

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

Project Title:

ENRTF ID: 057-C2

Reducing Spread of Japanese Beetle with Biological Control

Topic Area: C2. Invasive Species - Terrestrial

Total Project Budget: \$ 250,673

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

Other Non-State Funds: \$ 0

Summary:

Research on biological control of Japanese beetle grubs with the soil-inhabiting *Ovavesicula* microsporidan that occurs naturally in the East Coast and when introduced into Michigan reduced grub runners.

Name: Vera Krischik

Sponsoring Organization: U of MN

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Location

Region: Statewide

County Name: Statewide

City / Township:

_____ Funding Priorities	_____ Multiple Benefits	_____ Outcomes	_____ Knowledge Base
_____ Extent of Impact	_____ Innovation	_____ Scientific/Tech Basis	_____ Urgency
_____ Capacity Readiness	_____ Leverage	_____ Employment	_____ TOTAL _____%

2012 MAIN PROPOSAL

PROJECT TITLE: Reducing spread of Japanese beetle with biological control

I. PROJECT STATEMENT: The goal of this collaborative project is to reduce the spread of the invasive exotic Japanese beetle (JB) in Minnesota through research on biological control for the immature soil-inhabiting grub stage. In addition, we will determine the best short term insecticidal management for grubs until biological control is established.

Japanese beetle was introduced from Japan to the East Coast in 1917 and spread to Minnesota by the late 1990's. In the East extremely high populations of beetles were found in the 1960's, but by 2012 the adult beetles are rarely seen. Research at the Connecticut Agricultural Station demonstrated that *Ovavesicula*, a soil-inhabiting biological control protozoan, was killing Japanese beetle grubs in the soil. In 2007, Dr. Dave Smitley of Michigan State University introduced the pathogen to some Michigan golf courses. In 2009 his team continued to collect data that compares populations of Japanese beetle at sites where *Ovavesicula* is active with sites where it is absent. His data revealed that *Ovavesicula* reduces survival of Japanese beetle grubs by 25 to 50% per year. Dr. Smitley is continuing this work and is a collaborator with us on the introduction of the protozoan in Minnesota. Another collaborator is the Minnesota Turf and Ground Foundations; their Executive Director, Jeff Turtinen, is supportive of this project to reduce pesticide use and better manage Japanese beetle. In addition, J. Johnston, Grounds Keeper Senior, Ground Services Minnesota State Capital Grounds, has also offered to work with us, as he has extreme problems managing JB.

In 2007 I published a paper on the comparison of conventional and biorational insecticides for controlling Japanese beetle adults. None of the well-advertised earth friendly biorational insecticides killed adults. As part of my research program on Japanese beetle, I found that trap catches of adult Japanese beetle increased 1000 times in the last 7 years in the metro. Female beetles prefer to feed on irrigated turf that is high in nitrogen. Japanese beetle spreads from irrigated turf into recreational fields, parks, and home lawns because proper insecticides are not used and timed to the vulnerable grub stage. Specific insecticides are effective for adult beetles feeding on roses, lindens, and grapes, while grubs feeding on the roots of turf require different management and insecticides. My collaborative UMN-MDA publication on Japanese beetle management can be viewed at the CUES website (<http://www.entomology.umn.edu/cues/extpubs/7664japanese/DG7664.html>) as well as my CUES section on turf management (<http://www.entomology.umn.edu/cues/IPM-turf/IPM-turf.html>). My paper on control of adult Japanese beetle can be read at <http://docserver.esa.catchword.org/deliver/cw/pdf/esa/freepdfs/00220493/v100n3s26.pdf>

The JB research project will have 3 components:

1. Research on releasing and establishing the protozoan biological control for grubs at 10 sites and measuring their efficacy over 3 years.
2. Research for grubs on the efficacy of conventional insecticides (imidacloprid, chlorpyrifos, bifenthrin, trichlorfon) compared to biorational non-toxic insecticides (halofenozide, acelepryn, milky spore disease, nematodes).
3. Hands on workshops with landscapers and consumer to review the demonstration project and biological control research.

II. DESCRIPTION OF PROJECT RESULTS. Total budget: \$250,673

Activity 1. Research on releasing and establishing the protozoan biological control for JB grubs at 10 sites and measuring their efficacy over 3 years. **Budget: \$153,936**

Outcome	Completion Date
1. Research on releasing and establishing the protozoan biological control for grubs at 10 sites and measuring their efficacy over 3 years	2016

Activity 2. Research for grubs the efficacy of conventional insecticides (imidacloprid, chloropyrifos, bifenthrin, trichlorofon) compared to biorational non-toxic insecticides (halofenozide, acelepryn, milky spore disease, nematodes). Use the research site on the St. Paul Campus as a demonstration project for workshops. **Budget: \$88,737**

Outcome	Completion Date
1. Research for grubs the efficacy of conventional insecticides (imidacloprid, chloropyrifos, bifenthrin, trichlorofon) compared to biorational non-toxic insecticides (halofenozide, acelepryn, milky spore disease, nematodes).	2016

Activity 3. Outreach programs: Hands on workshops with landscapers and consumer to review the demonstration project and biological control research. **Budget: \$8,000**

Outcome	Completion Date
1. Demonstration projects will be visited during the annual UM Turf Field Day and two-UM-MDA recertification workshops for pesticide licenses (attendance of both around 200 people). We will provide articles and talks in state and commodity group newsletters and meetings. We will create a section on the popular landscape management website CUES (www.entomology.umn.edu/cues) to disseminate the information. We will convene 8 workshops over the 3 years around the state to discuss JB management and present data. We will use the demonstration site on the St. Paul Campus for local workshops.	2016

III. PROJECT STRATEGY

A. Project Team/Partners: Create an advisory panel with stakeholders.

1. Dr. Dave Smitley of Michigan State University, Department of Entomology
2. Minnesota Turf and Ground Foundations; Executive Director, Jeff Turtinen
3. J. Johnston, Grounds Keeper Senior, Ground Services Minnesota State Capital Grounds
4. State agencies

B. Timeline Requirements

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

Research: Initiate summer research on collecting and performing efficacy experiments on JB protozoans

Demonstration Projects: Set up demonstration projects on the St. Paul campus to investigate the efficacy of low risk and conventional insecticides for JB grubs.

Outreach Workshops: Convene 8 workshops over the 3 years around the state to discuss issue and present data. Use the demonstration site on the St. Paul Campus for local workshops.

Outreach materials: Write and produce collaborative bulletins. Distribute bulletins and construct a section on the CUES website (<http://www.entomology.umn.edu/cues>)

C. Long-Term Strategy

Statewide, provide biological control research and precise management information to reduce the spread of JB, reduce pesticide use, and reduce economic impact to natural resources.

2012-2013 Detailed Project Budget

Reducing spread of Japanese beetle with biological control

IV. TOTAL ENRTF REQUEST BUDGET: Three years

BUDGET ITEM (See list of Eligible and Non-Eligible Costs, p. 11)	AMOUNT
The goal of this collaborative project is to reduce the spread of the invasive exotic Japanese beetle (JB) in Minnesota through research on biological control for the immature soil-inhabiting grub stage. In addition, we will determine the best short term insecticidal management for grubs until biological control is established.	
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:	\$0
	\$44,000
Research supplies: Supplies to establish bioassays with grubs in the field, bioassay materials, rearing cages, bioassay containers, equipment for applying insecticides, insecticides	
	\$25,200
Travel: Outstate to Michigan and Connecticut to collect biocontrol agents (lodging \$300 + plane \$400 + food \$200 + car \$300= \$1,200 x 3 trips per year in year 1 and 2). Instate travel to research sites (Fleet Services vehicle 10 days/months x 6 months @ \$100/day per year for all 3 years)	
	\$24,000
Greenhouse bench fees and field Bioassays with grubs, 30 months x \$800/mo	\$8,000
Publication: Cost for duplicating management recommendations, factsheets, handouts for use at meetings and talks, publication costs for research papers	
	\$8,000
TOTAL ENVIRONMENT AND NATURAL RESOURCES TRUST FUND \$ REQUEST =	\$250,673

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:	\$ -	

PROJECT TITLE: Reducing spread of Japanese beetle with biological control

Project Manager Qualifications and Organization Description

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.

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

Vera obtained her PhD from the University of Maryland in 1984, 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. She teaches a Pesticide Use Course and Ornamental and Turf IPM Course. She has published papers on JB and imidacloprid. She has two books: one published by John Wiley entitled " Microbial Mediation of Plant Insect Interactions" and another published by the MN Agricultural Experiment Station on "IPM of Midwest Landscapes": Her collaborative MN Department of Agriculture-UM extension leaflet on JB is widely used and she is the contact at UM for JB issues. She has trapped JB for the last 7 years at golfcourses around the Twin Cities. She is director of CUES: Center for sustainable urban ecosystems, that promotes natural resource management, online at www.entomology.umn.edu/cues.

Dr. Krischik offers workshops for MDA pesticide certification and recertification every year. She is an invited participant to the MDA DNR gypsy moth committee, EAB committee, and JB committee over the years. She has partnered with MDA, DNR, MNLA, MNTGF, master gardeners, and watershed districts for her outreach and research programs and publications.

Organizational Statement: The Department of Entomology is part of the University of Minnesota.

