FRIENDS OF ROAN MTN

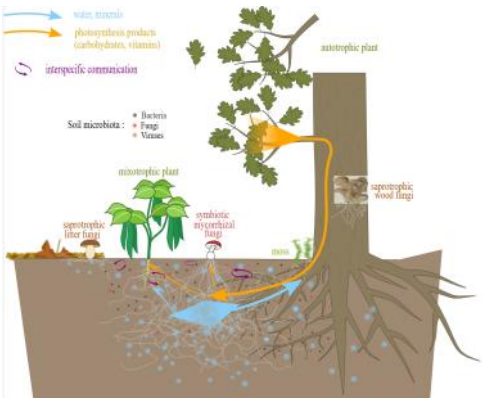
Volume 29 No. 2 Fall 2025

The Wood Wide Web

— Jerry L. Faulkner Ph.D.

A walk through a forest is a smorgasbord of sensations. The images of the trees and shrubs, the rustling of the leaves and the sounds of birds and other inhabitants, the unique odor from the volatile organic compounds released by the trees, and the coolness that their transpiration brings.

But hidden from our senses, beneath our feet, is a vast network that connects the trees and shrubs of the forest and is vital to their health and function. Under each footprint are kilometers of connections.



Coursing through the soil is a network of fungi that forms mutualistic relationships with the roots of 90% of the plants in the forest. This symbiotic relationship is referred to as mycorrhiza. “Myco” originates from the Greek word for fungus, and “rhiza” means roots.

Fungi exist as thread-like structures called hyphae. A mass of hyphae is a mycelium. The mushrooms or mold we see on the surface are the spore-producing structures and represent a small portion of the total mycelium. Connection is established when the extensive hyphae in the soil form a sheath around the surface of roots and penetrate between root cells (ectomycorrhiza) or actually penetrate the cells of roots (endomycorrhiza).

Early understanding of mycorrhizae revealed the mutual benefit of the relationship. Fungi break down organic compounds in the soil, making the nutrients available to the plants. This is especially true of nitrogen and phosphorus. In return, the fungi receive carbohydrate nutrition from the plants.

Subsequent research revealed that the fungal mycelium serves as a transfer connection between trees and shrubs. The connection was initially detected in the laboratory and then later documented in the field.

The mycorrhizal network can be huge. The largest known living thing on earth is an individual fungus in Oregon’s Malheur National Forest. Known as the Humongous Fungus it covers an area of 3.4 square miles (2,200 acres) and is estimated to weigh up to 35,000 tons.

Much of our full understanding of the role of the mycorrhizal network comes from the work of Canadian forest biologist Suzanne Simard. Through a series of elegant field experiments, she was able to document the multiple functions of the fungi. Her first publication in 1997 in the journal Nature resulted in the coining of the phrase “wood wide web.” One highly respected scientist opined that her discovery would “forever change

how people view forests."

Simard used radio-isotopes to track the transfer between trees and shrubs. She likens the mycorrhizae to a network of connections much like the Internet. There are multiple pathways connecting individuals. Actual mapping of the network revealed a constellation of hubs. She referred to these large hub trees as "mother trees." The network allows the forest to behave as a single organism.

Experiments revealed that the mycorrhizal network was a conduit for transferring nutrition between trees. Carbohydrate compounds moved freely between trees in a two-way transfer. Often, the mother trees were "feeding" other trees. While trees and shrubs of different species could receive nutrition, the mother trees were disproportionately sending food to smaller trees and seedlings of the same species and sending more nutrition to their own offspring. Interestingly, the flow could reverse seasonally depending on moisture and light abundance.

In addition to nutrition exchange, the network provided a means of chemical communication between plants. Amino acids (building blocks of proteins) hormones, defense signals, poisons and other organic compounds moved through the connections.

Shared hormones coordinate actions such as flowering or leaf abscission. Defense signals could alert neighbors to an insect infestation so they could prepare defense compounds. Even natural disease fighting compounds and pesticides could be transmitted between individuals.

All this is happening oblivious to the casual observer. It is just one aspect of the hidden life of trees.

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References:
Finding the Mother Tree. Discovering the Wisdom of the Forest. Suzanne Simard. Alfred A. Knopf Publishing. 2021
How trees talk to each other. S.W. Simard. TED Summit, Banff, AB. 2016. Https://www.ted.cm/talks/suzanne.simard
Net transfer of carbon between ectomycorrhizal tree species in the field. Suzanne W. Simard et.al. *Nature.* 388: 579-582. 1997

Jerry L. Faulkner, a life-long Tennessee resident, holds Masters and Doctoral degrees in botany and Ecology from the University of Tennessee. He served 28 years in the community college system. Jerry and his wife, Wanda, serve as education resource volunteers in the GreatSmoky Mountains National Park and lead hikes at the Spring Wildflower Pilgrimage. Jerry will present *The Hidden Life of Trees* on Friday, Sept.19, at 7:30 pm at the park conference center.

GIFTS AND MEMORIALS

Friends of Roan Mountain gratefully acknowledges these charitable gifts

Memorial Gifts

James Hunter in memory of Nancy Odendhal

Donations

Karen Cervak
Angela Dittmar
Doug Judin
Susan Peters
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Bill Cockett
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Julie Labhart
Bob & Lori Souther
Tyler Wicks

Join us for our Annual Membership Meeting

Saturday, September 20, at 5:30 PM in the conference center. At the meeting you will receive information regarding the activities, projects and finances of the organization. The election of board members will be held. The following have been nominated for this year's election:

Gary Barrigar, Janet Brown, Chris Campbell, Joe Deloach, Beth Dunbar, Anne Whittemore

Nominations from the floor may be made at the meeting. The annual meeting provides an opportunity for the membership to give input concerning the policies and activities of FORM. Any member wishing to submit an item for the agenda of the annual meeting may do so by contacting Gary Barrigar, friendsofroan@gmail.com.

Botanical Specificity

just jamey

First, good news for poison ivy (*Toxicodendron radicans*), poison oak (*T. pubescens*) and poison sumac (*T. vernix*) sufferers as there is hope on the horizon from researchers at the University of Mississippi who are developing a vaccine and have received patents while continuing research:

https://egrove.olemiss.edu/cgi/viewcontent.cgi?article=7548&context=umnews
https://www.scientificamerican.com/article/a-vaccine-against-poison-ivy-misery-is-in-the-works-as-scientists-also-explore-new-treatment-paths/

Some botanists feel the only true name for a given plant is the scientific name of *Genus species* and *subspecies* or *variety*. Some may think scientific names are "all Greek to me" and that is true of the word botany which comes from Ancient Greek "*botanē* (βοτάνη)" (thanks Wikipedia) and predates many scientific "-ologies" at least as a term. However, scientific plant names are based on botanical Latin which is important for insuring that we are talking about a specific plant and are not confusing plants in cases where common names are inadequate or apply to more than one species.

There is also frustration with the misuse of technical descriptive terms and poor use of common names for plants to the point that some common names are simply junk. A good example is field garlic (*Allium vineale*) which is sometimes called "onion grass" though it is neither an onion nor a grass, it is a garlic species with cloves just like cultivated garlic (*Allium sativum*). Many plant species have multiple common names in different regions across their ranges. *Kalmia latifolia* is known as mountain laurel, calico bush, and (even) ivy. *Rhododendron maximum* is known as great laurel, rosebay rhododendron, white rhododendron, and great rhododendron. *Liriodendron tulipifera* is better known as tuliptree than tulip poplar or yellow poplar because it is in the magnolia family (Magnoliaceae) not the poplar and willow family (Salicaceae).

However, you sometimes get lucky when the common name is also the scientific name. For instance, *Iris* is the genus name for irises, *Geranium* is the geranium genus (but not the other geranium which is *Pelargonium* though they are in the same family), *Magnolia* is the magnolia genus, *Lobelia* is the lobelia genus, *Galax* is the galax genus, and *Trillium* is the trillium genus. However, for genera containing multiple species you need to clarify which species you are talking about, such as dwarf crested iris (*I. cristata*), spotted geranium (*G. maculatum*), Fraser magnolia (*M. fraseri*), great blue lobelia (*L. siphilitica* but which is not good for treating syphilis), and red trillium (*Trillium erectum*). You still end up using two or more words so why not make them the genus and species? Fortunately, *Galax* is a monotypic genus (the only species in the genus) so calling it galax is fine though it still has other common names such as wandflower, wandplant, and beetleweed.

Learning specificity in the botanical lingo can be challenging when using technical keys for identifying plants. There are dozens of words related to describing how hairy plant parts can be, and they all mean something specific including the shape, complexity, and positioning of hairs. These include the terms

pubescence, pubescent, retrorse, septate or simple trichome, sericeous, setaceous, silky, stellate, stelliform, stipitate, strigose, tomentose, tuft, uncinate, velutinous, villous, and woolly (this list comes from an early version of the Guide to the Vascular Plants of Tennessee). Despite appearing to begin with the "tri-" prefix indicating three, trichomes can be simple non-branched hairs. An emerging trend in newer plant guides and technical floras is to use technical terms while also defining some of the terms in the keys and texts which helps with learning botanical terms.

And lastly: Prickers, Spines, and Thorns are often considered interchangeable in common usage but mean different things to a botanist (Shakespeare was wrong about roses having thorns):

Pictures are from the University of Tennessee Knoxville Herbarium (**https://herbarium.utk.edu/**).

		
Prickers are derived from the cortex and epidermis of plants and are often confused with thorns. Calling the Canada blackberry (*Rubus canadensis*) the "thornless blackberry" is nonsensical because they have prickers. Here are prickers on winter twigs of swamp rose (*Rosa palustris*).	**Thorns** are only found on woody plants and are derived from branches. Here is a true thorn on the winter twig of bigfruit hawthorn (*Crataegus macrosperma*, formerly known as *Crataegus roanensis*).	**Spines** are derived from leaves or stipules. American holly (Ilex opaca) leaves are a good example of leaves with spiny margins. Here are nodal spines on the winter twig of round-leaf or Appalachian gooseberry (Ribes rotundifolium) which is fairly common at high elevations of the western part of the

Congratulations to SAHC Roan Stewardship Director Marquette Crockett!

Marquette has been honored by **North Carolina Wildlife Federation** as the Public Lands Conservationist of the Year! At a reception ceremony on May 3, Marquette was recognized along with other leaders across the state in the NCWF's 60th Annual Governor's Conservation Achievement Awards.
A contingent of team members supported Marquette at the event - including SAHC Stewardship Director Sarah Sheeran, SAHC Land Protection Director Michelle Pugliese, volunteers Saylor Fox and Bettye Boone, SAHC Finance Compliance Director Lisa Fancher, and Marquette's husband Michael Welch. Please join us in congratulating Marquette on this well-deserved recognition for her work stewarding the Highlands of Roan!
Read more at **https://ncwf.org/blog/60th-governors-awards/**

Update on Tom's Branch

The 52-acre property on Tom's Branch that Southern Appalachian Highlands Conservancy purchased in 2022 transferred to the U.S. Forest Service in June. The property, now part of Cherokee National Forest, is located off TN Hwy 143 just north of Carvers Gap and highly visible to hikers on the Appalachian Trail at Round Bald and Jane Bald. Its location and the protection of water quality in Tom's Branch, a headwater of the Doe and Watauga Rivers, made it a conservation priority for decades. The Overmountain Chapter of Trout Unlimited contributed a $6,000 donation towards the protection and stewardship of the Tom's Branch tract. During the time period that SAHC owned the property, we partnered with the Watauga Ranger District of Cherokee National Forest and volunteers to clean up a trailer full of trash that had been illegally dumped on the property. We are thrilled that the transfer of the land to the USFS is now complete!

Cornell Lab of Ornithology Grant for Bird Habitat and Storm Recovery

Southern Appalachian Highlands Conservancy has been awarded a $25,000 grant from the Cornell Lab of Ornithology's Land Trust Bird Conservation Initiative Small Grant Program. SAHC and partners will use grant funds to address the devastating impacts of Tropical Storm Helene on fragile high elevation habitats on SAHC's Roan High Preserve, reducing wildfire risk and working to restore globally rare habitats. SAHC's 1,240+ acre Roan High Preserve protects pristine high elevation habitat directly adjacent to the heart of red spruce – Fraser-fir forests on Pisgah National Forest. The Preserve supports a host of high-elevation endemic or rare species, including the Carolina Northern flying squirrel, Saw-whet Owl, and Red Crossbill. "In September 2024, our region was devastated by impacts from Tropical Storm Helene, and the Roan Highlands was one of the most hard-hit areas," says Roan Stewardship Director Marquette Crockett. "High elevation hardwoods, oak, and conifer forests on south and east facing slopes were subject to large blow downs. High order streams were scoured, and landslides and debris flows occurred across roads and trails. We estimate that more than one-third of forests on SAHC's Roan High Preserve suffered directly from severe blow downs, with smaller wind impacts scattered throughout the landscape."

SAHC's grant project will clear soil roads on the Preserve for access and wildfire response; reduce fine fuels in blowdown areas by topping, limbing, and bucking downed trees; and study storm impacts on high-elevation forest bird species.

"We are grateful to be able to contribute to recovery efforts in our landscape and community by reducing wildfire risk on the Preserve, as we actively work with partners to begin restoration of rare high elevation habitats," adds Marquette. "We also look forward to learning more about avian response to this natural disaster by using automated recording units to inventory the bird community currently using the site and to monitor changes over time."

Xtreme Roan Adventures

The 2025 Xtreme Roan Adventures was great. The weather was beautiful, even if hot.

The exciting news from this year's Xtreme Roan Adventures was the introduction of two new Adventure Leaders. Rowan Gray assisted the Bird Adventure. Annaclaire Carder assisted the Butterfly Adventure. We welcomed a new Owl Pellett Dissection Leader, Tara Gray.

It was great to welcome new families. Amazing to see how much our returning kids have grown over the past year. There were so many excited and enthusiastic kids everywhere.

Thanks to Jeremy Stout from the Nature Center at Steele Creek Park for the Free Friday Night interactive presentation on Bio-geography. We had good participation and attention from the kids. Jeremy had double duty Friday and Saturday.

Thanks to all the leaders and staff who made the event run without a glitch. Leaders and staff worked hard to make it enjoyable for all. Many thanks.

So, mark your calendar for the next Xtreme Roan Adventures on July 25, 2026.

'see you on the mountain.

Ken Turner

Rangers preparing for Salamanders At Night Adventure

Bays Mountain Ranger Miranda with a hands-on display

Bird Adventure begins with Rowan and Michele

Spider Adventure is hands-on!

Butterfly Adventure begins with Nancy and Annaclaire

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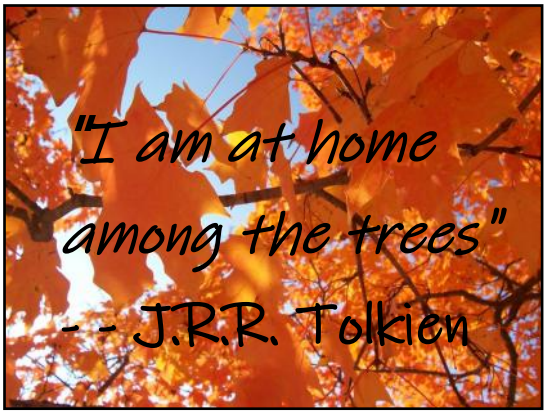
Friendly Reminders

MEAL Orders – **Payment for Spring Rally meals must be received by Tuesday, September 16th .** The reservation form can be found in the brochure or on our website. Mail your check and reservation form to Nancy Barrigar, 708 Allen Avenue, Elizabethton, TN 37643.

You can now register online. Find the link and rally brochure on our website's homepage.

Door Prizes -- We gladly accept items donated for door prizes. These will be given away on Friday and Saturday prior to the evening programs. Ideas: nature-related books, photos or art, outdoor gear, plants, homemade goodies . . .

If you prefer to read your FoRM newsletters online (color version) email friendsofroan@gmail.com with your request.



MARK YOUR CALENDAR

Spring Rally	Last Friday - Sunday in April	April 24 - 26, 2025
Youth - XRA	Last Friday & Saturday in July	July 25 - 26, 2025
Fall Rally	Friday - Sunday in September nearest 1st day	Sept 19 - 21, 2025
Winter Rally	Saturday in February near Valentine's Day	February 21, 2026