

The Morel of the Story:

Comparing Scientific Research With Local Mushroom Hunters' Knowledge of Morel Mushrooms

MEET THE SCIENTISTS!

Dr. Marla Emery, Geographer ►

My favorite experience was interviewing a man who grew up gathering plants in the forests. He had a lot of experience. He helped me understand many things about how local communities use and benefit from forests.

As we were driving around one day, he stopped his truck. He took me to a place where service berries and huckleberries grow close to each other. "This is one of my favorite flavors," he said. He showed me how to pick some of each and pop them into my mouth at the same time. He was right. It's a delicious combination. He reminded me, however, that some wild berries can be deadly. Wild berries should not be eaten unless you are with someone who knows which berries are safe to eat.



What Kind of Scientists Did This Research?

- **geographer:**
This scientist studies Earth's natural environment and human society.



► **Dr. Elizabeth Barron,**
Geographer

My favorite experience is hiking and looking at plants and trees. I never thought much about mushrooms until I started the morel (mò **rel**) mushroom project. At the time, I did not know much about morel mushrooms and, especially, did not know how to find them in the forest.



To prepare for the project, I spent several months reading about morel mushrooms. I learned how important they are to local people and local culture in Maryland. Maryland is located in the United States Mid-Atlantic region. After reading about mushrooms, I was anxious to see my first morel mushroom. I went to Maryland to do **preliminary** fieldwork for the project.

On my first interview, the man I was talking with offered to take me out to look for morel mushrooms. We found eight that afternoon. I'll never forget the feeling of seeing a morel for the first time, growing right out of the soil. It was a total thrill, and, as they say, the rest is history! In this photo, I am holding morel mushrooms.

Thinking About Science

Think about one thing you have learned from your own observation and experience. Let's say you have observed that 2-year old children usually cry when they do not get their way. Do you think your own knowledge is less or more accurate than scientific knowledge on the same topic? How does your own learning compare with scientific learning?

In this study, the scientists were interested in comparing what local people have learned from experience with what scientific research has shown. In this case, the topic was the places and times to find wild morel mushrooms. Wild morel mushrooms are hunted and harvested for their flavor. Some people have hunted morel mushrooms since they were young. The scientists in this study wanted to compare what these people have learned with what scientific studies have shown about where and when morel mushrooms can be found.



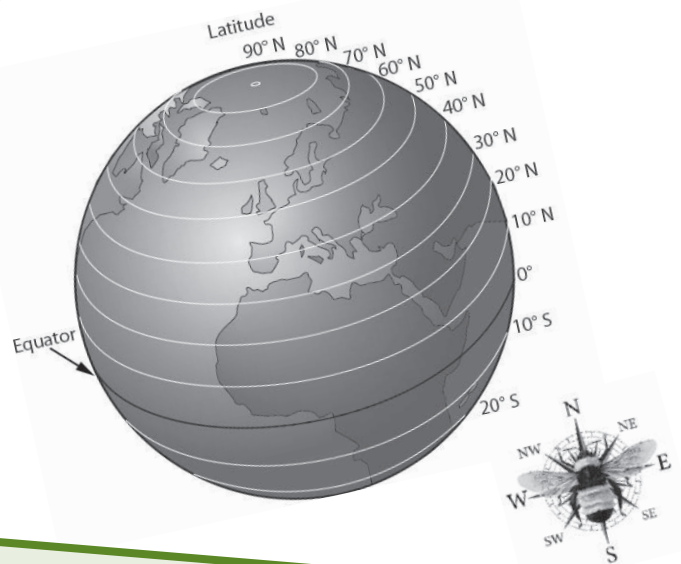
Thinking About the Environment

Mushroom hunting is a favorite pastime of many people. Mushrooms are hunted in the wild and often are gathered to be eaten. Mushroom hunting is a **specialized** skill that takes years to learn. Wild mushroom species are difficult to identify, and many wild mushrooms are poisonous. No one, therefore, should eat a mushroom found in the wild unless he or she is with an experienced person who can positively identify the **species** as safe to eat. Some poisonous mushrooms look a lot like edible mushrooms. This resemblance between some safe and poisonous mushrooms is why mushroom hunting is a skill that takes years to learn. Mushroom hunters often say, "When in doubt, throw it out."



In this research, the mushroom being hunted is called a morel. Morels are found throughout the Northern Hemisphere (figure 1). Morel mushrooms are part of an underground fungus. The part of a mushroom that you can see is the fruiting body. The fruiting body of morels is seen in the spring. Morels are often found near certain trees, such as elm, ash, and apple trees. Morel hunters look forward to hunting in their favorite places each spring.

Figure 1. The Northern Hemisphere is the area of Earth north of the equator. Illustration by Samantha Bond.



Are Wild Mushrooms Safe To Eat?

Never eat a mushroom that you find outside, whether it is growing in your yard, in a forest, or anywhere else. The only exception to this rule is if you are with an experienced adult mushroom hunter who has identified a mushroom as safe to eat. Never give a wild mushroom to someone else to eat. Some mushrooms can make humans very sick, and some can even be **fatal**.

Introduction

Morel mushrooms are found across the Northern Hemisphere (see figure 1). Because morels are found in so many places, they can look different and are found in many different habitats (figures 2a-2c). Not much scientific research has been done on morels growing in the Mid-Atlantic region. In the Mid-Atlantic region, therefore, morel **ecology** is still a mystery. To learn more about morel mushrooms, the scientists reviewed research about these mushrooms from the Pacific Northwest region (figure 3). Morels grow, among other places,

Figure 2a



Figure 2b



Figures 2a-2c. Many species of morel mushrooms are found in Earth's Northern Hemisphere. These species include the yellow morel (a), the half-free morel (b), and the black morel (c).

Photos by Chris Evans, Illinois Wildlife Action Plan and courtesy of <http://www.bugwood.org> (2a and 2b) and Joseph O'Brien, Forest Service and courtesy of <http://www.bugwood.org> (2c).

Figure 2c





Figure 3. The Pacific Northwest region of the United States.



<http://www.naturalinquirer.org>
Cartographer: Lindsay Gmann 2013

in national parks of the Mid-Atlantic region (figure 4). Some park managers were worried that the morel **population** might be declining in these national parks. If the morel population is declining, the managers might need to limit the number of mushrooms that local hunters could gather each year. Little research had been done on morel populations in this region. The park managers, therefore, asked the scientists to study morels in the Mid-Atlantic region's national parks.

The scientists decided to ask questions of morel hunters living in the Mid-Atlantic region. The scientists believed that local

mushroom hunters had a lot of knowledge about morels. The scientists wanted to compare the mushroom hunters' knowledge with the knowledge produced by scientists in the Pacific Northwest region. By combining research findings with local morel hunters' knowledge, the scientists hoped to better understand the morel population in Mid-Atlantic national parks.

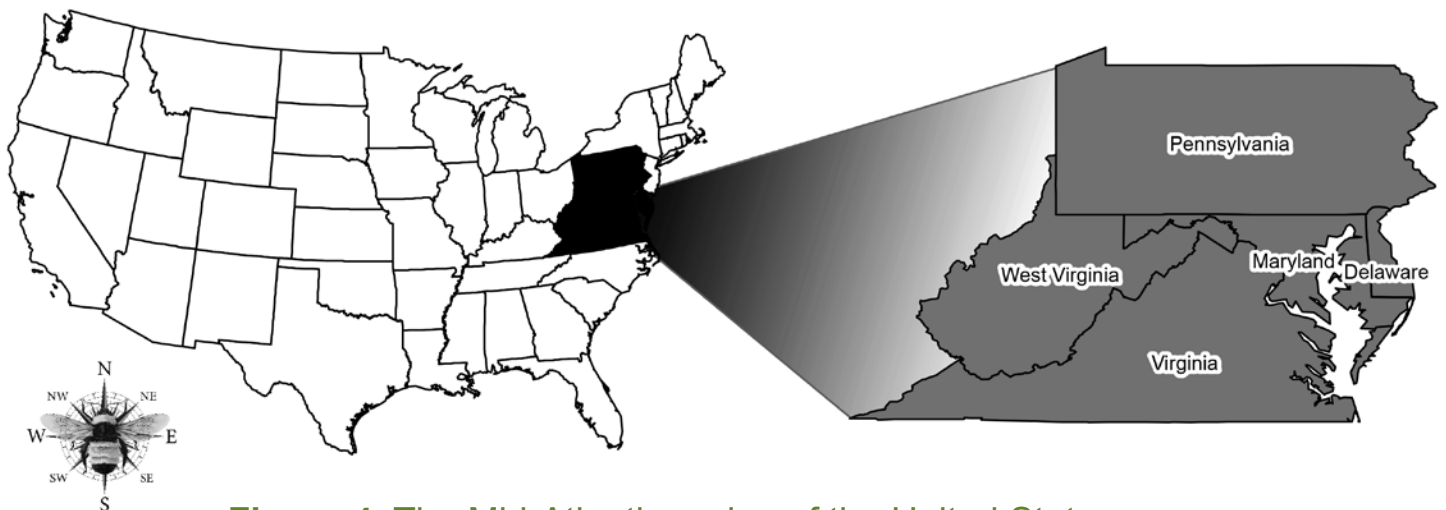


Figure 4. The Mid-Atlantic region of the United States.

<http://www.naturalinquirer.org>
Cartographer: Lindsay Gmann 2013

How Do Morel Mushrooms Get Their Nutrients?

Morels get their nutrients in two ways. Morels are **decomposers**. These mushrooms use **biochemical** processes to break down the cells of dead and decaying organisms. Morels also produce **filaments** that form around the ends of certain tree roots (figure 5). This relationship is called **symbiotic**, because the morels and the tree share resources. The morels receive carbon in the form of sugars and other organic substances from the tree. The tree benefits because the morels help it take in minerals and other substances from soil.

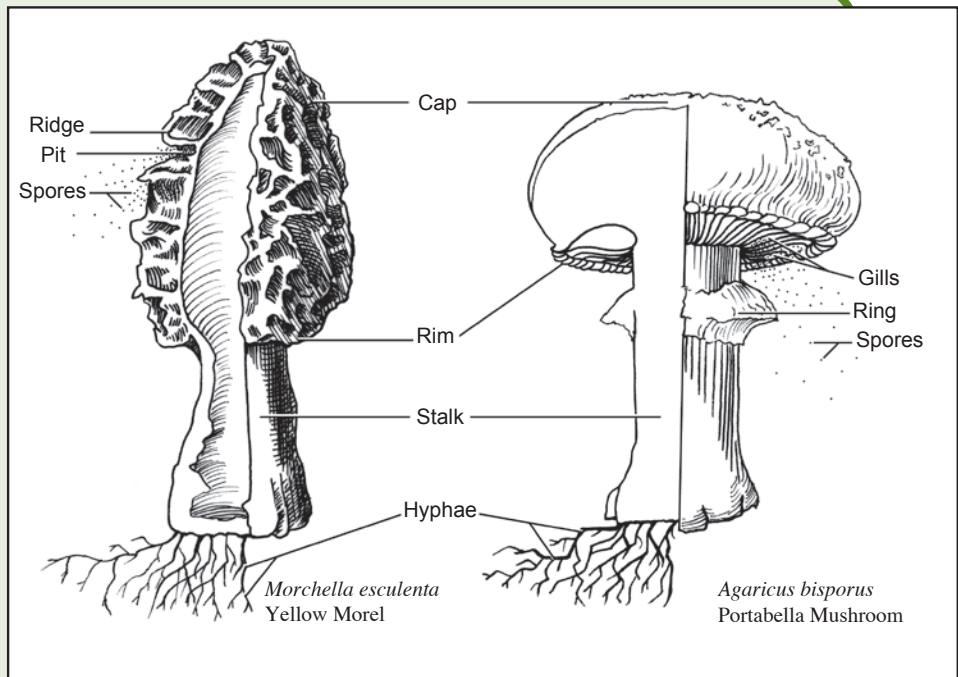


Figure 5. The parts of a mushroom. Notice the filaments, called hyphae, at the bottom of the mushroom stalk. Illustration by Stephanie Pfeiffer.

Reflection Section

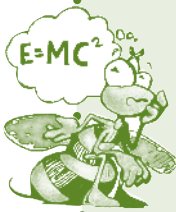
Why might morel research done in the Pacific Northwest not apply directly to morels in the Mid-Atlantic region?

Do you think local morel hunters would be a good source of information about the population of morel mushrooms? Why or why not?

Methods

The scientists were interested in learning from people who hunt morels in the Mid-Atlantic region's national parks. The scientists asked questions of 41 morel hunters. These individuals ranged in age from 18 to more than 65 years of age. These hunters had spent between 9 years to more than 30 years hunting morels. The scientists

audiotaped their interviews, which totaled almost 40 hours across all individuals. The scientists **transcribed** the audiofiles into a computer program, resulting in 1,034 pages of questions and answers. The scientists also went into the forest with some of these hunters, learning from them as they watched them hunt morels.



Number Crunches

What was the average length of an interview in minutes?
What was the average length of a transcribed interview in number of pages?

The scientists used a computer program to place all the answers into categories. The scientists then compared research findings

from the Pacific Northwest with the morel hunters' knowledge.

Reflection Section



Why do you think the scientists audiotaped and transcribed the interviews they conducted with the morel hunters?

Why did the scientists compare research findings from the Pacific Northwest with the answers given by the morel hunters in the Mid-Atlantic region of the United States?

Findings

Mid-Atlantic morel hunters identified five to six types of morels. Morels can look different, depending on what species they are and where they are found. The scientists

compared research findings from the Pacific Northwest with the Mid-Atlantic morel hunters' knowledge (figure 6).

Figure 6. The scientists compared the knowledge gained through research in the Pacific Northwest with local knowledge gained over generations of morel hunting in the Mid-Atlantic region.

Pacific Northwest Research Findings	Mid-Atlantic Morel Hunters' Knowledge
Types of Trees With Morels Found Nearby	
Elm, ash, tulip poplar, apple, oak, white pine, coniferous trees in the Pacific Northwest	Elm, ash, tulip poplar, apple, and white pine
Disturbances	
Flooding (negatively affects morel fruiting) Soil disturbance, fire, trees killed by insects (promote morel fruiting)	Logging, blow-downs , flooding (all negatively affect morel fruiting)
Weather	
Following snowmelt	Following snowmelt
Environmental Threats: Development	
Habitat destruction from logging and development (negatively affects morel fruiting)	Habitat destruction from development (negatively affects morel fruiting)
Environmental Threats: Fungicides , insect sprays	
No research available	Insect spray used to kill gypsy moths (negatively affects morel fruiting)
Environmental Threats: Harvesting Many Morels	
No impact reported from harvesting many morels	Some hunters believe harvesting many morels is causing morel population decline
Climate Change	
No research available	Earlier morel hunting season has been observed over the past several years

Reflection Section



Look at figure 6. What do you notice about the comparison between Pacific Northwest research and Mid-Atlantic local knowledge?

Based on the findings in figure 6, what conclusions can you draw about the impact of harvesting many Mid-Atlantic morels on the population of morels?



Discussion

The scientists concluded that **insufficient** evidence exists to determine whether morel populations are declining in the Mid-Atlantic region. The similarity of morel hunters' knowledge with that of the research findings

was an important finding. The morel hunters' knowledge can therefore be combined with research findings to increase understanding of morels.

Did you know?

A colony of honey mushrooms (*Armillaria solidipes*) in Oregon's Malheur National Forest is estimated to be at least 2,400 years old. This colony spans about 2,200 acres (8.9 km²) and is thought to be one of Earth's largest living organisms. This fungus lives underground and is visible only in the fall when the honey mushrooms appear. Although many fungi are beneficial to trees, this fungus causes the death of many of the trees with which it is **associated**.



Photo by Gil Wojciech and courtesy of <http://www.bugwood.org>.

The scientists suggested that scientific studies on morel biology and ecology should be done in the Mid-Atlantic region to help answer the question of morel

population decline. In particular, the scientists suggested that morel populations should be monitored over a period of years in **collaboration** with local morel hunters.

Reflection Section



Based on this research, should national park managers limit the number of morels that can be harvested in Mid-Atlantic parks? Why or why not?

Do you think morel hunters' knowledge should be considered along with research findings about morels? Why or why not?



Glossary

association (ə sō sē āt): A connection or relationship between things or people.

biochemical (bī ō ke mi kəl): Characterized by, produced by, or involving chemical reactions in living organisms.

blow-down (blō daʊn): Tree that has been felled by high winds.

collaboration (kə la bə rā shən): The act of working jointly with others.

coniferous (kā nə fər us): A type of tree having (pine) cones.

ecology (i kā lə jē): The study of the interactions of living things with each other and with the nonliving environment.

edible (e də bəl): Safe to be eaten.

decomposer (dē kəm pō zər): Organism that digests parts of dead organisms and the wastes from living organisms.

fatal (fā təl): Causing death.

filament (fi lə mənt): A single thread or a thin flexible threadlike object.

forage (fōr ij): Search for food.

fungicide (fən jə sīd): An agent that destroys fungi or inhibits their growth.

habitat (ha bə tat): The place or environment where a plant or animal naturally or normally lives and grows.

insufficient (in(t) sə fi shənt): Not sufficient; not enough.

mycelium (mī sē lē əm): The mass of interwoven filaments (called hyphae) that forms the vegetative portion of a fungus and is often submerged in another body.

organic (ōr ga nik): Of, relating to, or derived from living organisms.

population (pā pyə lā shən): The total number of individuals of the same type occupying an area.

preliminary (pri li mə ner ē): Something that comes first in order to prepare for or introduce the main part of something else.

specialized (spe shə līzd): Designed, trained, or fitted for one particular purpose or occupation.

species (spē sēs): A class of individuals having common attributes and designated by a common name.

symbiotic (sim bī ōt ik): The living together in close union of two dissimilar organisms.

transcribe (tran(t) skrīb): To make a copy of (dictated or recorded matter) in longhand or on a machine (as a computer).



If you are a trained Project Learning Tree educator, you may use “The Fallen Log” or “People of the Forest.”