SELECTING AND CUTTING WOOD FOR SHIITAKE CULTIVATION

With the continued growth of the natural log based shiitake industry demand for suitable logs for cultivation will also increase. Land owners, who are not cultivators, may find that their wooded acreage could possibly be managed or harvested for suitable logs and provide another income stream from their property. Before a single tree is cut though, an understanding of the log requirements is needed as is the long term consequences of tree harvest on overall forest health. Proper forest management is a must for long term stand health and future timber crops and is beyond the scope of this fact sheet. If you have any doubts about which trees to cut remember this: “when in doubt, consult it out.”

Green is Good

Selecting healthy, living green trees of a suitable species is perhaps the most important requirement. Diseased trees often have dead areas and suppressed, low vigor trees often have either dead areas or little available nutrients for productive mushroom cultivation. The success of the mushroom cultivator is tied to proper tree selection, inoculation and incubation. Get this right and the rest is easy!

Timing of Cut

Dormant Season Cut

Timing of the cut will influence the long term productivity of a shiitake bed log. With oaks, the shiitake fungus will grow best in logs that have a large sapwood to heartwood ratio and high stored carbohydrate levels. This means that the best time to harvest oaks for shiitake cultivation is during the dormant season. This time frame is the period from one third leaf color change in the autumn until two to three weeks before visible bud swell in the spring. Within this time frame there is an even further optimal time to cut, and that is at one third leaf color change in the fall. As the tree is entering dormancy, all radial growth has stopped and the cells have not hardened off so the shiitake mycelium will be able to penetrate the cells readily. Cutting at any time, however, during the dormant period is entirely acceptable.

Growing Season Cut

Once trees have broken dormancy in the spring, stored carbohydrate levels decrease, the girth begins to increase and as a result bark retention is poor over the life of the bed log. If logs are cut past dormancy (while buds are swelling or leafing out), expect a 20% or larger yield reduction over the life of the log because of bark loss. Inoculating these logs after just a week or two after cut will help maximize production.
Log Storage After Cutting

Aside from timing the cut during the dormant season, an equally important consideration is aging the wood prior to inoculation. Your decision of on how long to age the logs post cutting and prior to inoculation depends on many factors, such as wood species, bark thickness of individual logs, damage or scarring of the wood and indoor or outdoor storage conditions. Logs should rest a minimum of two weeks after felling before inoculation but can rest up to six months if logs are snow covered and protected. Logs cut closer to the arrival of warm spring weather should still rest a minimum of two weeks (particularly important with oak) but inoculated by the time daytime highs are up to 70F. Large cracks on log ends (greater than two mm wide) indicate the logs have dried too much and will require soaking prior to inoculation. Other considerations are as follows:

- **Wood species, bark thickness and log diameter:** Wood species often dry at different rates, much of this a result of bark thickness and diameter. Larger logs dry slower, often because of thick bark and less over all surface area. Logs that will be stored longest should be largest in diameter. Inoculate thin barked and small diameter logs first.

- **Scarring:** large scars and multiple large branch stubs increase drying rate. Inoculate this wood early on.

- **Storage:** Logs cut in fall can be felled and left whole on the forest floor until spring. Remove limb wood that will not be used for cultivation purposes to prevent leaf out in case of a warm spell. Take care that the tree is not dropped into an open field where exposure to wind and sun can dry them excessively. Alternatively, cut logs into meter lengths post felling and pile in a dead stack and cover until ready to inoculate. Ideally, a Shiitake log should never touch the ground to eliminate forest floor contaminants. Stacking logs on pallets or rails will help satisfy this requirement.

Ideally logs should be cut from trees in pole sized stands in need of a thinning, from plantations or from tops of trees that were harvested for saw logs. From these resources potential bed logs can be selected for mushroom cultivation.

Selection and Handling of Logs

Bark retention is of primary importance and care should be taken to minimize damage to the bark during felling and bucking. For this reason machine harvested logs are unsuitable for mushroom cultivation. All species of oaks are suitable for shiitake cultivation however, disease pressure seems to be less in the white oak group (Burr Oak, White Oak, Swamp White Oak) Other tree species such as Sugar Maple, American Beech and Ironwood also serve well as shiitake bed logs.

The ideal shiitake bed log has only two cuts on it; one on each end. This is generally not the case though. Side
branches on potential bed logs should be cut flush with the log surface. This is done to prevent bark damage to other logs during the inoculation, laying and soaking steps. Once side branches are removed, the stem can be cut into logs of suitable lengths. The traditional length has been one meter or 40 inches. For ease of handling during the cultivation process log lengths should consistent and diameters can range from three to seven inches with logs in the four to five inch diameter range being ideal.

As the wood is bucked into suitable lengths, the sawyer should ascertain it is living. This is readily evidenced by a bright white sapwood contrasting with a dark heartwood. While cutting to length, any pieces with obvious decay should be discarded as they will be unsuitable for cultivation.