

MORE THAN FOOD

Mushrooms thrive in melting snow

U.S. Forest Service botanist shares fungi passion at annual festival in Santa Cruz

SANTA CRUZ » Thea Chesney has been obsessed with mushrooms since she was a child. “Instead of a regular children’s book, I carried around a mushroom field guide,” Chesney said, now a botanist with the U.S. Forest Service.

Chesney gave a presentation at the recently completed Santa Cruz Fungus Fair, hosted at the Loudon Nelson Community Center, about her work in the field and a curious mushroom that sprouts in the most unlikely of seasons.

Along with a booth to identify the mushrooms found in your own backyard, gourmet mushroom tacos, and hands-on children’s activities, the Fungus Fair featured talks led by mushroom experts and enthusiasts during its three-day run. On Saturday’s afternoon program, Chesney stood in front of a packed audience.

Aside from being known as a delicious plant-based treat, mushrooms, collectively called fungi, are interesting organisms that have been around for millions of years. “Fungi are ancient, they show up in the fossil record around the same time as land plants,” Chesney said.

And without fungi, Chesney said, we wouldn’t have plants. Some mushrooms have evolved a relationship with nearby trees, where an exchange of vital nutrients takes place below ground between the two root systems. In what’s known as mycorrhizal symbiosis, mushrooms suck up water and mineral nutrients such as nitrogen and phosphorus from the soil, and send them to the tree, in exchange for the sugars the tree produces by photosynthesis.

Chesney’s work focuses on mushrooms that grow in the western mountains, such as the Sierra Nevada and Cascade Mountain ranges. She works year-round — even when mountain tops are covered in snow during the winter and early spring. These snowy habitats aren’t an obvious habitat for fungi, Chesney explained during her presentation, but the root systems of some snow-sprouting mushrooms are decades old and have developed ways to thrive in the tough conditions.

At higher elevations of 3,000 to 6,000 feet, snowpack reliably accumulates during winter months and thaws in the spring, Cheney said. As temperatures warm, usually April through June, the

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snow begins to melt and the ground below becomes wetter, providing a perfect environment for about five to 10 opportunistic mushrooms.

One particular species, *Hygrophorus goetzei*, has evolved for thousands of years to take advantage of the wetter-than-usual ground, she said. As the temperatures begin to slowly warm, this light pink capped mushroom of only a few inches wide can be found on the edge of a retreating snowbank, where the snow is about to melt.

As the fruiting body, or what we as consumers know as the mushroom, begins to grow, it gives off heat. It's a small, almost unnoticeable amount of warmth, Chesney explained, but is

just enough to melt a small hole in the snow for the mushroom's stalk to grow and cap to sprout open.

"It didn't occur to me that some mushrooms are snow-evolved," said Ted Raab, a plant biologist at Carnegie Institution for Science, who attended Chesney's presentation at the fair. Currently, these snow adapted mushrooms are known to exist only in the western mountains of North America.

As our climate is changing, Chesney pointed out, so will our seasons — and likely, seasonally-growing mushrooms such as the *Hygrophorus goetzei*. "We don't even know exactly how many mushrooms exist in the western mountains yet," she said, though current estimates are in the thousands.

"People are interested in eating them, but there is so much more to the world of mushrooms," Chesney said.