

**Environment and Natural Resources Trust Fund
2012-2013 Request for Proposals (RFP)**

Project Title:

ENRTF ID: 053-C2

Best Seasonal Time for Landscape Management of EAB

Topic Area: C2. Invasive Species - Terrestrial

Total Project Budget: \$ 281,473

Proposed Project Time Period for the Funding Requested: 3 yrs. July 2013 - June 2016

Other Non-State Funds: \$ 0

Summary:

For managing emerald ash borer in Minnesota, research the effect of insecticide application time and method on reducing pesticide use, on efficacy of killing beetles, and on protecting nontarget insects.

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Sponsoring Organization: U of MN

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Location

Region: Statewide

County Name: Statewide

City / Township:

<input type="checkbox"/>	Funding Priorities	<input type="checkbox"/>	Multiple Benefits	<input type="checkbox"/>	Outcomes	<input type="checkbox"/>	Knowledge Base
<input type="checkbox"/>	Extent of Impact	<input type="checkbox"/>	Innovation	<input type="checkbox"/>	Scientific/Tech Basis	<input type="checkbox"/>	Urgency
<input type="checkbox"/>	Capacity Readiness	<input type="checkbox"/>	Leverage	<input type="checkbox"/>	Employment	<input type="checkbox"/>	TOTAL <input type="checkbox"/> %

2012 MAIN PROPOSAL

PROJECT TITLE: Best seasonal time for landscape management of EAB

I. PROJECT STATEMENT

Management of the economically destructive emerald ash borer (EAB) in landscapes employs two methods, removal of dead or dying trees and annual treatment of landscape trees with insecticides. Efficacy of insecticides in controlling larval EAB was performed during the last 6 years in EAB infested states. These recommendations were posted in 2009 on the web in a multistate (Michigan, Ohio, Indiana, and Wisconsin), nonpeer reviewed report http://www.emeraldashborer.info/files/Multistate_EAB_Insecticide_Fact_Sheet_22May09.pdf and summarized in a question-based website <http://www.entm.purdue.edu/EAB/faq.shtml>

The research supporting the insecticide recommendations in the report were performed in states where rainfall and soil moisture levels were higher than Minnesota. Minnesota receives rainfall on average of 26 in/yr which is 32% less rainfall than Ohio (38 in/yr) where most of the research was performed and less rainfall than the EAB infested states, such as Indiana, 39 in/yr, Illinois, 33 in/yr, and Michigan, 32 in/yr. The report recommends a soil drench of imidacloprid as one of the best control options, but the ability for a tree to uptake imidacloprid depends on soil moisture. In MN high pressure soil injections, trunk sprays or trunk injections may be more effectively taken up by the tree and may be the better option. The chemical producer recommends insecticide application only in spring or fall, but consumers and professionals will apply insecticides in summer when the insecticides may not be absorbed by the tree as there is not enough water to move the chemical down to the roots. Instead, the insecticide may remain on the surface and flash thunderstorms may remove the insecticide in runoff.

The overall goals of this project are to promote proper guidelines for insecticide application and protect water quality by researching the best application time for insecticides used for managing EAB. We plan to study: 1) Uptake of insecticides into ash trunk and leaves at 3 seasonal times: May, July, and September, 2) Uptake of insecticides by plants growing under ash trees, and 3) Development of MN based insecticide recommendations to reduce insecticide use, protect water quality and pollinators.

II. DESCRIPTION OF PROJECT ACTIVITIES. Total budget: \$281,473

Activity 1: We propose to study the effects of seasonal application time on the uptake of imidacloprid insecticide into ash trees. We will study 3 methods of application: passive soil drench, soil injection, and trunk injection. **Budget: \$149,473**

Outcome	Completion Date
1. Apply insecticides at 3 seasonal times: May, July, and September.	2016
2. Measure concentration in trunk and leaves through residue analysis.	2016
3. Repeat research on same trees and reapply imidacloprid in season 2 and measure in season 3.	2016

Activity 2. We propose to study the uptake of insecticides into plants growing under insecticide-treated ash. **Budget: \$132,000**

Outcome	Completion Date
1. Determine concentration of imidacloprid in leaves, pollen, and nectar for landscape plants growing under treated ash for the 3 application methods	2016
2. Determine the effects of these concentrations on behavior and mortality	2016

of bumble bees and beneficial insects that kill pest insects.	
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Activity 3. We propose to share our data with state agencies, city foresters, landscape managers, and municipalities to develop best management practices for protecting ash, water quality, and nontarget species. **Budget: \$0**

Outcome	Completion Date
1. Develop Minnesota based EAB management recommendations that protect water quality, provide best efficacy, reduce pesticide use, and protect nontarget species.	2016

III. PROJECT STRATEGY

A. Project Team/Partners

Letters of support gathered for 2009 LCCMR submission. approval, removal " 6c. Emerald Ash Borer Landscape Management Impacts"

1. Ralph Siefert, Head Forester MPRB, Minneapolis Park and Recreation Board
2. MGCSA, MN Golfcourse Superintendents Association
3. Mark Stennes, certified arborist
4. June Mathiowetz, Sustainability Project Coordinator, City of Minneapolis
5. Dr. Phil Lewis, USDA APHIS, to work in his lab to quantify imidacloprid residue

B. Timeline Requirements

The project requires 3 years of research for field work and analysis.

C. Long-Term Strategy and Future Funding Needs

We will use data generated by this proposal to apply for Federal Grants to continue the research. We will share our data with state agencies, commodity groups, and municipalities dealing with EAB management.

2012-2013 Detailed Project Budget

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IV. TOTAL ENRTF REQUEST BUDGET: Three years

BUDGET ITEM <i>(See list of Eligible and Non-Eligible Costs, p. 11)</i>	AMOUNT
Research the best seasonal time (May, July, September) for applying imidacloprid to ash trees to control EAB. Measure the residue of imidacloprid insecticide in ash trunk, ash leaves, and plants growing under treated ash trees.	
Personnel:	
Graduate Student \$20.57/hr + fringe (18.49% health insurance and \$13,244 tuition) for 3 years, plus 3% inflationary increase	\$121,225
Undergraduate, \$11.00 hr x 40 hrs/wk for 20 weeks for 3 years	\$28,248
Contracts: contract with local landscaping firm to apply insecticides to ash trees	\$30,000
Research supplies: Bioassays materials, rearing cages, bioassay containers, beneficial insects, equipment for applying insecticides, insecticides, smaller DBH ash trees to be planted on St. Paul campus, space rental St. Paul campus, greenhouse fees	\$30,000
Residue analysis: Measure with residue analysis the amount of imidacloprid in leaves, trunk, plants under trees, and soil adjacent to tree with ELISA quick test and HPLC-mass spec	\$60,000
Greenhouse bench fees and field space rental St. Paul campus, greenhouse fees	\$6,000
Publication: Cost for duplicating management recommendations, factsheets, handouts for use at meetings and talks. Publication costs for research papers.	\$6,000
TOTAL ENVIRONMENT AND NATURAL RESOURCES TRUST FUND \$ REQUEST =	\$281,473

V. OTHER FUNDS

SOURCE OF FUNDS	AMOUNT	Status
Other Non-State \$ Being Applied to Project During Project Period: None are secured or pending at the present time.	\$ -	
Other State \$ Being Applied to Project During Project Period:	\$ -	
In-kind Services During Project Period: None are secured or pending at the present time	\$ 31,504	<i>Secured</i>
Remaining \$ from Current ENRTF Appropriation (if applicable):	\$ -	
Funding History: USDA SARE grant 2010 \$175,000: Bayer Chemical Company 2004-2008 \$90,000	\$ 265,000	

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Project Manager Qualifications and Organization Description

Dr. Vera Krischik, Assoc. Professor Ecology of Urban Landscapes, Department of Entomology, University of Minnesota, St. Paul Campus

The PI is a tenured Faculty in the Entomology Department of the College of Food, Agricultural and Natural Resource Sciences at the University of Minnesota. One of the goals of the College is to develop viable food and agricultural systems, while maintaining healthy natural resources. The PI has over 30 years of research expertise and publications in this area. Equipment and facilities are available for this research.

Vera obtained her PhD from the University of Maryland in 1984, held at Post Doc at the University of Maryland, was a researcher at the New York Botanical Garden (NSF sponsored Visiting Professor for Women, 1991-1993), and was an IPM coordinator at USDA, Washington DC from 1988-1994. Since 1995, she is a professor in the Department of Entomology at the St. Paul, University of Minnesota. She teaches 2 courses: ENT 5009, Pesticide Use and Misuse and ENT 4015, Ornamental and Turf IPM. She has 6 published papers on the non target effects of imidacloprid on beneficial insects and 2 published papers and 2 in manuscript on the proper use of imidacloprid for landscape plants. She has two books: one published in 1991 by John Wiley entitled "Microbial Mediation of Plant Insect Interactions" and another published in 2004 by the MN Agricultural Experiment Station on "IPM of Midwest Landscapes", 316 pp. She has partnered with MDA, DNR, MNLA, MNTGF, and watershed districts for her outreach and research programs and publications. She has developed a plant restoration bulletin and poster in cooperation with the DNR and Ramsey Watershed District. She teaches at least 5 large workshops each year on proper pesticides use in cooperation with MDA and MNLA. She has trained 6 graduate students and 1 post doc. She is director of CUES: Center for sustainable urban ecosystems that promote natural resource management, online at www.entomology.umn.edu/cues. Dr. Krischik was contacted by MN National Public Radio on June 23, 2009 for an interview on the non-target effects of imidacloprid on birds and bees.

online at www.entomology.umn.edu/cues/krischiklab/krischik.htm

1. Tenczar, E. G., and V. A. Krischik. 2007. Comparison of standard (granular and drench) and novel (tablet, stick soak, and root dip) imidacloprid treatments for cottonwood leaf beetle (Coleoptera: Chrysomelidae) management on hybrid poplar. *J. Econ. Entomol.* 100: 1611-1621.
2. Krischik, V. A., A. Landmark, and G. Heimpel. 2007. Soil-applied imidacloprid is translocated to nectar and kills nectar-feeding *Anagyrus pseudococci* (Girault) (Hymenoptera: Encyrtidae) *Environ. Entomol.* 36(5): 1238-1245.
3. Rogers, M. A., V. A. Krischik, and L. A. Martin. 2007. Effect of soil application of imidacloprid on survival of adult green lacewing, *Chrysoperla carnea* (Neuroptera: Chrysopidae), used for biological control in greenhouse. *Biological Control* 42(2): 172-177.
4. Gupta, G., and V. A. Krischik. 2007. Professional and consumer insecticides for the management of adult Japanese beetle on hybrid tea rose. *J. Econ. Entomol.* 100(3): 830-837.
5. Tenczar, E. G., and V. A. Krischik. 2006. Management of cottonwood leaf beetle (Coleoptera: Chrysomelidae) with a novel transplant soak and biorational insecticides to conserve coccinellid beetles. *J. Econ. Entomol.* 99(1): 102-108.
6. Smith, S. F. and V. A. Krischik. 2000. Effects of biorational insecticides and imidacloprid on four coccinellid species (Coleoptera: Coccinellidae). *J. Econ. Entomol.* 93(3): 732-736.
7. Smith, S. F. and V. A. Krischik. 1999. Effects of systemic imidacloprid on *Coleomegilla maculata*. (Coleoptera: Coccinellidae). *Environ. Entomol.* 28(6): 1180-1195.

Outreach: National Public Radio June 23, 2009 Interview on imidacloprid use in ash trees

Courses: ENT 4015 Ornamental and turf entomology; ENT 5009 Pesticides

Books: 1. Krischi, VA and J. Davidson. 2004. *IPM of Midwest Landscapes*, MN Ag Exp Station, 316pp; 2. Barbosa, P, V. Krischik, and CG Jones (eds.).1991.*Microbial mediation plant-herbivore interactions*, JWileySons, 530 pp

