Special Technology Development Program

New Project Proposal

PROJECT NUMBER:R1-2002-01

PROJECT TITLE: Testing the effectiveness of verbenone pouches in protecting lodgepole and whitebark pines from mountain pine beetle attack.

PROJECT STATUS: New

EXPECTED PROJECT DURATION: One year

EXPECTED COMPLETION DATE OF THE PROJECT: Completed FY 02; Report in FY 03

SUBJECT:

1. Total Suppression/Prevention Technology	%		2. Survey and Monitoring Technology	%	
a. Total Biological Control i. Microbial % ii. Parasitoides % iii. Synthetic hormones/pheromones % iv. Other %	100	%	a. Advancements in Detection Technology		%
			b. Landscape Level Assessment Technology i. Data Visualization		%
b. Total Modeling i. Pesticide (Insecticide) Application % ii. Disturbance % iii. Growth and Yield % iv. Organism % v. Population % vi. Terrain %		%	c. Remote Sensing i. Aerial % ii. Hyperspectral % iii. Satellite %		%
			d. Other		%
c. Genetic, Cultural and Silvicultural Innovations For Controlling Pest Species i. Fire % ii. Methyl Bromide Alternatives % iii. Thinning/Regeneration Techniques and other Silvicultural Guidelines % iv. Resistance, Screening, and Breeding %		%	3. Assessment Technology	%	
			a. GIS % b. Spatial Analysis % c. Landscape Analysis % d. Decision Support % Risk and Hazard % Expert Systems %		
d. Pesticide Application (Spray) Technology i. Equipment innovations % ii. Methods and Guidelines %		%	4. Social Values	%	
			5. Technology Transfer Innovations	%	
e. Other		%	6. Other	%	

STATUS OF SUBJECT SPECIES: Native

PROJECT OBJECTIVES: Determine effectiveness of verbenone in preventing mountain pine beetle attacks.

BRIEF DESCRIPTION OF PROJECT: Whitebark and lodgepole pine stands in Montana and Idaho will be selected in which to conduct this study. Host stands must be of susceptible conditions to MPB, with beetle populations nearby; but of sufficiently little beetle-caused mortality to make a viable test opportunity. The test will be comprised of three treatments (40 pouches per acre, 20 pouches per acre, and untreated controls). Each treatment will be replicated 6 times, on 1-acre plots, in each host. Plots will be treated prior to beetle flight—May in WBP, June in LPP—and evaluated for treatment effectiveness following beetle flight—in September. Data will be analyzed and report completed during winter 2002-03.

FHP LEAD CONTACT:

Name	Affiliation (Office or Dept.)	Phone, E-mail, Fax
Ken Gibson	FHP, Northern Region, Missoula, MT	406-329-3278; kgibson@fs.fed.us; 406-329-3132

FHP LEAD INVOLVEMENT:

Role	Time Commitment
Assist in designing and conducting project.	5 weeks

PRINCIPAL INVESTIGATOR(S):

Name	Affiliation (Office or Dept.)	Phone, E-mail, Fax
Sandy Kegley	FHP, Northern Region, Cd'A, ID	208-765-7355; skegley@fs.fed.us; 208-765-7307
Ralph Their	FHP, Intermountain Region, Boise, ID	208-373-4225; rthier@fs.fed.us; 208-373-4111
Barbara Bentz	RMRS, Logan, UT	435-755-3577; bbentz@fs.fed.us; 435-755-3563

PRINCIPAL INVESTIGATOR(S) INVOLVEMENT:

Name	Role	Time Commitment
Sandy Kegley	Assist in designing and conducting project	5 weeks
Ralph Their	Assist in designing and conducting project	5 weeks
Barbara Bentz	Assist in designing and conducting project	5 weeks

COOPERATORS:

Name	Affiliation (Office or Dept.)	Phone, E-mail, Fax
Dr. Pat Shea	PSW (retired)	530-758-5078; pshea@fs.fed.us

COOPERATOR INVOLVEMENT :

Name	Role	Time Commitment
Pat Shea	Consulting	1 week

JUSTIFICATION: At present, the only means available to protect high-value MPB hosts from beetle attack is through preventive insecticide treatments. Though carbaryl is a safe and effective means of protecting trees from beetle attack, there exists a need to find alternatives to insecticidal treatments. As an anti-aggregating pheromone of MPB, verbenone has the potential to provide a much safer, more effective and more efficient means of protecting high-value stands and trees.

URGENCY: Now is an opportune time to test this strategy because beetle populations are sufficiently high to provide good test opportunities in many places in the intermountain West.

NATIONAL FHP TECHNOLOGY DEVELOPMENT PRIORITY :

Priority 1: __ Priority 2: X Priority 3: __ Priority 4: __

This project addresses the need to develop tools necessary to reduce adverse impacts of forest pests. Prior testing has shown excellent results in protecting susceptible hosts from MPB attacks using verbenone pouches. Verbenone pouches are currently registered for use against SPB in southeastern US. We believe with continuing good results, MPB and its various hosts could be added to the current label.

TECHNICAL COMMITTEE DEVELOPMENT PRIORITY:

Priority 1: __ Priority 2: _X_ Priority 3: __ Priority 4: __

Priority 5: __ Priority 6: __ Priority 7: __ Priority 8: __

The addition of an anti-aggregant protectant against MPB-caused mortality would greatly contribute to the management strategies available for use against this major forest pest.

SCOPE OF APPLICATION: The use of an anti-aggregant to protect trees and stands from MPB attack would find wide application throughout the range of MPB. If proven effective and registered, it would be used as extensively as is MCH against DFB.

RESEARCH BASIS: The use of verbenone to prevent MPB attacks has been tested intermittently since the late 1980s. Bubble capsule formulations used previously have provided inconsistent results. During the 1990s work done in the southeast, against SPB, showed much higher concentrations of verbenone were effective protectants. Recent work in Canada and western US, using these higher rates (verbenone pouches) have provided exceptional protection against MPB attacks.

METHODS: The proposed test will measure the effectiveness of verbenone pouches (5 grams of verbenone, compared to 0.5 grams in bubble capsules) in protecting MPB hosts against beetle attacks. We will select 18, 1-acre blocks in both WBP and LPP stands in which to install the test of 6 replicates of 3 treatments each (40 pouches/acre, 20 pouches/acre and 0 pouches/acre). Pouches will be stapled to individual trees, prior to beetle flight, on about a 33' and 45' grid, respectively, to assure even distribution of verbenone throughout the plot. Following beetle flight, we will conduct a 100% survey of the treated plots, tallying all attacked trees. Treatment success will be determined by a direct comparison of new attacks in the treated and untreated plots.

MEASURES OF SUCCES: **Standard of Success:**

Standard of Success will be sufficiently few new attacked trees in the treated plots to make the effort and expense worthwhile. Ideally, treated plots would have less than 10% of the new attacks found on untreated plots.

Expected Outcomes: Expected outcome is sufficient efficacy data to have verbenone registered for use against MPB in lodgepole and whitebark pine stands. Ultimately, data would be collected in other MPB hosts as well.

Implementation of Products/methods: Products of the test—registration of verbenone—would lead to widespread use of a most efficient, safe and effective means of protecting high-value hosts of MPB from beetle-caused mortality.

PRODUCTS AND DUE DATES: Product will be data sufficient for EPA registration of verbenone pouch for use against MPB.

PUBLICATIONS: Results will be published in office reports, Journal of Economic Entomology, or other refereed publications.

TECHNOLOGY TRANSFER: Long-term products of the test—registered verbenone pouches—will be used by land managers as well as private land owners. Its use will be similar to that of MCH, which is widely used in the intermountain West to protect susceptible DF from DFB attack.

PRODUCT LEVERAGING: This test is part of a continuing process that, if successful, will lead to registration of the verbenone pouch for use against MPB. It is currently registered for use against SPB and we hope to gather data sufficient to have MPB added to the label.

LONG-TERM BUDGET REQUEST:

	Item	Requested FHP STDP Funding	Other-Source Funding	Source
FY 2002				
Administration	Salary	$3,600 (Seasonals)		
	Overhead			
	Travel	10,000 (All participants)		
Procurements	Contracting			
	Equipment	8,640 (Verbenone)		
	Supplies	1,000 (Misc.)		
YEAR TOTALS		$23,240		

FY 2003				
Administration	Salary			
	Overhead			
	Travel			
Procurements	Contracting			
	Equipment			
	Supplies			
YEAR TOTALS				

FY 2004				
Administration	Salary			
	Overhead			
	Travel			
Procurements	Contracting			
	Equipment			
	Supplies			
YEAR TOTALS				
PROJECT TOTALS				

LONG-TERM BUDGET REQUEST EXPLANATION: NA

BENEFITS: A valuable tool to help protect high-value trees from attack by MPB; and a potential replacement for insecticidal preventive treatments.

LITERATURE, CITATIONS, ATTACHMENTS, etc.:

Gibson, Kenneth E.; Schmitz, Richard F.; Amman, Gene D.; Oakes, Robert D. 1991. Mountain pine beetle response to different verbenone dosages in pine stands of

western Montana. Research Paper INT-444. Ogden, UT: U.S. Department of Agriculture, Forest Service, Intermountain Research Station. 11 pp.

Huber, D.P.W. and Borden, John H. 2000. Protection of lodgepole pines from mass attack by mountain pine beetle, *Dendroctonus ponderosae*, with nonhost agiosperm volatiles and verbenone. Entomologia Experimentalis et Applicata. In press.

Kegley, Sandra J; Bentz, Barbara J.; Their, Ralph W.; and Gibson, Kenneth E. 2002. Effectiveness of non-host volatiles and verbenone in protecting pine trees from mountain pine beetle attack. U.S. Department of Agriculture, Forest Service, Northern Region, Forest Health Protection Report. In preparation.

Progar, Robert A. 2001. 2000 Redfish Lake verbenone trial progress report. U.S. Department of Agriculture, Forest Service, Intermountain Region, Forest Health Protection Report. 6 pp.

Schmitz, Richard F. and McGregor, Mark D. 1990. Antiaggregative effect of verbenone on response of the mountain pine beetle to baited traps. Research Paper INT-423. Ogden, UT: U.S. Department of Agriculture, Forest Service, Intermountain Research Station. 7 pp.