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PROPOSAL TYPE

For National Research Initiative Competitive Grants Program Proposals Only

[ ] Standard Research Proposal
[ ] Conference
[ ] AREA Award
  [ ] Postdoctoral
  [ ] New Investigator
  Strengthening:
  [ ] Career Enhancement
  [ ] Equipment
  [ ] Seed Grant
  [ ] Standard Strengthening

Project Title:

Master Gardener-facilitated IPM education for homeowners

Key Words: IPM, pesticides, homeowners, consumers

For Higher Education Program Proposals Only:

Need Area: _____

Discipline: _____

SUMMARY

We propose a multi-state IPM Issues Project to maximize the effectiveness of outreach to homeowners by working through Master Gardeners in Maryland, Delaware, and West Virginia. We will develop, implement, and evaluate educational materials aimed at increasing homeowners' knowledge and adoption of IPM and safe pesticide handling practices. Outreach materials will include a Web-based IPM education tool as well as educational brochures and a PowerPoint presentation. The brochures and presentation will be distributed/implemented by Master Gardeners at various venues.

Evaluation of program success will be a key element of the project. Homeowners' attitudes, knowledge, and use of IPM strategies will be assessed prior to and following outreach. Those who contact Master Gardeners either in person or by telephone will be asked to answer a brief questionnaire concerning IPM knowledge and attitudes before and after the interaction with the Master Gardener. They will also be solicited to participate in a survey to be conducted at the end of the growing season. Users of the Web-based tool will also be solicited for participation in the post-season survey. Data will be analyzed and results will be used to refine the program in future years. The materials developed and subsequently refined using the feedback from the study will be made available to the other states in the Northeast. The procedures used to implement the program can also be adapted for other states at that point.

I. PROJECT DESCRIPTION

A. Priorities Addressed

This proposal addresses priorities / areas of emphasis developed by (1) the Northeastern IPM Center (NE IPMC), (2) the Community IPM Working Group, and (3) the Northeast Research, Extension, and Academic Program (NEREAP) Committee for IPM and (3) as follows:

- General IPM Priorities for the Northeast, 2006. Community IPM Priority 1: Coordinated public awareness program to promote IPM to consumers. Community IPM Priority 2: Help homeowners understand the concepts and correct practices of IPM (fact sheets, educational outreach, tools that help increase knowledge and awareness of the practices that they can put into place).

- Community IPM Working Group, 2007. Priority 1: Expand communications and outreach through IPM based educational materials targeting residents on issues that affect human health and water quality.

- Community IPM Working Group, 2005. Priority 2: Develop and create an outreach campaign for residential IPM (radio, TV, and other creative forums). Develop material and distribute to end-users. Measure success of project.

- NEREAP, 2006: Area of Emphasis for IPM in the Northeastern Region of the United States: Use of web-based technologies for IPM decision making.

- In addition, although the targeted audience differs, the project also addresses General IPM Priority for the Northeast, 2006: Communications and Training for IPM Users Priority: Assess the effectiveness of electronic-based communications to IPM users (growers, practitioners).

B. Problem, Background and Justification

Anecdotal information suggests homeowners often choose a simple pesticide solution rather than utilizing IPM approaches. When homeowners do choose to use a pesticide, either alone or as part of an IPM approach, there is concern that safe use practices may not be implemented.

It is evident that there is a need for homeowner outreach concerning IPM, and pesticide safety. The Pesticide Program Dialogue Committee (PPDC) Consumer Labeling Work Group (PPDC-CLWG) has identified consumers' general failure to read and follow the pesticide label as a problem. The PPDC-CLWG found that providing background on the reasoning behind certain label statements would likely increase consumers' compliance with label directions (Wible and Spagnoli, 2006). States throughout the U.S. have implemented various approaches to educating homeowners about IPM and safe pesticide handling, but rarely has the impact of these approaches been studied.

Direct outreach to homeowners has rarely been reported in the peer-reviewed literature. One such project involved direct outreach to women who were pregnant or had small children and

visited health clinics. The women were given an educational pamphlet along with a brief oral message about pesticide safety. The authors concluded that the use of pamphlets and brief verbal reinforcement in the clinical setting was effective in increasing knowledge about pesticides and alternatives to pesticide use (Sklansky et al., 2003).

A mass media campaign conducted in Seattle, Washington between 1997 and 2000 featured the use of the media to spread the message of "natural lawn care" which included the reduction of pesticide use on lawns and in gardens (Reilly 2001). This campaign made use of the character, Bert the Salmon, to spread the message "When it comes to your lawn, act naturally". Bert the Salmon became the campaign leader and was featured in television and radio, at promotional events, educational events, and in distributed informational materials to support the case. This project did evaluate the impact of the outreach and after four years of media advertising; it was concluded that the campaign resulted in about a 13% increase in homeowners who leave grass clippings on the lawn, and about the same increase in the reduction of pesticide application to lawns. This success story did not come without a considerable cost, as project estimates for the four year campaign totaled well over $1,000,000.

Another logical and less costly approach to improve homeowners' knowledge of IPM principles and safe use of pesticides has involved outreach through retailers that sell pesticides. A 2007 informal survey of members of the American Association of Pesticide Safety Educators (AAPSE) showed that, while several states have implemented such projects, working with retailers and developing sustainable outreach projects has been difficult due to a variety of reasons. Factors that have proven difficult to resolve include high rates of retail worker turnover, increased desire to promote a sale versus spending time educating clientele, and inconsistency in how information is provided to the consumer. A project implemented in 2001 involved the creation of training sessions for retail employees in Illinois on aspects of IPM and pesticide safety (Czapar et al 2004). These investigators concluded that the stores were generally open to implementing educational programming, but problems such as time concerns and the inability to maintain staff undermined the potential effectiveness of the project.

In 2002, The Alliance for the Chesapeake Bay began an outreach project to promote the use of "Integrated Pest Management (IPM) strategy that makes use of the least toxic, most effective method of control for a specific pest" (Alliance for the Chesapeake Bay, 2007). They aimed to do this by providing outreach through retailers and through Master Gardeners. Promotional materials were placed in retail stores, and employees were educated about IPM through in-store presentations. It was concluded that the retailer outreach was successful as measured through increased sales of products considered less toxic (Alliance for the Chesapeake Bay Online, 2007; Canadian Centre for Pollution Prevention, 2004). Unfortunately, the researchers did not solidify a relationship with Cooperative Extension and Master Gardeners prior to implementing the study. By failing to do this, half of their outreach program disintegrated before the idea could be thoroughly examined.

A dual state study in Indiana and Illinois investigated whether an educational program for Master Gardeners would be an effective means to minimize insecticide use and increase adoption of biological control techniques against garden pests (Sadof et al 2004). Along with the educational program, the participating Master Gardeners were taught tools for conducting research and asked

to carry out small-scale studies in their gardens during the growing season. The researchers concluded that an increase in the use of biological control was more likely in those who "conducted research and also reduced their use of pesticides after workshops." This study provides evidence that educational programs can impact the behavior of Master Gardeners; however, it did little to examine the impacts of knowledge transfer to the homeowner.

Other forms of homeowner outreach include Web sites aimed at promoting awareness of IPM, answering homeowner questions and providing further means for assistance within the gardening realm. These Web sites vary based on the publisher of the information and the intended target audience of the information. Evaluations of the sites' effectiveness have not been published.

Most projects conducted to date have been pure implementation projects. The small amount of research conducted has focused primarily on the availability of information through various venues; measurement of the impacts on behavior of homeowners has generally not been addressed. According to Varlamoff et al. (2002), "it appears that free availability and convenience are overriding factors in a homeowner's choice of gardening information source." Another factor in consumers' use of information is whether arguments made for adoption of a particular practice are in line with what the consumer considers important. Frequently, educators design materials based on their own biases regarding arguments they expect to be influential. In fact, these biases may not be held by the audience they seek to influence, with the result that acceptance of the message is poor and adoption of desired changes not accomplished. Social marketing strategies seek to identify motivators and barriers to acceptance as reported by the targeted audience.

Master Gardeners are volunteers who interface with the public on various matters related to all aspects of gardening. In Maryland, Master Gardeners emphasize the importance of using an IPM approach to prevent and control pests in their gardens, lawns, and landscapes, but they do not currently have consistent materials written for a homeowner audience which they can offer to their clientele. Maryland Master Gardeners have identified targeted knowledge/adoption of general IPM principles by homeowners as a primary goal. They have also identified potential overuse of imidacloprid by homeowners as a concern. We propose a project that will provide IPM education to homeowners through Master Gardeners and an on-line tool. Our proposed project will incorporate two thrusts: 1) education for homeowners on general principles of IPM, and 2) specific education on an IPM approach to controlling pests targeted by imidacloprid. With convenience and free availability in mind, we propose a model based on these principles to provide IPM outreach to homeowners and to assess its effectiveness in terms of homeowners' adoption of improved practices.

C. Project Overview

This IPM Issues Project seeks to maximize the effectiveness of outreach to homeowners by working through Master Gardeners in Maryland, Delaware, and West Virginia. We will develop, implement, and evaluate educational materials aimed at increasing homeowners' knowledge and adoption of IPM and safe pesticide handling practices. Outreach materials will include written materials, a PowerPoint presentation, and a computer-based program and will be distributed/implemented through Master Gardeners. The materials developed will be made

available to the other states in the Northeast. The procedures used to implement the program can also be adapted for other states.

Evaluation of program success will be a key element of the project. Homeowners' attitudes, knowledge, and use of IPM strategies will be assessed prior to and following outreach. Those who receive outreach materials will be asked to answer a brief questionnaire concerning knowledge and attitudes. They will also be solicited to participate in a survey to be conducted at the end of the growing season. Data will be analyzed and results used to refine the outreach program in future years

D. Preliminary Work

In a series of meetings between the project director, a graduate student, Master Gardeners, and key state specialists active in Master Gardener training and oversight, we have agreed on elements desired by the Master Gardeners to address concerns they have identified. Through the state Master Gardener and leading Master Gardeners, we have developed an agreement to implement key aspects of the proposed project through Master Gardeners in Maryland. Unlike the project conducted by the Alliance for the Chesapeake Bay, our plan has already been embraced by Master Gardeners who are eager to incorporate the materials we will provide into their outreach.

E. Procedures

1. Development of educational materials. Three brochures, a PowerPoint presentation, and a Web-based educational IPM tool will be developed. The University of Maryland will take the lead on developing all educational materials. Cooperators in Delaware and West Virginia will assist through reviewing and refining the materials. To ensure that the educational materials meet the expectations and needs of Master Gardeners who will be responsible for implementation and distribution, Master Gardeners will be involved in development of all of the educational materials.

- One brochure will present best management practices / IPM practices for home gardens, lawns, and landscapes and will concentrate on simple approaches that could be adopted by homeowners for situations prevailing in the Northeast. Among others, concepts to be presented include the importance of identifying pests; using thresholds to determine whether control is necessary; using pest control strategies that are least toxic to humans, beneficials, and the environment; and the importance of reading the label if a pesticide is chosen.

- The second brochure will address IPM approaches to pest problems for which many homeowners are reported to be using imidacloprid. While imidacloprid use can be appropriate for controlling various pests, Maryland Master Gardeners have expressed concerns about possible overuse of this insecticide. They have noted that homeowners may simply be purchasing products on the basis of advertisements or store displays, without knowledge of whether they have a pest that needs to be treated. Concepts to be presented include how to define an infestation, assessing appropriate options, and avoiding development of resistance.

- Because pesticides in general may be an appropriate part of an IPM approach, the third brochure will focus on best pesticide handling practices for homeowners. A broad range of safety procedures will be addressed. This brochure will also present the reasoning behind some label language and/or recommended procedures, which is a technique suggested by the PPDC-CLWG to improve label compliance by consumers. For instance, some labels state "Do not apply when heavy rainfall is expected." The brochure will explain that rainfall can move the product off-target, decreasing the effectiveness of pest control and increasing the chance of contaminating water sources or adversely affecting habitat for fish and aquatic wildlife.

- A PowerPoint presentation will be developed for Master Gardeners to use. The presentation will address general principles of IPM. The set will include a script. Master Gardeners will be able to use the presentation in its original form or adapt the presentation to specific needs, depending on their audience and specific pests.

- A Web-based IPM educational tool will be developed. The application will address general principles of IPM. Specific topics include importance of pest identification, concepts of pest threshold, decision criteria, range of pest management strategies, protection of beneficials, best pesticide handling practices, etc.

2. Outreach at farmers' markets and plant clinics.

- Outreach to homeowners will be conducted through Master Gardeners volunteering at the Annapolis Farmers Market and other plant clinics in Maryland, Delaware, and West Virginia throughout the 2008 growing season. One of the largest and best-attended plant clinics is offered every Saturday on the grounds of the Annapolis farmers' market in Anne Arundel County, Maryland throughout the spring, summer, and fall months. The Master Gardener booth at the Annapolis Farmers Market receives approximately 2,800 visitors annually; attendance at plant clinics at other venues is variable and has not previously been quantified. By incorporating the Master Gardener plant clinic in Anne Arundel County, we will reach a significant number of homeowners and can expect to solicit a reasonably large number of respondents to the pre- and post- interaction surveys. Participants from other venues throughout the three states will enlarge this base.

- Some Master Gardeners in the three-state area interface with homeowners through more structured outreach at plant clinics held on demand at various locations. These Master Gardeners give presentations to homeowners on various subjects of interest, including IPM, and may choose to include the IPM PowerPoint presentation at these venues.

- Master Gardeners will distribute the three IPM brochures as appropriate at plant clinics, farmers markets, and other venues.

- Master Gardeners will administer brief initial surveys to homeowners during their visit to the farmers' market, plant clinics, etc. The survey questionnaire will characterize homeowners' attitudes and knowledge about IPM as well as their responses to several arguments for

adoption of IPM.

- Master Gardeners will solicit clientele to participate in a post-season survey to determine changes in attitudes, knowledge, and adoption of IPM and pesticide handling practices. Users who wish to participate will be asked to leave their email address with the Master Gardener, or to visit the Web-based IPM application (see below) to sign up for the post-season survey. Individuals who are willing to participate but do not have access to email will be asked to provide contact information so they may be mailed a questionnaire. Willing participants will be contacted in the fall of 2008 and asked to complete a survey to assess changes in adoption of IPM and pesticide best handling practices.

2. Outreach through the Web-based application.

- Master Gardeners will provide clientele (in person or via telephone) with the URL for the Web-based IPM education tool. The URL will also be printed on the IPM brochures. The Web application will be designed with non-obligatory pre- and post-interaction surveys on knowledge and attitudes concerning IPM and pesticide safety. The application will also ask whether the user is willing to provide an email address to participate in the post-season electronic survey. Users who wish to participate will submit an email address through the Web-based tool. They will be contacted by email in the fall of 2008 and asked to complete a survey to assess changes in attituteds, knowledge, and adoption of IPM and pesticide best handling practices.

F. Evaluation / Assessment

1. Pre-interaction questionnaire, to be administered to visitors at plant clinics or other Master Gardener venues prior to PowerPoint presentations and/or distribution of brochures.

- A brief questionnaire will test consumers' knowledge and attitudes toward IPM. The questionnaire will also assess responses (positive or negative) to general arguments made for implementation of IPM, including decreasing potential for runoff to the Chesapeake Bay and other water sources, lessening the chances for development of pest resistance to pesticides, reducing the potential for adverse effects on beneficials, and minimizing potential exposure of family members and pets to pesticides. Consumers' ratings of how meaningful the arguments are to them will be captured and analyzed and will be used in developing future outreach materials for the homeowner audience.

2. Post-interaction questionnaire, to be administered to visitors at plant clinics or other Master Gardener venues following PowerPoint presentations.

- A brief questionnaire will test consumers' knowledge and attitudes toward IPM as a result of the PowerPoint presentation. As the post-interaction survey is designed to be administered immediately after the outreach, it is not appropriate to test the brochures through this method, since consumers will not have had a chance to read and absorb the materials prior to the post-test. The post-interaction survey will ask whether the participant plans to consider using an IPM approach. It is expected that more individuals might be willing to participate in both the

pre- and post-interaction surveys than the post-season survey. Thus, although the post-interaction survey cannot assess actual adoption of IPM, the results will be valuable as an interim estimator.

3. Post-season survey, to be administered in fall of 2008 to homeowners who agreed to participate in the survey. (Includes people who agreed during visits to plant clinics or other Master Gardener venues as well as those who agreed through the Web-based tool.)

- A questionnaire will assess participants' change in knowledge, attitudes, and adoption of IPM and safe pesticide handling practices. The post-season survey is an appropriate tool to test all three methods of educational outreach, but will likely return a smaller number of responses than the pre- and post-interaction surveys. The survey will be administered by one of two methods, depending on the participant's electronic capabilities.

  a.) Electronic administration/data collection – Individuals who agreed to participate in the post-season survey and who submitted email addresses will be contacted and asked to complete and return the survey questionnaire via email.

  b.) Administration/data collection through U.S. mail – Individuals who agreed to participate in the post-season survey and who submitted street addresses will be mailed the survey questionnaire and a stamped, return-addressed envelope.

G. Project Subparts

Table 1. Project subparts.

Project Subtitle	Master Gardener-facilitated IPM education for homeowners: **Development of educational materials**	Master Gardener-facilitated IPM education for homeowners: **Implementation and assessment**
Type of project	C. Regional IPM Publications	B. IPM Issues
Funds requested	$18,400	$37,250
Scope of project / integration into overall project goals	1). Development, printing, and distribution of three IPM brochures: (a) general IPM principles for homeowner implementation; (b) IPM approach to pests for which homeowners use imidacloprid; and (c) best pesticide handling practices. A total of 14,000 copies of each brochure will be produced. Because of the large farmers'	I. Implementation of educational materials by Master Gardeners in MD, DE, and WV. II. Development, administration, and analysis of pre- and post-interaction surveys on homeowner knowledge and attitudes toward IPM; development,

	market venue for distribution, MD will receive 3,000 copies of each brochure; DE and WV will receive 1,000 copies each. The remaining copies will be offered to states in the Northeastern region through their IPM Coordinators. 2.) Development and distribution of a PowerPoint presentation on general IPM concepts. The set will be distributed to Master Gardeners in the project within MD, DE, and WV via the state facilitators. A copy will also be sent electronically to the IPM Coordinator for each of the other states in the Northeast. 3.) A Web-based educational IPM tool for the homeowner/consumer general audience.	administration, and analysis of post-season survey on homeowners' adoption of improved IPM / pesticide safety practices.
Evaluation/Assessment	1.) Number of brochures distributed to homeowners in MD, WV, and DE. 2.) Number of presentations made to homeowners in MD, DE, and WV by Master Gardeners using the IPM PowerPoint set. 3.) Number of hits on the Web-based IPM tool.	1.) Pre-interaction survey will characterize homeowners' knowledge of and attitudes toward IPM; potential motivators and barriers to adoption of IPM will be assessed. 2.) Post-interaction survey will assess change in knowledge/attitudes toward IPM; intent to utilize IPM strategies. 3.) Post-season survey will quantify actual adoption of IPM practices/strategies as a result of brochures, IPM presentation, and/or use of Web-based IPM tool.

H. References

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II. COOPERATION AND INSTITUTIONAL UNITS INVOLVED

The project will be coordinated through the Department of Entomology, University of Maryland, College Park. Master Gardeners throughout the state will cooperate to provide project outreach. We have reached an agreement with the Maryland Master Gardener Coordinator (Mr. Jon Traunfeld) and leading Master Gardeners to collaborate on the proposed project. Maryland has also coordinated this project with key cooperators from Delaware (Dr. Susan King) and West Virginia (Dr. John Baniecki). These individuals have agreed to assist in the development of educational materials and to facilitate working with Master Gardeners in their own states.

III. KEY PERSONNEL

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Table 2. Roles of Key Personnel

Key Personnel Name & Relevant Expertise	**Project Role & Responsibilities**
Amy Brown -- As Coordinator of PEAP, which is an affiliate of the University's IPM Program, Brown has over 20 years experience in pesticide safety education for consumers/homeowners and other audiences	Project Director: Oversee development and distribution of materials, survey questionnaires, data analysis, project evaluation; develop project report(s).
Amanda Matheny – Experience in working with administrators to facilitate public outreach.	Project Co-Director: Perform data analysis; assist in development of educational materials, distribution of materials and survey questionnaires, project evaluation and report(s); participate with MGs at Anne Arundel farmers' market; facilitate interactions with Web technical assistant. The Project Co-Director will have primary responsibility for day-to-day operations of the project as well as for all work associated with data collection and analysis.
Jon Traunfeld – Coordinator of Maryland's Master Gardener Program; experienced in administering volunteer programs.	State Facilitator for MGs in MD: Assist in development of educational materials; serve as contact for state MGs; facilitate implementation.
Susan Whitney King – Urban Entomologist and Coordinator of Pesticide Applicator Training for Delaware; experienced in developing and delivering educational programming to varied audiences	State Facilitator for DE: Assist in development of educational materials; serve as contact for state MGs.
John Baniecki – Extension Specialist in both Plant Pathology and Entomology for 37 years, and Past IPM Coordinator for West Virginia for 18 years; experienced in developing and delivering educational programming to varied audiences; has an established relationship with WV Master Gardeners.	State Facilitator for WV: Assist in development of educational materials; serve as contact for state MGs.