Morel Mushrooms

August 2018

Morchella species

Field Notes

Morel mushroom (*Morchella sp.*) in Yosemite National Park, 2016 – fruiting after the 2015 Rim Fire. Photo by Andrew Larson.

General Description

Morel mushrooms are the fruiting bodies produced by fungi of the genus *Morchella.* These fungi have a hollow stem and a conical cap with pits and ridges, resembling a honeycomb or pine cone.

The conifer-dominated montane forests across western North America likely share similar *Morchella* species of morels. These species fall mainly within the black morel group. Some species can be identified by visible characteristics, while others require molecular analysis.

Morels are among the most highly sought after and prized mushrooms for culinary use. Significant recreational, subsistence, and commercial harvests occur throughout their range, although many national parks prohibit harvest, or strictly limit it. If you do venture out to seek morels, be sure to understand the harvest regulations wherever you go and know how to distinguish false from true morels!

Distribution and Habitat

Morels grow in all countries of the Northern Hemisphere that have temperate or boreal forests, or forests that experience a distinct cold season, especially with winter snow. They also occur in some Mediterranean or subtropical regions such as coastal California, the highlands of Mexico and Guatemala, and the Middle East.

In the western U.S., morels are typically found in coniferous forests, including species of *Pinus* (pine), *Abies* (fir), *Larix* (larch), and *Pseudotsuga* (Douglas-fir), as well as in *Populus* (cottonwood) riparian forests. In the first year following a fire, some morel species, often called "burn morels," reproduce prolifically.

Ecology

Morels have complex life cycles and relationships. Evidence from experiments or observation of fruiting patterns suggests that some species live and feed on dead organic matter, or are saprotrophic. Other species associate with a particular tree species, or sometimes grasses. These species form symbiotic relationships that benefit both the plant and the fungus.

The most important relationship ecologically is mycorrhizal, meaning "fungus-root." The fungal hyphae (tiny threads that are the smallest units of a fungus) grow among and sometimes into the outer cells of plant root tips, creating a zone where nutrients are exchanged between the fungus and the plant. The fungus absorbs water and mineral nutrients with its mycelial network and shares them with the host plant, and in return the fungus absorbs carbohydrates from the plant's roots. Morels may vary between saprotrophic and mycorrhizal at different stages of their life cycle.

Reproduction

Morels can reproduce sexually and asexually. Under certain conditions they can send up a fruiting body without interacting with another fungus. This asexual reproduction has the advantage that it can happen quickly, to make the best of a small window of good conditions. The fruiting body will release millions of its microscopic spores, a tiny proportion of which will germinate.

Alternatively, hyphae from two different morels of the same species intertwine and then send up a fruiting body or mushroom, again releasing spores, but containing genes from both parents.

Conservation

Several management actions could help conserve morel mushrooms. Maintain historical fire regimes in forests where "burn morels" grow. Conduct research and monitoring to better understand the habitat needs and life cycles of different types of morel species. Regulate harvesting so that habitat is protected and populations are sustainable. And finally, seek strategies to reduce and mitigate impacts of climate change in protected areas.

Where to See

Morels are likely to be found in all of the Klamath Network parks, and the best opportunities to see morels in abundance would be in burned areas, the spring following a fire.

More Information

Web page: Morel Biology and Evolution

Pilz et al. 2007. Ecology and management of morels harvested from the forests of western North America.