

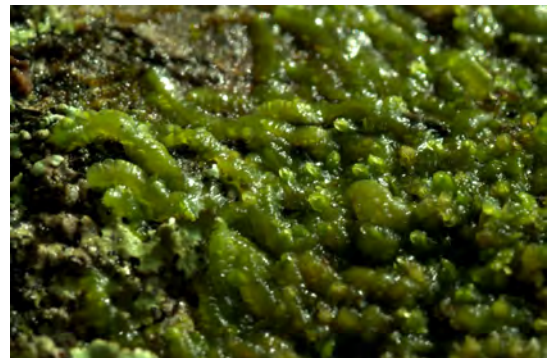
bear



"Where can we go to see a bear?" ... "How can we find a salamander?" ... "What's the best place to find wildflowers?" ... "Where are the elk?" These are questions that visitors to the **Great Smoky Mountains National Park** often ask, eager to see these icons of the natural world, preserved and protected by a **National Park System** that celebrated its centennial this past week. Only natural, of course, since these animals and plants provide a mix of familiarity and danger, the stuff of tall tales and fairy tales. Having traveled many miles, the payoff is to see what you would never find in the city or suburbs of home - a taste of adventure, something to say that you've seen.



Right there in front of you, however, all around you as you walk along the trails in the Appalachian wilderness of the **GSMNP**, there is another world of mystery - a *showcase of intense diversity* long gone from many places on earth. All it takes is a *closer look* - and a willingness to *learn what it is that you are looking at*. Once you know, windows open onto a strange and beautiful place - the deeper world of nature that supports the larger and more familiar land of the tree and the flower and the salamander ... and the elk and the bear.



We humans are mammals, vertebrates, and the plants that we and our animal herds eat are mostly angiosperms. We use the woody parts of angiosperms and gymnosperms to build our shelters and houses. This thin slice of life - vertebrate animals and vascular plants - is what we're programmed to notice ... it's what we see when we look out onto our world. Not only that, but this is the big stuff, big as one of our fingers or bigger than us - it's easy to see. Vertebrate animals, however, are only a tiny part of **Kingdom Animalia**, and **Kingdom Plantae** is ancient and immense - and vascular plants occupy only one corner of this group.



There are 3 other **Kingdoms of Life**, too, of course - all around us, covering and coloring the barks of trees and all rock surfaces, carpeting the ground beneath our feet and any part of a plant or animal that falls dead to earth. Members of **Kingdom Fungi** work intensely to clear the deadwood and fallen leaves, transforming dirt into soil. Working in close cooperation with tiny subterranean root fibers, fungi allow plants to absorb nutrients and water into roots, whose dynamics we only think we understand. Fungi are generally seen and acknowledged only when they twist their fibers together to reproduce, pushing into air with color and structure.



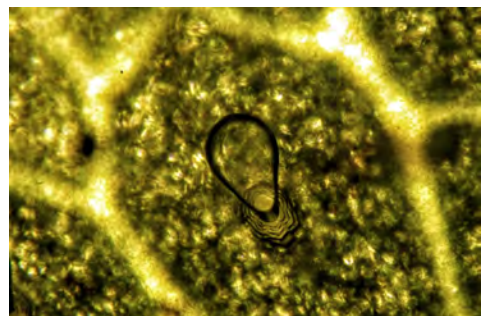
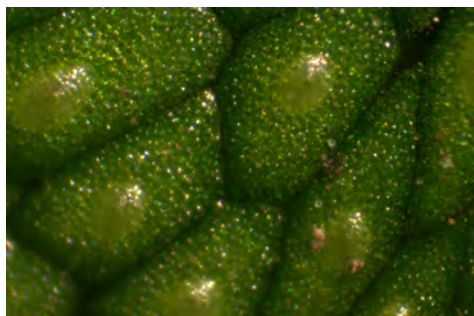
Smaller life forms are usually overlooked entirely - their beauty missed because unaided human vision has its limits. Over 300 years ago, however, a Dutch draper wanted to get a closer look at the threads in his drapery material. Pursuing this, Tony Leeuwenhoek learned to make lenses and delivered the first microscopes to the world. Since then, instruments designed to magnify what's in our field of view have proliferated. Quite a beautiful cosmos down there, operating just beyond the range of human eyesight. **Kingdom Protocista** is a vast collection of living wonders that includes small organisms having a nucleus (eukaryotes) - algae and amoebae and rotifers and paramecium ... another world within "our" world.



Cooperation and collaboration is a pervasive theme in the living world. Although a cell membrane limits the boundary of each distinct individual, close association among separate organisms, often of vastly different type, is the rule. Survival depends on it. Lichens exemplify this symbiosis, with fungal filaments supplying support and structure, while algal cells capture photons from the sun, making ATP, providing an energy source for the collaborative organism.



Kingdom Prokaryotae organisms are unicellular, lack nuclei, and include bacteria, blue-green algae, and Archaeans. This group is commonly feared, because a minuscule fraction of its members cause disease. There's a lot of beauty down there, however ... and every breath we take contains *oxygen supplied directly by cyanobacteria or their descendant chloroplasts*. Furthermore, our ability to *utilize oxygen to metabolize efficiently is dependent on mitochondria*, which our eukaryotic ancestors gained when prokaryotes entered cells and stayed as endosymbionts quite a long time ago.



So, if you want to see bears and myriad other spectacular creatures in the **GSMNP**, take a hand lens and a small microscope with you next time you visit. Escape your narrow view of the world, read up on it a little. Open your mind. Educate yourself. There is astonishing beauty all around you ... and there are bears all over the place.



(... see also [bear](#) webpage)



