

TravelLab: In a forest on the trail of synchronous fireflies (Update)

June 20 2018, by Ted Anthony



This June 14, 2018 photo shows Peggy Butler, organizer of the Pennsylvania Firefly Festival looking at some fireflies in a jar during an evening hike overlooking the Tionesta Creek and Firefly Island, left rear, in Kettleville, Pa. For several weeks in June each year people from around the world make the trek to this northwest Pennsylvania forest to see all manner of fireflies. (AP Photo/Gene J. Puskar)

Picture a moonless June evening, shortly after midnight, deep in a

northwestern Pennsylvania forest. Wild sounds echo gently. Stars glow far above through the canopy of trees. Otherwise it is dark—so very dark.

But wait. There—right there, to the left—a single tiny light flickers on. And then another. And another. In moments they are switching on and off in stunning synchronicity, as if, deep in the woods, you have come upon a magical summertime Christmas tree. It's a show of light and nature, biology and dreaminess. It's everything the glowing screen in your pocket is not.

This is what it's like to walk smack into a pack of synchronous fireflies—"lightning bugs," as many of us called them in childhood. But these possess the unique capability of flashing in glorious, almost otherworldly unison.

The display happens every year in North America as spring ebbs into summer. It sweeps north as temperatures warm, up from Tennessee's Smoky Mountains to, on this night, the thick woods of the 500,000-acre (200,000-hectare) Allegheny National Forest, 100 miles (160 kilometers) from Pittsburgh.

Of hundreds of types of fireflies, these are perhaps the most remarkable. What they do, in a world of mass-produced experiences, is organic and natural and utterly unplugged.

People come from around the world for this. Peggy and Ken Butler organize an annual Pennsylvania Firefly Festival here, offering an intricate, quiet and fleeting experience where science and poetry live side by side.



This June 14, 2018 photo shows Peggy Butler, organizer of the Pennsylvania Firefly Festival, as night falls over her Black Caddis Ranch on the edge of the Allegheny Forest, heading out in search of fireflies in Kelletville, Pa. For several weeks in June each year people from around the world make the trek to this northwest Pennsylvania forest to see all manner of fireflies. (AP Photo/Gene J. Puskar)

Visitors come to see the "Chinese lantern" fireflies that seem to float through the air by Tionesta Creek. But they come, most of all, for the synchronous fireflies, that put on their choreographed light show for two weeks in late June in the forest around the Butlers' Black Caddis Ranch.

"It's so hard to put into words," Peggy Butler says. "A lot of people tell us they're here for a bucket list item. They're trying to find some missing piece of something."

THE EXPERIENCE

To walk on the edge of Tionesta Creek, cross over "firefly island" and wander into the forest to see the synchronous insects glowing and flitting above is to ponder a wonderful question: Where do the fireflies end and the stars begin?

The Butlers moved here from Ohio several years ago with no idea of the bounty in their backyard. Firefly researchers showed up and told them, essentially, "Prepare yourselves. You're going to get a lot of visitors."



This June 13, 2018 shows versicolor, or "Chinese lanterns," fireflies that seem to float through the air along a path on the Tionesta Creek in Kettleville, Pa. For several weeks in June each year people from around the world make the trek to this northwest Pennsylvania forest to see all manner of fireflies. (AP Photo/Gene J. Puskar)

They did. Last year, more than 500 people converged on their property for the festival. This year, campgrounds are booked for peak firefly season.

The phenomenon injects some economic energy into an area once dominated by sawmills, lumberyards and tanneries. But that traffic comes at a cost: "thousands of people traipsing through the forest, willy-nilly, looking for these things," as Butler puts it.

Because female fireflies stay close to the ground, as do firefly larva and immature insects, more foot traffic can mean more firefly casualties. And because fireflies light up less when light pollution is present, visitors with flashlights and cellphones can interrupt mating and impact the next firefly generation.

And yet, the appreciation of natural phenomena in an age of videogames and synthetic distractions is worth something, too.

"I'm very actively trying to spend my life not staring at a screen," says Kiley Voss, 21, of Buffalo, New York, who's studying conservation biology and interning with the Butlers. "I want to spend my life outdoors and be places where there's no cell service. This is one of those places."



This June 13, 2018 photo shows a sign in the Allegheny National Forest that directs hikers to Peggy and Ken Butler's Black Caddis Ranch in Kelletville, Pa. For several weeks in June each year people from around the world make the trek to this northwest Pennsylvania forest to see all manner of fireflies. (AP Photo/Gene J. Puskar)

THE SCIENCE BEHIND IT

How do they do it? And why?

The first question has an answer. As for the second, firefly experts only have theories.

Synchronous males can see each other light up, and they can reset their internal pacemakers in real time to sync with male counterparts flying nearby, according to researchers.

Females wait below, in brush near the ground. The males light up to attract them, as with most firefly species.

But why? Why light up together, when that would seem to create competition for males trying to entice a female mate? Why create what Sara Lewis, who has researched fireflies for more than two decades, calls "silent synchronous symphonies"?



In this June 14, 2018 photo Peggy Butler, organizer of the Pennsylvania Firefly Festival, checks her firefly net while preparing for an after dark hike in search of fireflies on and near Black Caddis Ranch on the edge of the Allegheny Forest, in Kelleetville, Pa. For several weeks in June folks from around the world make the trek to this northwest Pennsylvania forest to see all manner of fireflies. (AP Photo/Gene J. Puskar)

"It's still a mystery," says Lewis, a biology professor at Tufts University

in Massachusetts. "Why some, and why not others? Why are they doing it? We still don't know."

There are theories. The first, known as "visual clutter," suggests that it's to male fireflies' advantage to cluster so they're broadcasting in sync with other males in their line of sight, thus attracting female attention.

The second theory, the "silent window," focuses not on the synchronized lighting but in the pause for darkness between bursts. Perhaps, that theory goes, if they're all dark for 6 seconds or so, they can more easily see females flashing in the brush below.

The third hypothesis involves a particular species of synchronous fireflies that congregate in "display trees." If they can coordinate their signals to flash simultaneously, perhaps the brighter light can be seen farther away and entice females to fly into the trees to mate.

"It might be the most burning question in firefly biology that we don't have an answer to," Lewis says. "Why should thousands of males who normally would be competing for females' attention, why should they be cooperating?"

For Butler, biology and romance create something special. The fireflies, in addition to attracting mates, are attracting people to this small patch of Pennsylvania woods.



This June 14, 2018 photo shows Peggy Butler, organizer of the Pennsylvania Firefly Festival, at her Black Caddis Ranch, as she prepares for an after-dark hike along the nearby Tionesta Creek to Firefly Island in search of fireflies in Kelleetville, Pa. For several weeks in June folks from around the world make the trek to this northwest Pennsylvania forest to see all manner of fireflies. (AP Photo/Gene J. Puskar)

"There's this awe, every time. It's amazing," Butler says. "And this little bug has brought us so many interesting people."

If You Go...

SYNCHRONOUS FIREFLIES: The annual Pennsylvania Firefly Festival takes place June 23 at the Black Caddish Ranch and B&B in Kellettsville (near Interstate 80) but tours and lodging are sold out; www.pafireflyfestival.org and www.blackcaddisranch.com. Campsites near the Allegheny National Forest fill up early in the season but plan ahead for next year: www.recreation.gov

FURTHER READING:

—"Fireflies, Glow-worms and Lightning Bugs," by Lynn Frierson Faust, University of Georgia Press, 2017.

—"Silent Sparks: The Wondrous World of Fireflies," by Sara Lewis, Princeton University Press, 2016.

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