



MATSUTAKE

The Mushroom Everyone's Talking About

On his hands and knees, a man sifts through soil in a flagged off square patch of forest floor. Pulling his soil specimens from the ground, he places it in a sealed bag, labeling the exact GPS coordinates where he located it. At the end of the day, this specimen, and hundreds like it, will be shipped off to a lab for DNA testing. While the scene unfolding might sound a lot like a crime scene, this team of biologists and volunteers aren't out to crack a case. They're on the hunt for the prized American matsutake mushroom (*Tricholoma magnivelare*) in the name of providing information to resource specialists about how best to manage matsutake within forest stands to ensure healthy, long-term populations of the fungus.



Volunteers display their Matsutake findings while surveying.

In 2010, the Deschutes National Forest, in partnership with Oregon State University, began a study that would use DNA analysis to determine the presence or absence of matsutake in soil samples taken before and after forest treatment. The study, a first to use this kind of DNA-based analysis of soil samples to locate matsutake, also became the first to examine the effects of tree thinning on the American matsutake.

Found in a region spanning from northern California to southern Canada, the matsutake lives primarily among lodgepole pine and mixed conifer stands. While they thrive under the tree canopies, the matsutake become susceptible to wildfires and disease when dense understory develops. Known for their unique taste and aroma, matsutake are considered a highly prized mushroom. The Crescent Ranger District on the Deschutes National Forest features some of the most prolific matsutake harvesting habitat, supporting the demands for commercial and recreational harvesting of the mushroom.

Crescent Ranger District Botanist, Christina Veverka led a team of Deschutes National Forest biologists and more than 60 local mushroom enthusiasts, who volunteered for the project, in an

enormous data collection effort. The location of the project concentrated on areas around Crescent Lake, located on the east side of the Oregon Cascades' crest, where professional and hobbyists alike had previously noted bountiful matsutake harvests.



Members of the collection team dig through the soil for traces of matsutake.

During the collection period, prior to any forest treatment, the team located matsutake in 420 pre-determined plot locations. Team members collected four soil samples from each plot, resulting in 1,680 soil samples gathered. Using the infamous “smell test”, collectors confirmed the presence of matsutake in each of the samples. Biologists then shipped the samples to Oregon State University, where Dan Luoma and Joyce Eberhardz, chief investigators for the study, conducted DNA analysis to more accurately identify the presence of the matsutake.

Over the course of the 2011-2012 winter months, thinning operations took place throughout the study area. In order to minimize ground impacts, forest treatment was only completed atop a solid snowpack.

Researchers and volunteers returned to their 420 plots following forest treatment. While some plots had been intentionally left untouched, to remain as control blocks, other plots had undergone the thinning process. They once again resampled each plot and sent the soil to Luoma and Eberhardz at Oregon State University (OSU). In all, researchers at OSU carried out more than 2,000 DNA reactions to determine if the matsutake remained in the soil.

Overall, the goal of the study was to provide information to resource specialists in how best to manage matsutake within forest stands. Veverka, other Forest Service biologists and OSU researchers wanted to better understand just how exactly thinning and forest treatment would affect the fungus. They were also curious about matsutake ecology and wanted a better understanding about the habitat requirements for matsutake.

With the final round of DNA analysis complete, results showed that the matsutake maintained its presence in treated areas. DNA surveys showed a 63% detection of matsutake post-forest treatment in the control blocks—areas untouched during thinning. DNA analysis found a 61% detection rate of matsutake in areas that received thinning. These results support a projection of long-term healthy matsutake harvests and persistence across the area.

For Veverka and those involved with this project, they believe the key to continuing a sustainable management strategy for the matsutake will be grounded by common understanding among



A volunteer enjoys the unique matsutake aromas during the surveying process.

resource managers, the mushroom industry and the general public.

“I have carefully listened to the advice the mushroom harvesters have provided to this project since 2002 when they began to voice opinions on the effect of active forest management on their livelihood,” affirms John Allen, forest supervisor for the Deschutes National Forest. “I am very concerned about having a forest that can sustain matsutake harvest over the long-term.”



From the looks of this ground-breaking study, it looks like matsutake, for the foreseeable future will continue to produce. Given the findings, resource managers are now better equipped with information to make decisions that will promote a sustainable matsutake harvest and balanced ecosystem.

Collection team members record their findings and ready the soil samples for DNA analysis in the lab.