

# FARMING EXOTIC MUSHROOMS IN THE FOREST

## INTRODUCTION

One income opportunity derived from forest farming is the production of exotic mushrooms. Many of these edible mushrooms, such as shiitake (*Lentinula edodes*), maitake (*Grifola frondosa*), lion's mane (*Hericium erinaceus*), and oyster (*Pleurotus spp.*) feed on the cellulose and lignin in wood. Although a significant volume of these mushrooms is produced under artificial conditions on a substrate of sawdust, grains and other supplements, production on logs results in firmer texture and more flavor.

Production of high-value mushrooms on small diameter logs of almost any hardwood species enables a private forest landowner to utilize forest thinning residue. In the past ten years or so, markets for shiitake mushrooms have remained stable, with wholesale prices for top quality mushrooms ranging from \$4 to \$12 per pound, depending on supply and demand.

## EXOTIC MUSHROOMS COMMONLY FARMED IN THE FOREST

**Shiitake** - Gourmet mushrooms that look like many other stalked mushrooms, have a slight garlicky taste, are honey brown to almost black on top with white gills underneath.

**Maitake (also called hen-of-the-woods)** - Gourmet mushrooms which tend to grow in large masses of overlapping scales, similar to turkey feathers, are brownish-gray in color with light gray to cream edges.

**Lion's mane (also called pompom)** - Gourmet mushrooms which grow to resemble a pompom, with many "spikey" projections downward on a single large (greater than a six inch) mass, cream to white in color.

**Oyster** - Gourmet mushrooms which come in a wide array of colors from cream to various pastels, which can grow in a stalked form, like shiitake, or in more of a mass form, like lion's mane.

## MATERIALS AND EQUIPMENT

### HIGH SPEED DRILL

Use drill bits sized for the kind of spawn or inoculation tool used (see below), and a drill stop to prevent drilling too deeply into the wood.

### SPAWN

This material comes in two forms, sawdust spawn and dowel spawn. Both include spores of the desired mushroom species which have been "run" through either sawdust or small wooden dowels (about one inch by 3/16 inch). Grain is added to the sawdust mixture as a nutrient and carbohydrate source.

Sawdust spawn is usually sold by the pound and dowel spawn in containers of 100. Standard units (enough to inoculate 10 to 20 logs) cost around \$20. A rule of thumb is that shiitake inoculation will cost \$1.00 to \$1.50 per log. In addition to its two physical forms, shiitake spawn also comes in different varieties-warm season, cool season, and wide range (referring to the climatic conditions under which the strain is most likely to fruit). Growers should consider a cold weather strain for growth in the spring or fall and a warm weather or wide range strain for summer. New growers should experiment with different types to see which work best under their unique

conditions. Costs for spawn of different mushroom species vary—spawn for oyster and lion’s mane may cost closer to \$2.00 per log, and maitake, \$3.00 per log. When ordering spawn, it is suggested that at least two strains of spawn be used.

### **FRESHLY CUT LOGS**

Logs should be cut no more than a few days before inoculating, and the trees from which the logs are cut should be alive at the time of cutting. Inoculating into freshly cut logs should ensure that the fungus which begins the breakdown process of the log is the desired mushroom species and not something else. Recommended log diameters are three to eight inches; recommended lengths are two to four feet. Logs smaller than three inches in diameter can dry out very quickly; logs greater than six inches in diameter can produce mushrooms over a longer period of time but require more inoculation sites per log to compensate for the greater diameter. Maitake can also be inoculated directly into the stumps of freshly cut trees. Mushroom logs require a lot of handling, so it is important to note that a log four feet by eight inches can weigh up to 80 pounds! Oaks have proven to be some of the most productive species for exotic mushrooms, and a wide variety of other hardwood species are also acceptable.

### **CHEESE WAX OR OTHER FOOD-GRADE WAX**

When spawn is inoculated into the logs, the inoculation sites and any other raw wood sites (cuts, branch stubs, scrapes, possibly the ends) should be coated with hot (400 degrees F.) wax. This sterilizes the surface of the site against any competing fungi or bacteria and prevents water loss, maintaining proper moisture content.

- **Heat source for the wax-** anything that will melt the wax and keep the wax hot during the inoculation step. Possibilities include a heavy duty pot on a camping stove or other heat source, or a self-contained electric deep fryer.
- **Applicators for wax-** metal or glass turkey basters work best, ideally with a steel wool screen in the tip. Most paint brushes or similar applicators will melt. Natural fiber brushes can be used, but are more expensive and difficult to find.

### **INOCULATION EQUIPMENT**

Sawdust spawn requires a simple plunger or inoculation tool to pack the right amount into the drilled holes. Dowel spawn plugs are inserted into the logs and usually hammered flush with or just below the surface of the log. Both types need to be waxed.

### **LABELS FOR THE LOGS**

Purchased or handmade labels from aluminum cans work well. It is important to label each log with the date it was inoculated, the tree species, and the type of spawn used.

## **GROWING PROCESS**

### **OBTAIN LOGS**

Cut or obtain fresh-cut logs during the dormant season when sap is running in the tree and contains the maximum amount of stored carbohydrates—either in the late fall when sap is moving down into the roots, or in the late winter/early spring when it begins to move up to the crown again, roughly Thanksgiving to St. Patrick’s Day. During log cutting, it is important to minimize damage to the bark layer.

### **INOCULATE LOGS**

Inoculate the logs by drilling a pattern of holes through the bark and into the sapwood. Drilling adjacent rows offset from the next row makes the classic diamond pattern. Holes within rows need to be six inches apart. The depth of the drill holes depends on the type of spawn and the inoculation tool used. Fill each hole with spawn, seal the inoculation site, and label the log. A rule of thumb is that the number of rows down the length of a log should be one less than the number of inches in diameter at the log’s small end. For example, if the log is five inches in diameter, there should be four rows of holes down the log’s length. Inoculation should occur within two weeks of

felling a tree.

**INCUBATE LOGS**