

MOUNTAINS

Park leads in science of ‘water bears’

Zoologist to share research at National Park speaker series



Word from the Smokies
Aaron Searcy
Guest columnist

When Dr. Paul Bartels takes a walk in the woods, he sees a landscape absolutely teeming with bears. You’ll just need a microscope to see the ‘bears’ he has in mind.

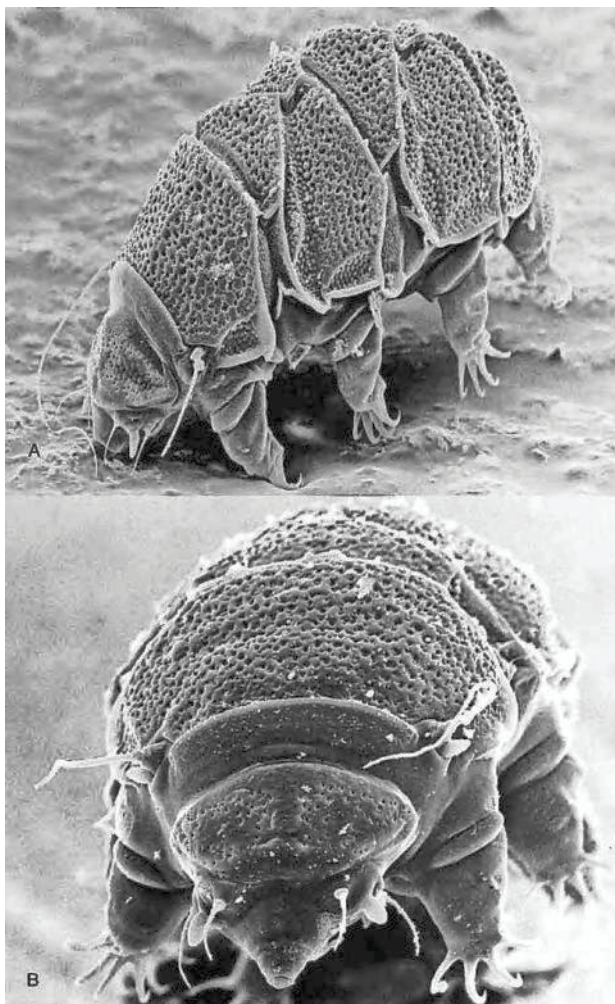
“They occur in moss and lichen on trees and rocks,” said Bartels. “They’re also in soil, in leaf litter, and stream sediment and periphyton — the green stuff that forms on rocks and plants in most bodies of water.”

As an invertebrate zoologist and professor at Warren Wilson College, Bartels studies microscopic water bears, also known as tardigrades. Water bears are incredibly hardy and incredibly small animals with eight legs that can live just about anywhere, from the Arctic, to the equator, to the bottom of the sea. Some species are known for their remarkable ability to enter an extreme state called ‘cryptobiosis,’ in which most life processes are put on pause until environmental conditions improve.

Between 2000 and 2010, Bartels and his students at Warren Wilson College in Swannanoa completed one of the largest systematic inventories of tardigrades ever conducted as part of the All Taxa Biodiversity Inventory project in Great Smoky Mountains National Park. That inventory, orchestrated in coordination with park partner Discover Life in America (DLiA), revealed a practically unexplored world of microscopic life humming away just beneath the realm of the humanly visible.

“The Smokies are now one of the best-known locations anywhere on earth for tardigrade fauna,” said Bartels. “When we got started, there was only one published paper that had reported just three species. Now, we’re up to a total of 85 species.” Eleven of those species have been officially described as species new to science, and Bartels suspects that more than twice that will eventually be proven to be new species as new data is obtained.

Water bears can be found in relative abundance in so many different places that the first challenge to studying them is simply deciding where to begin. Starting with a nearly blank slate in 2000, Bartels and his students working in the Smokies decided to use some of the park’s existing research plots to document and compare tardigrades across a range of forest types.

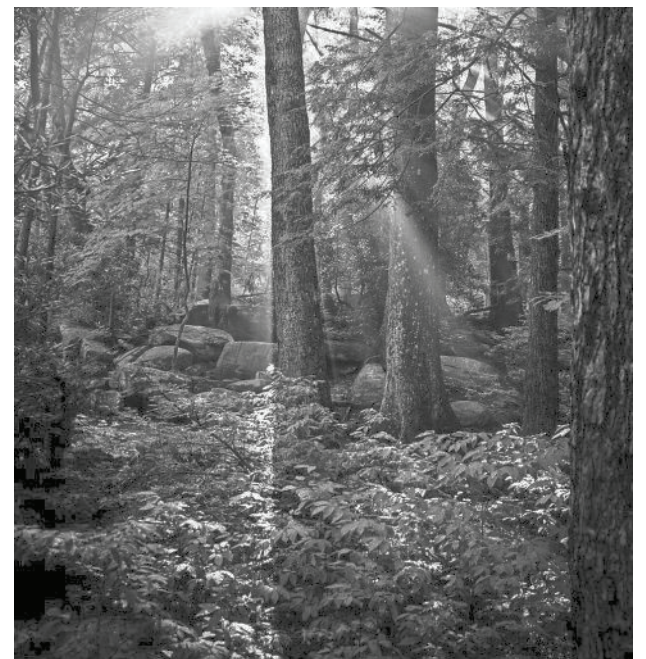


Claxtonia mauccii
SCANNING ELECTRON MICROSCOPY PROVIDED BY DR. DIANE NELSON, EAST TENNESSEE STATE UNIVERSITY

“In the end, we collected about 900 samples across the park and over 16,000 separate specimens,” said Bartels. “Once the researchers returned to the lab, they began the tedious job of isolating those specimens from their surroundings and mounting them on slides — each sample requiring hours of work in a process Bartels describes as occasionally “overwhelming.”

The results of that meticulous work, however, are invaluable to scientists everywhere. In the process of their study, Bartels and his students created their own key to identifying and classifying tardigrades that can be used by future researchers who may want to work with this little-known group of animals.

“The reason I study tardigrades and got involved in the Smokies inventory in the first place is because they are such a vivid example of the extent of our ignorance of biodiversity,” said Bartels. “People think scientists have already discovered everything there is to know,



Scientists chose the lush landscape of Great Smoky Mountains National Park to conduct one of the world’s largest systematic inventories of tardigrades to date.
PROVIDED BY SHAWN CLIFFORD

and nothing could be further from the truth. There are uncharted wonders we can’t even see, and they are right here in our own backyard.”

Though public awareness and interest in water bears has grown rapidly since Bartels first began his work in the Smokies, much basic science remains to be done when it comes to understanding this particular branch of the tree of life and how it contributes to the health of ecosystems as a whole. Researchers are also particularly interested in understanding tardigrades’ cryptobiotic processes, which could potentially be applied toward developing technologies to preserve cells or tissues.

For even one of the world’s foremost authorities on the subject, the process has been humbling.

“After 20 years of exploration,” said Bartels, “we’ve really just barely scratched the surface.”

Bartels will be sharing more about water bears in the Smokies and beyond on Friday, August 20, as a featured speaker at DLiA’s Science at Sugarlands educational series. Registration for the free online event is currently available at dlia.org/sas.

Aaron Searcy is a publications associate for the 28,000-member Great Smoky Mountains Association, an educational nonprofit partner of Great Smoky Mountains National Park. Learn more at smokiesinformation.org and reach the author at Aaron@gsmassoc.org.



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Bill before Gov. Cooper requires parents to approve COVID shots

Bryan Anderson
ASSOCIATED PRESS/REPORT FOR AMERICA

RALEIGH, N.C. — A bill requiring minors to get approval from their parents before receiving a COVID-19 shot in North Carolina was sent to Democratic Gov. Roy Cooper on Thursday.

The measure, which cleared the state Senate unanimously earlier this week, passed on Thursday with support from all but five House Democrats.

Americans who are at least 12 years old are currently eligible for the shot. Parental consent for the COVID-19 vaccine for youths between the ages of 12 and 17 would be required once the bill becomes law but only apply as long as the COVID-19 shots remain approved by the U.S. Food and Drug Administration for emergency use. The FDA may soon give the Pfizer vaccine final approval, which is the only vaccine available for children 12 years and older.

According to the North Carolina Department of Health and Human Services, state law “gives people under the age of 18 the ability to make certain health decisions, including the choice to get a COVID-19 vaccine, if they show the decisional capacity to do so.”

The parental consent provision is included within a

“We’re gonna examine that legislation as it goes through the process.”

Gov. Roy Cooper

bill that expands the types of medications immunizing pharmacists can administer.

In a Wednesday news conference, Cooper declined to say whether he would sign House Bill 96 if it reached his desk.

“I’m not gonna give you what you want,” Cooper said. “We’re gonna examine that legislation as it goes through the process. It does some important things that we know that we need to do, so we’re going to continue to look at it.”

As of Thursday, 262,236 North Carolina adolescents aged 12 to 17 have gotten at least one shot of the two-dose Pfizer vaccine, state health department data shows. The vaccinated youth represent less than 33% of the nearly 800,000 children in that age group, far below the statewide average of 59% of eligible residents and 87% of adults 65 or older at least partially vaccinated.

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