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Eye on the Environment

Mushroom Bumper Crop

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Boletus edulis. Photo by Tim Wheeler.

If you've walked in the woods this fall, you've probably noticed the bumper crop of mushrooms. Even if you haven't been in the forest you may have noticed shaggy manes along your driveway or Russulas (aka: duff-humpers) pushing up through the roadbed.

While last year at this time we were experiencing an unusual cold snap of sub-zero temperatures, this autumn has been rather mild and rainy. September saw only a couple of nighttime temperatures drop below freezing in the valleys, coupled with 17 consecutive days of precipitation. The end result—lots of mushrooms.

But a closer look into the mushroom world reveals that things are more complicated than they appear. Mushrooms belong to the Eumycota Kingdom, more commonly called the Fungi Kingdom. The Fungi Kingdom is divided into 5 categories including things like molds that appear on spoiled food, slim molds (some of which grow on rotten logs), and other strange and lesser known types of fungi.

Mushrooms themselves are really only the reproductive structure of certain types of fungi. Another way to think about this is to compare the relationship between mushrooms and fungi with a fruit tree.

A mushroom is just like an apple, while the fungal structure is equivalent to the rest of the tree. Though an obvious difference is that unlike a tree, the fungal structure, or mycelium, lives under ground and out of sight.

A common misconception is that if you pick a mushroom you are killing a living organism. Not true, you have only taken away one of the fruiting bodies of a fungi, just like you would not kill the tree by picking an apple.

The mycelium is an underground network of cobweb-like strands called hyphae, that grow in soil or wood, secrete enzymes, and digest organic matter returning nutrients to the soil and releasing CO2 for plants to breathe.

When conditions are right, the mycelium develops an underground nugget of hyphae, called a primordium, which in turn matures into a mushroom. The job of the mushrooms is to then produce spores (the equivalent of apple seeds) that have the ability to start the fungi lifecycle all over again.

Some of the more interesting types of fungi are mycorrhizal, meaning "fungus root". Mycorrhizal fungi form symbiotic relationships with vegetation by attaching to the root systems of plants, grasses, and trees. In fact, mycologists have found that over 90% of all terrestrial plants have associations with mycorrhizal fungi. Moreover, some species have multiple associations with a diversity of mycorrhiza. Take Douglas fir for example -- mycologist have identified over 200 species of fungi that attach to the root system of a single Doug fir tree.

So what is this mutually beneficial relationship all about? In reality, we have probably only begun to scratch the surface on this subject. We know that by attaching to the root systems of vascular plants, fungi –which are unable to photosynthesize— receive important carbohydrates. In return, the mycorrhiza enhances a plants ability to absorb water and nutrients in the soil by increasing the surface area of the root system. Therefore, plants and trees that have well developed associations with mycorrhizal fungi tend to be much healthier (measured by more vigorous growth and a better capability to fight off disease) than those that lack these relationships.

One mycologist from the Northwest, Paul Stamets, has found that not only are certain fungi good at helping plants fight attacks from various diseases, but some species have the ability to help humans in a similar way due to their ability to kill pathogens such as pox and flu viruses. So convincing are Stamets findings that the US Department of Defense has agreed to protect certain stands of old growth forests where these fungi occur as a matter of national defense!

Emerging research suggest an even more complex relationship between plants and mycorrhizal fungi. Not only have mycologist found that extensive networks of fungi attached to the roots of most plants, but they are finding that these networks of mycelium actually connect individual plants to one another. In some cases, they have found that mycelium can span across different species, thus allowing an individual tree of one species to exchange nutrients with another individual of a completely different species. This complex network is nature's version of the Internet.

So if you haven't taken the time to get outside and check out all the fungi activity happening in the woods this fall, I recommend you do so before we start getting hard frosts and the mushrooms disintegrate back into the forest floor.

I know for me that while I have been out scouting for deer and elk this season, I can't help but notice all the mushrooms activity and wonder if the true health of our ecosystem is not measured by trophy bucks and bulls, but by the processes happening under our feet and out of sight.