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If you build it, they will come

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By Alex Féthière

Photo in the print edition: The ingredients for balanced composting are easily measured in 5-gallon buckets, appropriately wetted, and mixed on a tarp or in a garden tip trailer. Also shown: a diagram of the soil food web, from the Soil and Water Conservation Society’s “Soil Biology Primer,” and loading the compost corset from a short ladder, which “is more controlled and easier on the shoulders.” (Journal photos by Alex Féthière)

Maybe you compost in a little plastic box that fits in your apartment. With larger digs you may instead have a pile or a plastic cylinder that turns like a raffle drum, but produces smells instead of winning numbers.

One of the joys of life out here is scaling up from all these and making enough compost to supply everything you grow — and to meticulously tailor it to be biologically complete. Such compost can achieve everything that fertilizers and poisons can without the blowback, while improving soil’s ecology and its water retention.

This compost can inoculate other composts or organic materials with soil food web denizens and begin nutrient cycling in them. The only sustainable method to regenerate soil fertility in perpetuity is with mulches and compost that are diversely alive.

Bacteria and fungi are the foundation of the soil food web, feeding on organic matter and what plants release from their roots. Healthy plants tailor these secretions to encourage desirable populations of particular bacteria and fungi, which cluster in the root zones. They stick around their feeding sites with glues that help build soil structure.

These sites become buffets of eating and being eaten when predators are attracted to the bustle. Protozoa, like amoebae, flagellates and ciliates, and nematodes (wormlike critters specialized into fungal, bacterial, and predatory nematodes that eat other nematodes and protozoa) graze on the fungi and bacteria, and ideally some microarthropods like mites and springtails show up as well.

Another level of arthropods and the larger predatory nematodes are next on the food web. They chow down the preceding according to their tastes before animals, in turn, munch them.

This eating results in a lot of bathroom visits. Because the world is their bathroom, the soil quickly becomes chockablock with stable nutrients in a plant-available form.

This is the point of biologically diverse compost. It is, as the Brazilian hunter-gatherer quoted by linguist Daniel Everett said of a kill too large to preserve, “Store my meat? I store my meat in the belly of my brother.”

Building a soil food web stores your food in an infinitude of tiny bellies. After eating, they will return the favor by feeding your vegetables and trees, before themselves being foddered to larger mouths. Nutrient-cycled food cannot be washed away, eventually migrates deeper as the soil horizon deepens, and regenerates itself as long as you don’t poison it.

This isn’t the first time I’ve written about compost for the Shelton-Mason County Journal, but I’m attempting something on a larger scale to perfect and quantify it. I’m making biologically complete compost after a lifetime of cold composting.

Though results from application of compost have always been my quality yardstick, I will soon be measuring the populations of organisms by microscope so their benefits will be certain and undesirables can be excluded. The next step is tailoring organism profiles by combining feedstocks and conditions. Would you like a more fungal compost to suit your trees? Or would your vegetables revel in a balanced bacterial and fungal compost? “Boutique” composts are not just funny, but possible.

MIXING IT UP

I hope by now you see why I’d go to all this trouble and handle so many redolent inputs. Should you be interested in attempting the same, I documented my construction and loading of a simple compost corset big enough to heat up properly. It is also staged on a shipping pallet to improve air circulation and prevent moisture wicking into it.

Thermophilic composting kills only pathogenic microorganisms, so it’s necessary to get temperatures up; 131 degrees Fahrenheit for three days, 150 degrees for 48 hours, or 165 for 24 hours will neutralize all pathogens, pests and seeds. It’s convenient that oxygen and high temperature, as long as moisture is adequate, can only do us good.

Certain high-nitrogen feasts will cause an explosion in bacterial populations. Fish waste (must be free of preservatives!), chicken manure and spent brewery grains are effective bacterial accelerants. Blood meal is the best because it’s shelf-stable and compact, but it is the most expensive.

Compost bacteria reproduce every 20 minutes when they have enough food. And all that naughty business is hot stuff: One million bacteria reproducing at once will raise the temperature of a pile by one degree.

When the pile has maintained the correct temperatures for long enough, it is turned by transposing the middle to the bottom and the bottom to the top and sides. The compost corset design makes it easy to open, move to another palette, shuffle layers and close.

The main components of compost production are “greens” and “browns.” Don’t worry whether you can’t possibly produce kitchen waste on this scale. Neither can I.

Our region's winter weeds and grasses make excellent greens, so anything I need to supplement the kitchen scraps I freeze in 25-pound dog food bags can be mown up and thrown in. It's a good thing my paths needed cleaning up, because my kitchen scraps had not completely thawed.

Browns are woody materials such as dead leaves and wood chips, preferably partially decomposed. These supply the carbon to the other inputs' nitrogen and make for a stable finished product. While mixing in the maple leaves I've been storing, I noticed the maple seeds are sprouting already.

The optimal ratio in warmer months is 10% accelerant, 30% greens, and 60% browns. Because it's winter and my accelerant is pastured chicken manure mixed with pine shavings (browns), I adjusted to 30% accelerant, 30% greens and 40% browns, which are all dead leaves. More accelerant is necessary to help heat in colder temperatures.

The shipping pallet is lined with hardware cloth to keep out varmints. If I were using spent grains as an accelerant, I'd wrap the bottom 2 feet of the corset in a layer of hardware cloth as well.

Once the corset is stood up on the pallet, it's time to wet, mix and load the inputs. This is easiest in a garden tip trailer, which won't get punctured by the manure fork like tarps could. A tip trailer also holds water better.

Moisture level is critical to encouraging beneficial organisms. Fifty percent moisture means no one will go thirsty; any more and air passage will suffer, causing anaerobic decomposition instead. Any less and biological activity is hampered.

This is easily measured by squeezing random handfuls of the materials as you mix. Assuming you're a person of average strength, a drop or two of moisture squeezed by hand means 50% moisture. If it sticks together, it's closer to 60-65%. A clump of material that falls apart without weeping a drop is nearer to 30%.

As each load is evenly wetted and mixed, fork it into the closed compost corset. You might be more comfortable standing on a short ladder because the fencing is 4-feet tall.

Stick in a 4-foot-long compost thermometer, tent a tarp over the corset to keep off rain and that's it. Check the thermometer regularly; it should reach 131 degrees within 24 hours. Whenever you turn, you'll lose up to 15 degrees of heat, so keep a sack of blood meal on hand and sprinkle it in if you're turning cooler compost.

After the appropriate number of turns, the compost should cool until the 21-24 day mark. Its diversity will only increase as it matures for up to six months — biologically speaking, it is degrading toward topsoil and finally mere dirt at that point.

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