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AP Associated Press

Destructive insects on rise in Alaska

By DAN JOLING, Associated Press Writer *Sun Sep 10, 12:56 PM ET*

Destructive insects in unprecedented numbers are finding Alaska forests to be a congenial home, said University of Alaska forestry professor Glenn Juday, and climate change could be the welcome mat.

Warmer winters kill fewer insects. Longer, warmer summers let insects complete a life cycle and reproduce in one year instead of two, the forest ecologist said.

Warm winters also can damage trees and make them less able to fend off insect attacks by changing the nature of snow. Instead of light, fluffy snow formed at extreme cold temperatures, warm winters produce wet, heavy snow more likely to break the tops of spruce trees, Juday said.

"They are not well adapted to handling big, heavy wet snow loads," Juday said. "It does them in."

Since 1980, aerial surveys indicate spruce bark beetles have killed mature white spruce trees on 4.4 million acres, including more than a million acres of the Kenai Peninsula south of Anchorage in an outbreak that took off after 1988.

"We lacked two successive cold winters in the state," Juday said. "We had really warm summers, the numbers of the beetles blew up, the resistance of the trees was down simultaneously everywhere. We just got one super outbreak rolling across the landscape and it just killed most of the mature trees in a whole region of the state."

Spruce bark beetles bore into trunks and feed on the live cambium layer, a thin strip of tissue between bark and wood.

Trees resist beetles with pitch, made up of hydrocarbons including up to 17 forms of terpene, the substance from which turpentine is distilled.

The ratio of those terpenes are a signal of the health of the tree. When a tree is injured — its top perhaps broken by heavy snow — terpene ratios go off in one direction.

Using sophisticated chemical receptors, spruce bark beetles detect variations in terpenes. Injured trees offer less resistance.

"They sniff the tree," Juday said. "If the tree's healthy, they try to avoid it. Why? If they start to bore into a healthy tree, it's got a lot of pitch, and the pitch is under high pressure. It's boring in and the pitch is pushing it back out."

When an entire forest is stressed or injured, and terpene ratios go wild, and reproductive success is high, beetles overwhelm trees and the ability of predators such as woodpeckers to keep them under control, Juday said.

The latest nemesis is spruce budworm, which defoliates white spruce by feeding on new buds in May or June, and later spruce needles. By killing the terminal bud at the top of the tree, budworms set off a process of stem decay. An infestation can turn a healthy young white spruce into a Charlie Brown Christmas tree, skeletonized and scrawny.

Hardwoods have not been spared.

The amber-marked birch leaf miner, a European import, turns birch leaves brown. No tree deaths have been documented, but researchers suspect repeated heavy infestations can weaken birch.

Aspen leaf miners have turned quaking aspen leaves from green to silver. The insects expanded from 1,400 acres in 2000 to 584,405 acres in 2004, according to the University of Alaska Fairbanks.

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