

## NATURE'S LABORATORY

*"There are old mushroom hunters, there are bold mushroom hunters - but there are no old, bold mushroom hunters!."*

-- Minnesota Mycological Society

While fungi such as mushrooms are often associated with decay or as something poisonous to be feared, fungi play an important role in ecosystems around the globe. True, some fungi cause athlete's foot or spoil food, but other fungi help break down and recycle organic material such as dead plants and animals back into the soil so that other organisms can survive. More noticeably, however, fungi come into play in our everyday lives. Aside from the shiitakes in our sandwiches and the portobellos in our pastas, you'll find fungi at work in the bathroom, the kitchen, even the laundry room.

Yeasts, for example, are used to brew beers and to encourage breads to raise. If you like blue cheese, you might be surprised to learn that its distinct flavor is produced by the mold *Penicillium roqueforti*. The lifesaving antibiotic Penicillin is derived from a mold too. And that white stuff on a deli-style sausage of salami? Mold as well. Even laundry detergents contain cleaning agents extracted from fungi.

The appreciation of mushrooms as organisms and as culinary dishes have become fields of their own. Scientists and amateurs who study mushrooms are known as mycologists. The search for mushrooms is known as mushrooming, and those who prepare and eat their finds practice mycophagy.

Although they emerge from the earth, fungi aren't plants; they belong to their own kingdom, the aptly named fungi. Fungi include everything from mushrooms and molds to lichens, mildews, yeasts, rusts, and smuts. Mushrooms alone include a vast spectrum of specimens: earthtongues, elf cups, morels, lorchels, coin caps, funnel caps, wax caps, parasols, death caps, oysters, fairy helmets, hedgehogs, groundwarts, woodcrusts, and earthcrusts, to name a few.

Scientists estimate there are as many as 1.5 million fungi species in the world. In North America, there are over 1,000 species of mushrooms. Considering there are approximately 250,000 species of flowering plants worldwide, this gives you some idea how successful fungi are. Still, of those 1.5 million fungi, only 28,700 fruiting fungi, 24,000 rusts, smuts and molds, and 13,500 lichens have been successfully identified.

That shouldn't be surprising, considering we only catch a glimpse of the mushroom's life. The mushroom as we know it is merely a fruiting body, a temporary reproductive structure only visible aboveground. The greater part of a mushroom's life takes place underground where the mycelium, a body of thread-like filaments known as hyphae branch out like spider webs throughout the ground.

In order to reproduce, the mushroom fruiting body forms when hyphae grow together in a cluster. In garden-variety gilled mushrooms, the fruiting body erupts from an "egg", as the fruiting body is known before it emerges aboveground. Supported by the stalk, the cap unfolds, leaving behind a skirt-like annulus. Once the cap has filled out into its final shape, the spore-storing gills on the underside of the mushroom are exposed, permitting the mushroom to reproduce.

There's reason to believe the world's largest organisms are mushrooms, either the 1,500-acre mycelium reported in Washington state or the 37-acre, 110-ton mycelium in Michigan.

**Hands On:** As a general rule, you should never collect or eat mushrooms unless they've been purchased at a store. Since many poisonous mushrooms growing in the wild resemble store-bought mushrooms, it's best not to take any chances. Some wild mushrooms can make you very ill, others can kill you, and some people react differently to various levels of mushroom toxins. A number of *Coprinus* species can result in nausea and vomiting when consumed with alcohol.

Still, there's nothing wrong with observing mushrooms in the wild. After a rainy day, take a walk in the woods to see what mushrooms you can find. If you have a camera, you can take photographs of the specimens you encounter. Once you've developed the film, grab a mushroom field guide and see if you can identify the different species.

Better yet, visit the grocery store and see what mushrooms they have to offer. You might notice that some mushroom varieties are much sought after and priced accordingly. A cheap mushroom will do just fine, though. Buy an exemplary specimen of a few species and take them home to dissect. After closely studying the mushroom from all angles, sketch and label the different structures you can identify. Use your field guide if need be. Then, carefully tear or cut the entire mushroom in half to get a better view of the gills.

A great website to visit is [www.mykoweb.com](http://www.mykoweb.com), a site dedicated to the science of mycology and the hobby of mushrooming. Mykoweb offers an online version of "The Fungi of California" which describes 370 species with over 1,500 images and includes a key to identifying individual fungi.

Remember that mushrooms are often very hard to identify without training and a number of key clues. Mycologists collect the entire fruiting body for inspection later, and often use microscopes, spore prints, and chemicals to confirm their identification. Even then, those who collect mushrooms take care to key out their mushrooms, and store and prepare them properly to prevent accidents.

*Matthew Bettelheim graduated from the University of California, San Diego, with a Bachelor's in Science, and is at present a wildlife biologist and freelance science writer.*

