SCHOOL IPM IMPLEMENTATION IN ILLINOIS
Final Grant Report

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SUMMARY

A survey was made of the Illinois public school districts to determine their adoption of Integrated Pest Management (IPM). Questionnaires were completed by 62.3% of the 875 districts in the state. There was an adequate representation of responses based on school enrollment, type, and distribution through the state.

Almost 90% of school districts utilize pest control operators to perform pest control work, and over half use custodial or maintenance employees. These also evaluate sighting reports. Almost two-thirds of the districts use sticky traps to scout for and monitor pest occurrence.

Over two-thirds use non-chemical IPM methods to control pests in and around buildings. Only 27.7% exclusively use insecticide sprays to control ants; others use a mixture of IPM methods. With other invading pests, 31.8% exclusively use insecticides for control. Approximately two-thirds of school districts use mechanical control methods to manage yellowjacket problems.

In the landscape, at least one-half use herbicides to control weeds. Only 17.8% use pesticides to control disease and insect pests of trees, shrubs, and turf. About 60% use pruning to reduce these pests. However, about one-fourth do not control disease or insect pests in the landscape.

About 60% of school districts notify parents and guardians about non-bait pesticide applications through newsletters and similar methods. About 20% utilize phone call or take-home notes for notification of individual applications. About 15% have informed parents of their right to notification, but have not received any requests to do so.

Based on these data, approximately two-thirds of Illinois public school districts use IPM methods including scouting and multiple control measures for structural pests. However, about half rely on herbicides for landscape weed control, but about 60% use non-chemical methods for landscape insect and disease control. At least three-fourths of the school districts are adhering to pesticide use notification statutes.

INTRODUCTION

Integrated Pest Management (IPM) has gained acceptance as the proper method of control of insect pests, weeds, diseases, rodents, and other pests since it was first

implemented in the 1960's. From its early use on field crops and forestry, its methods have been adapted for most pest situations. IPM utilizes a variety of cultural, mechanical, biological, and chemical methods to ecologically manage pest populations. The use and evaluation of these methods is based on scouting as a means of determining relative pest population levels and their associated damage potential.

Illinois state statutes required that public school districts utilize IPM in indoor (structural) and outdoor (landscape) pest control by August 1, 2000 or inform the Illinois Department of Public Health (IDPH) of financial or other situations that prevented IPM adoption. School districts must also notify interested parents or guardians before non-bait pesticides are applied.

University of Illinois Extension (Extension) has been active in programs aimed at school IPM education for over a decade. This has included two series of IPM workshops for school administrators and personnel, one in the early 1990's and another in 2000, both organized by IDPH. In 2001, Extension participated in a series of school IPM symposiums attended by both school personnel and pest management professionals organized by IPM Systems, Inc. In conjunction with IDPH, the Illinois Structural Pest Control Advisory Council, and the Illinois Pest Control Association (IPCA), Extension helped write "A Practical Guide to Management of Common Pests in Schools, Integrated Pest Management" in 1999. Extension was also a member of the advisory committee for the regional school IPM center at Purdue University.

This survey determined the level of IPM adoption and pesticide application notification by Illinois public school districts. It was sent to every Illinois public school district. Safer Pest Control Project (SPCP) has previously conducted similar surveys focused on schools in northern Illinois.

MATERIALS AND METHODS

A survey questionnaire was developed and sent to every public school district in Illinois to determine whether and to what extent each practiced IPM. Proposed questions were developed and sent to a variety of organizations for their critique and suggested additions. Responses were received from USEPA Region 5, Illinois Department of Public Health, Sentinel Pest Control, and Safer Pest Control Project. These suggestions were utilized in developing the final questionnaire.

The questionnaire addressed organization of the IPM program, structural IPM activities, and landscape IPM activities. It consisted of 12 questions. The first three questions determined the size of the student population, type of schools in the district, and geographical area of the state. Questions three through six addressed administrative procedures for pest control in the district. Questions seven through nine probed into methods used to control structural pests. Questions ten and eleven addressed landscape pest control methods. Finally, question twelve asked about methods used to notify parents of pesticide use. Pest control questions addressed specific pests and methods in order to avoid IPM jargon and response bias. .

The questionnaire was posted to the SurveyMonkey.com internet site located at: http://www.surveymonkey.com/s.asp?u=314352869410, where participants were able to answer the questions electronically. The questionnaire was also sent to the superintendent or other administrator of each of the 875 Illinois public school districts' addresses as listed on the Illinois State Board of Education website. The paper format questionnaire was accompanied by a self-addressed business reply envelope, a set of "Ugly Guys" structural pest identification color picture cards, and a letter explaining the purpose of the questionnaire and how to access the internet site. The cover letter for this questionnaire is included as Appendix A. Thus, the school administrator had the option of responding electronically or by mail. A second notice in the form of a postcard was sent by mail to each school district as a reminder to fill out the survey.

Participation in this survey was completely anonymous. The internet site did not retain e-mail addresses of origin. Data from paper questionnaires received were promptly entered into the internet site, and then the questionnaires and envelopes were destroyed. Because a law requiring IPM use or refusal is already in place, it was decided that identification of responding school districts would likely reduce the level of cooperation, particularly of those districts not conducting IPM.

Procedures for conducting the survey were approved for human subject research by the University of Illinois Institutional Review Board. This also allows the external publication of these results.

RESULTS AND DISCUSSION

The questionnaires were mailed to each Illinois public school district on November 27, 2006. A total of 553 completed questionnaires were received out of the 875 public school districts that were surveyed for a response rate of 63.2%. The form of the questionnaire and a tabulation of percentage responses and individual responses to the questionnaire are provided in Appendix B of this report.

Demographics

Approximately half of the responses came from districts with a **student population** of 500 to 2000 students. Almost one-third of the responses were from smaller districts, and almost one-fifth came from larger districts. This provides a reasonable cross-section of responses to avoid bias towards school size.

There was also a relatively even distribution of **school type**. Almost 90% of school districts contained elementary schools, whereas the presence of middle schools, junior high, and high schools ranged from somewhat less to more than half of the districts. Many consolidated school districts retain their elementary schools as separate districts.

Geographical representation of the responses is provided in Figure 1. These data reveal a satisfactory cross-section through the state. The northeastern portion of the state

including Chicago and its associated suburbs (area codes 630, 708, 847) was represented by about one-fifth of the responses. Similarly, the approximately southern one-third of the state in area code 618 was represented by just under one-fourth of the responses. Northern Illinois outside of the Chicago metropolitan area provided almost one-fourth of the responses. The northwestern and central areas of the state were almost equally represented, with the two areas together comprising almost one-third of the responses.

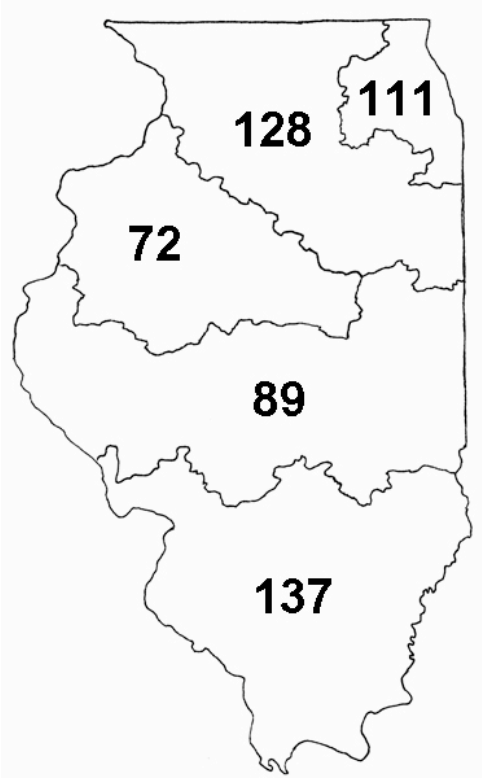

Figure 1: Geographical representation of questionnaire responses.

Administrative Procedures

Most school districts utilize professional pest control operators as **pest management providers**. Over half use their custodial and maintenance employees. This may represent a division of labor depending on the situation. Many pest management methods relate to proper building maintenance, such as caulking cracks and crevices, ensuring tight door thresholds, and clean-up of food and other spillage. Outdoors, physical weed removal, proper mowing, and pruning of trees and shrubs are all pest management methods commonly practiced by custodial and maintenance personnel. In addition, small pest infestations may be addressed with the use of baits or other insecticides by these personnel without the involvement of professional pest management companies.

Teachers and other support staff were involved in pest control in a relative small number of school districts (13.4%). Pests were not controlled in only 5% of school districts.

Scouting is an important part of an integrated pest management program. Determining pest occurrence and pest numbers are vital in tailoring pest management response directly

to the situation rather than relying on calendar date or intermittent control based on little or no pest occurrence information.

Sticky traps are very useful in determining the presence of indoor pests as well as relative abundance. Their use is a clear indication of IPM being practiced. It is encouraging that approximately two-thirds of the school districts are using them. Because sticky traps do catch and remove individual pests, some of the reported usage may have been primarily as a control method. However, even that use of them represents mechanical control and is part of an IPM program. In addition, when the traps are used as a control method, the presence and relative amount of trap catch still constitutes a form of pest monitoring.

Pheromone traps are very useful in detecting the presence of grain and other pantry insect pest infestations. They are primarily used in warehouses, being less useful in smaller situations such as the commercial kitchens and associated food storage areas utilized by many school districts. In these smaller facilities, infested food is more easily noticed. That, along with some school districts' reliance on externally-prepared lunches and other food, probably accounts for their use in less than 8% of the districts.

Light traps indoors are useful in an IPM program in detecting invading insects, primarily flies. However, they are also useful in the detection of some pantry beetles. Their primary use in an IPM program is the mechanical control of flies, moths, and other invading pests in buildings. Light traps are also used outdoors to attract and catch primarily night-flying insects, where research has shown them to be almost useless in providing meaningful pest management. Light traps were used by about one-tenth of the school districts.

Individual reports of pest sightings are recommended in an IPM program. They are a form of scouting, but are typically biased towards the sites commonly frequently by occupants. They provide knowledge not only of areas in need of pest control, but their presence or absence after control efforts have been conducted provides feedback on control effectiveness. Over one-third of the districts used forms which provide written documentation of an IPM program's challenges and effectiveness. Over three-quarters of the districts utilized verbal pest sighting reports.

It is important that well over half of the school districts utilized pest control operators or custodial or maintenance employees to **evaluate sighting reports** because these were the ones reported as primarily conducting the pest control work. Approximately one-quarter to one-third of the districts utilized administrators, office personnel, or others apparently not involved in conducting pest control activities to oversee the pest management program.

Structural Pest Control

Ants have been shown in several reports, including calls to Extension offices, to be the most common pest problem in buildings. This makes them an excellent pest for IPM query as almost all schools should experience problems with them. In fact, only 2.7% of the districts reported that they do not control ants. In addition, ants can be controlled through a variety of chemical and non-chemical methods.

Insecticide sprays were used by about two-fifths of the districts outdoors, with about the same portion using them indoors. A similar proportion utilized interior baiting, probably the most effective method of control utilizing insecticides. Only one-fifth used exterior baits. Approximately half of the school districts used at least one of the non-chemical options provided, crack and crevice closure or food sanitation.

Important to this survey was determining the number of school districts that were only using insecticide sprays to control ants. That is, not using insecticidal baits or non-chemical control methods. Exterior insecticide spraying only was used by 10.1%, interior crack, crevice, and baseboard application only was reported by 4.0%, and 13.6% used only exterior and interior non-bait insecticide applications. The sum of these indicates that 27.7% were only using non-bait insecticide applications to control ants associated with buildings.

Invading insect and related pests other than ants are also a common pest problem in buildings. Field crickets, multicolored Asian lady beetles, ground beetles, wolf spiders, other ground spiders, and many other insects and insect relatives enter buildings at various times of the year. Indoor and outdoor insecticide sprays are effective, but the control that they provide is temporary, typically lasting only a few weeks. There are no baits available for most of these insects. A more permanent solution involves caulking cracks and crevices in foundations, around windows, and along edges of buildings. Avoiding dead organic matter such as fallen leaves and bark mulch along the outside foundation is also useful. This decaying organic matter provides moisture, food, and shelter for many of these pests and a source of insect and similar prey for others. This results in numerous invading pests next to the foundation, making it more likely that some will find their way indoors.

Approximately two-fifths of the school districts used exterior insecticide spraying to control invading pests. About the same percentage used insecticides indoors as crack and crevice or baseboard applications. Exterior insecticide spraying was the only method used by 12.1% of respondents, with only 4.0% using only interior insecticide applications. However, 15.7% of respondents used both exterior and interior insecticide applications without using other, non-chemical, methods. In total, 31.8% of school districts reported only using insecticide applications to control invading pests.

Non-chemical methods to control invading pests were used by a majority of the respondents. Over 60% physically removed pests through sweeping or vacuuming, and about one-third physically removed pests individually. Mechanical control was used by almost half by caulking or screening cracks and crevices to keep out invading pests. Maintaining tight doors was a mechanical control method used by about half of the respondents to keep out pests.

Yellowjackets are yellow and black, one-half inch long wasps that are commonly referred to as bees by the public. Unlike honey bees, individual yellowjackets sting with little provocation and sting repeatedly. In addition to the pain and swelling caused by

stings, a small proportion of the human population is unusually sensitive to insect stings, being at risk of dying from anaphylactic shock from a single sting. Yellowjackets are most numerous and most likely to sting from mid-August through early fall. This coincides with the portion of the school year when temperatures are high enough that school buildings without air conditioning typically have the windows open for ventilation. Schools, hospitals, and other public buildings in the U.S. tend to not have window screens, making it easy for yellowjackets to enter.

The survey shows that almost two-thirds of Illinois public schools have invested in window screens. Approximately the same percentage keeps windows and doors closed as much as possible. Many of these are likely to have air conditioning. It is encouraging to see this form of mechanical control utilized to such a large extent.

In the fall, when numbers are high and their nectar food source from flowers is dwindling, yellowjackets visit garbage dumpsters and similar locations in high numbers seeking sweet liquids such as soda pop, lemonade, and fruit juice. Almost 60% of school districts keep dumpsters away from open school windows. Similarly, self-closing outdoor trash cans help reduce the number of yellowjackets around the school, and one-fifth of the districts utilize them.

Although approximately one-third of school districts treat yellowjacket nests with insecticide, only 2.9% provided only that response. Based on the responses to this question, IPM is used to a large extent by Illinois public school districts to manage their yellowjacket problems.

Landscape Pest Control

The use of herbicides, weed killers, is a very popular method of **weed control** in landscapes throughout Illinois as well as the rest of the U.S. Although their use has come under attack to the point of restrictions on their use in some municipalities and public areas, they are still widely used. They are commonly marketed with fertilizer, resulting in some overlooking the presence of herbicide in the mixture.

Approximately one-half of school districts apply weed and feed products containing both herbicide and fertilizer to turf areas. About the same number utilize spot herbicide spraying of weeds. Many of these applications are likely used to eliminate weeds in sidewalk cracks and parking areas. About one-fifth spray large areas of turf to control weeds.

Even though hand-weeding or hoeing is very labor intensive, well over one-third of the school districts use this option. About 12% did not use any weed control. Particularly in turf areas, mowing provides an acceptable, even plant cover even when many weeds are present.

Insect pests and diseases detract from the aesthetic appearance of turf as well as many trees, shrubs, and other ornamental plants. However, many of these pests are not threats to the long-term health and survival of the plants. Reduced or no control of these pests is

a viable option, particularly when the damage is not very obvious. Over one-fourth of the respondents do not control insects and diseases in their landscapes.

Approximately one-fourth of school districts apply insecticides to control white grubs on turf. Less than one-fifth apply pesticides to trees and shrubs. Similarly, 17.8% only use pesticides to control insects and/or diseases on turf, trees, and shrubs.

Dying branches on trees and shrubs provide a source of insect pests and diseases to attack healthier plants. Almost 60% of school districts physically control these pests through pruning out dying branches. Physical control is also used by over one-third of the respondents by pruning out infested plant parts. Hand-removal of insect pests is used by only 6%, another form of physical control.

An excellent cultural control of white grubs is to make turf areas less susceptible to attack by adult egg-laying beetles through avoiding summer irrigation. However, less than 10% utilized this option. Late summer football and soccer practice combined with the need to have lush, green turf for game play in the fall cause many school turf managers to maintain high quality turf through the summer in order to have the fields available when needed.

Pesticide Use Notification

Illinois state statutes require that parents or guardians have the opportunity to be notified of pesticide applications other than baits used in school buildings or on school grounds during the school year. If parents do not request notification after it is offered to them, the school district is not required to notify them. This has occurred in 15.8% of the respondents. Only 6.8% of school districts do not have a notification policy.

Almost 20% of school districts utilize individual parental notification through telephone calls or take-home notes prior to each pesticide application. Approximately 60% of school districts use less specific notification through school newsletters or take-home notes issued monthly, quarterly, or annually. A significant number, almost one-fourth of school districts utilize other methods of notification or had other responses to this question.

APPENDIX A: QUESTIONNAIRE COVER LETTER

UNIVERSITY OF ILLINOIS
EXTENSION

Department of Natural Resources and Environmental Sciences
S-408 Turner Hall
1102 S. Goodwin Ave.
Urbana, IL 61801

Insert school administrator address here

The enclosed survey is being sent statewide to determine the use of Integrated Pest Management (IPM) in Illinois public schools. This survey is being conducted by University of Illinois Extension on a grant issued by the United States Environmental Protection Agency in cooperation with the Illinois Department of Public Health (IDPH). University of Illinois Extension is one of the leading providers of IPM education in the state of Illinois.

We would like the survey to be completed by the person responsible for coordinating the control of insects and other pests for your school district.

The intent of this survey is to determine how widespread IPM has been adopted. The survey is designed so it can be responded to with complete anonymity. The results of the survey will be used to determine the need for additional educational programs targeted to school personnel.

As a token of our appreciation for your cooperation and the cooperation of your school district we have enclosed a set of pest identification cards.

Participation in this survey is completely voluntary. Your decision whether to participate or not will have no impact on the availability of services from Extension to your school district. Feel free to contact me if you have questions about the survey. If you have questions about your rights as a research subject feel free to contact the University of Illinois Institutional Review Board at IRB@uiuc.edu or by calling 217-333-2670. Please keep a copy of this letter for your records.

Thank you for your assistance. Additional information on implementing IPM in schools can be found at the IDPH website: http://www.idph.state.il.us/envhealth/entpestfshts.htm

Sincerely,

Philip L. Nixon, Ph.D.
Extension Entomologist
pnixon@uiuc.edu

APPENDIX B: QUESTIONAIRE RESPONSE SUMMARY

Percentages for each response are listed, followed by the actual number for that response in parentheses. The total number of respondents that answered the question is listed as well as the number of respondents that did not answer that question. The number of responses for a question commonly totals more that the number of respondents because multiple answers were accepted.

Please take a few minutes to complete the following survey. We want only one response per school district. Your response will help us assess current pest control practices in Illinois schools and enable us to produce educational programs to assist you in pest control. This survey is designed so your responses will be anonymous. The survey should be completed by the person responsible for coordinating pest control activities.

If prefer you can respond anonymously via the WWW. The survey software does NOT log IP addresses or other identifying information. http://tinyurl.com/ykneuo

For each question, please select as many responses as are appropriate.

1. Indicate the size of the student population of your district.

32.2% (177) Fewer than 500
49.4% (271) 500 – 2000
18.4% (101) more than 2000
549 respondents
2 skipped question

2. Indicate the type of school(s) in your district.

89.5% (494) Elementary
56.5% (312) Junior High
41.3% (228) Middle School
63.4% (350) High School
552 respondents
1 skipped question

3. To assist us in tailoring programs for different parts of the state, please provide us with your telephone area code (first three digits)

16.4% (89) 217
13.3% (72) 309
0.2% (1) 815/309
25.2% (137) 618
20.4% (111) 630, 708, 847
5.9% (32) 630
6.3% (34) 708
8.3% (45) 847
23.6% (128) 815
0.7% (4) Out-of-state & unused area codes

543 respondents
10 skipped question

4. Who does the majority of the pest control work in your district?

88.6% (489)	Pest control operator (exterminator)
57.4% (317)	Custodial or maintenance employees
13.4% (74)	Teachers and support staff
5.1% (28)	None – pests are not controlled
2.5% (14)	Other (please specify)

552 respondents
1 skipped question

5. Which pest monitoring method(s) are used inside and outside district buildings?

37.3% (205)	Pest sighting forms
78.0% (429)	Verbal individual pest sighting reports
65.6% (361)	Sticky traps
9.7% (64)	Light traps
7.8% (43)	Pheromone traps
1.5% (8)	None
8.0% (44)	Other (please specify)

550 respondents
3 skipped question

6. Who evaluates the sighting reports?

57.8% (316)	Pest control operator (exterminator)
63.1% (345)	Custodial or maintenance employees
8.0% (44)	Office personnel
16.5% (90)	Principal or superintendent
10.1% (55)	Other (please specify)

547 respondents
6 skipped question

7. Which methods are used to control invasion of ants into your buildings?

44.2% (242)	Exterior insecticide spraying
20.6% (113)	Exterior insecticide baiting
39.2% (215)	Use of crack and crevice or baseboard insecticide applications
42.3% (232)	Interior insecticide baiting
46.7% (256)	Caulking or screening cracks and crevices
56.2% (308)	Improving food handling and clean-up methods in cafeteria and lounges
2.7% (15)	None
6.4% (35)	Other (please specify)

548 respondents
5 skipped question

8. Which methods are used to control crickets, ladybugs, ground beetles, spiders, and other occasional invaders?

41.8% (227) Exterior insecticide spraying
36.8% (200) Use of crack and crevice or baseboard insecticide applications
61.0% (331) Frequent sweeping or vacuuming
45.3% (246) Caulking or screening cracks and crevices
50.8% (276) Maintaining door sweeps and tight door thresholds
35.4% (192) Hand removal or smashing of individuals as they are noticed
6.1% (33) None
6.4% (35) Other (please specify)

543 respondents
10 skipped question

9. Which methods are used to restrict yellowjackets (yellow and black wasps or "bees") in and around district buildings?

66.6% (332) Keep doors and windows closed as much as possible
64.2% (352) Have screens on open windows
59.5% (326) Locate dumpsters well away from open windows
33.4% (183) Treat yellowjacket nests with insecticide
20.1% (110) Utilize self-closing outdoor trash cans
10.2% (56) None
10.2% (56) Other (please specify)

548 respondents
5 skipped question

10. Which weed control method(s) are used on lawns, playgrounds, sports fields, and other outdoor areas?

38.7% (212) Hand-weeding or hoeing weeds
48.7% (267) Applying weed and feed herbicides to control weeds in turf areas
55.1% (302) Spot spraying weeds in turf areas and/or pavement areas
20.8% (114) Spraying large areas of turf to control weeds
11.9% (65) None
7.8% (43) Other (please specify)

548 respondents
5 skipped question

11. Which insect and/or disease pest control method(s) are used on lawns, playgrounds, sports fields, and other outdoor areas?

58.6% (320) Pruning dying branches from trees and shrubs
38.3% (209) Pruning out plant parts infested with insects and/or diseases
6.0% (33) Hand-removal of caterpillars, beetles, and other insect pests
25.5% (139) Applying insecticides to control grubs on sports fields and/or playgrounds
8.6% (47) Avoiding summer irrigation of turf on sports fields and/or playgrounds to reduce grub attack

17.8% (97)	Applying insecticides to control insects and/or fungicides to control diseases on trees and shrubs.
28.2% (154)	None
3.7% (20)	Other (please specify)

546 respondents
7 skipped question

12. How do you notify parents that pesticides are being used?

61.8% (337)	By school newsletter or take-home notes monthy, quarterly, or annually
19.1% (104)	By phone calls or take-home notes shortly before each pesticide application
6.8% (37)	Don't have a notification policy
15.8% (86)	No parents requested notification after it was advertised to them
24.0% (131)	Other (please specify)

545 respondents
8 skipped question

13. Thank you for completing this survey. Please feel free to add any comments or suggestions below

14 respondents
539 skipped question