

Use of Low Value Hardwoods for Shiitake Mushroom Production

Final Report for FS99-096

Project Type: Farmer/Rancher

Funds awarded in 1999: \$1,929.00

Projected End Date: 12/31/2003

Region: Southern

State: North Carolina

Principal Investigator:

[Walker H. Rayburn, Jr.](#)

Project Information

Abstract:

Most farms have small woodlots or wooded field edges that are not well managed. They contain small diameter hardwoods that need to be removed to allow more valuable crop trees to grow well. These low-value trees are not economical to remove for pulp, so they are often just left. If a market could be found for these trees, enabling the farmer to remove them profitably, the value of the remaining timber would increase. And forestland contributes to improved water quality and diversity of habitat for wildlife on the farm.

Many of the low value, small-diameter hardwood tree species that need to be removed to improve the growth of remaining valuable trees in a woodlot might provide logs on which to grow Shiitake mushrooms. If found suitable for Shiitake production, these less valuable (for timber) trees could be removed and used to produce a valuable product (Shiitakes). Shiitake mushrooms can be grown on a small area with minimal labor requirements. There is a good market for Shiitakes.

In late February through early March small trees of 9 types were cut, carried out of the woods (to prevent contamination by forest soil) and inoculated with wide-temperature-range Shiitake spawn from two sources. On the day they were to be inoculated, they were cut into 3- foot sections. The scrap from the middle of the 7-foot section was used to determine the initial moisture content of the log.

A standard plug drill was used to drill rows of holes along the length of the log, 6 inches apart and 3-4 inches between rows, depending on the diameter of the log. Plugs of spawn were driven into the holes and sealed with hot bees wax. The logs were weighed and tagged. Two logs of each species were selected as test logs and fitted with screw eyes to allow easy weighing.

After weighing all the logs and determining the initial moisture content, we observed that the moisture content of some species was below the 30 percent moisture level considered optimum for mycelium growth. The logs were immediately submerged in water in an effort to increase their moisture content. We submerged the logs for one week and dried for one week since we had tank capacity to soak half of the logs at one time.

Due to dry weather, every other week soaking was continued until temperatures reached 70 degrees and then logs were not soaked for 3 weeks in an effort to stimulate a crop. The same procedure was followed in the fall to try for a crop.

The first mushrooms were harvested in September. By this time, the tags had weathered to the point that individual logs could not be tracked, but the species could still be determined by the bark.

The yields were low. American Beech has a thin bark that deteriorated early in the study. Since the mycelium are supposed to grow beneath the bark this resulted in exposure of the mycelium and probably its death. Cherry bark stayed intact during the study, but the sapwood decomposed fast. Cherry log moisture was low but they did produce some mushrooms. Sweetgum logs kept their bark and had adequate moisture. They also produced some mushrooms but the flavor was bland. Hickory logs remained in good condition. While they did not produce a crop, Hickory logs at the same location inoculated a year earlier with the same type of spawn from the same supplier are producing mushrooms. Red maple started out with adequate moisture but the bark started coming off the second year. Muscle wood logs started out with low moisture and the bark deteriorated rapidly. Oak started out with low moisture, the bark is still intact and they produced a crop. Yellow Poplar started out with a high moisture content, deteriorated rapidly and produced 3 mushrooms!

The yield was not worth the effort of 125 hours of labor. I think that the weather conditions during the first few months contributed to this problem. Also Yellow Poplar, Sweetgum and some Oaks leaf out earlier than some of the other species, and thus the sap rises earlier. Cutting the later-leafing species later in the season may help increase the moisture level. The problem is that after sap rise, the bark is more likely to slip during handling. The Sweetgum and Hickory logs inoculated a year before this study produced much better and were producing throughout this study. Based on these observations I consider Shiitake mushroom production a risky business in Northeastern North Carolina. I did not visit other local producers because they were out of business by the time I received this grant.

Cooperators

- [Toni Campbell](#)

North Carolina CES

- [Jeanine Davis](#)

North Carolina CES

- [Marjorie Rayburn](#)

North Carolina CES

- [Lewis Smith](#)

North Carolina CES

Research

Participation Summary

Any opinions, findings, conclusions, or recommendations expressed in this publication are those of the author(s) and do not necessarily reflect the view of the U.S. Department of Agriculture or SARE.



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