Special Technology Development Program
Progress Report

PROJECT NUMBER: R6-97-03

PROJECT TITLE: Testing pheromone-based methods for managing the Douglas-fir beetle at the landscape scale.

PROJECT STATUS: Continuing, no funds requested.

EXPECTED PROJECT DURATION: 4 years

EXPECTED COMPLETION DATE OF THE PROJECT: FY 2001

SUBJECT: Bark Beetles, Douglas-fir beetle (*Dendroctonus pseudotsugae* Hopkins)

STATUS OF SUBJECT SPECIES: native

PROJECT OBJECTIVES: The objective of this study is to determine if a combination of pheromone-based treatments can significantly reduce Douglas-fir beetle impacts on resource values at the landscape scale. A secondary objective is to compare the efficacy and selectivity of pheromone-baited trap-trees with pheromone-baited traps.

BRIEF DESCRIPTION OF THE PROJECT: This study was conducted in eastern Washington and northern Idaho using a paired plot design. Five replications were installed. Plots consisted of small landscape units of about 1,000 ha that were infested with Douglas-fir beetle. Paired plots were selected to be as similar as possible and relatively close to one another. One plot from each pair was randomly selected to receive pheromone treatments and the other served as an untreated control.

Both aggregation and antiaggregation pheromones were used to minimize beetle-caused tree mortality. Specific pheromone treatments were developed in consultation with the local land managers. High-value stands such as recreational or administrative sites, old-growth reserves, or riparian areas where managers wished to minimize tree mortality were treated with the antiaggreagation pheromone, 3-methylcyclohex-2-en-1-one (MCH). Pheromone trap sites were selected in the general forest areas based on accessibility and minimum potential for tree mortality to negatively impact management objectives. Trap sites were chosen to cover the plots as uniformly as possible. Pheromone treatments were applied at each site for at least two consecutive years. Plots have been aerially surveyed each year to determine the amount and distribution of beetle-caused tree mortality on treated and control plots before treatment, each year during treatment, and one year after treatment. The final aerial surveys were conducted during the summer of 2000. The amount and distribution of tree mortality on treated and control plots and surrounding areas will be compared to assess treatment efficacy.

We installed 3 replications of the landscape level test in the spring of 1997. Two replications (Slate and Fenn) were on the Nez Perce National Forest in Central Idaho and the other (Wenatchee) was on the Wenatchee National Forest in central Washington. We installed 2 additional replications in the spring of 1998. One replication (Newport) was on the Colville National Forest in eastern Washington and the other (Priest Lake) was on the Panhandle National Forest in northern Idaho. The 1997 plots were all retreated in 1998. All 5 plots were retreated in 1999. All 5 study areas had Douglas-fir beetle populations that were attacking and killing live trees. The plots at Slate, Wenatchee, and Newport included MCH applications to protect wildlife habitat and recreational sites. Approximately 50 acres were treated with MCH on each of those plots. There were no high-valued stands that justified MCH treatment on the Fenn or Priest Lake replications. Pheromone-baited traps were established on all 5 treated plots. We installed 31 traps at Slate, 27 at Fenn, 26 at Wenatchee, 31 at Newport, and 28 at Priest Lake. Traps were emptied and maintained at weekly

intervals throughout the beetle flight period each year. Over 90% of the trap samples have been processed in the lab and the data are currently being entered and analyzed.

Aerial surveys of all plots were conducted in late summer of 1997, 1998, 1999, and 2000. The 1997 aerial surveys were pre-treatment data for the 3 plots that were installed that year. The 1998 aerial surveys represent pre-treatment conditions for the 2 replications added in 1998. That is, the infested trees identified in this survey were attacked and killed in 1997, prior to plot establishment. The 1998 surveys of the other 3 replications are the first data on the efficacy of the treatments applied in 1997. The 1999 aerial surveys represent first and second year results depending upon the year that the plot was installed. The 2000 aerial surveys are second and third year results for plots established in 1997 and 1998, respectively. The aerial survey data is currently being analyzed.

Remaining trap samples will be processed and all data will be analyzed and summarized for the landscape scale test by early in 2001.

In 1997, a study was installed near the landscape level plots at Slate to compare the efficacy of pheromone-baited trap-trees and traps. The results of that study demonstrated that traps caught significantly more beetles than trap-trees. More male beetles were caught in pheromone-baited traps than in trap trees, while significantly higher numbers of females were caught in the trap-trees.

CHANGES TO ORIGINAL PROJECT SCOPE OR OBJECTIVES: Only 3 replications were installed during the first year of the study instead of 4 as originally proposed because we were unable to locate more than 3 suitable areas before beetles began to emerge. Two additional replications were installed during the second year. As a result of this delay in plot installation, the study has been extended by a year over the original schedule. Only 3 of the 5 treated plots included MCH applications because the other 2 plots had no high-valued stands justifying MCH treatment. Also, due to the large size of plots, rugged terrain, and limited access, we decided to rely on aerial surveys rather than ground surveys to assess treatment efficacy on all plots. Finally, we decided to conduct the comparison of pheromone-baited traps and trap trees in separate areas rather than overlay that study on the landscape level test as originally proposed to prevent confounding the results of either project. None of these changes to the original study plan will prevent us from meeting the project objectives.

ADDITIONS TO ORIGINAL PROJECT SCOPE OR OBJECTIVES: None

FHP LEAD CONTACT:

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PRINCIPAL INVESTIGATOR(S):

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COOPERATORS:

Name	Affiliation (Office or Dept.)	Phone, E-mail, Fax
Ken Gibson	R! Forest Health Protection Missoula Field Office	
Paul Flanagan	Forest Entomology and pathology	

	Wenatchee National Forest Science
Paul Shielke	Lake Wenatchee Ranger District
	Wenatchee National Forest
Heather Berg	Selway Ranger District
	Nez Perce National Forest
Jennifer Nelson	Salmon River Ranger District
	Nez Perce National Forest
Lynn Kaney	Newport Ranger District
	Colville National Forest
Larry Meyer	Priest Lake Ranger District
	Idaho Panhandle National Forests
Tim McConnell	Region 1 Forest Health Protection
	Missoula Field Office
Keith Sprengel	Region 6 Forest Insects and Disease
	Westside Technical Center

COOPERATOR INVOLVEMENT:

Name	Role	Time Commitment
Ken Gibson	Plot location	
Paul Flanagan	Plot location	
Paul Shielke	Plot location and maintenance	
Heather Berg	Plot location and maintenance	
Jennifer Nelson	Plot location and maintenance	
Lynn Kaney	Plot location and maintenance	
Larry Meyer	Plot location and maintenance	
Tim McConnell	Aerial surveys	
Keith Sprengel	Aerial surveys	

PRODUCTS AND DUE DATES: This project will produce specific recommendations for the application of aggregation and antiaggregation pheromones to protect resources from the Douglas-fir beetle. In the original proposal we stated that the final recommendations would be available by the middle of 1999.

STATUS OF PRODUCTS/PRESENTATIONS: Because we were not able to install all of the plots in 1997 and processing of trap samples in the lab is taking longer than expected, the final results will not be available until early in 2001.

ACCOMPLISHMENTS TO DATE:

Products: Annual progress reports.

Publications:

Dodds, K.J., D.W. Ross, and G.E. Daterman. 2000. A comparison of traps and trap trees for capturing Douglas-fir beetle, *Dendroctonus pseudotsugae* (Coleoptera: Scolytidae). J. Entomol. Soc. Brit. Columbia 97(in press).

Technology Transfer: Informal discussions with cooperators. No formal technology transfer will occur until the project is completed.

FIRST FISCAL YEAR FUNDED: FY 1997

FUNDS OBLIGATED FROM BEGINNING OF PROJECT THROUGH CURRENT FISCAL YEAR (extend table as needed)(Ignore this section if not requesting funds)**:**

	Item	Requested Funding	Expended Funding	Unused Funding
FIRST YEAR				
Administration	Salary			
	Overhead			
	Travel			
Procurements	Contracting	67,918	67,918	
	Equipment			
	Supplies			
Year Totals		67,918	67,918	
SECOND YEAR				
Administration	Salary			
	Overhead			
	Travel			
Procurements	Contracting	54,015	54,015	
	Equipment			
	Supplies			
Year Totals		54,015	54,015	
THIRD YEAR				
Administration	Salary			
	Overhead			
	Travel			
Procurements	Contracting	12,000	12,000	
	Equipment			
	Supplies			
Year Totals		12,000	12,000	
Year Totals				
PROJECT TOTALS		133,933	133,933	

FUNDS NOT USED FROM PREVIOUS FISCAL YEAR

Fiscal Year	STDP Funding Allocated	Funds Obligated	Funds Unused

EXPECTED BUDGET FOR NEXT FISCAL YEAR (extend table as needed)**:**

	Item	Requested FHP STDP Funding	Other-Source Funding	Source
Administration	Salary			
	Overhead			
	Travel			

Procurements	Contracting			
	Equipment			
	Supplies			
Totals		None		

DIFFERENCE BETWEEN ORIGINAL AND AMENDED REQUESTS AND JUSTIFICATION: 0

STDP FUNDING NEEDED: 0

Total estimated additional future funding needed beyond the current fiscal year:

Estimated STDP funding needed in remaining year(s) of the project by fiscal year. Show separately the funding to be requested/provided from other sources (extend the table as necessary).

Fiscal Year	**STDP Funding**	**Other-Source Funding**	**Source**