

Forest detective finally notices strange purple plants in muskegs, finds name, and more names

by Ed Berg



Exobasidium fungi. Credit: Kacy McDonnell/USFWS

The forest detective prides himself on noticing the small details of daily life in the natural world, and on knowing the names of a good many of them. He has, however, found that he probably will not see something if he doesn't have a name for it.

Take the case of this obscure purple plant (see photo with yellow background) that commonly grows in muskegs, along with Sphagnum peat moss, lowbush cranberries (lingonberries), blueberries and Labrador tea. I had no name for this plant and must have overlooked it for years, until one day for no obvious reason it caught my eye as something I couldn't identify. This was embarrassing, like meeting a familiar face and being instantly aware that you have never known this person's name.

I quickly set about digging up the plant to get a better look at it. The purple leafy stem was about 6 inches long, and it had simple soft, flat leaves about an inch long. There were no flowers, and indeed it occurred to me that I had never seen any flowers on this kind of plant. A single long stringy stem snaked down into the peat moss. I followed the long stem, determined to dig up the whole plant, and to my surprise found that the stem was connected to a nearby flowering bog rosemary plant. Bog rosemary has the scientific name of *Andromeda polifolia*, for the beautiful

princess Andromeda of Greek mythology, and it is indeed a beautiful dwarf shrub in wetlands in the spring, with clusters of delicate pink urn-shaped flowers.



Lowbush cranberry plants. The green shiny foliage (background) is normal; the red foliage is infected with the fungus *Exobasidium juelianum*, which changes the color of the leaves but does not alter their basic shape. (Photo by Ed Berg)

So, what then was this flowerless purple plant, with larger, flat deciduous-looking leaves? Normal Andromeda leaves are evergreen, with rolled edges, like Labrador tea. These plants couldn't be related, yet they were obviously growing together. I collected more of the purple plants, and showed them to several botanist friends, and even sent some to a plant pathologist. They all admitted that they had seen it, but no one had a name for it. Finally a visiting Norwegian sphagnologist (a peat moss specialist) recalled that he had seen a name for this thing, and looked it up for me when he returned home.

It turns out that the purple part of the plant is caused by an infection of the fungus *Exobasidium karstenii*. The fungus takes over the plant's normal growth mechanism like a cancer, and causes the plant to produce larger, flimsier leaves of a purple color. Late in the season, black fungal spores can be seen on

the bottom of the leaves. The spores are dispersed by the wind to infect new host plants.

Insects often produce galls on leaves and twigs to house their offspring, and the *Exobasidium* shoots can be thought of as a kind of gall. In both cases a foreign organism takes over the growth mechanism of a plant and creates a new structure to facilitate its own reproductive success.

Once I had a name for this condition, I started searching the literature, and found that there are many other species of *Exobasidium* that affect common members of the heath family (*Ericaceae*) in the North. Indeed, armed with more names I started seeing more species of this type of fungus, which I had indeed never noticed.

For example, have you ever noticed the reddish purple leaves on blueberries during the summer? Blueberry leaves should be green during the summer, but the reddish purple ones are infected by *Exobasidium vaccinii-uliginosi* (a name pirated from the scientific name for blueberries *Vaccinium uliginosum*).

Likewise, on lowbush cranberry I sometimes see stunted shoots with small red leaves with white undersides; this is *Exobasidium juelianum* growing on our much-loved *Vaccinium vitis-idaea* cranberries. (See photo #2.) Lowbush cranberries also host *Exobasidium vaccinii*, which produces a gall-like thickened welt with a red center on the leaves.

Have you ever picked the so-called “true cranberries” (*Vaccinium oxycoccus*) in muskegs? These plants have scattered large plump berries growing on thread-like stems with tiny leaves. Kids love these cranberries because they overwinter well, and can be picked in the early spring. The leaves should be evergreen, but some of them are red with the fungus *Exobasidium rostrupii*.

Likewise, crowberry plants (in the *Empetraceae* family) often show a single stem with bright purple or red leaves among a sea of stems with green leaves. This is *Exobasidium empetri*. (See photo).

A Google image search on the Internet will pull up nice photos of many of these fungal conditions, especially if the search is not limited to English language sites.



*Crowberry plants. Upright purple stems are infected with the fungus *Exobasidium empetri*; the spiky green leaves (near the ground) are normal. (Photo by Ed Berg)*

The *Exobasidium* fungal conditions don’t usually kill the host. Indeed, in the world of parasites, it’s bad form to kill your host because the host is your meal ticket. Given the wind-blown spores, it’s not surprising to find many of the boreal forest *Exobasidium* species on both sides of the oceans. One recent study of the *Exobasidium* on bog rosemary and mountain heather (*Cassiope tetragona*) in Europe found that the frequency of infection increased at lower elevations, suggesting that the fungus likes warmer temperatures and that we may see more of it with increased climate warming.

Carl Linnaeus, the Swedish founder of modern genus-and-species scientific names, is quoted saying, “If you do not know the names, your knowledge of the things perishes.” (Linnaeus, *Critica Botanica*, 1737). This is well put, but I would add that without names, our knowledge can’t even get off the ground, because we probably won’t recognize that we are looking at something worth a name. There is more to seeing than meets the eye.

Ed Berg has been the ecologist at the Kenai National Wildlife Refuge since 1993. Ed will teach his one-credit Cycles of Nature course at the Kenai Peninsula College in Soldotna and Homer, beginning September 11 and 13, respectively. Previous Refuge Previous Refuge Notebook columns can be viewed on the Web at <http://www.fws.gov/refuge/kenai/>.