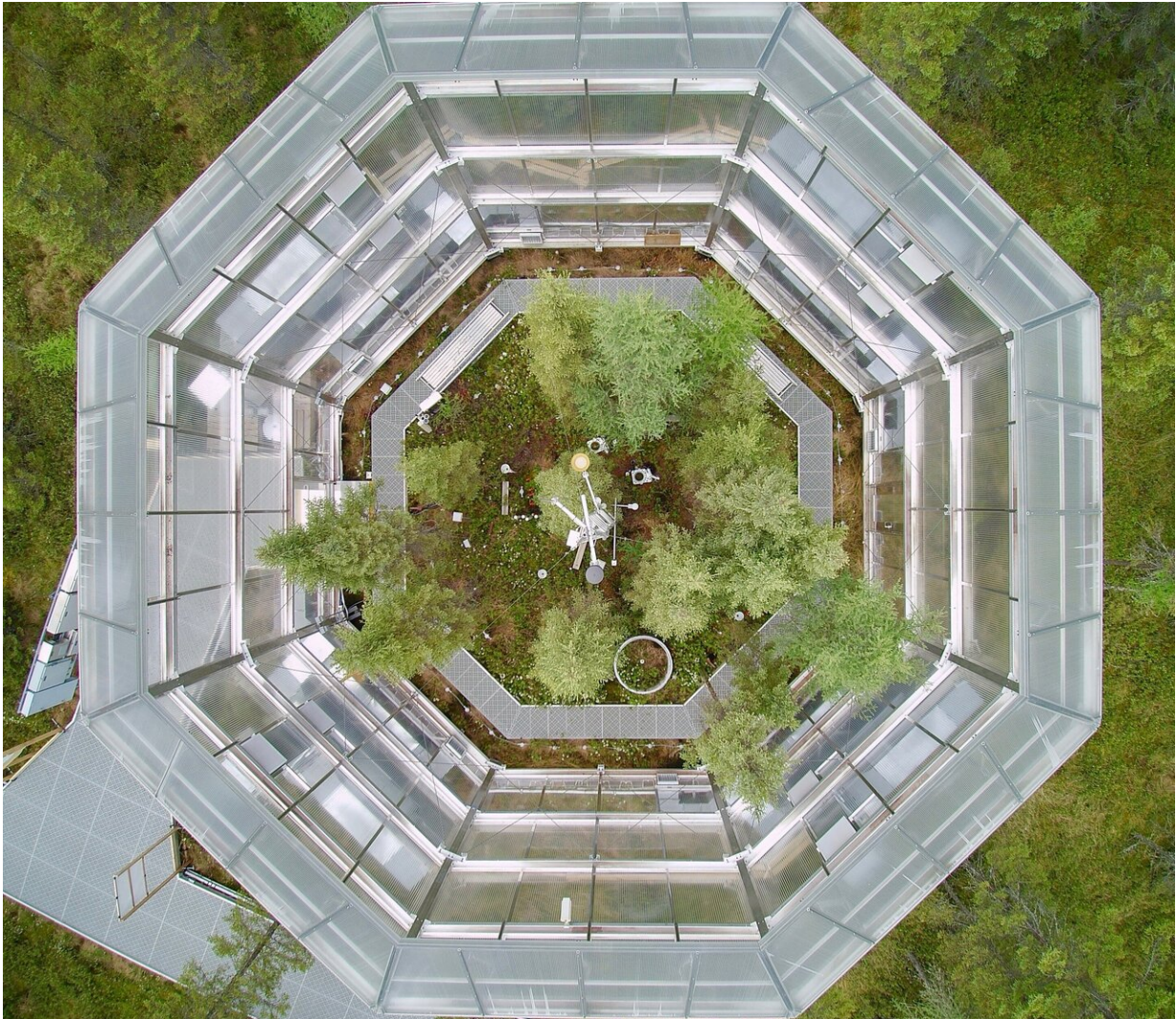


# Microbial meltdown

November 5 2019

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Sphagnum moss substantially controls key ecosystem processes like carbon cycling in northern peatland ecosystems. Credit: David Weston/Oak Ridge National Laboratory, U.S. Dept. of Energy

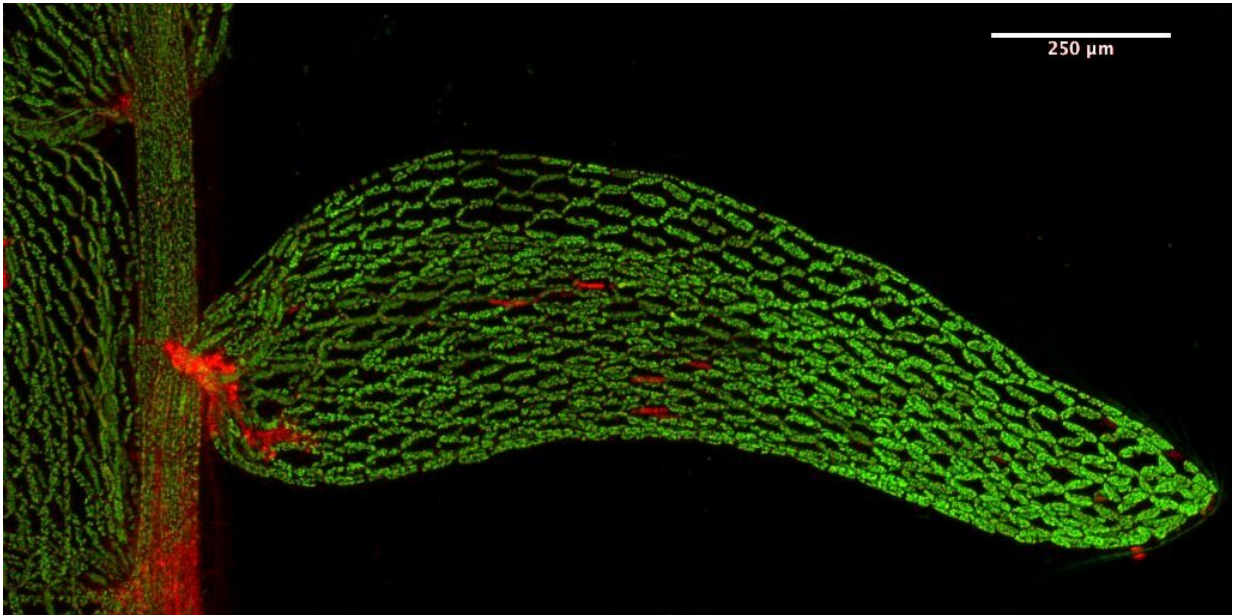
A team of scientists at Oak Ridge National Laboratory and Georgia Institute of Technology found that critical interactions between microbes and peat moss break down under warming temperatures, impacting moss health and ultimately carbon stored in soil.

They investigated the mosses' reaction to a range of temperatures onsite at [SPRUCE](#), a whole-ecosystem warming experiment in the peatlands of Minnesota.

Using genomic analyses, the team showed that the heat caused microbial diversity to decline, reducing the microbiome's ability to capture nitrogen from air for moss to use.

"Sphagnum mosses and their microbiomes substantially control the cycling of carbon and nitrogen across the landscape," ORNL's David Weston said. "We are looking at what is causing this breakdown in the relationship between mosses and microbes."

This research advances understanding of how changing [environmental conditions](#) might affect nearly one-third of the world's soil [organic carbon](#) currently stored in northern peatland ecosystems.



Beneficial microbes, shown in red, aid Sphagnum mosses in using nitrogen from the air to fuel plant growth. ORNL scientists have shown this nitrogen fixing activity declines with warming temperatures. Credit: David Weston/Oak Ridge National Laboratory, U.S. Dept. of Energy





Enclosures at the Spruce and Peatland Responses Under Changing Environments, or SPRUCE, experiment are set at five different temperatures and elevated levels of carbon dioxide to study how plants and microbes react to a warmer climate above and below ground. Credit: Paul Hanson/Oak Ridge National Laboratory, U.S. Dept. of Energy

**More information:** Alyssa A. Carrell et al. Experimental warming alters the community composition, diversity, and N<sub>2</sub> fixation activity of peat moss ( *Sphagnum fallax* ) microbiomes, *Global Change Biology* (2019). [DOI: 10.1111/gcb.14715](https://doi.org/10.1111/gcb.14715)

Provided by Oak Ridge National Laboratory

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