Head: The Pine Beetle Problem
By Davis English

Four million acres.

That's how much forest the Mountain Pine Beetle has damaged in Colorado since becoming a noticeable problem in 1996. Countless trees and communities have been taken over by these tiny pests and forest workers have experienced difficulties attempting to contain the epidemic. The beetles are simply too small and travel too rapidly through Colorado's thick swaths of trees that have become so characteristic to our state.

Professor of insect systematics and taxonomy at Colorado State University, Boris Kondratieff, explained how the Mountain Pine Beetle systematically kills off trees by the thousands.

"The Pine Beetle is an interesting one," Kondratieff said. "The female lays her eggs under the bark and introduces a deadly fungus in there too. Then, the larvae and fungus go about systematically killing the tree by cutting off vital flows of water and nutrients."

The fungus – specifically blue stain fungus – ends up girdling the tree and killing it within weeks. One year after the pine dies, its needles turn red or reddish brown and after four years, the tree becomes gray due to loss of needles and decomposition.

Kondratieff went on to tell me about how the adult beetles use pheromones to signal other beetles to a stand of weakened trees. This allows multiple adults to attack the same tree at once, which leaves it with little chance for survival.

"These guys (pine beetles) are hard to get rid of because they're built to withstand incredible temperatures – highs and lows," Kondratieff said. Generally, it takes a two-week cold snap of temperatures lower than minus 10 degrees Fahrenheit to kill off a substantial number of beetle eggs and larvae. With the warmer winters we have been experiencing recently, Mountain Pine Beetles have gained more ground than they could have otherwise. Climate change seems to be positively affecting how these insects fare in existing ecosystems.

Fire policies in Colorado have also impacted how the beetles have strengthened in the past few decades. Because most National and State Forests have had a no-burn wildfire policy in the past, many of our hills are thick with trees. Fires haven't naturally thinned the forests and, as a result, there are more trees with more diseases that the beetles can easily overtake. It's like releasing a virus (the beetle) into a packed subway (thick forest) versus releasing that same virus into a sparsely filled outdoor park. The virus will always spread more prolifically in the packed subway. The absence of natural fires has transformed our forests from outdoor parks to subways.

So the Mountain Pine Beetle is going about killing our beloved Colorado forests and on top of this, they're resilient little critters. Although adults are only a few millimeters in

length, they pack a punch when an outbreak starts. This being the case, researchers have developed a few methods to stem the growth of the Pine Beetle, but it's difficult to contain such a widespread problem.

Whitney Cranshaw, a professor of insect and pest management at Colorado State University, understands how control methods work on the Mountain Pine Beetle.

"Basically, these are tough insects," Cranshaw said. "We're mainly interested in using pesticides like permethrin-based chemicals (insect neurotoxins) to stop the spread of the beetles. It's been fairly effective, but the beetles are so so widespread and it can be difficult to identify every tree that's been hit. A silver lining is that there seem to be fewer and fewer healthy pines for adults to infest."

Along with chemical treatment of forests, there are numerous other beetle management techniques that have been tested over the last few years. The systematic removal and burning of affected trees to physically remove beetles from an area is a popular approach, but can be time consuming and costly. Another approach involves using the beetle's own pheromones to attract other beetles to a single location in which they are subsequently burned or treated with chemical agents.

Various groups around the state have also taken to using preventative measures in order to stem the growth of the pest outbreak. The most common of these measures is the mechanical thinning of forests to simulate natural tree thinning from wildfires. By cutting down sick or dying trees, beetles are left with far fewer susceptible trees to infect. It's proven to be an effective method of prevention in smaller plots of land, but is simply too large a task for the US Forest Service to complete. Because of this, many local forestry departments have used what are known as "controlled burns" to thin vulnerable trees in an area. They do this by setting a patch of forest ablaze and letting nature work as it's designed to by burning down weak trees and leaving the stronger ones standing.

As the pine beetle tightens its grip on Colorado and the American West, many are wondering if there are enough trees to support the beetles' infestation. So many forests have been affected to the point where the Mountain Pine Beetle is simply running out of tree stands to take over. In fact, the number of infected trees has dropped significantly from 1.15 million acres in 2008 to just 264,000 acres in 2013. Breckenridge resident and CSU student, Schuyler Wright has noticed the slowing of beetle proliferation recently.

"It seems like the beetles have hit some geographic limitations," Wright said. "They're running into aspen stands and can't infect any more trees. Also, the Forest Service has gotten much more proactive in applying pesticides and thinning affected trees. At my folks' place in Breckenridge, the surrounding pines are all brown, so I find it difficult to believe the beetles have much more room for growth."

While the Mountain Pine Beetle epidemic may not be over, it's definitely past its peak. We're finally learning how to effectively control the pests in the waning stage of their enormous attack. The rice-sized assailants have wreaked havoc on Colorado forests, but

if their reign of terror has taught us anything, it's that nipping similar future outbreaks in the bud could prevent catastrophic ecological and economic disasters from occurring.