Tree Leaves and Their Long Journey Into the Soil

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I fondly remember the autumn smell of burning leaves when I was a kid in the 1950s. Our push mower wouldn't grind them up so my brothers and I had to rake all those leaves out to the street and burn them. In the 70's the environmental movement stopped the burning and it became the responsibility of the villages and cities to haul the leaves away. This month I'll tell you the story of leaves from the tree's point of view. It may change the way you perceive this annual ritual of fall.

Leaves are the solar panels that capture the sun's energy and power trees fantastic growth during the summer. Once their work is done we throw them away as useless but there is a whole world in the soil just waiting for this important food source to power the mighty forests and the plants that grow in our landscapes.

You may have noticed leaf spots in the early fall. These are a normal and healthy sign that before the leaves have even left the tree there are fungi colonizing and beginning the break down process that is the basis of forest, and landscape health. When a leaf touches down on the soil it is a source of nutrition for the vast array of soil inhabitants. Bacteria outnumber and outweigh all other soil creatures numbering 10 trillion per square meter! They are the bottom of the pyramid upon which we rest digesting leaves, dead fungi, dead insects and animals converting pollution into plant food. Some bacteria live in association with roots and convert unavailable nitrogen in the air to nitrogen in an available form for plants.

Fungi colonizing a Tulip tree leaf before it even falls off the tree

Fungal organisms also dominate the soil, eat dead leaves and branches converting them into food that supports the whole ecosystem. An important fungal benefit is that they attach themselves to plant roots and extend the root surface area and ability to absorb food. Fungal hyphae also connect plant roots to other plant roots helping plants communicate, defend and feed one another.

Very soon after it has touched down the leaf is chewed, and digested by springtails, pill bugs, millipedes, craneflies, midges, snails, earwigs, crickets, bristletails, fungi and bacteria until all that is left is the skeleton, just veins and midrib. Maybe you've seen these skeletonized leaves in the forest. Earth worms drag them down deeper into the

The resulting nutrients are water soluble and then available to plants and the organic matter called “humus” holds and keeps those nutrients from being washed away by the rain. Some of the other actors in this soil drama are birds, squirrels, chipmunks, slugs, ants, spiders, nematodes, cicadas and, you get the idea, many more.


Mushrooms decaying mulch

So you may suppose that fungi, bacteria, and bugs are *attacking* your landscape while in reality, the vast majority of insects and microorganisms are essential in growing healthy and strong plants. Lets see what some of them do.

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- Springtails eat decayed leaves, fungi, bacteria and algae, generally cleaning up the leaf litter, keeping other organisms under control and in turn are kept under control by spiders.
- Pill Bugs or “roly-polys” eat dead leaves, so they are an important component of the carbon cycle and in turn, toads, bees and spiders eat pill bugs for dinner.
- Millipedes patrol and eat dead leaves, branches and fungi. They provide breakfast for birds, toads, badgers, ants and spiders.
- Crane Flies (also called Mosquito eaters) eat mosquitoes in the larval stage. They eat decomposing leaves, fungi, algae and in turn make an important food source for birds, spiders, dragon flies and praying mantises.
- Midges are detritivores (they eat dead stuff) so they are important in fueling nutrient cycles and in providing dinner for frogs and swallows.
- Snails are usually not interested in healthy plant material so they are welcomed and even protected in some gardens because they process dead plants and animals into fertilizer. “Who eats snails?” You might ask… ducks, robins, foxes and French people.
- Earwigs, believe it or not, are considered beneficial because they prey on nuisance pests like sow bugs, aphids, mites and insect eggs. Frogs, newts, toads, beetles and birds consider earwigs the breakfast of champions.
- Crickets are a valuable part of the ecosystem because they break down plant material and keep other insects in control. Spiders, Ground


Skeletonized White Oak leaf with it’s younger neighbors

Beetles, lizards, rodents and birds in turn keep crickets in control.

Did you know that ants contribute more to the soil health, cultivation, aeration and soil structure than earthworms do?

•Bristletails eat dead leaves, algae, fungi and lichens. Spiders love to eat them.
•Earthworms eat dead leaves. They also scout for and eat the fungi and bacteria that are eating those dead leaves.
•Everyone knows that robins eat earthworms, but did you know it is imperative that birds feed protein rich food, like worms and insects, to their growing chicks? Bird feeders are not a substitute for these insects. Birds will die without insects.
•Ants eat just about anything that can be eaten, and in turn are hunted down and devoured by just about every insect and animal that is bigger than they are. Did you know, however, that ants contribute more to the soil health, cultivation, aeration, and soil structure than earthworms?

Insects, animals, and soil micro organisms support one another and the plants that surround them and they keep each other in balance by not allowing one species to dominate. This competition and cooperation works together powering a healthy landscape and tree leaves fuel the whole thing.
So why is this so important? Why do we want all of these leaves, animals, insects, fungi and bacteria in our landscapes?

Put simply, soil microorganisms digest plant and animal decay harnessing energy upon which our survival is dependent. Without this processing nature's life cycles would stop.

Microorganisms eat the leaves and in turn are eaten by other microorganisms. The many soil inhabitants harness the energy captured by the sun in the leaves, combine it with minerals from deep in the soil in a form that is available to plants.

Amazing fact: *In death plants in cooperation with microorganisms leave more nutrients in the soil than the ones that they consumed during their lifetime.*

Can't we fertilize the plants to replace any nutrients lost by leaf cleanup? Soil scientists have learned that the soil is a dynamic living community that cannot be supplanted with chemical fertilizer alone. For example, ants and worms make tunnels in the soil allowing air circulation, water movement, and root penetration. Soil organisms secrete sticky substances that bind the soil into a loose structure that allows better root penetration, water holding capacity, nutrient holding capacity and aeration of the soil.

When we leave the leaves on the ground there is a slow build up of the soil that supports healthier plants. When we blow the leaves away there is a slow erosion of soil

and plant health because ***the leaves are the fuel that power plant health*.**

In the 1950s we used to burn all of the tree branches and leaves. It is a great credit to our municipalities that we now recycle and turn them into mulch and compost.

What can you do to harness all of those life giving leaves and use them to bring health and vitality to your landscape?

1.Segregate your trees and shrubs from lawn in your landscape as they do at the Chicago Botanic Garden and The Morton Arboretum.

2.Mulch the non grass areas.

3.Leave the leaves in the mulch forever.

4.Mow/mulch the leaves in the grass or blow the leaves into mulch areas.

5.If you can't stand leaves in the mulched areas then blow them away to be recycled and re-mulch every year.

6. Mulching trees and shrubs is the single most beneficial treatment you can do for your landscape.

Much of the information contained in this article is from Life In The Soil by: James B. Nardi.

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