

MOUNTAINS

Study adds to knowledge of fire-enhanced fungi



Word from the Smokies
Frances Figart
Columnist

Great Smoky Mountains National Park has among the highest diversity of fungi in North America. There are more than 3,000 documented species, probably a significant underestimation of the true numbers according to fungi experts, or mycologists.

A mysterious type is called pyrophilous fungi. It has long been thought that their fruiting bodies – mushrooms – are either enhanced by or completely dependent upon fire.

Mycology is a dying academic area. So, it was fortunate that two of the few remaining scientists who can accurately identify fungi in the wild happened to be working at the University of Tennessee when the Chimney Tops 2 fire occurred in the park four years ago in November of 2016.

“Great Smoky Mountains National Park and the eastern US deciduous forests have not had many fires for about 100 years,” said Karen W. Hughes, a professor in UT’s Department of Ecology and Evolutionary Biology. “Thus, there was not much knowledge about pyrophilous fungi in the eastern forests.”

Hughes grew up in Salt Lake City. When she was in ninth grade, her family moved to Japan where her father was the lead statistician for the Atomic Bomb Casualty Commission in Hiroshima. She returned to Utah for an MS degree, then taught in Thailand and in Washington, DC, before going back for her Ph.D. at the University of Utah. After that, she joined the UT faculty in 1973.

In about 1990, Hughes began working with mycologist Ronald H. Petersen. Collaborating was easy, not only because they were both professors in the same department, but because of their very unique relationship – built around their common passion: fungi.

“Ron and I started collaborating when molecular biology first became a tool for identification of mushrooms, and so the partnership worked well with me doing the DNA sequencing and Ron doing the morphological identifications,” said Hughes. “We have collaborated for about 30 years, and during that time took students all over the US, and to Europe, South America, and Central America for our studies on species distributions.”

In 2005, Hughes and Peterson got



Researchers Karen Hughes and Ron Peterson met as professors in the University of Tennessee’s Department of Ecology and Evolutionary Biology. They married in 2005. COURTESY PHOTOS



The witch’s hat mushroom, *Hygrocybe conica*, is one of the species of pyrophilous fungi that is enhanced by fire.

married at a Mycological Society of America meeting in Hawaii. She was 65 and he was 71.

The pair worked with other mycologists

to define species, evaluate species distributions, and find cryptic (hidden) species. They had always wanted to answer questions like: What is the timing

of pyrophilous fungi after a fire? Are they endemic? Are they the same as those in the western US?

When the 2016 fire occurred, it offered an opportunity to explore these questions in the Smokies. Hughes swiftly applied for a National Science Foundation “RAPID” grant to do the study. Hers was the only grant related to these fires that was funded.

“We put together a team of mycologists across mycological disciplines, organized large group forays, and set up the data collections systems,” said Hughes. “All this was in place when we received the grant and started work in February of 2017, approximately two months after the fire.”

With more than 70,000 documented specimens of fungi in their collections, Hughes and Peterson were poised to show, through their studies, that pyrophilous fungi were indeed only found after a fire or were enhanced by a fire.

Where do these fungi live when fire is not present? Prior to their study, the answer was largely unknown.

“We know now,” said Hughes, “that at least some of these hide out inside plants, including mosses, and are released after a burn. After fruiting, their spores re-infect new seedlings. A few are in the soil at very low levels but are fire-resistant, so they have a competitive advantage after a fire has killed competing fungi. In a few cases, we still don’t know where they hide.”

Why does this couple love fungi so much? “Many fungi are degraders and break down organic materials, returning nutrients to the soil. They provide food to cultures all over the world, they are a source of medicines, and some are psychogenic and are being tested as a treatment for depression and PTSD,” Hughes said. “Their importance is really underappreciated.”

Peterson, now 86, is still sifting through their considerable herbarium collection of fungi specimens and getting correct names on some of what they call the LBMs (little brown mushrooms). Hughes, now 80, is finishing the data analysis on the fire study and then hopes to focus on some kind of semi-retirement. “Though I doubt,” she said, “that either of us will ever really stop working.”

Frances Figart is the editor of Smokies Life magazine and the Creative Services Director for the 34,000-member Great Smoky Mountains Association, an educational nonprofit partner of Great Smoky Mountains National Park. Reach her at frances@gsmassoc.org.

BRIEFS

State reaches deal with Maryland, Virginia on offshore wind

ANNAPOLIS, Md. – Maryland, Virginia and North Carolina announced an agreement on Thursday to advance offshore wind development. The states agreed to form a team with representatives from each jurisdiction that will work to streamline the development of regional offshore wind resources.

The three states have committed to work together to increase regulatory certainty and encourage manufacturing of component parts. The partnership also will aim to reduce project costs through supply chain development and share information and best practices.

“This bipartisan agreement with neighboring states allows us to leverage our combined economic power and ideas to achieve cost effective success,” North Carolina Gov. Roy Cooper said in a statement announcing the agreement.

UNC issues alert for armed person

CHAPEL HILL – The University of North Carolina at Chapel Hill issued an alert on Friday for a person described as armed and dangerous near the campus.

The school issued an alert shortly before noon Friday indicating a person was spotted near the Ambulatory Care Center west of the campus, but provided no further details. Faculty, students and staff were ordered to go inside immediately and close windows and doors until further notice.

The student newspaper reported “dozens” of law enforcement vehicles on the scene.

Police: 8-year-old boy accidentally shot, killed inside house

CONCORD – An 8-year-old boy was shot and killed when a man accidentally fired a gun inside a house early Friday

morning, police said. The child was dead when officers were called to the home at 2:08 a.m., Concord Police announced.

“I just think you have to practice extreme firearm safety,” Maj. Robert Ledwell Jr. told WSOC-TV. “We have to be cognizant that we are not treating a firearm like we do an ink pen.”

Police said the man suspected of shooting the child is a resident of the home and has been cooperative with investigators. Authorities are not looking for other suspects.

Police: Burglary suspect shot after he fired gun at officer

GREENSBORO – Police in the city of Greensboro said an officer shot and wounded a burglary suspect in an incident occurred shortly before midnight on Thursday. Police said they had received a report of a burglary in progress.

They said the officer approached on foot, and that the suspect shot at the officer. Police said the officer returned fire, striking the suspect.

Police said officers took the suspect into custody and rendered aid before he was taken to a local hospital. They said that Aaron Nehemiah Turner, 20, of Greensboro, was listed in critical but stable condition. Police did not release the identity of the officer involved or the races of the officer or the suspect.

Investigations into the incident are ongoing, including to determine whether Greensboro Police Department policies were followed.

When the criminal investigation is completed, the Guilford County District Attorney will review it. The officer involved in the incident was placed on administrative duty.

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