

Landscape-scale treatment promising for slowing beetle spread

February 2 2009

Mountain pine beetles devastating lodgepole pine stands across the West might best be kept in check with aerial application of flakes containing a natural substance used in herbal teas that the insects release to avoid overcrowding host trees, according to a team of scientists.

Findings from the U.S. Forest Service-funded study appear in the February issue of *Forest Ecology and Management*. The study was conducted in California and Idaho, and showed how applications of laminated flakes containing a substance called verbenone resulted in a three-fold reduction in insect attack rates, compared to areas where they were not applied.

The technique could provide a way to treat infestations on a large scale and limit further spread into millions of acres of trees made vulnerable because of climate change, overcrowding and fires.

It could also be an alternative to insecticides, which can have adverse environmental effects. Thinning of some overstocked forests is still recommended to reduce susceptibility to bark beetles. But, the flakes can provide some protection for the dense, old-growth stands required by wildlife, according to the scientists.

The largest beetle outbreak in North American history is now occurring in Canada, where more than 22 million acres are affected, according to the British Columbia Ministry of Forests and Range. Outbreaks of this magnitude exacerbate global warming by converting forests from carbon

sinks to carbon sources.

Scientists have known for more than a decade that one of the safest strategies for deterring such infestations was through application of verbenone, which beetles release to inhibit aggregation by members of their own species, and the Food and Drug Administration has approved for use as a flavor ingredient. But, manual application of verbenone is difficult where infestations cover thousands of acres in remote, steep terrain.

"Verbenone flakes gave significant protection from mountain pine beetles when applied to low to moderate beetle populations," said Nancy Gillette, a Forest Service scientist at the Pacific Southwest Research Station and one of nine researchers involved in the study. "Higher beetle populations will probably require higher application rates."

Gillette and her colleagues speculated that flakes released from the air might better disperse and simulate natural beetle release than large, manually-applied verbenone packets so they used helicopters to release flakes.

They treated 10 plots at two sites, one near Mount Shasta in Northern California and another in Idaho's Bitterroot Mountains. The sites had similar tree densities and existing rates of infestations. Helicopters dropped flakes on half of the plots and left the others untreated, with application rates of about 9.7 flakes per square meter.

The treatments reduced the level of attack to about a third of that in untreated plots in both California and Idaho. Future studies will test a biodegradable formulation of the flakes.

More information: The study, "Aerially Applied Verbenone-Releasing Laminated Flakes Protect *Pinus contorta* Stands From Attack by

Dendroctonus Ponderosae in California and Idaho" can be seen in the journal *Forest Ecology and Management* at:
[dx.doi.org/10.1016/j.foreco.2008.12.017](https://doi.org/10.1016/j.foreco.2008.12.017)

Source: US Forest Service

Citation: Landscape-scale treatment promising for slowing beetle spread (2009, February 2)
retrieved 25 April 2024 from
<https://phys.org/news/2009-02-landscape-scale-treatment-beetle.html>

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