

EPA docket ID Number: EPA-HQ-OPP-08-001

Project title: Implementation of Integrated Pest Management (IPM) in Colorado Schools

Project Coordinator: Assefa Gebre-Amlak

Extension Specialist

Colorado State University Extension

525 15th Avenue

Greeley, CO 80631

970-304-6535 Ext.2074 (ph.)

970-351-0415 (fax)

Assefa.Gebre-Amlak@Colostate.Edu

Sandra K. McDonald

Environmental and Pesticide Education Specialist

Colorado State University

1177 Campus Delivery

Fort Collins, CO 80523-1177

970-491-6027(ph.)

970-491-3862 (fax)

sandra.mcdonald@colostate.edu

Laura Pottorff

Colorado Department of Agriculture

Division of Plant Industry

700 Kipling St. Suite 4000

Lakewood, CO 80215-5894

303-239-4178 (ph)

303-239-4195 (fax)

laura.pottorff@ag.state.co.us

John Scott

Colorado Department of Agriculture

Division of Plant Industry

700 Kipling St. Suite 4000

Lakewood, CO 80215-5894

john.scott@ag.state.co.us

Project Duration: 2 years

1st year fund request: \$21,580

2nd year fund request: \$21,433

Total funding Request: \$43,013

Executive Summary

We believe pesticides used in schools are a serious concern because school children are affected more profoundly than adults by the side effects of pesticide exposure. According to the National Research Council report in 1993, the risk of harm from exposure to pesticides is relatively higher for infants and children than for adults exposed at the same levels.

These concerns about risks of pesticide exposure to children have led to adoption of Integrated Pest Management (IPM) in schools in many states. The Monroe Model is designed to facilitate the transition from traditional pest control practice to a contemporary and verifiable IPM program in school districts. The use of this model in 10 school districts in seven states resulted in an average 71% reduction in pesticide applications and 78% reduction in pest complaints to school administrations.

The goal of this project is reduce pests and pesticide applications in Colorado schools. To achieve this goal the first objective is to develop a verifiable IPM program in pilot schools in a selected school district during the first year of the project. Pilot schools will be selected with the help of school districts interested in working with the IPM Implementation Team. We have formed a “School IPM Implementation Team” with members from the Colorado Department of Agriculture, Colorado State University, private pest management industry, school districts and local communities. This team has initiated an IPM in Schools survey to determine the current level of IPM implementation and to identify schools and school districts that are interested in piloting the program.

The pilot program will begin with school staff interviews and intensive site inspections or audits during the first year of the project. The school premises will be inspected internally and externally by the IPM Implementation Team to identify active pest infestation, pest-conducive conditions and perceived pests in the school.

The other major objective of our project is to educate school community members involved with IPM implementation in pilot schools. The School IPM Team will develop a training program for pilot school faculty and staff. The Monroe Model identifies the custodians, kitchen staff and maintenance crew as the key personnel who have ample opportunity to avoid and mitigate pest-conducive conditions during routine duties.

During the second year, IPM implementation will be expanded to other schools in the district and school districts. Interested schools will be working with the pilot school staff and our team to implement the program. To facilitate expansion of IPM implementation, school districts will assign an IPM Coordinator to handle program activities and work with the IPM Team and other schools in the district.

Project Narrative

I. Project Title: Implementation of Integrated Pest Management (IPM) in Colorado Schools

II. Project Description and Objectives

Purpose: This project will facilitate the implementation of verifiable IPM programs in schools to reduce pests and pesticide applications.

Objectives

1. Implement verifiable school IPM programs in pilot schools.
2. Expand IPM implementation from pilot schools to more schools in the selected district.
3. Reduce pests and pesticide applications in schools.

Rationale

Pest problems occur in rural as well as urban settings including crop fields, parks, homes, schools etc. Dependence on synthetic pesticides as conventional means to control pests in different settings has resulted in serious environmental pollution and health problems.

Children's exposure to pesticides in schools has been a serious concern because they do not have the awareness of side effects of pesticides. In addition, according to the National Research Council report (1993), the risk of harm from exposure to pesticides is relatively higher for infants and children than for adults exposed at the same levels.

Because of their small size and faster metabolism, children are more susceptible to the adverse effects of pesticide exposure than adults. Pesticide exposure may have an immediate and/or long-term effect on children. Several pesticides, such as pyrethrins and pyrethroids, organophosphates and carbamates (some still commonly used in schools), are known to cause or exacerbate asthma symptoms (Eskenazi 1999; Rajotte 2004; Towhid Salam 2003).

Asthma is one of the nation's most significant and fastest-growing chronic health threats to children under 18 (Bonilla et al. 2005). It is the leading cause of school absenteeism, estimated at 12.8 million lost school days in 2003 (CDC 2003). The estimated cost of treating asthma in those younger than 18 years of age is \$3.2 billion per year. The Centers for Disease Control recommends reducing pest infestations and implementing IPM in schools as the effective primary strategies for addressing asthma in school children.

Though we do not have information on pesticides used in Colorado schools, a number of pesticides commonly used in schools elsewhere have been identified as neurotoxins, carcinogens or developmental and reproductive toxins by US EPA and other authorities (US Environmental Protection Agency 2007). Yet these products and uses persist in schools when effective, affordable and less hazardous options are available. Learning

ability and long-term health can also be directly affected by children's exposure to certain pesticides (Rauh et al. 2006). Children spend a significant amount of time in schools.

The implementation of IPM in ten school districts, in seven states (1-10 years duration) resulted in an average 71% reduction in pesticide applications and 78% reduction in pest complaints to school administrations (Gouge et al. 2006). Many organizations and agencies have long recognized the benefits of IPM in urban environments: IPM for schools is specifically recommended by the National Parent-Teachers Association in a position statement, the National Pest Management Association and the Entomological Society of America (NPTA 1992; NPMA 2000; ESA 2007).

The Monroe IPM Model is designed to facilitate the transition from traditional pest control practice to a contemporary and verifiable IPM program in school districts.

This IPM model has been successful in the school environment because cultural and mechanical strategies can be incorporated into existing custodial and maintenance activities such as sanitation, energy conservation, building security and infrastructure maintenance.

We have formed a School IPM Implementation Team consisting of members from the Colorado Department of Agriculture, Colorado State University, school districts, pest management professionals (industry) and local communities to coordinate activities and provide training and technical support to schools and school districts.

Some of the barriers that probably limit implementation of IPM in schools include lack of incentive for IPM adoption and lack of understanding about IPM by the school administration/board. The Implementation Team will establish a close working relationship with schools and districts implementing IPM to overcome these barriers.

Project Activities

Objective 1: Implement a verifiable IPM program in pilot schools

The Monroe IPM Model will be used to implement IPM in Colorado schools. During the first year of the project, a school district interested in IPM adoption will be identified with help of school IPM members from Colorado school districts to initiate a pilot demonstration program.

Three schools (one high school, a middle school and an elementary school) will be selected for the Pilot IPM Program during the 1st year and the IPM Implementation Team will develop a working relationship with these schools. Our team will conduct a series of meetings with faculty, staff and others (nurses, parents, volunteers and pest management contractors) of pilot schools to demonstrate that IPM allows schools to more effectively manage pests while maintaining the safest learning environment.

The IPM Team will monitor or audit each school for common pests and conditions conducive to pest entry and infestation in the beginning of the program. A detailed audit

that reports active infestations, pest-conducive conditions, and perceived pests will be generated. Action items such as immediate, short-term, and long-term priorities for management strategies will be identified.

The IPM Team will develop a training program for pilot school faculty and staff to recognize pests, pest infestations and pest-conducive conditions. Training will be given two to three times a year. It will help participants to “do what they are doing now, just think pests.”

This will include training of custodians, kitchen staff, maintenance personnel, faculty and administrators to incorporate IPM into their existing operational activities. Custodians will learn how to identify areas and situations that are conducive to pests and how to correct these situations. Maintenance personnel will learn how to identify pest entrances into school and how to correctly seal them.

Additional pest audits will be conducted at mid-term and at the end of the Year One implementation period to generate any necessary remediation activities.

Pest-monitoring traps and pest-sighting logs will be used to report pest problems. Monthly IPM newsletters will be produced on issues relevant to the season and will be distributed to districts electronically. This newsletter will be available to faculty, staff, students and parents at the pilot schools.

The school district will be asked to appoint an IPM Coordinator (Specialist). The IPM Coordinator will have district-wide responsibility that includes pest management duties. The IPM Coordinator will become the point person for the IPM Team and will communicate with the district’s decision makers, who can ensure any necessary cultural and mechanical remediation.

Objective 2: Expand IPM implementation from the pilot program to additional schools and school districts

The Pilot IPM Program will be evaluated for its effectiveness in terms of reducing pests and pesticide applications at the end of Year One. Pest applications and pre- and post-pesticide applications will be compared. It will allow early demonstration of effectiveness of IPM and will provide adopters with an immediate benefit.

The IPM Team and District IPM Coordinator will identify schools interested in implementing IPM in the district. Together with the pest management professionals, the IPM Coordinator will assume the role of diagnostician and educator for the district.

The IPM Implementation Team will assist and provide technical help to the District IPM Coordinator and will assist with diagnostic and educational training in new schools where IPM will be implemented. Our team will interact monthly with the pilot community, contracted pest management service provider(s) and the District IPM Coordinator.

The District IPM Coordinator along with pest management professional (in-house or contracted) will determine the need for pesticide applications based on the presence of economic pest infestations in schools.

Pest audits will be conducted in the expansion schools in Year Two. This will include an initial, mid-term and end-of-year audit. The initial audit will include information on immediate action items, mid-term and long-term actions such as eliminating pest-conducive conditions, sanitation and exclusion of pests.

Pest-monitoring traps and pest-sighting logs will be used and the presence of any pests will be reported by pest management professionals and/or the District IPM Coordinator. Monthly IPM newsletters will be produced on issues relevant to the season and distributed to districts electronically. This newsletter will be available for faculty, staff, students and parents.

Expansion schools will be evaluated on their performance as IPM adopters after one year. This evaluation will be the same as for the Pilot Schools.

Objective 3: Reduce pests and pesticide applications in schools

IPM activities including staff training, pest monitoring, sanitation and exclusion will reduce pest problems and pesticide applications in schools. Pesticide applications will be based on the actual pest infestations and economic threshold levels for pests that occur in schools.

The District IPM Coordinator and pest management professionals will record of pest occurrence and pesticides applied in school. These will include the pesticide, application rate and method, specific pest problems, the number of pesticide applications and expenses of the applications (labor/materials).

Pesticide records will be obtained from schools by the IPM Team to determine the success of IPM implementation.. Other costs including maintenance to buildings (i.e, fixing door sweeps, eliminating gaps and pest-conducive conditions) will be recorded.

III. Background information

In 2006, there were 794,026 students in 1,771 public schools within the 178 school districts in Colorado; while the non-public schools (379) had 56,118 students (www.ced.co.us).

Data on the types of pest management practices in Colorado schools are not available. Currently, we are working with school districts to obtain data through a school survey with initial funding secured from the Colorado Department of Agriculture.

Children's exposure to pesticides in schools has been a serious concern. In addition, according to the National Research Council report, the risk of harm from exposure to pesticides is relatively higher for infants and children than for adults exposed at the same levels.

The major goal of our project is to reduce pests and pesticide applications in Colorado schools by implementing a verifiable IPM program using the Monroe Model in 2008, 2009 and beyond. This will reduce exposure to pesticides and create safe school learning environments.

Similar IPM implementation in ten school districts, in seven states (1-10 years duration) resulted in an average 71% reduction in pesticide applications and 78% reduction in pest complaints to school administrations (Gouge et al. 2006).

Many organizations and agencies have long recognized the benefits of IPM in urban environments: IPM for schools is specifically recommended in a position statement by the National Parent-Teachers Association; the National Pest Management Association and the Entomological Society of America (NPTA 1992; NPMA 2000; ESA 2007).

The Monroe IPM Model is designed to facilitate the transition from traditional pest control practice to a contemporary and verifiable IPM program in school districts.

This model has been successful in the school environment because cultural and mechanical strategies can be incorporated into existing custodial and maintenance activities such as sanitation, energy conservation, building security and infrastructure maintenance.

We have formed a School IPM Implementation Team consisting of members from the Colorado Department of Agriculture, Colorado State University, school districts, pest management professionals and local communities to coordinate activities and provide training and technical support to schools and school districts.

Our limited communication with schools and school districts to date indicates there is interest in implementing IPM in Colorado to create a safe learning environment for children.

IV. Resources

We have formed a School IPM Implementation Team for Colorado representing organizations including Colorado Department of Agriculture, Colorado State University, Colorado Department of Health, school districts, a private pest management company and other business sectors. The IPM Team is developing implementation strategic planning to launch the program.

The Colorado Department of Agriculture has provided initial funding for a baseline survey to obtain information on IPM in schools in Colorado and to identify schools interested in implementing IPM.

The Project Coordinator has participated in the existing PESP program in Utah, and as a member of the Western States School IPM Working Group has taken part in the group

meeting and conference calls. The Colorado IPM team will be collaborating and sharing experiences with these groups.

Our team will collaborate with Drs. Dawn Gouge (University of Arizona) and Marc Lame (Indiana University) for training, pest audit and pest press during the pilot demonstration and expansion periods. Both have successful school IPM programs in their respective states.

In addition, Dr. Whitney Cranshaw, Colorado State University entomologist, and his associates will be involved in pest identification and training of school staff and faculty.

Dr. Debra Young, CSU Extension Director and Dr. Tom Holtzer, Head of the Department of Bioagricultural Sciences and Pest Management (BSPM) will provide administrative as well as technical supports for the program in their respective capacities.

County extension agents will work closely with the IPM Team and District IPM Coordinator to organize meetings and training workshops in schools.

V. Performance Measures and expected Outcomes and Outputs

The major goal of our project is to reduce pests and pesticide applications in Colorado schools. In the short term, the pilot school district will be impacted by implementing IPM in their schools. In the long term, we plan to expand IPM implementation in additional schools districts to create a safe learning environment for Colorado children.

This project will have the following specific outcomes:

- Reduced Pest problems in schools
Measures: the number and abundance of pest species in sticky traps, and the number of pest-conducive conditions pre- and post-IPM implementation will be compared.
- Reduced pesticide applications in schools
Measures: pesticide use records will be obtained from all IPM-implementing schools for comparing the type of pesticides and number of applications pre- and post- IPM implementation.
- Improved knowledge of pest identification, pest-conducive conditions and pest management
Measures: We will develop a survey to assess the improved knowledge of faculty, staff, principals and administrators in pest identification and their opinion before and after IPM implementation in their schools.

VI. Outreach and Transferability

During the first year of the project, the pilot schools will be used as demonstration sites for IPM use in schools. Schools within the same district and/or other districts will visit pilot schools as part of an outreach program.

During the expansion period (Year Two), the IPM Team and District IPM Coordinator(s) will conduct pest audits and training for faculty, staff and school administrators in other schools/districts interested in IPM implementation.

The impacts of IPM implementation in schools in terms of reducing pests and pesticide applications will be presented at meetings of the Colorado Department of Education and school districts.

School districts that have successfully implemented IPM will be recognized through plaques, certificates and positive media exposure.

In addition, data on reducing pests and pesticide applications in schools will be presented in workshops/conferences and published in research and extension bulletins.

VII. Sustainability

Our IPM team will facilitate IPM implementation through training, demonstration and collaborations during the pilot program as well as the expansion periods. The trained school faculty, staff and administrators will incorporate IPM into their existing job responsibilities in their schools and districts.

The District IPM Coordinator will work closely with pest management professionals and the School IPM Team to provide IPM training and leadership in his/her district and other school districts.

Each school district will take ownership of their IPM programs. Additional staff training will be provided by district IPM Coordinator as necessary.

The Colorado IPM team will develop a school IPM web site where all necessary resources including training materials, pest management newsletters and diagnostic information will be available for schools.

As well as At the end of the project period, school districts and extension offices will work together to provide training and other resources needed for full adoption of IPM.

VIII. Budget

IMP Implementation in Colorado Schools

IX. Environmental Results and Past Performance

Colorado State University (CSU) has performed a large number of federally funded assistance agreements the last three years. The following are among EPA agreements,

1. Analysis of Soil Carbon Exchange
2. Ecological Thresholds and Responses of Stream Benthic Communities to Heavy Metals
3. National Agricultural Greenhouse Gas Inventory of Soil Organic and N₂O Emission
4. Onion Thrips and its Yellow Spot Virus Management with Mulch and Biologically-based insecticides in Colorado
5. Onion Thrips and its Yellow Spot Virus Management: On-Farm Demonstration

X. Programmatic Capacity

EPA assistance agreements similar or related to our proposal performed by CSU include;

- Mitigating Environmental Risk Associated with Over Application of Pesticides Due to Enhanced Degradation in Crop Fields
- Innovative Precision Management Strategies to Reduce Pesticides and Nitrogen Loading into soil
- Reducing the Pesticide use by Floriculture Professionals in Inter-mountain Western Region
- Reducing Pesticide Use in Potatoes by Using Control Crops and Compost Tea

References Cited

Colorado Department of Education (CDE): <http://www.cde.state.co.us>

Center for Disease Control. 2003 (CDC). Asthma.

<http://www.cdc.gov/HealthyYouth/asthma/>

Eskenazi B, Bradman A, Castorina R. 1999. Exposures of children to organophosphate pesticides and their potential adverse health effects. *Environmental Health Perspectives.* 1999; 107(S3):409-419.

U.S. Environmental Protection Agency (EPA). 2004. Report on 2004 activities, Environmental Stewardship Branch. EPA Website. Available at: <http://www.epa.gov/oppbppd1/peps/publications/2004-report.pdf>

Entomological Society of America. 2007 (ESA). Integrated Pest Management (IPM) in Schools http://www.entsoc.org/resources/position_papers/school_ipm.htm

Gouge, D.H., M.L. Lame, and J.L. Snyder. 2006. Use of an implementation model and diffusion process for establishing Integrated Pest Management in Arizona Schools. *Amer. Entomol.* 52 (3): 190-196.

National Pest Management Association (NPMA). 2000. NPMA promotes responsible pest management in schools (press release, January 4, 2000). NPMA, Dunn Loring, Virginia.

National Parent Teachers Association (NPTA). 1992. Position statement: the use of pesticides in schools and child care centers. NPTA, Chicago, Illinois.

Rajotte, A. 2004. Asthma and pesticides in public schools: Does the ADA provide a remedy where FIFRA fails to protect? *Boston College Environmental Affairs Law*

Review 31:149-175. (http://www.bc.edu/schools/law/lawreviews/meta-elements/journals/bcealr/31_1/05_TXT.htm)

Rauh V. A. , Garfinkel R., Perera F. P., Andrews H. F., Hoepner L, Barr D. B., Whitehead R., Tang D., Whyatt R. W. 2006. Impact of prenatal chlorpyrifos exposure on neurodevelopment in the first 3 years of life among inner-city children. *Pediatrics*. 2006 Dec;118(6):e1845-59. Epub 2006 Nov 20.

Towhid Salam, T., Y. Li, B. Langholz, and F.D. Gilliland. 2004. Early-life environmental risk factors for asthma: Findings for the Children's Health Study. *Environ. Health Perspectives* 112: 760-765.