2. Project Description

a. Project Directors: Changlu Wang, Richard Cooper
Project Title: Developing multimedia materials to educate the public on bed bug IPM

Project Type: Regional IPM publications

b. Project Summary

The recent surge of bed bug infestations and management difficulties is, without question, a major concern facing both the public as well as the professional pest management industry. The resurgence of bed bugs has significant health and economic impact. Successful elimination of bed bug infestations requires the collaboration among residents, management staff, and pest management professionals. Multiple tools and steps are usually needed to achieve desired results and minimize environmental risks. Yet, because bed bugs are a relatively new pest, most people are unprepared for dealing with bed bugs. There is a shortage of user-friendly educational materials on best bed bug management techniques. Information on step-by-step approach to eliminate bed bugs is especially in *urgent need*. The objectives of this project are to: 1) develop a video demonstrating the bed bug biology, prevention, inspection, monitoring, proper use of non-chemical and chemical control tools, and step-by-step approach for conducting community-wide bed bug IPM programs, and 2) develop web sites demonstrating cost effective bed bug prevention and control techniques. Use of videos will help reduce control cost and economic loss, pesticide use, and human health risks associated with improper bed bug control practices. This project addresses the priority "Use diverse media to educate the public on implementing IPM in their homes, lawns, and landscapes" identified by Community IPM Working Group.

c. Background and Justification

During the past ten years, bed bugs (*Cimex lectularius* L.) have re-emerged as a serious pest throughout the United States as well as many other developed countries (Doggett et al. 2007). This increase has been especially dramatic in the Northeast region. Between 2004 and 2008, the New York City Department of Health and Mental Hygiene saw bed bug related inquiries rise from 192 to 9,213 (NYC Department of Housing Preservation and Development, 2009). In response to this threat New York City's Mayor Bloomberg created the NYC Bed Bug Advisory Board to provide advice and guidance to the city in addressing the serious issues associated with bed bugs and bed bug management. The Baltimore City Health Department reported a 26 times increase in bed bug calls from 2004 to 2008 (Sarah Norman, unpublished data). Two thirds of the pest control companies in the Northeast reported an increase in bed bug calls over the previous twelve months in a survey (Gangloff-Kaufmann et. al., 2006). Bed bugs have gone from a pest that was almost non-existent, to one that is now present in all 50 states and is quickly becoming a pest of major economic importance. As a result, the U.S. Department of Housing and Urban Department listed "support research to improve methods for preventing and combating bed bug infestations" as one of its long term strategies of the Healthy Homes Strategic Plan

(www.hud.gov/healthyhomes).

Part of the challenges in fighting the current bed bug resurgence is that the general public lacks the knowledge about bed bugs. In a recent survey, we found 50% of the residents were unaware of bed bugs while their homes were infested, (Wang et al. 2009). Lack of public knowledge on bed bugs causes unintended spread of bed bugs. Failing to recognize bed bug infestations at their early stage makes the control effort more difficult and expensive.

Another challenge is that the public as well as the pest management professionals (PMPs) often do not know how to eliminate bed bug infestations both effectively and safely. There is a lack of basic understating of the bed bug biology and management options. Use of off-label chemicals is common (Potter et al. 2008, Wang et al. 2009). In addition, improper use of chemicals causes immediate risk of human pesticide exposure. Ineffective management practices leads to chronic infestations and high cost. Thus, delivering proven effective bed bug IPM practices to PMPs, property managers, and the residents is critical in reducing new infestations, reducing control cost, and reducing risks associated with improper bed bug control practices.

Hands-on trainings, such as bed bug summits organized by Pest Control Technology magazine, are available and well attended. However, these trainings are expensive and are far from meeting the need for educating multiple agencies and consumer groups nationwide. Without immediate and efficient public education effort, bed bug spread within and between communities will continue to spread rapidly. Misuse of pesticides, increased economic loss, and health risks associated with bed bug control practices will soon become a huge burden to property managers and the occupants.

There are no video materials describing step-by-step approaches on bed bug management. Videos are superior to printed materials in that they are easier to learn by audients of all education levels. Many bed bug control procedures (such as inspection, application of hot steam, proper removal of infested items, etc.) are best learned through demonstrations. Therefore, videos demonstrating bed bug IPM strategies will likely lead to more effective learning of bed bug IPM than traditional publications. We propose to develop a comprehensive video on bed bug biology and management. This project fills an important existing gap in bed bug educational materials. This project addresses the priority “Use diverse media to educate the public on implementing IPM in their homes, lawns, and landscapes” identified by Community IPM Working Group. It will benefit many different groups of people that include, but are not limited to, PMPs, property managers, health workers, and the general public.

d. Objectives and Anticipated Impacts

Our objective are to: 1) develop a video demonstrating the bed bug biology, prevention, inspection, monitoring, proper use of non-chemical and chemical control tools, and step-by-step approach for conducting community-wide bed bug IPM programs, and 2) develop web sites demonstrating cost effective bed bug prevention and control techniques. This project will *further the mission* of the Northeastern IPM Center by providing an easy-to-learn bed bug IPM education material.

Use of the video material is expected to have the following impacts:

1) Safeguarding human health and the environment. The public will be more aware of bed bug biology, control techniques, and IPM. They will less likely bring in new infestations or spread existing infestations unintentionally. Use of off-label products is expected to be reduced.

2) Economic benefits. Effective learning of IPM principles and proven effective technologies will lead to more effective bed bug control, lowered pest control cost and economic loss.

3) Implementation of IPM. We anticipate the video materials will stimulate all PMPs in adopting safer and more effective bed bug IPM programs in their daily practices. At least 3,000 PMPs will be trained through meetings organized by the National Pest Management Association. The bed bug videos will also become available nationwide through Rutgers University web site and a web site hosted by Bed Bug Central, Inc.

e. Approach and Procedures

The video production and web design will follow the following stages:

1) Planning. Dr. Changlu Wang from Rutgers University and Mr. Richard Cooper from Bed Bug Central, Inc will design the contents and organization of the video, prepare scripts. A photographer from Bed Bug Central, Inc will design the video layout and styles.
2) Laboratory shooting of bed bugs biology and behavior.
3) Field shooting of bed bug natural hiding places, inspection procedures, bed bug prevention, monitoring, and control techniques. We will also interview residents, property management staff, PMPs on their responses to bed bug infestations. Implementation of a step-by-step community-wide IPM program will be demonstrated in a high rise apartment building.
4) Video editing and initial web design: A photographer will edit the video clips into a ≈ 50 minutes video with technical advice from Dr. Wang and Mr. Cooper. Video clips will be posted on Rutgers University and Bed Bug Central web sites.
5) Review: The video product and web sites will be sent to 3 extension entomologists, 5 PMPs, 3 property managers for review. We will also play the video in 3 bed bug infested communities and collect comments from residents.
6) Revision. Based on comments from the reviewers and residents, the video and websites will be revised. Two hundred copies of video will be produced and distributed to extension agents, PMPs, property managers, county health departments. A downloadable version will be posted on the Rutgers University and Bed Bug Central web sites.
7) Evaluation. Survey sheets will be sent to selected audience groups to evaluate the impact of the video.

Time table (7/1/2010 – 6/30/2011)

- 7/1-9/1/10: Planning stage
- October 2010: Laboratory shooting
- 11/1 – 12/31/10: Field shooting
- January 2011: Review
- February 2011: Revision
- March 2011: Web posting
- 5/1 – 6/30/2011: Evaluation

f. Evaluation plans

We will distribute 200 copies of the video to targeted audience groups (PMPs, county health departments, extension agents, and property managers). We will also show the video in 2-3 bed bug infested low-income communities. Survey sheets will be handed out after showing the video or sending out the videos. The survey sheets will include the following questions:

1) How do you rate the overall usefulness of the video (circle one from the following answers)?
   a) Very useful. b) somewhat useful. c) not useful.
2) What changes you will make as a result of watching the video?
3) Is this video helpful in your effort of eliminating bed bugs?
4) Will you recommend this video to others?
5) What additional contents you would like to see in future editions?
6) Please describe yourself (circle one from the following answers):
   a) property manager, b) extension agent, c) pest control professional, d) government employee, e) concerned resident, f) other _____.

The survey sheets will be analyzed for environmental and economic impact and likelihood of voluntary IPM adoption.

Literature Cited

Doggett, S. 2007. A code of practice for the control of bed bug infestations in Australia. http://medent.usyd.edu.au/bedbug/bedbug_cop.htm.

Gangloff-Kaufmann, J., C. Hollingsworth, J. Hahn, L. Hansen, B. Kard, and M. Waldvogel. 2006. Bed bugs in America: A pest management industry survey. Amer. Entomol. 52: 105-106.

Potter, M. F. 2008. The business of bed bugs. 2008. Pest Management Professional. 76 (1): 24-25, 28-32, 34, 36-40.

Wang, C., K. Saltzmann, E. Chin, G. W. Bennett, T. Gibb. 2009. Characteristics of the bed bug, *Cimex lectularius* (Hemiptera: Cimicidae) infestation and dispersal in a high-rise apartment building. J. Econ. Entomol. 102: (In print).

SITUATION: Bed bug infestations are increasing rapidly in the U.S. The public and the pest control industry desperately need easy-to-learn educational materials to curb the bed bug resurgence.

PRIORITIES: "Use diverse media to educate the public on implementing IPM in their homes, lawns, and landscapes"

PROGRAM ACTION- LOGIC MODEL

Inputs	Activities	Outputs	Outcomes		
			Short	**Medium**	**Long**
People, time, money; interdisciplinary collaboration.	shooting videos about bed bug biology and management Presentations, demontrations, design of web sites.	A stand-alone bed bug video; video clips on the web.	People are aware of bed bug biology and IPM. **Possible measures** Collect survey data to assess changes in knowledge, attitudes, and aspirations using IPM.	Pest managent professionals reduce use of pesticides, include more non-chemical control tools. Property managers and residetns increase support for bed bug IPM. **Possible measures** Measure increased adoption and implementation of IPM tactics.	Reduced pesticide applications; more effective control; greater health benefit; lowered economic loss; lowered pest control cost. **Possible measures** Measure reduced incidence of bed bug infestations, reduced number of pesticide applications, and reduced control cost to eliminate bed bugs.