

Good IPM requires good records to help you solve pest problems, give you a historical perspective of pests, and let you anticipate seasonal pest problems. The information that must be recorded includes pest reports, control actions, housekeeping problems, structural deficiencies, and other problems contributing to pests. In schools, records must identify sensitive areas where pesticides (and certain other control methods) must be used carefully or not at all.

IPM programs may use various types of reports or records. A few of the most common are described below, and examples are provided in the appendix.

Logbook

A logbook is the centerpiece of IPM operations and recordkeeping: the key to the program. It is a permanent record book, usually a loose-leaf book, which is available to school staff at all times. (In large schools there may be different logbooks for different areas, but in most schools there will be but one.) The logbook contains everything about the

program, all pest sightings, actions taken, recommendations made, and reports written. A typical logbook might be arranged in tabbed sections as follows:

General information. Includes a general description of the IPM program (its tactics and goals), IPM concepts, directions on how to use the logbook, contacts and technical personnel, and a service schedule. The general information section allows interested staff to learn what is to be expected from the program.

Floor plans/maps. A set of plans that would show sensitive sites and locations of pest control devices and monitoring tools (see discussion below).

Pest activity log. Notes in this section would be made by the IPM technician or any staff member that sees a pest or evidence of pests. Entries would include information such as identification of pest sighted (if known) or description, number of pests seen or trapped, specific locations, date and time, A sample *Pest Activity Log* sheet is provided in the appendix.

Monitoring data. Some IPM programs record catches in monitoring traps. This section would contain data sheets listing trap number/location, date, pest ID, number trapped, etc.

IPM service reports. In this section would be filed any reports noting sanitation or structural deficiencies, and any pesticides applied or other control actions taken (see discussion below and the sample report in the appendix).

Pesticide information. The logbook should include pesticide labels and material safety data sheets (MSDS) for any pesticide used, unless these are kept in a separate book or location.

Miscellaneous information. This section could include educational information on pests and pest management, correspondence, special reports (such as summary reports, see below), or other information about the IPM program.

Review the records in the logbook occasionally to identify pest trends, problems areas, etc.

Floor Plan of School

Sometimes a floor plan can be obtained from the school; sometimes you need to draw your own. All rooms should be labeled (classroom, science lab, bathroom, cafeteria, etc.) and room numbers noted. Hours of use should be noted, if known. The plan should show sensitive areas, the location of traps, bait stations, and other monitoring and control equipment, and pest hotspots or areas that experience regular sanitation problems. Here is a checklist of things to show on the floor plan:

- all buildings and structures
- cafeteria
- other eating areas, snack areas
- home economics kitchen
- teacher's lounges
- vending machines
- food storage
- animal areas/cages
- science labs
- rest rooms
- gym lockers/showers
- computer rooms
- drop ceilings

- crawl spaces
- attics and false ceilings
- heating/AC lines, ducts
- floor drains
- pipes through walls
- voids over walk-in coolers
- refrigeration line tunnels in slabs
- steam tunnels
- garbage collection areas
- recycling collection areas
- standing water, leaks, condensation points, etc.
- location of sticky traps, pheromone traps, and other pest monitoring equipment.

And outdoors:

- dense brush and weeds
- heavy ground cover

- previous rodent nesting and burrowing sites
- compost piles
- trash collection areas
- playground trash cans
- construction supplies/lumber

IPM Service Report

This report is similar to a "service record" or "service ticket" in regular pest control but includes more information. The *IPM Service Report* is a record of what was checked, what was found, and what was done by the IPM technician on that service date. If any pesticides were applied, this form would include a description of the product, the treatment, the site, the application rate, and the amount applied. It also includes a section to report poor sanitation and housekeeping, structural deficiencies, or school activities that might cause pest problems (although sometimes IPM programs have separate sanitation or deficiency reports). A sample *IPM Service Report* is provided in the appendix.

Summary Report

Sometimes called a "status report" or a "quality assurance report," this is often a quarterly report, usually prepared by a supervisor, which evaluates the IPM program's recent performance (see discussion below).

Evaluating Success or Failure

IPM programs incorporate a regular and periodic review of inspection reports, sanitation reports, the logbook, and other records to (1) see how the program is working, and (2) identify any changes that are necessary. The review may be conducted by a technician or, more often, by a supervisor. Sometimes, this review process is called "quality assurance" or "quality control." Whatever it is called, the review answers these kinds of questions:

- Are all pest populations below action thresholds?
- Have all objectives been achieved?
- Is the monitoring program adequate?
- Should other actions be tried?
- Can time and effort be reduced?
- What problems have been identified?
- What changes are necessary?
- Who should you contact to carry out these changes?

Typically, an IPM program is evaluated every three months, although some programs may be evaluated every six months or even once per year. A summary report is prepared, usually by a supervisor or even a third party, and submitted to the school. It notes the current conditions, discusses the progress made against particular pests or conditions, identifies problems, and sometimes offers recommendations for change.

Chapter Seven: Summary and Conclusions

Pest control is changing with the times. What was common and accepted practice a decade ago is no longer seen as acceptable to many people. A new approach to pest control has evolved. It is called integrated pest management or IPM. It reduces the risks from pesticides and improves the quality of pest control. A concerned public is asking, and sometimes demanding, that it be used instead of traditional pest control service, particularly in sensitive sites such as schools.

Integrated pest management, or IPM, is a system of controlling pests that does not depend on automatic application of pesticides. Instead, pests are monitored by regular and careful inspections. The inspections also identify conditions contributing to pest problems. The IPM technician then decides what actions are necessary, if any, based on the biology and habits of the pests involved. Priority is given to nonchemical pest management techniques, particularly those that can prevent a recurrence of the problem. Pesticides are used when nontoxic options are unreasonable or have been exhausted, and are used in a way that minimizes potential exposure to people and the environment. Records are kept to track problems, prevent recurrences, and evaluate the results of pest management actions.

An IPM program consists of a cycle of monitoring, control, and evaluation. The monitoring component of an IPM program is essential to its success. *Monitoring is a documented, systematic inspection conducted at regular intervals.* It keeps you informed

about all aspects of the pest situation and conditions at the site.

In many situations there may be a specific level of pests (or damage) that can be reached before action is taken. One house fly in a classroom would not normally trigger control. On the other hand, a cockroach in a cafeteria would require a very careful inspection to find out if other cockroaches were present, and probably some kind of control action. *An action threshold is the point at which action must be taken.* Action thresholds vary with the site and the pest.

A component of IPM is education of staff, students, and interested parents about potential pest problems, their causes, and the IPM solutions. Simply having informed individuals who will spot and report pest problems can go a long way toward managing pests in a school.

Building maintenance and grounds personnel should understand pestproofing and other steps they can take to keep pests from entering buildings. Housekeeping staff can learn to find and give special attention to areas with sanitation problems. Food service workers should understand the connection between inadequate sanitation and pests. Students can even help by regularly cleaning leftover food out of their lockers and picking up trash paper.

When a pest problem requires action, look first to those methods not requiring the use of pesticides. Pest control practices such as trapping, caulking, power washing, and vacuuming are control measures that can be used with a high degree of safety. You must first employ methods that work over the long term, or that prevent pests in the first place; methods such as pest-proofing (exclusion) or operational changes that improve sanitation. Often, nonchemical measures are combined for the most effective results, and sometimes used together with limited pesticide application. However, as required by law, pesticide application must only occur after nontoxic ooptions alone are unreasonable or have been exhausted.

Pesticides may be used in school IPM programs. However, they should not be applied automatically or on a schedule, but only when nontoxic options are ureasonable or have been exhausted. What is most important, use them in ways that minimize risk to people, particularly to children.

There are many factors to consider when choosing a pesticide for use in a school. You want it to be effective, of course. But in a school setting, particularly in rooms used by students, you want to be sure to choose pesticides that pose the least hazard to people. Some schools may limit your choices to a predetermined list of permitted pesticides.

Use low-exposure application techniques. Most bait, crack and crevice, and void treatments put insecticides where cockroaches and many other indoor pests spend most of their time, *and where children are least likely to contact the insecticide.* These are also the techniques and sites least likely to generate indoor air residues.

Good IPM requires good records to help you solve pest problems, give you a historical perspective of pests, and let you anticipate seasonal pest problems. The information that must be recorded includes pest reports, control actions, housekeeping problems, structural deficiencies, and other problems contributing to pests. In schools, records must identify sensitive areas where pesticides (and certain other control methods) must be used carefully or not at all.

IPM programs use various types of reports or records including logbooks, service reports, sanitation reports, monitoring data records, pesticide records, and floor plans.

IPM programs incorporate a regular and periodic review of these records. Typically, an IPM program is evaluated every three months, although some programs may be evaluated every six months or even once per year. A summary report is prepared, usually by a supervisor or even a third party, and submitted to the school. It notes the current conditions, discusses

the progress made against particular pests or conditions, identifies problems, and sometimes offers recommendations for change.

IPM has proven to be the best alternative to traditional pesticide-based services. It provides effective, long-term control of landscape and structural pests, while protecting the health, environment, and quality of life of our children. The *Governor's Pesticide Council* of the State of Maryland recommends using integrated pest management (IPM) to reduce the risk that school children will be exposed to pesticides.

action threshold the point in a pest management pro-

Appendix A: Glossary

gram at which some action must be taken.

active ingredient the chemical or chemicals in a pesticide responsible for killing, poisoning, or repelling the pest. Listed separately in the ingredient statement on the label.

aerosol a material that is stored in a container under pressure. Fine droplets are produced when the material dissolved in a liquid carrier is released into the air from the pressurized container.

borescope a hand-held, fiber optic inspection tool that allows the technician to see inside walls, behind paneling, and into other areas not normally accessible.

crack and crevice a pesticide application method in which small quantities of pesticide are placed into cracks, crevices, and other small openings where cockroaches and other pests hide.

deposit the amount of pesticide on the treated surface after application.

emulsifiable concentrate a pesticide formulation with a large amount of non-water soluble active ingredient dissolved in a liquid solution. An emulsifier is added so that the pesticide can be diluted, usually with water, to form an emulsion.

end-use product the final form in which a pesticide is applied; the ready-to-use product that results after the pesticide concentrate is mixed with water, oil, or other diluent.

flushing the use of an aerosol pesticide to drive a pest out of its hiding area.

frass the combined feces, shed skins, and particles of food left by an insect pest; or the combined feces and wood fragments left by a wood-boring insect.

hand lens a small, portable magnifying lens used by entomologists in the field.

harborage shelter or refuge; the hiding places or protected areas, such as cracks and crevices, that cockroaches or other pests inhabit.

insect growth regulator IGR; a chemical that controls insects by interfering with insect hormones, usually affecting the insect's ability to develop from pupa to adult, or to reproduce.

integrated pest management IPM; a planned pest control program in which a combination of compatible methods are used to control a pest. IPM requires monitoring and nonchemical methods of pest control such as sanitation, pestproofing, and trapping. Under IPM, pesticides are only to be used, when nontoxic options are unreasonable or have been exhausted, in order to keep exposure to minimum.

logbook a permanent record book, usually a loose-leaf, that is the centerpiece of IPM operations. The logbook contains general information, notes on pest activity, monitoring data, IPM service reports, pesticide labels, MSDSs, and other information about the IPM program.

material safety data sheet (MSDS) an informational form, required by the Occupational Safety and Health Administration, and provided by the manufacturer or distributor of a hazardous material. The MSDS provides detailed technical and safety information on use of and exposure to the chemical product.

moisture meter a device, usually hand-held, that

measures electrical resistance and gives a reading of the level of moisture between two needles inserted along the grain of wood or in plaster.

monitoring a systematic pest inspection that is conducted at regular intervals to determine the numbers of a pest, the amount of damage caused by a pest, the effectiveness of treatment methods, and to evaluate other factors related to an IPM program.

nonchemical controls pest control measures that do not use pesticides or other chemicals, but employ instead sanitation, pestproofing, trapping, structural alterations, and other nontoxic methods.

nontarget species any plant, animal or other organism that a pesticide application is not aimed at, but that may accidentally be injured by the chemical; not the target pest.

pestproofing a nonchemical, physical control measure to prevent the entry or movement of pests into or out of a structure or area. Includes sealing and caulking of crevices and holes, installation of screens, etc.

pheromone a natural attractant produced by animals, including insects, to draw others of the same species, usually for mating. Synthetic laboratory-produced pheromones are used in traps and lures as control or monitoring devices for certain insect pests.

pin and wire a method for preventing birds from roosting on ledges, etc. that consists of spring-tensioned stainless steel wire supported by metal posts. Birds cannot perch on the wires or roost beneath them.

porcupine wire a metal strip containing a series of sharp, metal prongs used to prevent the roosting of pest birds on structures.

quality control in IPM, inspection and review of a program to evaluate success and identify shortcomings. Also called quality assurance.

residual pesticide a pesticide that continues to remain effective on a treated surface or area for an extended period following application.

runway a path; a familiar route that rats and mice use to move to and from their burrows or nests. A runway is often worn smooth or noticeably marked with dark smears (rubmarks) from the rodent's hair. Runways usually follow along the base of a wall, building foundation, or fence.

sanitation the use of measures to promote cleanliness and healthy surroundings. In pest control, steps taken to remove the source of a pest's food or harborage sites.

secondary pest a pest, other than the main pest, which normally causes little damage or concern, but which may become a primary pest if conditions change.

sensitive site a place such as a school or hospital where pesticides could cause great harm if not used with special caution.

signal word a word, either ***Caution***, ***Warning***, or ***Danger***, that must appear on a pesticide label to show how toxic the pesticide is.

space spray a pesticide which is applied as a fine spray or mist to a confined area to kill flying or crawling insects.

spot treatment a pesticide application to a restricted area not to exceed two square feet.

tamper-resistant bait station a holder for toxic bait used in rodent control that will provide the least amount

of risk to children, pets, and other animals. As defined by EPA, the bait station must be durable, lockable, have warning labels, and must be anchored to keep it in place.

tracking patch a light dusting of nontoxic material like clay or talc that is dusted over a rodent's travel routes and later checked for footprints or evidence of rodent activity.

ultraviolet light light that is just beyond the violet in the visible spectrum; also called blacklight. Certain insects are attracted to ultraviolet light which is used in commercial insect traps.

void treatment a pesticide application method in which a spray or dust is injected or blown into the empty space inside walls, in false ceilings, or inside other enclosed spaces.

volatility the ability of a pesticide to vaporize (turn into a gas) when exposed to air.

wettable powder a dry pesticide formulation in powder form that forms a suspension when added to water.

Appendix B: Sample Reports and Forms

This appendix contains various sample reports and forms that can be used as is or modified for an IPM program in a school.

1. Pest Activity Log [1]

2. IPM Service Report [1]

3. NPCA Facility Survey Checklist [2]

4. NPCA Survey Summary Sheet [2]

5. NPCA Sanitation and Pest Control Inspection Report [2]

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2/ Reprinted with permission from the National Pest Control Association

Pest Activity Log

REPORT OF PEST SIGHTING				CORRECTIVE ACTION	
Date	Location	Pest description/number	Name/phone	Technician	Date

IPM Service Report

Service Address		Room/Site
IPM Technician	Date/Time	Map Code

PESTS OBSERVED: ☐ Cockroaches ☐ Rats ☐ Mice ☐ Stored product pests
☐ Flies ☐ Ants ☐ Other _____

SANITATION PROBLEMS:

STRUCTURAL DEFICIENCIES:

OTHER PROBLEMS:

RECOMMENDATIONS:

Actions Taken

NONCHEMICAL CONTROL ACTIONS

PESTICIDES APPLIED

General Facility Survey

NPCA Management Guidelines Series
National Pest Control Association

Survey Checklist	**General Facility Information**	
Name and Address of Facility	Principal Contacts	Date
		Type of UNIT

Facility Information

1. Products Handled _____ Types of Packaging _____
2. Transportation In and Out of Facility _____
3. Facility size _____ sq.ft. Is floor plan or map available? _____

Sanitation Program

1. Is there a written sanitation plan? _____ Is it available for review? _____
2. Is regulatory inspection history good? _____ Date of last inspection _____

   Results of last inspection _____

Current Pest Control Program

1. Sanitation Inspection ____ In-House ___ Contractor:_____ Amount_____
2. Rodent Control ____In-House ___ Contractor:_____ Amount_____
3. Insect Control ____In-House ___ Contractor:_____ Amount_____
4. Bird Control ____In-House ___ Contractor:_____ Amount_____
5. Rodent Bait Stations: Exterior Locations:_____

   Interior Locations:_____
6. Traps: _____ Multiple; _____ Expanded Trigger; _____ Regular; _____ Glue Boards
7. Insecticides Used: _____
8. Rodenticides Used: _____

Purchasing Program

How is purchasing handled at facility? (Describe process, personnel involved, etc.)

GENERAL FACILITY SURVEY CHECKLIST

Exterior Areas

1. Is area around facility clear of weeds, grass, and brush?	Yes	No
2. Is the fence line also clear?	Yes	No
3. Is there a 20- to 50-foot-wide bare strip adjacent to perimeter?	Yes	No
4. Is there a 2-foot pea gravel strip to prevent rodent burrowing?	Yes	No
5. Is there standing water on the grounds that may attract pests?	No	Yes
6. Are outside garbage containers at least 50 feet from doors?	Yes	No
7. Are garbage containers placed on concrete slabs and drained into sanitary sewers?	Yes	No
8. Is frequency of garbage removal adequate?	Yes	No
9. Do garbage containers have tight-fitting lids?	Yes	No
10. Are walls reasonably clean and free of dust, moss, etc.?	Yes	No
11. Do doors close tightly?	Yes	No
12. Are all exit doors rodent-proof?	Yes	No
13. Are door seals intact?	Yes	No
14. Are air curtains used?	Yes	No
15. Do air curtains appear effective?	Yes	No
16. Do windows or skylights have broken panes?	No	Yes
17. Do open windows and vents have fine mesh screens to keep insects out?	Yes	No
18. Have all holes and cracks been filled to discourage hiding places or entry points for pests?	Yes	No
19. Are birds roosting or nesting in any exterior areas?	No	Yes
20. Are there signs of rodent harborage or burrows?	No	Yes
21. Is there spillage or trash that may attract pests?	No	Yes
22. Have discarded equipment and materials been placed next to building?	No	Yes
23. Are pallets stacked away from building?	Yes	No

24. Are pallets off the ground?	Yes	No
25. Are materials and equipment stored on elevated racks at least 12 inches off the ground?	Yes	No
26. Are there lights on or near the building that may attract night-flying insects?	No	Yes
27. Is paving in good repair?	Yes	No
28. Are there rodent barriers on railroad siding doors?	Yes	No
29. Are there door gaskets at track entry to structure?	Yes	No
30. Are plumbing and electrical service entrances sealed?	Yes	No
31. Are there potential out-building pest hazards?	No	Yes
32. Are exterior perimeter bait stations and traps in place?	Yes	No
33. Are exterior openings all protected/sealed?	Yes	No

Receiving Area

34. Are chemicals and foods received in the same area?	No	Yes
35. Are the carrier vehicles clean and in good repair?	Yes	No
36. Is there an incoming inspection procedure for all receivables?	Yes	No
37. Are dock levelers clean underneath?	Yes	No
38. Are dock doors closed when not in use?	Yes	No
39. Are materials stacked against walls in this area?	No	Yes
40. Are materials coded as they arrive?	Yes	No
41. Are supplies uncased in the receiving area?	Yes	No

42. Are empty cartons and cases taken to the trash disposal area immediately?	Yes	No
43. Are received goods placed on sanitary shelves or mobile storage carts for distribution throughout the facility?	Yes	No

Interior Areas

44. Are there holes or cracks in walls?	No	Yes
45. Are walls and windows free of dust, cobwebs, etc.?	Yes	No
46. Are drains clean?	Yes	No
47. Are elevator pits clean and dry?	Yes	No
48. Is there standing water in the facility?	No	Yes
49. Are ultraviolet attractors/electrocuters in use?	Yes	No
50. Is product kept away from walls?	Yes	No
51. Are bait stations present?	Yes	No
52. Is there evidence of insects, rodents, or birds?	No	Yes
53. Are floor surfaces smooth and free of cracks and holes?	Yes	No
54. Are floors cleaned regularly?	Yes	No
55. Is there accumulated debris along wall/floor junctures?	No	Yes
56. Is there accumulated debris on top of product, equipment, etc.?	No	Yes
57. Is there evidence of rodent activity along walls and equipment?	No	Yes
58. Is there evidence of rodent-chewed bags or nesting sites?	No	Yes

59. Is there evidence of bird activity (feathers, droppings, nesting, etc.)?	No	Yes
60. Is there evidence of birds of protected species?	No	Yes
61. Is a fly program in evidence?	Yes	No
62. Are there flying insects in the building?	No	Yes
63. Is there evidence of insect larvae?	No	Yes

Product Storage Areas

64. Is there an incoming inspection procedure for all receivables?	Yes	No
65. Is the storage area too crowded?	No	Yes
66. Are all products stored on pallets?	Yes	No
67. Are pallets at least 18 inches away from the walls?	Yes	No
68. Is there a painted line on the floor along walls to indicate inspection aisles?	Yes	No
69. Is product stacked in aisleways?	No	Yes
70. Is there evidence of a broken or exposed product in stacks?	No	Yes
71. Are there any unusual odors near food products?	No	Yes
72. Are chemicals stored with or over food items?	No	Yes
73. Is there evidence of employee smoking or eating in this area?	No	Yes

74. Are there signs of insects or rodents near supporting posts of shelving or on overhead beams?	No	Yes
75. Is there accumulated product near shelving posts?	No	Yes
76. Are there any holes or cracks that would permit rodent entry?	No	Yes
77. Is there spillage?	No	Yes
78. If resacking/repackaging is done in the facility area, does it conform to good manufacturing practices?	Yes	No
79. Is any product exposed to overhead contamination?	No	Yes
80. Are floor drains operational?	Yes	No
81. Are rodent control devices/glueboards present, clean, dated, and mapped?	Yes	No
82. Are all containers identified?	Yes	No
83. In refrigeration/freezer storage rooms, are floors and walls clean?	Yes	No
84. Are shelves and ledges clean?	Yes	No
85. Are doors self-closing?	Yes	No
86. Are there any holes in the walls permitting rodent harborage?	No	Yes
87. Are pallets or containers identified by date of delivery?	Yes	No
88. Are products that are received first also the first to be used or shipped? (FI-FO; "First-in, first-out")?	Yes	No

Morgue or Returned Merchandise Area

89. Are all products spoiled by damage, insects, rodents, or other causes stored in a designated "Quarantine Area" (Morgue)?	Yes	No
90. Are there procedures for disposing of these products?	Yes	No
91. Are quarantined items disposed of quickly to prevent pest breeding places?	Yes	No

92. Is contaminated or infested merchandise promptly removed from area and facility?	Yes	No
93. Are food and nonfood items separated by an aisleway?	Yes	No
94. Are rodent control devices/glueboards present in this area?	Yes	No

Shipping Areas

95. Are carrier vehicle floors and walls in good condition?	Yes	No
96. Is there residue from nonfood items previously shipped in the carrier?	No	Yes
97. Have all paper liners and waste been removed from carrier?	Yes	No
98. Are there objectionable odors?	No	Yes
99. Are carrier vehicles inspected before use?	Yes	No
100. Are there procedures for rejecting carriers?	Yes	No

Lunch Room and Locker Room Areas		
101. Is there a designated eating area?	Yes	No
102. Is the area clean?	Yes	No
103. Are locker rooms clean and free of debris?	Yes	No
104. Are tops of lockers free of all materials?	Yes	No
105. Are doors to areas self-closing?	Yes	No
106. Are any food products or equipment stored in the restroom areas?	No	Yes

Office Area		
107. Is overall sanitation good?	Yes	No
108. Are there any obvious pest breeding areas?	No	Yes
109. Are doors self-closing?	Yes	No
110. Is area clean and free of spilled food?	Yes	No
111. Are ceilings drop ceilings?	No	Yes

General Sanitation Throughout the Facility		
112. Is there evidence of poor sanitary practices by employees?	No	Yes
113. Is the overall appearance of the facility orderly?	Yes	No

Note to the Inspector. For ease of evaluation, this checklist has been designed so that responses listed in the righthand column indicate potential problems. This format will allow you to scan the checklist and focus on areas needing attention.

Survey Summary Sheet

Customer _____ Date _____

AREA OF THE FACILITY	INITIAL SERVICE			SPECIAL SERVICE			REGULAR SERVICE			MATERIALS and EQUIPMENT
	Minutes		# Serv.	Minutes		# Serv.	Minutes		# Serv.	
	Reg.	OT*		Reg.	OT*		Reg.	OT*		
TOTAL										

* Depending upon company policy, hours scheduled outside normal working hours may be considered overtime. In this event, your estimate should include whatever scheduled overtime will be necessary.

SANITATION AND PEST CONTROL INSPECTION REPORT

Inspector: _____

	YES	NO	N/A
Exterior Areas			
1. Evidence of pest activity	___	___	___
2. Pest harborage	___	___	___
3. Adequate garbage handling	___	___	___
4. Proper garbage container design	___	___	___
5. Adequate pickup frequency	___	___	___
6. Trash disposal: proper storage of waste paper	___	___	___
7. Pavement free of cracks, good drainage	___	___	___
8. Adequate weed control	___	___	___
9. Adequate perimeter rodent control including tamper-resistant bait stations	___	___	___
10. Adequate perimeter insect control including proper lighting	___	___	___
Other comments:			
_____	___	___	___
_____	___	___	___
_____	___	___	___
Building Exterior			
1. Adequate rodent-proofing	___	___	___
2. Adequate insect-proofing	___	___	___
3. Bird exclusion measures	___	___	___
4. Sufficient cleanability	___	___	___
5. Elevator and dumb waiter pits: clean, good drainage	___	___	___
6. Floor drains: clean and open; traps filled	___	___	___
7. Plumbing: no leaks or clogged drains	___	___	___
8. Ventilation: screens and vents clean	___	___	___
9. Condensation: proper drainage; clean drip trays	___	___	___
10. Proper lighting: sodium vapor lamps or shielded incandescent bulbs at building entrances and loading docks provide safe visability and facilitates cleaning	___	___	___
Other comments:			
_____	___	___	___
_____	___	___	___
_____	___	___	___

	YES	NO	N/A
FOOD PREPARATION AREAS			
1. Enclosed areas accessible and clean	___	___	___
2. Voids under and behind equipment clean	___	___	___
3. Clean counter surfaces	___	___	___
4. Proper bulk food storage	___	___	___
5. Adequate flying insect traps: lamps replaced annually in spring	___	___	___
Other comments:			
_____	___	___	___
_____	___	___	___
_____	___	___	___
DISHWASHING AREA			
1. All dishes, drains and screens cleaned nightly	___	___	___
2. Drums and pails on dollies or shelves	___	___	___
3. Mops and squeegies off the floor	___	___	___
Other comments:			
_____	___	___	___
_____	___	___	___
_____	___	___	___
GARBAGE AND TRASH AREAS (INDOOR)			
1. Adequate storage area	___	___	___
2. Cleaned frequently	___	___	___
3. Containers of proper design	___	___	___
4. Containers properly covered	___	___	___
5. Grease drums on dollies	___	___	___
Other comments:			
_____	___	___	___
_____	___	___	___
_____	___	___	___
REST ROOM AND LOCKER ROOMS			
1. Adequate for number of employees	___	___	___
2. Sanitary and in good repair	___	___	___
3. Doors self-closing, do not open into food area	___	___	___
4. Adequate ventilation	___	___	___
5. Lockers regularly inspected and cleaned	___	___	___
6. Laundry receptacles available	___	___	___
Handwashing Facilities			
7. Soap and towels available	___	___	___
8. Adequate trash receptacles	___	___	___
Other comments:			
_____	___	___	___
_____	___	___	___
_____	___	___	___

	YES	NO	N/A
EMPLOYEE LUNCH ROOMS AND PUBLIC DINING			
1. Tables, seats and under booths clean	___	___	___
2. Trash containers clean	___	___	___
Other comments:			
_____	___	___	___
_____	___	___	___
_____	___	___	___
VENDING MACHINES			
1. Spillage or food debris	___	___	___
2. Pest activity present	___	___	___
3. Excess goods under and behind equipment	___	___	___
Other comments:			
_____	___	___	___
_____	___	___	___
_____	___	___	___
OFFICE AREAS			
1. Trash can liners; no debris or spillage under liners	___	___	___
2. Regular trash removal	___	___	___
Other comments:			
_____	___	___	___
_____	___	___	___
_____	___	___	___
PUBLIC AREAS (LOUNGES AND RECEPTION AREAS)			
1. Floors clean	___	___	___
2. Equipment and counters clean	___	___	___
3. Pest harborage or evidence	___	___	___
Other comments:			
_____	___	___	___
_____	___	___	___
_____	___	___	___

EVIDENCE OF PEST ACTIVITY: (LIST AREAS)

_____

_____

_____

REVIEWED BY: _____ **DATE:** _____

CLIENT NAME: _____

SUMMARY: _____

_____

_____

USING THE CHECKLIST REPORT FORM

Subjects covered in the checklist are arranged close to the same order as the text. Columns on the side of the sheet permit the inspector to indicate areas that have deficiencies or need attention.

This checklist will serve:

- As a guide to indicate deficiencies. Each deficiency must be described in detail on the checklist-report form or on additional sheets. Ordinarily, the completed checklist should be reviewed with, and signed by, the person in charge of the establishment. These reviews and signed acknowledgements will help avoid subsequent disagreements.

- As an outline for a more detailed written report of a sanitation inspection. In this case, the text of this manual will be a useful guide in wording appropriate comments and describing deficiencies.

Copies of the completed checklists or reports will be of value to:

- The serviceman's supervisor and the company.

- The manager of the establishment being inspected.

- The remote management of firms with branch operations.

- The management of firms storing commodities at the establishment being inspected.

In addition, a series of reports on the same establishment will record the history of efforts at, or deficiencies in, sanitation.

The "Sanitation Inspection Guidelines for the Pest Control Operator" helps provide a basic program of sanitation and pest control mutually acceptable to the client and pest control operator. Entries indicating deficiencies may be used as the basis to explore further the client's needs for sanitation inspections and/or service.

Because of the diversity of accounts requiring sanitation reports, the following forms are offered as guidelines only and should be modified to address your specific needs.

INSPECTION COVER LETTER

NOTE: The following is a suggested format for use in a letter of transmittal or as a cover sheet for the inspection report.

The SANITATION AND PEST CONTROL INSPECTION REPORT is designed to help our valued customers comply with public health, FDA, USDA and other regulatory agencies by fostering a better understanding of our respective responsibilities in maintaining a pest-free, clean and orderly environment. Factors which directly affect effective pest control include good housekeeping, proper storage practices, prompt refuse disposal, good maintenance, and pest exclusion measures.

Simply stated, your professional pest control operator has an obligation to provide effective service of the highest caliber at an equitable fee commensurate with the scope of the services performed. Likewise, the customer must assume the responsibility for those sanitation deficiencies which hamper or nullify the services performed by the pest control operator.

Therefore, the SANITATION AND PEST CONTROL INSPECTION REPORT is submitted to accomplish the following objectives:

1. To report the extent and location of any pest problems encountered at the time of the inspection.

2. To specify actual or potential avenues of pest entry.

3. To report structural or environmental deficiencies serving as actual or potential breeding sites for insects, rodents or other pests.

4. To note improper storage practices which invites pest harborage and prevents good housekeeping.

5. To report poor housekeeping practices which attract and perpetuate pests and vermin.

6. To report deficiencies in plumbing, ventilation, lighting, cleaning and sanitary facilities.

The relationship of sanitation to the successful eradication and control of pests cannot be overemphasized. Sanitation spells the difference between success or failure of your pest control program, between mere reduction of pest activity and effective control.

Appendix C:
References, Resources, and Contacts

IPM programs require more knowledge, resources and talents than does traditional pest control service. For more information or assistance consult the references, resources, and contacts listed below.

Books and Manuals

Applying Pesticides Correctly: A Guide for Private and Commercial Applicators. EPA and USDA Extension Service. Revised 1991.

Common Sense Pest Control. W. Olkowski, S. Daar, and H. Olkowski. The Taunton Press, Newtown, CT. 1991.

Core Manual: Maryland Pesticide Applicator Training Series. Cooperative Extension Service, Univ. of Md. 1986-87, revised 1990-91.

Handbook of Pest Control. A. Mallis. Franzak and Foster Company. Cleveland, OH. 1990.

NPCA Field Guide to Structural Pests. E. H. Smith and R. C. Whitman. National Pest Control Association, Dunn Loring, VA. 1992.

Pest Control in the School Environment: Adopting Integrated Pest Management. EPA, Office of Pesticide Programs (EPA 735-F-93-012). 1993.

Prevention and Control of Wildlife Damage. S. Hygnstrom, R. Timm, and G. Larson. University of Nebraska Cooperative Extension. 1994.

Technician's Handbook to the Identification and Control of Insect Pests. C. Christensen. Franzak and Foster Company. Cleveland, OH. 1983.

Urban Integrated Pest Management: A Guide for Commercial Applicators. EPA, Pesticides and Toxic Substances (EPA 735-B-92-001). 1992.

Using Pesticides Safely - a six-part video series for training registered employees. Cooperative Extension Service, Univ. of Md. 1991. six videos.

Periodicals

Common Sense Pest Control Quarterly. BIRC, PO Box 7414, Berkeley CA 94707. Published *quarterly.*

Pest Control Magazine. Advanstar Communications. 7500 Old Oak Blvd., Cleveland OH 44130. Published monthly.

PCT Magazine. GIE, Inc. Publishers. 4012 Bridge Ave., Cleveland Ohio 44113. Published monthly.

Service Technician Magazine. GIE, Inc. Publishers. 4012 Bridge Ave., Cleveland Ohio 44113. Published bimonthly.

Techletter. A training newsletter for pest control technicians. Pinto & Associates, Inc., 155 Oak Road, Mechanicsville MD 20659. Published every two weeks.

The IPM Practitioner. BIRC, PO Box 7414, Berkeley CA 94707. Published monthly.

Information Sources

Home and Garden Information Center.
MD Cooperative Extension Service
Phone: 1-800-342-2507.

National Pest Control Association
8100 Oak Street
Dunn Loring, VA 22027
(703) 573-8330

Pesticide Regulation Section
Maryland Department of Agriculture
50 Harry S. Truman Parkway
Annapolis, MD 21401
(410) 841-5710

National Pesticide Information Center (NPIC)
Oregon State University
NPIC provides service and information on pesticide products, the recognition and management of pesticide poisoning, toxicology and symptoms, health and environmental effects, and clean-up and disposal of pesticides. There are two "800" telephone lines.

For the general public: **800-858-7378**

For scientists and professionals: **800-858-7377**