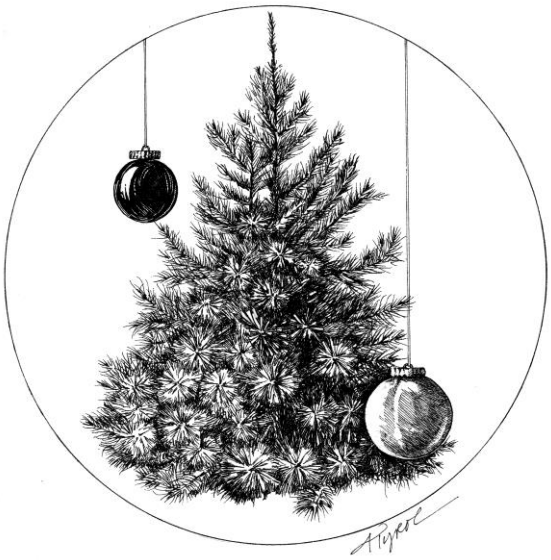
The Outside Story



No Fuss X-Mas Tree Recycling

By: Dave Mance III

In urban and suburban areas, Christmas tree disposal has come a long way since the bad old days when trees were just compacted with the rest of the household trash and landfilled. Today, progressive trash hauling companies run special organics routes where they collect and recycle trees, and many solid waste districts have drop-off centers where the trees are chipped. The recycled trees become compost or mulch or bioheat. It's neat to picture the whole cycle and the thousands of people involved. Looking down with a bird's eye view, we see the tree farmer planting and tending her fields, the trees being distributed to homes in the community in December, the trees reaggregating in wastewood yards in January and getting chipped, then the chips turning into heat, or light, or going back to the earth in huge aerobic piles.

Of course those of us who live in the sticks often employ a less involved tree disposal method: we take it out back to the hedgerow, drop it, turn around and walk back inside. In this case, too, there's a cool recycling story that involves thousands, or millions, of organisms, it just doesn't involve much thought or effort by people.

The wind and the weather do their part to start decomposition, stripping needles from twigs, soaking the wood. Moisture creates a good environment for microorganisms, and soon bacteria and actinomyceles (these little guys are part bacteria and part fungi, but unique enough to require their own classification) colonize the tree carcass. According to wood decay literature from the US Forest Service, it can take as few as four to six weeks for decay-associated microbes to completely penetrate wood structures.

The bacterial invasion paves the way for a fungal invasion. Bacteria make the wood permeable; in some cases they break down compounds thought to be toxic to rot-fungi. In addition, dead bacteria cells may also provide a source of nitrogen to their fungal partners.

Fungi arrive as spores, each just two-hundredths of a millimeter wide. They may have been carried on the wind, or on mouse fur, or maybe on a beetle's back. When a spore germinates, it slips its fungal filaments – called hyphae – between the tree's cell walls and oozes digestive juices that liquefy the wood. The hyphae then absorb nutrients and make new filaments. You won't see fruiting bodies for months or years, but by that time the decomposition process will be well underway.

Just as a decaying animal calls in vultures, decaying trees call in wood boring insects. While alive, the trees can sense a beetle's

presence and drown it in resins, terpenes, and other defense compounds. Now that the alarm system has been destroyed, insects ranging from minute boring beetles to sawyer larvae big enough that you can hear them chewing arrive to take their pound of flesh. Whole ecosystems are created, as predators and parasites like robber flies and ichneumon wasps show up to feed on the beetles or larvae, and flycatching birds arrive to feed on the flies and wasps, and your cat arrives to feed on the flycatchers. (Though because you bought the cat a bird-safe collar for Christmas, most of the birds, thankfully, escape.)

As the bark and the outer layers of the tree start to slough off, Lilliputian armies of detritivorous animals take over. Millipedes and woodlice and slugs and snails help turn the soft bits into soil. Collembolans – better known as springtails – eat plant material, but perhaps more important to this process, help spread bacterial and fungal spores as they poop all over the dead wood.

"But how long before the tree completely disappears?" you're wondering, and of course it depends on temperature and moisture and all kinds of other factors. But we can make an educated guess. Mathew Russell, with the University of Minnesota, and Christopher Woodall, with the US Forest Service, have been studying wood decay rates for years. (Read that quickly and it might sound like the most boring job in the world, and yet the research is cutting edge when you consider the greenhouse gas implications of the 2.3 trillion pounds of carbon that's found in the dead wood on the ground in US forests, not to mention the wildlife implications of what biologist call "deadwood-dependent species.") I asked them for their educated guess, and they pointed to a model that suggests that a 3- to 6-inch diameter red spruce or balsam fir log in a northeastern forest will completely decay in around 35 years. "For a typical Christmas tree that's 2 inches in diameter, 20 to 30 years would be a good approximation assuming adequate moisture (in terms of rainfall) to help decomposition move along," said Russell.

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