

Mushrooms in the Woodlot



by Phillip Meeks

Even when commercial production isn't the goal, a couple of hours invested one weekend afternoon can bless one's family with gourmet quality mushrooms for years to come.

Adding mushrooms to one's diet has numerous benefits. They have more protein than most vegetables as well as high levels of riboflavin and niacin. They hold trace amounts of vitamin C, B1, B12, D, and E. According to the *International Journal of Microbiology*, mushrooms have antioxidant, anti-cancer, antiallergic, antiviral, and antibacterial characteristics.

Many hikers, foresters, loggers, landowners, and others with access to woodlands learn to forage for morels, chanterelles, hen-of-the-woods, chicken-of-the-woods, lion's mane, and other edible wild species, and



Left: Holes are drilled into logs for insertion of dowels or sawdust containing the fungi.



Above: Mushroom dowels can be driven into holes without a special tool.

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Small-diameter trees removed during timber stand improvement are ideal for mushroom production.

while it's a rewarding hobby, there's no guarantee of coming home with a basket full of mushrooms. Furthermore, collecting mushrooms from the wild isn't without risk, especially when a hunter isn't completely sure of identification. Many edible wild species have toxic look-alikes. The National Poison Data Center reports over 7,000 exposures to toxic mushrooms in the U.S. each year.

So, there's an advantage to growing one's own mushrooms in terms of having a predictable supply of high-quality specimens.

One method for producing mushrooms that fits nicely with forest management operations is log cultivation, and two types that grow well on logs are shiitake (*Lentinula edodes*) from Asia and multiple species of oyster (*Pleurotus* spp.). Small-diameter hardwood logs between 3 and 8 inches in diameter are what's recommended for mushroom growing—exactly the kind of wood that is often removed in a timber stand improvement operation. There's no magic formula for log length, although 3 to 4 feet is the norm. It really depends on what the grower can manage

to lift and move while inoculating, stacking, and soaking the logs. Tops left behind after a harvest operation can also yield wood suitable for mushroom cultivation.

Log Selection

For shiitake, oaks are by far the preferable species, and white oaks are slightly better than red. Beech is also quite good. In fact, the *shii* tree of Asia that provides the root of this mushroom's name is related to beech and oak. A list of other hardwoods can yield good results, including sweet gum and elm. Less-dense woods like birch can be inoculated, although they won't produce for as many years as the oaks, which may bear mushrooms for five years or longer.

For the most part, these same species will be fine for oyster production, and depending on the species of *Pleurotus*, willow, poplar, cottonwood, aspen, and even some conifers can be added to the list. Remember that

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you're introducing a decomposer to the log, so avoid rot-resistant woods such as black locust and some species of hickory.

Timing

Successful mushroom cultivation is season dependent. February, March, October, and November are the best months for cutting and inoculating the logs. One important element for cultivation is the length of time that's passed between when the tree fell and when the mushroom spawn is introduced. It's easy to assume that the oak tree a storm brought down several months ago is perfect for inoculation, but the forest air is full of the spores of naturally occurring fungi, and it's likely that this older wood has already been colonized. Logs must be fairly fresh, but not so newly felled that they still cling to their natural defenses against fungal invasion. The best scenario is to inoculate the mushroom spawn one to two weeks after the trees are cut.

Supplies

You have the choice of inoculating with plugs or sawdust that has been colonized by the mycelia of the shiitake or oyster. The latter will require a specialized tool, but many consider sawdust a faster method, especially if you're cultivating more than a few logs.

To calculate the number of plugs you'll need, just consider the diameter and length of your logs. Plugs will be placed every 6 inches along the length, and there should be one "line" for every inch in diameter. As an example,



Wooden plugs colonized with shiitake mycelia will be tapped into fresh wood.

a 3-foot log that's 6 inches in diameter will need 36 plugs (six lines x six holes drilled in each line). Of course, a tool for drilling the holes will be needed, along with the correct-sized bits (5/16-inch to 3/8-inch, depending on whether plug or sawdust spawn is used). Some suppliers sell a "shiitake drill" that's actually just a modified angle grinder, or you can buy an adapter kit. If you plan to

plug a lot of logs—a commercial-sized operation—the speed of this method will save a lot of time in the long run.

Once the plugs have been tapped into the logs with a mallet or the sawdust has been packed in with the inoculator tool, the standard next step has been to dab melted cheesewax or beeswax over the holes. This seals out competing fungi and keeps moisture inside the holes. However, some will forgo this step entirely. If you live in a drier climate, then the wax is assuredly a required step. Otherwise, you might get by without it. If you're inoculating several logs, you might leave a couple unwaxed so as to compare results down the road.

Some of the more popular online supply companies include Mushroom People (<https://www.mushroompeople.com/>), Fungi Perfecti (<https://fungi.com/>), and Field & Forest Products (<https://www.fieldforest.net/>).

Record Keeping

Suppliers will sell different strains of mushrooms. Some will be more suitable for summer and others more adapted to the cooler temperatures of spring and fall. Yet others will be "wide-range" strains. To have a consistent supply of mushrooms, consider using several different strains.

A good practice—regardless of whether the goal is commercial production or not—is to affix a simple label to each log with the tree species, the date of inoculation, and the mushroom strain. A small tag cut from an aluminum can, for instance, can be etched with a nail and tacked onto the log. It might say something like RDO 3-20



Wax applied to inoculation holes is necessary in dry climates.

MP510, to convey red oak inoculated in March 2020 with the strain MP-510.

Stacking and Harvesting

Once the inoculation is complete, mushrooms can be stacked in a shady area of your woodlot—someplace where they'll benefit from precipitation and humidity. It's possible to store the logs in a basement or barn, but it will be necessary to soak or mist them periodically to prevent the wood from drying out.

Logs can be stacked in a log-cabin style or arranged in more of a teepee fashion. There's no major advantage of one stacking method over another. It will just be based on access to the logs if they'll be soaked later or how easily one can reach the resulting mushrooms. Full colonization of a log will take anywhere from six months to a year-and-a-half, so patience is a requirement. A hint that a harvest is nigh will be the appearance of white mycelia on the cut ends of your logs, as if dusted with talcum powder.

If you're content with collecting a handful of mushrooms whenever they decide to pop out, and as long as the logs are staying sufficiently shaded and damp, then there's no need to do anything. However, if you want to have control over your yields, you can fully immerse your logs for 24 hours in a livestock tank or washtub once the mycelia appear. A flush of mushrooms will happen within 10 days. You can force a flush of mushrooms three times between spring and fall. Each harvest can yield up to a half pound of shiitakes. In other words, a single log could produce a pound-and-a-half of mushrooms each year.

Mushrooms can make a lot of sense for a woodland owner and can provide a marketable product between timber harvests. Sales of specialty mushrooms have increased steadily in this country in recent years, climbing from \$65 million in 2012–2013 to \$106 million in 2017–2018. Retail prices at farmers' markets have ranged anywhere from \$3 to \$10 per pound. ■



A shiitake log will produce for years, until it's totally decomposed.

PHILLIP MEEKS is a forester and freelance writer. Originally from Tennessee, he currently resides in the mountains of southwest Virginia.

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