

# Humble peat mosses store global carbon, show amazing variety

by Ed Berg

This is a story about some little plants with a big role. The plants in question are the humble peat mosses, collectively known as *Sphagnum* moss.

Gardeners apply “fossil” peat moss to improve soil water-holding capacity. Indigenous people of the North have diapered their babies with dry *Sphagnum* moss as long as babies have been diapered. *Sphagnum* was used as a wound dressing up through the First World War, because an ounce of dry *Sphagnum* can hold a pint of blood. Backcountry hikers, too, have long considered *Sphagnum* the TP of choice for its softness and absorbent qualities.

*Sphagnum* in the form of dry peat is the first step toward coal. Over millions of years, the application of pressure and modest heat converts peat to brown coal (lignite), then to soft (bituminous) coal, and finally to hard (anthracite) coal.

On the scale of years and decades, peat bogs are a potential ally in the Great Carbon War now under way. As modern society continues to burn fossil fuels (the solid forms of which are derived from peat) and pump more carbon into the atmosphere, some of this carbon is retrieved by living plants through photosynthesis.

The recent reforestation of eastern North America, for example, is helping to reduce some of the human-generated atmospheric carbon and its contribution to global warming. Unfortunately, trees are only a temporary carbon sink; when trees decay or burn, they surrender their carbon back to the atmosphere.

Peat bogs, on the other hand, are more stingy and are much better long-term carbon sinks than are forests. About 10 percent of the carbon fixed in a peat bog is permanently retained as accumulating peat deposits. During a growing season, *Sphagnum* moss in a bog typically grows 4 inches (and as much as 16 inches), but snow flattens it down over the winter, with a net peat accumulation of about 1 millimeter (1/25 inch). As the peat accumulates and is flattened by the weight of overlying layers, it is compressed to the point that an inch of dry peat moss represents about 80 years of bog growth.

On a global scale, it is estimated that 25 percent of

all carbon stored in land plants and soils is in peat deposits. Much of the other 75 percent is in trees, but as I said, the tree carbon returns to the atmosphere much faster than peat moss carbon. Since most wetlands in the North either are or will become peat wetlands, one good reason for preserving wetlands is to keep them as carbon sinks to help retard global warming.

On the Kenai National Wildlife Refuge, we have thousands of acres of *Sphagnum* peat wetlands (generally called “muskegs,” but more properly described as bogs and fens).

I recently had a delightful opportunity to get a close look at the *Sphagnum* mosses while squiring several of the top *Sphagnum* experts (called “sphagnologists”) around the Kenai: Prof. Kjell Ivar Flatberg and his doctoral student Karen Finthingsgaard, from the University of Trondheim in Norway, and Prof. Richard Andrus, of the State University of New York.

There are up to 300 species of *Sphagnum* worldwide, and they are tough to tell apart. Most botanists just call them “*Sphagnum*” and let it go at that. I always figured we might have a half dozen species on the Kenai, so I was amazed to see these experts find 27 species in the first muskeg that we visited, near Turnagain Pass. During the next three days, we found many more species, and they taught me to identify perhaps a dozen common species by sight (without a microscope).

We all collected many bags of samples, and I expect to spend some interesting weekends over the winter identifying them. It appears likely that we picked up at least one new species, from the muskeg south of Headquarters Lake, and possibly a second new species from a muskeg along Swan Lake Road.

The wetlands of the Kenai are beautiful open spaces, and they can be explored with only a pair of rubber boots. They have their own special plants, many with beautiful flowers, as well as those, such as the *Sphagnum* mosses, which only reveal their beauty and diversity to visitors with patience and a good hand lens.

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tional Wildlife Refuge since 1993. Further information on Sphagnum can be found at <http://members.nbc.com/temsch/index.html>, and in C. B. McQueen's "Field Guide to the Peat Mosses of Boreal North America," which has

good pictures. For more information about the Refuge, visit the headquarters on Ski Hill Road in Soldotna, call 262-7021 or see the website at <http://www.fws.gov/refuge/kenai/>.