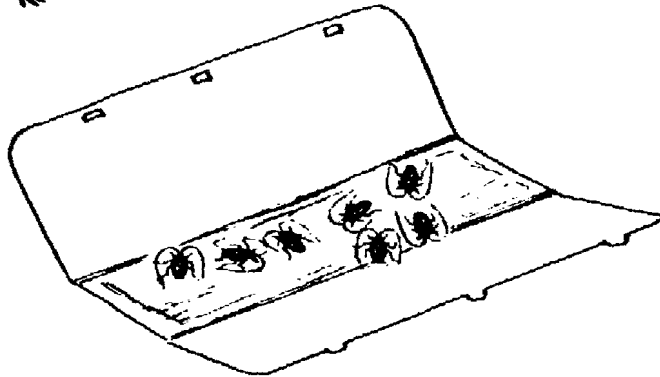


"Action Thresholds in School IPM Programs"

Supplemental Materials
for
Integrated Pest Management - IPM Training Manual



MARYLAND
DEPARTMENT OF AGRICULTURE
Pesticide Regulation Section

"Action Thresholds in School IPM Programs"

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for
Integrated Pest Management - IPM Training Manual

Maryland Department of Agriculture
Pesticide Regulation Section
50 Harry S. Truman Parkway
Annapolis, Maryland 21401
Telephone: (410)841-5710 FAX: (410)841-2765
Internet: <http://www.mda.state.md.us>

Prepared by
Lawrence J. Pinto & Sandra K. Kraft
Pinto & Associates, Inc.

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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

FORWARD

The Regulations pertaining to Integrated Pest Management (IPM) in School Buildings and on School Grounds 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 to minimize the risk to human-health and the environment associated with pesticide applications.

Action Thresholds in School IPM Programs

*Maryland Department of Agriculture (MDA) regulations require a school system to have an approved integrated pest management (IPM) plan. The plan must include standards to determine the severity of pest infestation and the need for corrective action. One way to meet this requirement is through action thresholds. This document was developed to help schools develop their own action thresholds. **The specific action thresholds mentioned in the document are offered as examples only.** They are not required by the regulations. Each school using action thresholds should develop thresholds of their own, suited to specific conditions at the school.*

Integrated pest management, or IPM, is a system of controlling pests that does not depend on automatic application of pesticides. A school IPM program consists of a cycle of monitoring, control, and evaluation. Pest levels and other factors are monitored through documented, systematic inspections conducted at regular intervals.



A key difference between IPM and traditional pest control is that IPM often uses "action thresholds." An action threshold is the point at which an IPM technician takes action to reduce a pest's numbers. Sometimes an action threshold is a number: five yellowjackets at a trash can, 10 percent feeding damage to a plant, three flies in a classroom. Sometimes it is qualitative: light or no infestation versus heavy infestation. Below the threshold level, the IPM technician does not apply pesticides or set traps or take any other direct control action. (Although the technician should continue to monitor and do sanitation inspections, pestproofing, and take other steps to prevent pest problems.) But if a pest is at or above the action threshold, the technician acts to control the pest.

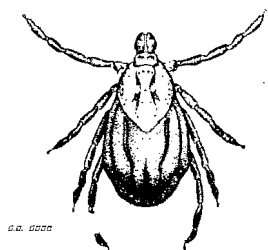
The idea behind the action threshold is that most pests can be tolerated at some low level. An occasional ground beetle in a school hallway, for example, would bother few people. The costs and risks of taking action because of that one beetle--replacing door sweeps, caulking cracks in walls, or applying pesticide--would far outweigh any benefits. Besides, a lone beetle is likely a temporary guest rather than a serious pest. But thirty ground beetles in a hallway would be a different story, and an IPM technician would need to take some kind of pest management action.

Action thresholds are easy to understand. Establishing them is more difficult. Action thresholds vary by pest (hornet versus ant), by site (storage room versus infirmary), and sometimes by geographic location (western Maryland versus southern Maryland), or by season (fourlined plant bugs stop feeding in June, so the action threshold might be much higher in July than May). For some landscape pests, action thresholds will also vary depending on whether natural enemies are present.

Establishing Thresholds

Five factors should be considered in setting action thresholds: economics, health and safety concerns, aesthetic concerns, public opinion, and legal concerns.

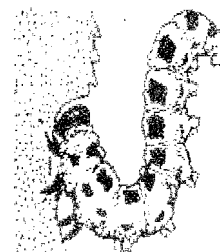
Economics



American dog tick

In high numbers, carpenter bees can seriously damage naturally aged, unfinished wood decking and trim. It can be expensive to protect this wood from carpenter bee attack by treating and sealing it. But it can be far more expensive to have to replace that wood after carpenter bees have damaged it. At some level of carpenter bee activity, the risk of damage justifies action. The action threshold might, for example, be set at an average of one carpenter bee per

five linear feet. Then, if eight or more carpenter bees were seen along a forty-foot stretch of building (which equals one bee per five linear feet), the IPM technician would schedule the unfinished wood for treatment or sealing.



Health and Safety Concerns

Action thresholds are set low when health or safety are at stake. The action threshold for ticks by a school athletic field would be set much lower if Lyme disease was common in the area. (Blacklegged ticks transmit Lyme disease.) Bee or wasp action thresholds indoors might be set as low as one (take action if you see a single bee or wasp), if a school child is known to have a severe allergy to stings. The threshold for poisonous black widow spiders would be much lower than for garden spiders.

Aesthetic Concerns

Aesthetic damage occurs when the appearance of something is degraded. Examples include bird droppings on sidewalks, defoliation or flower damage to landscape plants, and disease spots in lawns. People often disagree over what level of aesthetic damage should trigger action. What is acceptable to one person may not be to another. Aesthetic thresholds are fairly consistent, however, for pests that damage landscape plants.



The average person begins to feel that some control action is necessary when a pest has damaged roughly ten percent of the plant.

Public Opinion

Certain pests are seen as more disgusting, scarier, or otherwise worse than other pests. The reasons are complex, based on social, cultural, or psychological factors. Most people are less willing to tolerate a cockroach than a cricket, a tick than a beetle, a mouse than a pigeon.

Unfortunately, people often disagree on what level of a particular pest is tolerable. Some people, for example, are frightened of spiders. Seeing a spider is seeing one spider too many. Others view spiders as beneficial, and are willing to tolerate a few spiders, even in an occupied room. Those who equate pests with social status are often unwilling to accept any level of any pest. In contrast, cultural factors or fear of pesticides will often force people to tolerate an unusually high level of pests before they feel pest control action is necessary.

A person's tolerance of a particular pest can sometimes be modified by providing information about pests and beneficial organisms, and the risks and benefits of control.

Legal Concerns

Pests in commercial and institutional kitchens are regulated under state and county health codes. There is little tolerance for cockroaches, ants, mice, and other pests anywhere food is stored, prepared, or served, so action thresholds are typically low. Safety and building standards, rather than IPM considerations, may determine when action is necessary to control termites, rats, flies, and other pests in commercial and public areas, including public buildings such as schools. During public health emergencies, government agencies may legally mandate control of certain pests, such as raccoons or skunks during rabies outbreaks, or mosquitoes during encephalitis outbreaks.

Setting Action Thresholds

Schools need to set action thresholds

An Example of Setting Action Thresholds for Yellowjackets

Count the number of yellowjackets foraging at a trash can in a given ten minute period. If that number averages around five, and you are getting no complaints about yellowjackets, and no one is getting stung, then no action is necessary. That particular level of yellowjacket activity is acceptable. You might, therefore, set the action threshold at ten. Any time you counted ten or more yellowjackets at the trash can in a ten minute period, you would take further action, perhaps increasing trash pickups, powerwashing trash cans, setting additional yellowjacket traps, or spending an hour or two searching for nests.

—from *Yellowjackets and IPM*, available from the Maryland Department of Agriculture

that are suited for their facilities. The specific action thresholds may be developed by a contractor, school pest control staff, consultants, or by committee. Someone may already have developed action thresholds for some of your key pests. The information may be published in research or extension publications. Schools can sometimes obtain action threshold numbers from other schools that have IPM programs already in operation. Such action thresholds can be used as a reasonable starting point, and then modified to suit the conditions at a particular site.

Most action thresholds will be developed from scratch. The school first determines which pests to include and which locations need separate action thresholds. Then the school decides site by site and pest by pest what pest level is tolerable, and sets an action threshold for each pest at each site. For example, the school might decide that field ant colonies outdoors were of little concern, that an occasional ant or two in a basement storage room was tolerable, but that a single ant in the infirmary would require immediate action. On that basis, the school might set the action levels to be 2 colonies of field ants per square yard outdoors, 5 ants per 100 square feet for storage areas, and 1 ant in the infirmary.

Different levels of a pest may generate different control actions. If an IPM technician found three cockroaches in a storage room, he or she might simply place a couple of cockroach bait stations. But 30 cockroaches might require that the storeroom be extensively cleaned, treated with additional insecticides, and all cracks and crevices carefully caulked.

The school should review the action thresholds regularly, preferably quarterly. Action thresholds may need to be raised or lowered, particularly in the first year or two of an IPM program. Perhaps the level for house flies needs to be lowered because students are being bothered by flies in classrooms. Or perhaps the action threshold for pests on landscape plants needs to be raised because the plants are being sprayed too often. IPM is a dynamic process.

Examples of Action Thresholds

Listed below are a few examples of action thresholds for pests and sites in a school. Similar information is presented in Tables 1 and 2. The list of action thresholds is not complete, and the thresholds, while reasonable, are offered as examples only. Action thresholds at a particular school could be very different, depending on conditions at the school, pest tolerance levels, and other variable factors.

Please note that when action thresholds are exceeded, some pest management action would be necessary, but not necessarily pesticide application. And even though pests may be below action thresholds, the technician would still be responsible for identifying and reporting or correcting sanitation problems, pest entry points, etc. in order to prevent future pest infestations.

Ants (common house-infesting)

Classrooms and other public areas: 5 ants/room; infirmary: 1 ant/room; kitchen: 3 ant/room; maintenance and storage areas: 5 ants/100 square feet in two successive monitoring periods; outside grounds: 2 field ants mounds/square yard.

Ants (carpenter)

Classrooms, public areas, maintenance areas: 3 ants/room; infirmary: 1 ant/room; kitchen: 2 ant/room; immediate action if ant colony suspected inside or within 25 feet of any building.

Bagworms

Control on conifers when 2 or more large bags/tree or bush. In light infestations, hand pick and destroy; in heavy infestations, spray with *B.t.* between June 15 and July 15, or spray residual insecticides after July 15.

Bees (honey)

Classrooms, infirmary, kitchen and public areas: 1 bee; maintenance areas: 3 bees; outdoors: no action unless children are threatened.

Bees (bumble)

Classrooms, infirmary, kitchen and public areas: 1 bee; maintenance areas: 3 bees; outdoors: action necessary if communal nests are present in student activity area. Also action whenever children are threatened.

Bees (carpenter)

Classrooms, infirmary, kitchen and public areas: 1 bee; maintenance areas: 3 bees; outdoors: 1 carpenter bee/5 linear feet if susceptible, unfinished wood. Also action whenever children are threatened.

Cockroaches

Classrooms and other public areas: 2 cockroaches/room. If 2-10 cockroaches per room, apply cockroach bait. If 10 or more, track down infestations, review sanitation, trash handling, clutter, etc.; open equipment, check inaccessible areas; vacuum and otherwise clean room, and apply baits or other insecticides as necessary. Infirmary: 1 cockroach/room; kitchen: 1 cockroach/room; maintenance areas: 5 cockroaches/room; outside grounds: no action unless noticeable infestation.

Crickets

Classrooms and other public areas: 3 crickets/room; infirmary: 1 cricket/room; kitchen: 2 crickets/room; maintenance areas: 10 crickets/room; outside grounds: no action unless causing problems.

Grain and flour pests

Found in food for human consumption: 1/package or container; pet food: 1 if escaping from packaging; if found in pheromone traps: 2 of any one species (total of all traps)

House flies

Classrooms and other public areas: 3 flies/room; infirmary: 1 fly/room; kitchen: 1 fly/room; maintenance areas: 5 flies/room; outside grounds: 5 flies around any one trash can or 10 flies around a dumpster.

Landscape plants (general)

Whenever pest damage approaches 10 percent/plant.

Sample Action Thresholds* for Maryland Schools: Table 1

Pest	Classrooms/ public area	Maintenance area	Infirmary	Kitchen	Grounds
Ants, common house	5/room	5/100 ft ² in two successive periods	1/room	3/room	2 mounds/yard
Ants, carpenter	3/room	3/room	1/room	2/room	1 nest within 25 ft
Bees, honey	1/room	3/room	1/room	1/room	If children threatened
Bees, bumble	1/room	3/room	1/room	1/room	If children threatened
Bees, carpenter	1/room	3/room	1/room	1/room	If children threatened; 1 carpenter bee/5 linear feet
Cockroaches	2/room	5/room	1/room	1/room	If noticeable or invading
Crickets	3/room	10/room	1/room	2/room	If nuisance
House flies	3/room	5/room	1/room	1/room	5/trash can; 10/dumpster
Lice (head or body)	Take no action, refer to nurse				
Mice	1/room	1/room	1/room	1/room	burrows or activity in any student area
Rats	1/room	1/room	1/room	1/room	any burrows/activity
Silverfish	1/room	2/room	1/room	2/room	NA
Spiders, poisonous	1/room	1/room	1/room	1/room	1/activity area
Spiders, others	1/room	3/room	1/room	1/room	only if nuisance
Yellowjackets/hornets	1/room	1/room	1/room	1/room	10/10 minutes at trash; 1 if threatening children

* The specific action thresholds mentioned in the table are offered as examples only. They are not required by the regulations. Each school using action thresholds should develop thresholds of their own, suited to specific conditions at the school.

Sample Action Thresholds* for Maryland Schools: Table 2

Landscape or Grounds Pests	
Bagworms	Control on conifers whenever two or more large bags/tree or bush
Landscape plants	When pest damage reaches 10 percent/plant
Lawn pests	When pest damage reaches 10 percent/100 ft ²
Pigeons	10/building in 3 successive inspections; droppings 1-inch deep; nests obstructing gutters or equipment
Poison ivy	1 plant in any student area; no action in woods unless near path or student area
Tent caterpillars	1 tent or egg mass/ desirable tree; other trees if aesthetically unacceptable; 2 public complaints within 2 weeks
Ticks	3 of any species in student activity areas; in woods, action if moderate to heavy infestations; treat wood edges if evidence of blacklegged ticks
Weeds	15 percent in 100 ft ²

*** The specific action thresholds mentioned in the table are offered as examples only. They are not required by the regulations. Each school using action thresholds should develop thresholds of their own, suited to specific conditions at the school.**