

Acknowledgments

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Integrated Pest Management (IPM), as defined by the Environmental Protection Agency, is an effective and environmentally sensitive approach to pest management that relies on a combination of commonsense practices. IPM programs use current, comprehensive information on the life cycles of pests and their interactions with the environment. This information, in combination with available pest control methods, is used to manage pest damage by the most economical means and with the least possible hazard to people, property, and the environment. IPM programs take advantage of all pest management options including, but not limited to, the judicious use of pesticides.

Within this definition, IPM looks at pest problems using a multi-tactic approach. It considers the interactions between people and the pest to find the simplest way to solve the pest problem with the lowest overall risk to people's health and the school environment. IPM looks beyond exterminating the pest and the use of regular preventative pesticide applications. IPM considers factors that allow pests to become problems in the first place and uses a combination of cultural, physical, biological and chemical pest management strategies. It is a proactive approach that often provides long term results.

Abstract

Surveys were sent to 716 Nebraska school administrators to collect information about current pest management practices in public and private K-12 schools. Two hundred surveys were returned (26.3%), representing small and medium-sized school districts. Respondents identified invading pest species being the most significant indoor problems and weeds in turf the most important outdoors. The total annual cost of pest control was estimated to be in excess of \$1.3 million. Many school districts did not have a written pesticide use policy (73%), maintain a record keeping system for pest control applications (42%), or file pesticide labels (33%). Approximately 64% of school districts were making routine pesticide applications and only 9% of the schools districts used IPM. Pest management professionals made decisions about indoor (62%) and outdoor (50%) pesticide use, but decisions (47%) and applications (33%) were also made by school personnel. Most school personnel have little or no training and were not certified and licensed by the State of Nebraska. University of Nebraska can help schools develop and implement IPM policies and train pesticide decision makers to ensure a safe school environment.

Introduction

People are concerned about the quality of indoor and outdoor school environments, particularly in relation to the exposure to pesticides and allergens. Because of their small size and faster metabolism, children are more susceptible to the adverse effects of pesticide exposure than adults. Pesticide exposures may have both immediate and long-term effects. Exposure to volatile organic compounds in traditional pesticide sprays or pests such as cockroaches, dust mites, rodents, and molds can trigger asthma in children. Asthma is the leading chronic illness of children in the United States as well as the leading cause of school absenteeism due to chronic illness. Therefore, pest management must be conducted in schools, but it must be done responsibly.

A national movement is underway to reduce the risk of pesticide exposure by adopting integrated pest management (IPM) concepts in schools. During the last 10 years, a total of 33 states have passed legislation that requires schools to regulate pesticide use, implement IPM plans or provide notification when pesticides are used. Within these states, schools are reporting reduced pesticide use (up to 90%), fewer complaints about pests (up to 80%), and significantly reduced costs (up to 30%) for pest control. Federal and state bills have been introduced every legislative session over the last three years that would mandate that all Nebraska schools implement IPM plans and require parental notification prior to applying pesticides. These bills have not advanced, but it is likely that either a federal or state law will be passed in the near future.

In 2002, University of Nebraska Cooperative Extension began an *IPM for Schools* extension outreach project with its primary goal to encourage and assist public and private K-12 schools in Nebraska to develop and implement IPM plans. To date, we have surveyed Nebraska schools and developed a brochure, guidebook, and website (<http://schoolipm.unl.edu>) that promote IPM. The survey, conducted in 2002, was designed to determine the current pest control practices in Nebraska schools and to identify key IPM educational needs. The survey results are presented in upcoming sections and Appendix A. The survey instrument is in Appendix B.

Methodology

A list of public and private schools was obtained from the Nebraska State Department of Education. In September 2002, questionnaires were sent to superintendents of all 761 public and private school districts in Nebraska. Respondents were asked to return surveys by October 11, 2002. One reminder postcard was sent about two weeks after the survey was initially mailed. Two hundred surveys were returned—a return rate of 26.3%.

Results and Discussion

Responses to questions are presented categorically in Tables 1-33 in Appendix A. Data are expressed as percentages. Percentages may not total 100% because some respondents did not answer all questions. In some cases, multiple responses were possible within a given question, resulting in a total that is more than 100%. Results indicate that most surveys returned represented small and medium-sized school districts (Table 27a). To gain a better understanding of pest control practices in all Nebraska's schools, a follow-up telephone survey of non-respondents may be conducted.

Although questionnaires were mailed to school superintendents, they were often passed to personnel with the most expertise in pest management (Table 26). Fifty-two percent of respondents were professional educators, while 31% were custodial or maintenance personnel. The remainder were school board members or another staff members. Since almost half of the school districts that responded to the survey are small districts (Tables 27a and 27b), the data may be skewed toward small and, probably, rural schools.

Pests. In general, few complaints were registered about pests in and around the school environment. The most frequent (occasional or often) indoor pest problems reported were those entering structures from outside, including spiders (55%), ants (54%), and rats/mice (41%) (Table 1). Cockroaches, a pest usually found in the kitchen, were mentioned 28% of the time as being an occasional or often problem. Although management strategies are pest- and situation-specific, non-chemical IPM tactics of prevention and exclusion may be the most appropriate treatments for indoor pests, rather than pesticides.

Weeds in turf are a major problem for schools. The most frequent (occasional or often) weed problems reported by respondents were crabgrass (74%) and perennial weeds with

dandelion (83%) and white clover (56%) (Table 2). Insects and diseases were less of a concern in turf with white grubs (33%) and sod webworms (20%) the most frequent (occasional or often) insect problems and brown patch (26%) and summer patch (17%) the most frequent (occasional or often) disease problems. Turf insect and disease problems can often be prevented with improved cultural practices.

Costs of Pest Control. The total annual cost of pest control reported was \$341,698 (Table 4) an average of \$1,708 per responding district. When this amount is extrapolated for all 761 districts, a conservative estimated total for the entire state is about \$1,300,000. The data likely understates the cost of pest control in schools across the entire state, however, since respondents represented small and medium-sized school districts. The use of IPM can reduce the cost of pest control. A demonstration IPM project in Santa Barbara, CA, reduced the costs of pest control by 30%, while also improving the effectiveness of pest control.

Pesticide Policies. Only 8% of respondents reported that their school has a written policy for pesticide use (Table 5). Many do not maintain a record-keeping system about pesticide use (42%) (Table 6) or keep labels for pesticides used on schools grounds (33%) (Table 7). Lack of records makes it difficult for school districts to defend their actions if allegations are made against them regarding pest management procedures. A copy of the label should be kept in the same location as the application records. It is important to retain labels in case of an accidental poisoning, to help guide storage and disposal of the pesticide product, and to provide proof that applications were done in a manner consistent with label instructions. Since labels often change over time, it is important to retain labels that represent pesticide applications.

Few respondents indicated students and parents or teachers and staff were notified prior to applying pesticides (Tables 8a,b, 9a,b). School

districts may have applied pesticides after hours, on weekends, and during school breaks — when students, teachers and staff were not present, or no pesticides were applied at all (Table 8b). Eighty-three percent of respondents said that children, teachers, and staff were not present when pesticides were applied (Table 10a). However, 15% of respondents said that pesticides were applied when students, teachers, and staff were present. Results do not indicate whether applications were made indoors during normal school hours or whether applications were made outdoors when students, teachers, and staff were indoors. If waiting periods (those recommended on the label) were observed, this may not be a problem. Waiting periods identified are appropriate for the type of pesticides that school districts would likely be using (Table 10b).

Pesticide Decisions and Applications.

Respondents reported that pest management professionals, including pest control companies/lawn care companies, made many decisions about indoor (62 %) and outdoor (50%) pesticide use, but many also indicated that decisions were also made by school officials (42% indoor, 36% outdoor) and/or custodian/maintenance personnel (54% indoor, 57% outdoor) (Tables 11 and 13). Pest management professionals are trained through the University of Nebraska Pesticide Safety Education Program and must pass a test from the Nebraska Department of Agriculture to become licensed, but no license is required for school officials, custodians, and maintenance personnel that make pest management decisions. The survey revealed an example of an improper pesticide application; 12% of respondents said that at least one classroom was treated in the last year for head lice (Table 17a). Treatment of classrooms for head lice is ineffective and not recommended. Decision makers should be trained to help prevent unnecessary applications and exposure to children.

Respondents indicated that pest management professionals made many indoor pesticide applications (92%). Results also show, however, that school personnel (24%) and custodian/maintenance personnel (38%) made indoor applications (Table 12a). Responses about outdoor applications were similar with pest management professionals making applications (67%), along with school officials (19%), and custodians/maintenance personnel (53%) (Table 14a). School personnel and custodians/maintenance personnel may not be trained in structural pest control or ornamental and turf pesticide applications. Many things must be considered before pesticides are applied in sensitive areas such as schools. Considerations are discussed at length during seminars, pesticide applicator training sessions, and workshops provided for pest management professionals. Respondents indicated that only 0-10% of school personnel that made indoor applications and 18% of custodian/maintenance personnel were licensed applicators compared with 87% of pest control and 50% of lawn care personnel (Table 12b). None of the school personnel that applied pesticides outdoors, and 29% of custodian/maintenance personnel were licensed applicators compared with 82% of pest control and 64% of lawn care personnel (Table 14b). In reality, all commercial pest control and lawn care company personnel must be certified and licensed by the State of Nebraska to apply pesticides if they are paid to perform this service.

Approximately 64% of the respondents (Table 16a) said that their schools made routine pesticide applications—meaning that pesticides were applied even if pests were not present. Pesticides should only be applied when pests are present and need to be controlled. The use of IPM strategies can reduce the overall amount of pesticides currently being applied. For example, the Monroe County School Corporation, Monroe, IN, implemented a pilot IPM program that eliminated 90% of pesticide applications in three schools.

Pesticide Storage. Results indicate that pesticides were not being stored in classrooms (Table 18a) and the majority of those stored in school buildings were behind locked doors (Table 19b). Forty-six percent of respondents said that pesticides were not stored in the school/school district, but it isn't clear where they are being stored (Table 19a). The respondents may have interpreted "school buildings" to be those with students and teachers inside. In that case, the pesticides may have been stored on school property but not in buildings with students and teachers. Another possibility is that they purchased only the amount needed and, therefore, had no pesticides left over that required storage. A third possibility is that pest control/lawn care companies may have applied pesticides, and there were none to store.

Understanding IPM. Only 9% of the respondents said that they were using IPM (Table 21). However, several indicated that they were already using some of the components of IPM, including vacuuming, exclusion, trapping, reducing food and water sources (Table 23), which suggests these respondents do not understand IPM. The University of Nebraska Cooperative Extension has an excellent opportunity to provide the information that schools need to help them implement IPM practices.

Only 1% of respondents said that their schools/school district had a written IPM policy (Table 22). It is likely that most school officials would have difficulty developing an IPM policy without guidance. The University of Nebraska Cooperative Extension can train school administrators to write and implement their own IPM policies.

Sources of Information about Pest Management. Twenty-two percent of the respondents used information provided by Cooperative Extension, but 53% said that they received information from pest control/lawn care companies (Table 25). Respondents

probably did not realize that pesticide safety training is a University of Nebraska Cooperative Extension program, and that pest management professionals receive training materials, certification, and recertification training from Cooperative Extension. Therefore, advice and information given by these professionals may be consistent with Cooperative Extension recommendations.

Approximately one-third of survey respondents were either neutral or unhappy with their current system (Table 24), which provides opportunities for the application of IPM. As school officials learn about and begin to understand IPM and what it can do for them, they will want to implement IPM in their school districts.

Recommendations

The goal of the University of Nebraska Cooperative Extension *IPM for Schools* project is to reduce health and environmental risks associated with the use of pesticides and the presence of pests in Nebraska schools.

Cooperative Extension can play a pivotal role in assisting schools in the development and implementation of IPM policies. The survey has identified several areas that should be improved, added, and/or changed. Adjustments could significantly improve environmental quality, reduce the risks associated with pesticide use and pests, and reduce the costs of pest management.

Recommendations identified by the survey include the following:

- 1) school officials need to better understand IPM and its advantages,
- 2) schools should implement written policies on IPM and pesticide use,
- 3) school pesticide applicators should avoid routine pesticide applications, reduce the amount of pesticide used, and increase the use of reduced-risk pest control methods,

- 4) schools should notify students, teachers, staff and parents prior to applying pesticides,
- 5) schools should ensure that pesticide decision makers and pesticide applicators receive additional training, and possibly, licensing, and
- 6) people that apply pesticides inside schools should be trained and certified by the University of Nebraska and licensed by the Nebraska Department of Agriculture.

The University of Nebraska Cooperative Extension is committed to helping each Nebraska school system 1) develop and implement an IPM plan, 2) reduce the amount of pesticides applied, 3) increase the use of reduced-risk pest control methods, 4) reduce pest populations through prevention methods, and 5) gain a better understanding of IPM concepts.

Overcoming Barriers to Implementing IPM

Question 32 of the survey asked respondents to comment about barriers to implementing an IPM program. Some respondents said that it would cost too much (40%). Others indicated that it would take too much time/paperwork (20%), and that it would be too difficult coordinating with the pest control company (9%) (Table32a). These barriers represent concerns about additional time commitments and increased costs that could be required to implement IPM.

The concern about time and money is understandable, but there are a number of advantages of using IPM that outweigh these concerns. For schools that do not currently have an IPM plan, an initial effort would be needed to develop one. Assistance offered by Cooperative Extension would provide the necessary background information to help school administrators write such an IPM policy. Initially, IPM may be more expensive to implement than routine pesticide applications. Long-term costs of IPM, however,

are less because more proactive, permanent strategies are used to prevent pest problems before they start.

For IPM to work properly, accurate records and better communication between school staff and the pesticide applicators will be required. Better record-keeping provides a historical record of pest activity and control actions that makes future decisions easier. Accurate records would also be invaluable in the event of legal action taken against a school district.

The use of IPM requires greater knowledge and skill than traditional pest control practices and may require on-going training. It is essential to have people that make decisions and/or apply hazardous chemicals to be carefully trained so low toxic approaches are used whenever possible, and if it is necessary to use pesticides, no unnecessary risks to students, teachers, staff, and the environment are experienced. Any short-term costs associated with training will pay dividends over time as less toxic pesticides are used, resulting in a safer environment for students, teachers, and staff.