The purpose of the Florida Native Plant Society is to preserve, conserve and restore the native plants and native plant communities of Florida.

Official definition of native plant:
For most purposes, the phrase Florida native plant refers to those species occurring within the state boundaries prior to European contact, according to the best available scientific and historical documentation. More specifically, it includes those species understood as indigenous, occurring in natural associations in habitats that existed prior to significant human impacts and alterations of the landscape.

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One gram of healthy, non-poisoned soil (about 1/5 teaspoon) could contain one hundred million bacteria, one million actinomycetes (a special type of bacteria that provide the signature “good-soil” smell), and one hundred thousand fungi – if strung together, their filaments or hyphae would measure about 16 feet in length. This same gram of soil could also contain hundreds of nematodes living on the damp surfaces of soil particles, maybe a few insect eggs or larvae, and some earthworm cocoons. The exact proportions of each of these organisms will depend on soil conditions such as acidity, moisture, aeration, amount of humus, and what’s growing above the soil.

Soil acidity is measured on the pH (potential of Hydrogen) scale, with a pH of 1 being most acidic and a pH of 14 being most alkaline. Most plants grow well in a slightly acidic soil with a pH between 6 and 7, but some plants are adapted to highly acidic soils and other plants thrive in alkaline soils. Chemical conditions including acidity will change the balance of organism populations. Fungi are more plentiful in acidic soils, while actinomycetes and other bacteria prefer more alkaline conditions.

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You cannot readily change the nature of your soil for the long run. So it’s best to live with the soil chemistry you have and to find native plants that occur naturally in such soils. Test the soil so you know which plants will work best in your yard. Soil test kits are available online, at the local extension office, or in local garden shops. For general landscape uses, test the soil for acidity and macro- and micro-nutrients; in urban areas, you should also test for heavy metals or other toxins. Sample the soil in several places to obtain a good average of the soil for testing.

Soil texture is determined by its relative portions of sand, silt, and clay particles. These proportions are also not easy to change. Although it seems logical, you should not add sand to a clay soil because you are likely to end up with a cement-like material. You can improve soil structure whether it is sandy or clayey by adding compost, but in a native or mostly native
landscape, use compost made from local materials with no added manure.

Don’t use peat moss to amend your soil. There is no sustainable way to harvest peat. It takes hundreds of years to form under special anaerobic conditions, and efforts to restore mined peat fields results in more CO2 being released than sequestered. While peat moss adds humus and absorbs moisture, it is extremely acidic and provides virtually no nutrients. A viable substitute might be coconut coir, a by-product of the coconut industry. Absorbent and neutral in its acidity, coir also provides nutrients. The one big drawback of coir is its transportation footprint, because most of it is produced in Indonesia.

You can get some idea of what your native soil might have been before development by consulting the detailed soil maps available online and at your local extension office. The FNPS website has a detailed resource on the various native plant communities which could give you a good idea of what type of plant community might have been in your location (http://fnps.org/natives/native-plant-communities). This could provide a guideline for what to plant. In many Florida neighborhoods, non-native soil was imported for fill as part of the development process, especially in low-lying areas. So there may not be any truly native soil present in your landscape.

No matter what the soil is, you can still host a great native plant community in your yard.

The workings of a soil ecosystem

Whenever a seed germinates in healthy soil, the microbial community is activated because the seed secretes its chemical signals into the soil. Genetic information is exchanged; the various microbial players assume their positions on the tissues of the plant. Sometimes the microbes are nitrogen-fixing bacteria such as rhizobia that form root nodules on legumes, which help them to grow well in poor soil. But more often it is a mycorrhizal fungus that forms a symbiotic relationship with the roots. These collective relationships are called mycorrhizae.

Mycorrhizae work because the fungi colonize the root system of a host plant, providing increased water and nutrient absorption capabilities while the plant provides the fungus with carbohydrates formed from photosynthesis. Mycorrhizae sometimes offer the host plant increased protection against certain pathogens.

Approximately 90% of all vascular land plants live in some association with mycorrhizal fungi. Mycorrhizal fungi are often divided into two groups: the ectotrophic, which do not penetrate the roots cells, and endotrophic fungi that actually penetrate and enter the root cells.

Soil and climate change

Most of us know very little about the soil beneath our feet, and we humans have treated soil carelessly for millennia. More recently, we have finally come to appreciate the complex and valuable role that soils play, both in the way plants grow in it and in soil’s capacity to absorb excess carbon dioxide (CO2) from the atmosphere. Soil sequesters about four times more carbon than forests and all other vegetation making soil the second largest CO2-absorbing medium, after oceans. CO2 is a greenhouse gas and more of it in the atmosphere increases overall temperature averages. Unfortunately, as temperatures rise globally, soils emit more CO2, which in turn increases temperatures.

While some soils in tropical rain forests are deep peat-like materials, most rainforest soils are only a few inches deep and have low nutrients due to weathering and high microbial activity. Despite the dense vegetation of the rainforest, warm temperatures mean the collective metabolism of the soil ecosystem is high and soil humus breaks down very quickly, releasing CO2 into the atmosphere. The huge volume of rain in these ecosystems also rinses nutrients from the soil. This is why slash and burn treatment of tropical rainforests is short-sighted, because land uses such as cattle pastures use up the soil quickly when no rainforest is left to rebuild it.

Soil scientists have extrapolated the findings from tropical rainforests to other areas. They’ve observed that more CO2 is emitted from soils as temperatures rise and have explained this finding by the increased activity and respiration rates of microbes and other soil organisms. However a recent study shows that when drier soil is heated the microbes’ activity rates slow down. Nico Eisenhauer, the senior author of the study states, “It is most likely that instead of soil animals and microorganisms, the plants are responsible for the feedback effect because they also breathe with their roots. In order to improve the validity of climate models, we now urgently need to understand the biological processes in the soil better.” To read more about the study, see “Climate change: Soil animals cannot explain self-reinforcing effect” online at: www.sciencedaily.com/releases/2017/12/171221101332.htm

This is how science works. Scientists explain a phenomenon with what is known at the time and then others perform experiments and do studies to confirm the explanation or not. If further studies do not confirm the explanation, then others will perform more studies, and eventually a new explanation will be formed. Science is fluid and adjusts to new findings.
Female cicada killers excavate burrows in the soil where they stock to feed their offspring. Avoiding pesticide use in the home landscape allows beneficial insects like the cicada killer to complete their life cycles. Photo by Ginny Stibolt.

Fungi must absorb their food externally, and thus, they can easily absorb elements from the soil. Plants often have difficulty obtaining and absorbing major nutrients such as nitrogen and phosphorus, so fungi greatly increase the surface area that is open to nutrient and water absorption. The mycorrhizal relationship provides access to these essential compounds and elements for the plants. In return, the plant supplies the fungus with carbohydrates for use as energy.

In addition, mycorrhizae allow trees to communicate with each other and even trade nutrients, so the whole community of trees and other plants works cooperatively. Here’s a link to a Fusion Project Earth video that covers the topic pretty well: www.facebook.com/FusionProjectEarth/videos/1842749742657201/

How “conventional” lawn care affects the soil

Given all the complexity of a healthy soil ecosystem, just think what happens when a lawn service applies a general fungicide to your landscape. This intricate dance of fungi and plant roots, which is so important to the health of plants, is halted. The health of the plants will be negatively impacted: they may not die right away, but their growth and vigor will certainly decline.

A typical lawn service includes routine applications of herbicide, such as 2-4D, to keep out broad-leaved weeds; insecticides to kill mole crickets, ants and webworms; and fungicides to ward off wilt disease. Lawn services also amend the soil with synthetic fertilizers and various conditioners, such as lime, to help turf grass grow. These amendments alter soil chemistry only temporarily, so the applications are repeated. After this toxic mixture is applied, a sign is placed on the lawn warning you and your neighbors to keep off.

What you can’t see is what happens to the soil. The insecticides kill not only mole crickets, webworms and ants, but also centipedes, worms, nematodes (most are beneficial), insect larvae, ground-dwelling bees, and other soil organisms. Fungicides kill off all the fungi, which work to decompose organic matter, so turf may end up with an accumulation of thatch since the dead matter just sits there. Without decomposition, the soil becomes lower in natural nutrients, which is why lawn services then apply synthetic fertilizers so the grass will grow.

With continued chemical applications, the soil becomes more inert and eventually it serves only as an anchor for the turfgrass instead of a supportive growing medium. Repeated treatments for the lawn will continue to weaken its web of support for sustaining life. When the turf finally dies, homeowners are often required to replace the whole lawn with new sod to start the process all over again. Isn’t this the definition of insanity – doing the same thing over and over and each time expecting that the results will be different?

Restoring soil

Even after years of poison applications, a soil ecosystem will begin to recover by itself as soon as the poisons are stopped. For areas in your landscape where you still want to have lawn, stop all chemical treatments and begin the transformation to a “Freedom Lawn,” which is free of pesticides, free from synthetic fertilizers, free from over-irrigation, and free from over-seeding so it’s allowed to go dormant. There will be an adjustment period where there will be some bare spots, but soon other plants that tolerate mowing will take over these areas. This new paradigm will save you money, be good for the environment, and be safe for kids and pets 100% of the time.

You can encourage soil recovery by adding compost. Keep in mind that compost is not used in the same manner as an artificial fertilizer. Instead, it is applied more generously, as a way to improve soil texture and structure along with some nutrients and most importantly providing new populations of soil microbes. Apply compost as a top-dressing to the landscape – to keep soil disturbance to a minimum, do not dig it in. The compost will be absorbed into the soil itself as its soil organisms work. The organic materials in the compost provide the food for the soil’s ecosystem.

For native landscapes or freedom lawns, do not use manure in your compost, because its high nutrient levels may push the plants past the point of tolerance with high nitrogen levels. For kids and pets 100% of the time.

For areas in your landscape where you still want to have lawn, expect that the results will be different?

References and Further Reading


National Pesticide Information Center. Oregon State University online resource. www.npic.orst.edu

About the Author