

## Have You Ever Seen a Biological Soil Crust?

Probably most everyone will have answered “No” to that question and it may well be something you have never heard of either. But I can guarantee that many folks have in fact seen them, but didn’t know what they were looking at or didn’t think they were anything worth noting.

Speaking just about the ones most common in our area, and assuming we are talking about times when it hasn’t rained recently and the ground is dry, what we are talking about will appear as very dark brown or black things found on bare ground between vegetation in areas with little hoof or foot traffic. When dry, they most resemble an old, decaying, dried-up leaf and will likely be less than an inch or two in size.

When I went out into the pasture to look for some, it took less than 5 minutes to find an area where I picked up 4 or 5 little pieces shown in the “dry” photo. You might well ask, how do I know these things are not just bits of decaying plant litter? And the answer is, because of the response of the material: after I took the “dry” photo, I put a few drops of water on the material and within about one minute the material had absorbed the water and swelled up as shown in the “wet” photo. When dry, the material is very light and somewhat fragile. When wet it feels soft and rubbery.

So what is this stuff? Biological soil crusts, sometimes called cryptobiotic crusts, can be made up of several components, but most commonly a major component is cyanobacteria, what used to be called blue-green algae. Billions of years ago cyanobacteria were a major part of life on Earth, and it is widely believed that it was the photosynthesis conducted by these organisms that converted the carbon dioxide in the Earth’s atmosphere to the oxygen we have now.

So the biological soil crusts are made up of the cyanobacteria, some of which are in the form of long filaments plus tiny particles of soil held together by the filaments and the polysaccharide “slime” produced by the bacteria. Other microorganisms such as green algae and fungi, may also be part of the mix.

Because these crusts cover part of the surface of bare soil, they provide some protection against erosion, as well as helping to maintain soil moisture. Also, the cyanobacteria have the ability to fix nitrogen, thereby contributing to the fertility of the soil. In addition, these crusts provide homes to tiny insects and other soil organisms and are essential components of healthy soil.

Another advantage to these soil crusts is that they provide good environments for seed germination so that the germination rate of native plants is increased where crusts are present.

In wetter, colder climates, biological soil crusts can be much larger and more extensive and thus play an even larger role in the ecology of the local flora. Probably the largest such crust I have seen in our area was about the size of my hand and maybe a half inch thick—all when wet! Since these crusts are mostly in the dry state in our area and are therefore much smaller, the effects of the crusts on the soil and vegetation is certainly less important than in other parts of the country.

So if you wanted to go looking for these biological soil crusts, where would you go? My experience would indicate that in the Hill Country you would want to look in drier areas, probably not in the shade, where short grass was growing but where there are some small patches of bare ground between the vegetation. The crusts will be much more obvious right after a rain when the crusts will be much larger and probably lighter in color. Many folks have seen them in the wet stage and assumed they were some kind of mushroom, which they certainly resemble. If you find something that looks like it might be one of these crusts in the wet stage, mark the area and then return after things dry out and see what you find.

This is all just one more example of the incredible biological diversity of species we have, even in our semi-arid Hill Country. So go out and explore and enjoy it all.

Until next time....

Jim Stanley is a Texas Master Naturalist and the author of the book "Hill Country Landowner's Guide". He can be reached at [jstmn@kctc.com](mailto:jstmn@kctc.com). Previous columns can be seen at [www.hillcountrynaturalist.org](http://www.hillcountrynaturalist.org).