

Use Wood Mulch to Build Great Garden Soil

SAWDUST AND WOOD CHIP MULCHES WILL CONSERVE WATER, CONTROL WEEDS AND BUILD LONG-TERM SOIL FERTILITY.

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Most organic gardeners find that following nature's patterns serves them well. When it comes to building richer soil, nature's plan relies heavily on trees—fallen limbs, leaves, cones, seeds and, eventually, the massive trunks. Adapting this plan to your garden by using a wood mulch—such as wood chips, sawdust or other woody residues—as soil-building material is a strategy that promises huge, long-term returns.

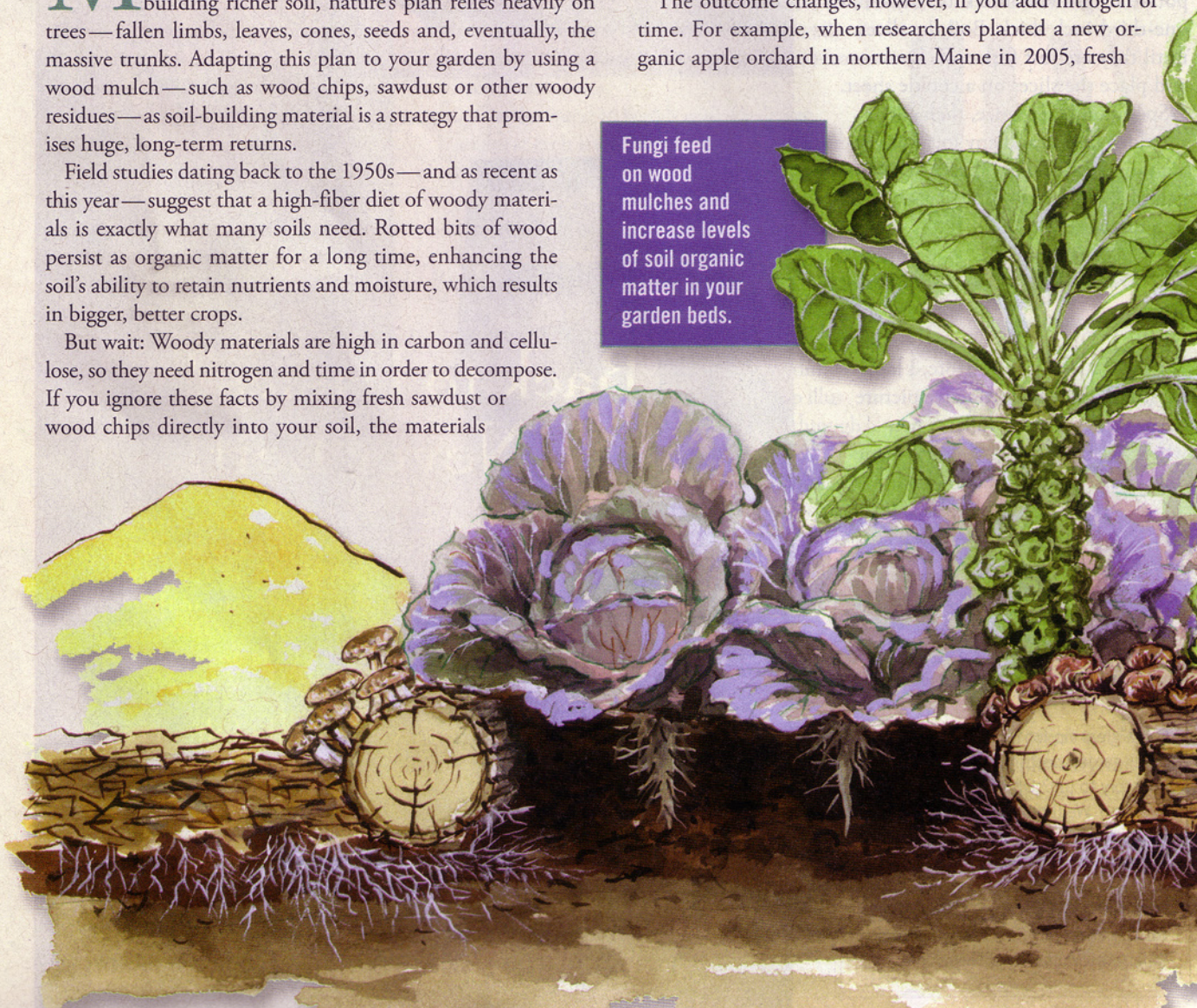
Field studies dating back to the 1950s—and as recent as this year—suggest that a high-fiber diet of woody materials is exactly what many soils need. Rotted bits of wood persist as organic matter for a long time, enhancing the soil's ability to retain nutrients and moisture, which results in bigger, better crops.

But wait: Woody materials are high in carbon and cellulose, so they need nitrogen and time in order to decompose. If you ignore these facts by mixing fresh sawdust or wood chips directly into your soil, the materials

will bind up much of the soil's nitrogen and render the spot useless for gardening for a season or two.

The outcome changes, however, if you add nitrogen or time. For example, when researchers planted a new organic apple orchard in northern Maine in 2005, fresh

Fungi feed on wood mulches and increase levels of soil organic matter in your garden beds.



wood chips combined with blood meal (a very high-nitrogen organic material with a typical analysis of 12-0-0) and tilled into the top layer of the soil—plus a surface mulch of wood chips—proved better than three other treatments at promoting rapid tree growth. And, in less than two years, the organic matter content in the chip-amended plots went from near zero to 2 to 3 percent.

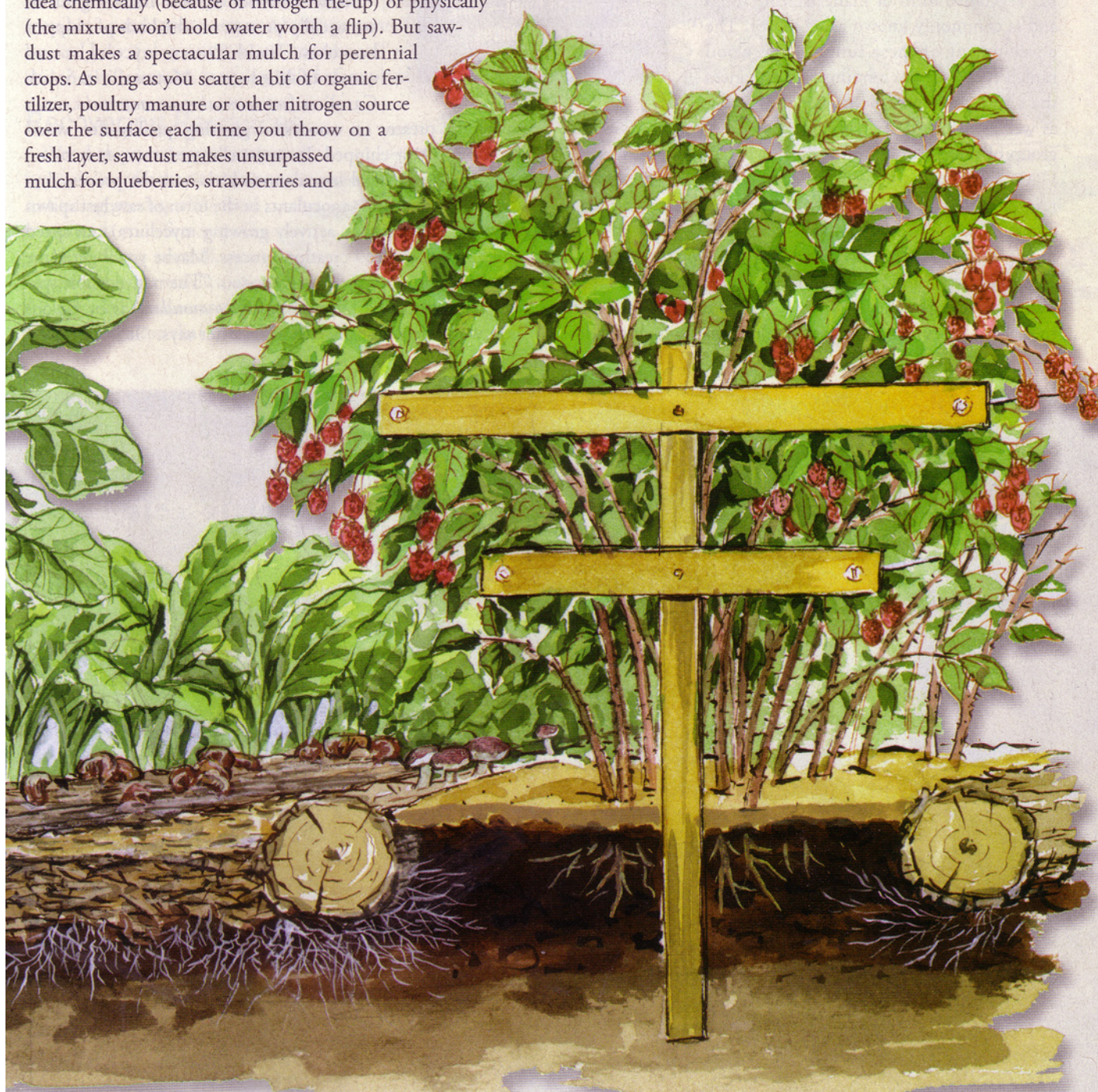
Sawdust has much more exposed surface area than wood chips do, so incorporating fresh sawdust into soil is not a good idea chemically (because of nitrogen tie-up) or physically (the mixture won't hold water worth a flip). But sawdust makes a spectacular mulch for perennial crops. As long as you scatter a bit of organic fertilizer, poultry manure or other nitrogen source over the surface each time you throw on a fresh layer, sawdust makes unsurpassed mulch for blueberries, strawberries and

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raspberries, and it can work well with asparagus, too.

Garden paths paved with sawdust-covered newspapers feel like carpet underfoot. After it has rotted, sawdust contributes mightily to soil's texture, because the spongy tidbits persist in the soil for a long time. The concern

that woody amendments acidify the soil is a myth. Only in the early stages of decomposition is there a fast flush of acids, when cellulose fibers begin to degrade. Long-term studies of the effects of wood chips and sawdust in soil actually show a slight



rise in soil pH, which is good news for most crops in most gardens. (The lower the pH, the more acidic the soil.)

Mycelium Madness

In the Maine apple orchard study, the research team observed that the wood chip plots became covered with white mycelium, which is the vegetative form of many fruiting fungi and is commonly known as white rot. The development of these fungi in the wood mulch increases the amount and enhances the character of organic matter in the soil, as well as helps the soil's ability to retain moisture. The huge group of fungi known collectively as Basidiomycetes is a core player in wood chip decomposition. Many produce mushrooms—pretty, but not generally edible. Where moist wood chips and soil unite, these fungi use enzymes to access nutrients in the wood, which is their energy source for the growth of threadlike, white hyphae. The hyphae knit themselves together into mycelium, which is easy to see. In addition to fungi, several specialized types of bacteria are able to degrade high-cellulose



One of the best wood-decomposing fungi—king stropharia—produces edible mushrooms.

materials such as wood chips, while others digest failing fungi.

Seen this way, it's easy to envision wood chips in soil as life rafts that support three major levels of soil life: the fibrous organic matter of the chips themselves, the biological mass of filamentous fungi that grows on them, and beneficial bacteria that come and go

in waves.

Starter colonies of these microorganisms are usually present on the bark of chipped branches. Tradd Cotter, mycologist and owner of Mushroom Mountain in South Carolina (www.mushroommountain.com),

says fungi present on wood start growing quickly after wood has been cut or chipped. In moist climates, there may be no need to add a fungal inoculant to kick-start the process, but Cotter says providing inoculants in the form of sawdust spawn (sawdust covered with actively growing mycelium) can speed and enhance the soil creation process. Maybe you'll get some edible mushrooms in the process, too. "The native edible species king stropharia (*Stropharia rugoso-annulata*) is by far our best wood-decomposing strain," Cotter says. "It is spreading

through our gardens, increasing soil depth and attracting beneficials, such as earthworms.” Sawdust or wood chip spawn of *stropharia* (winecaps) and other species are available from Mushroom Mountain, Field and Forest Products (www.fieldforest.net) and Fungi Perfecti (www.fungiperfecti.com).

Little was understood about the relationships between wood, fungi and soil back in 1951, when the Soil Conservation Service in Marcellus, N.Y., began a 15-year study of the effects of wood chips and cover crops on the growth of several vegetables. As the years passed, soil organic matter in the wood chip plots rose from 4 percent to 5.1 percent. Cabbage yields jumped 34 percent and snap bean production increased by 23 percent. The chips worked best if they were spread over the soil as a mulch and then tilled under in spring, just before planting.

Recovering Resources

Wood chips and sawdust are each byproducts of other activities, so finding good-quality, local resources is your first step. If you live near a sawmill, you can probably get sawdust cheap, though you'll need assurance from the sawmill operator that it doesn't include

Chipper-Shredder Options

If you have lots of trees to tend on your property, you may want to buy a chipper-shredder and make your own soil-building mulches. You could use the machine to shred fall leaves, too. If a storm brings a tree down, you can rent a chipper, or hire someone to come in and chip it up for you. Companies that make chipper-shredders include BCS (www.bcs-america.com), Country Home (www.drchipper.com), Echo (www.bearcatproducts.com) and MacKissic (www.mackissic.com).





black walnut sawdust, which releases a toxin that can be murder on tomatoes and other sensitive vegetables. Also avoid sawdust from plywood and painted or treated wood in your garden because of the glues and other chemicals. With sawdust, the lower you go on the production chain (a sawmill that handles whole logs), the more likely you are to get garden-worthy sawdust. For soil-building purposes, coarse sawdust is better than fine because it's less likely to pack into a mat, and it lasts longer as organic matter in the soil.

If kept moist, sawdust can decompose surprisingly quickly. In a study at Ohio State University, sawdust rotted faster than newspaper or straw, both of which were still recognizable after 16 weeks. To speed up rotting in a pile of sawdust, simply add moisture and nitrogen. This can be done by mixing up a big batch of fish emulsion, pouring it into an already damp, doughnut-shaped sawdust pile, and then covering it with a tarp or an old blanket to retain moisture. After sawdust turns black, you can use it to lighten up any soil—including potting soil—for seedlings and container gardening.

Most of the more recent studies with wood chips used what are called ramial wood chips, which are what you get when you put live, leafless hardwood branches, 2 to 3 inches in diameter, through a chipper to create pieces that are a half to 1 inch

You can usually find local sources for free sawdust and wood chips.

wide and 1 to 4 inches long. Ramial chips have relatively little bark and heartwood because of the size of the branches used, which is part of what makes them so attractive as a soil amendment. Superior batches also contain few leaves, cones or other prickly parts.

You can get ramial wood chips for free by connecting with tree-trimming crews working in your area. In some towns, such as Oshgosh, Wis., you can take small limbs to a chipping center on certain Saturdays and go home with your own homegrown wood chips. Wherever you live, a few phone calls to local utility companies or tree service companies should be all it takes to find a free supply. Wood chips often end up in landfills; let's put them to use enriching our garden soils instead. 🌳

Contributing editor Barbara Pleasant (www.barbarapleasant.com) grows organic vegetables, fruits and flowers in her southwest Virginia garden. Her soil foodweb loves to feed on the newspapers, sawdust and wood chips she uses to mulch pathways between her terraced hillside beds.