

Bark Beetle Pheromone Working Group
Union Plaza Hotel, Las Vegas, NV
October 17-20, 1988

Convened at 1:00 p.m. October 17. Chaired by Dave Holland.
In attendance: Dave, Bob Averill, Tom Hofacker, Ralph Thier, Ken Lister,
Charlie Sartwell, Pat Shea, Iral Ragenovich, Ken Gibson

Bob Began with a brief description of Greater Yellowstone Area analysis that he has begun working on. Mostly looking at fire effects--some of those effects may be increased insect activity. Also analyzing rehabilitation efforts, salvage of damaged trees, noxious weeds, etc. Groups from Regions 1, 2, and 4 will be involved in analysis--including plans for coming winter and next field season. Many questions remain concerning coordination between agencies and disciplines, natural phenomena in the Park (including fire), let-burn policies, insect infestations, etc.

Following Bob's introductory remarks, Dave outlined objects of current meeting: Identify strategies using bark beetle semiochemicals to be evaluated in the West in 1989. Discussion will include study plans, location of projects, identification of leaders and cooperators, and projected costs. Further noted, this meeting is a follow-up to one held in Boise in September. At that meeting, most agreed as to which strategies using bark beetle pheromones are considered "operational" and which ones require additional "field testing." This whole effort follows the Lakewood, CO, meeting in January 1988, at which many of these same points were discussed.

Verbenone Evaluations: First item of discussion was westwide verbenone tests conducted in 1988. Coordinated by INT (Ammen), pilot projects using verbenone bubble caps were conducted in Regions 1, 2, 4, and 6. An additional project was conducted using aerial application of verbenone-impregnated beads by PheroTech, PSW, and PNW.

Charlie mentioned there was some question about the elution of verbenone from the beads used in the aerial test. They (PNW) had questioned the length of time the beads eluted the chemical--thinking it was too short to be of practical use. Pat said their tests showed no problem whatever.

In further discussion of the 1988 projects--the results of which have not yet been fully analyzed--we determined the following needs for additional verbenone testing in 1980:

- Analysis of observed differences in treatment effects between lodgepole and ponderosa pine stands.
- May need more stringent criteria for plot selection to assure more similar conditions (stand and beetle infestation) between test areas.
- Need at least an additional year of testing.
- May want to look at bubble cap placement.
- May want to look at higher application rates than those tested--either higher elution rates per capsule or more capsules per acre.

Identified target dates of October 31 to have data for all tests (except aerial) to Amman. He would have preliminary analysis by December 1.

MCH Registration: Tom reported on varied interests in getting MCH registered. In addition to PheroTech, at least one other commercial firm has expressed interest. Total costs for registration could reach \$100,000. PheroTech is hopeful Forest Service will bear much of that burden. All of us should support continued efforts--try to exhibit utility of MCH--get backing of Regional Foresters, e.g., could MCH be used to protect fire-weakened Douglas-fir from attack by Douglas-fir beetle?

Douglas-fir Beetle: Are "bait and cut" strategies operational? Should/could MCH be used in concert? If so, how to evaluate its effectiveness? Iral accepted lead in putting together work plan for evaluating effectiveness of "bait and cut" strategies (not in conjunction with MCH). Look at "spot treatment" in paired drainages--try to determine area effect. Will have work plan by January 20, 1989. Identify analysis area needed, methods (2 baits/acre?), costs, etc.

A side question concerned use of MCH in standing trees. Strategies for deployment might include beads--either aerial or ground application, or bubble caps. Treatment objectives vary from protection of threatened stands to treatment of infested ones. Identified potential areas to test such strategies.

R-6	Willamette NF - Shady Beach Fire
R-1	Lolo NF - Madison Gulch Fire
R-4	Bridger-Teton NF, Payette NF
Multi-Region	Greater Yellowstone Area

Dave and Charlie agreed to take lead in working on study plan. Also due January 20, 1989. Consider future uses and opportunities for "push-pull" strategy. Need to explore how restrictive current experimental use permit for MCH is.

Spruce Beetle: Again discussed "bait and cut" techniques. They have been used successfully in Region 4. Discussed "spot" treatment versus "area" treatment. So far have only used PheroTech baits operationally. Tests in Alaska (using funnel traps) show Consep baits more effective than PheroTech. Should look at different baits, plus possibility of geographic variation. Skeeter Werner is apparently continuing to test different baits--someone should compare results in lower 48 states.

Iral assigned lead in developing study plan to test "bait and cut." Should be similar to ones for Douglas-fir beetle.

Discussed use of MCH to protect spruce--single trees and areas. All agreed it needs further testing. Bob volunteered for that lead--assess bubble caps and/or bead applications.

Pat discussed "lethal trap tree" work done in Alaska. Essentially a "spray and bait" strategy used where tree removal is not an option. In 5-acre areas, identified five spruce to be baited with spruce beetle pheromone baits. Each baited tree and all trees within 3-meter radius of baited tree were treated with 2 percent carbaryl. Checks were baited but not sprayed. No carbaryl treated trees were attacked, but neither were all checks. Perhaps beetle pressure not high enough. Plan to re-do in 1989. May use Consep baits. May also work with Ralph in R-4.

Mountain Pine Beetle: Discussed "bait and cut" strategies for second-growth ponderosa pine stands. Are results similar to those we see in lodgepole pine stands? Russ Mitchell has developed strategies to be tested on Deschutes NF in R-6. Plans to hold beetles in "spots" to allow completion of thinning on 10,000 acres. Bob noted R-2 hasn't had much luck using baits in ponderosa pine. He will contact Mitchell to check on study plan to see if it is applicable to stands in R-2.

Ips: Bob is interested in testing "trap out" technique described in PheroTech's literature. Will try to work with State of South Dakota in the Black Hills. Will attempt to trap throughout summer as second-growth ponderosa pine stands are thinned. Not sure if Ips species is pini or calligraphus, but baits should work for either. Hope to prevent attacks in standing trees. Tom will check on similar work being done in Northeast.

Western Pine Beetle: Ralph described work done in R-4 in 1988. Tried various combinations of "bait and cut," "lethal trap trees" and Verbenone treatments in effort to combat tremendous beetle populations on the Boise and Payette NF's. Their results were mixed--some strategies worked well, others less so. "Bait and Cut" worked, but second-growth ponderosa pine often difficult to sell if bluestained and checked badly. Some logging restrictions not well-suited to using baits. Also some difficulty in assessing results. Biology and life cycle of western pine beetle makes it extremely difficult to work with.

"Spray and bait" strategies worked well initially. Later in the summer, trees treated with carbaryl began to sustain attacks. By summer's end, nearly 80 percent of treated trees had been killed. Not yet sure why--whether trees were not sprayed sufficiently, if the bark did not hold chemical, or if beetle physiology is that much different than mountain pine beetle. Pat and Ralph will try to develop tests for 1989 which may help answer some of those questions. Will want to assure proper application of carbaryl, standardize "plot" size, determine whether it's best to retreat infested trees or establish new "lethal" trees nearby, and determine best timing of treatment. May involve FPM people from R-5 as well.

Verbenone treatments used in R-4 in 1988 were inconclusive. Verbenone (bubble caps) was challenged with baited funnel traps in some locations; in others, no baits were used. Traps collected same amount of beetles with or without verbenone nearby. Not sure if verbenone that is effective for mountain pine beetle is exactly the same as one for western pine beetle. Pat will check with

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Bill Bedard on that. If it is determined that the two are different, the western pine beetle enantiomer should be field tested. May also want to explore different "delivery" systems. Note: different EUP would be required for different formulation or product.

Research Needs: Need to determine elution rates of various products--particularly those by different companies--PheroTech and Consep, e.g. Notable differences observed in some products.

Pat thinks we should have other chemicals for individual tree protection. Pretty risky to have only one product registered. Others should be tested--pyrethroids, e.g.

Insect research in the West needs more support from FPM and field units. Future looks pretty bleak for some research units. We should all emphasize the work remaining to be done.

Prioritization of Defined Problems:

1. Additional verbenone testing (mountain pine beetle in ponderosa and lodgepole pine).
2. MCH in standing trees against Douglas-fir beetle.
3. "Push-Pull" strategy--MCH and baits for Douglas-fir beetle.
4. Evaluate Ips trap out technique.
5. Continue to evaluate "bait and cut" and "baited spray" strategies for western pine beetle.
6. Evaluate western pine beetle formulation of verbenone.
7. Evaluate Consep and PheroTech baits for spruce beetle--look at "bait and cut" in spruce stands.
8. Spray and bait strategy for spruce beetle control.

Questions to be Resolved:

- What will we do, what can we do in 1989?
- What are EUP requirements for 1989?
- What are "statistical limitations" for testing--need at least three reps or pairs of data?
- Can we count on additional "special project" money for 1989? (Tom indicated probably not--should probably take funds from "up front" money.)

- Should be develop standard plot selection criteria for all testing? For example:

- *5-10 infested trees/"spot"
- *minimum one "spot"/drainage
- *640 acres as base area

- Establish standards for baits per "spot?"

- *1-3 infested "spots" = 1 bait "spot"
 - *4-10 infested "spots" = 3 bait "spots"
 - *bait at 5 baits/acre on "spots" of 2 acres or less
 - *maximum distance of 10 chains between "spots"
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