

Chapter 5: Log Moisture

Measurement

If during inoculation, logs are found that are very dry then they should be soaked for at least 24 hours before inoculation. After inoculation, it is also important to maintain the moisture content of the logs. To determine initial moisture content, use the following formula and procedure:

$$\frac{[(\text{wet weight} - \text{dry weight})/\text{wet weight}]}{\text{X } 100} = \text{percent moisture}$$

Select a representative log and cut, from the center, a disk about 3/4-inch thick. Do not cut from the butt end because this may give a low reading. Weigh the disk on a kitchen scale. This is the wet weight. Place the disk in an oven overnight with the temperature set at 200 degrees F. Leave the oven door slightly ajar to allow moisture to escape. Weigh the disk in the morning. Place it in the oven for another hour and then reweigh. If the disk has not lost any more weight, this is the dry weight. Place the appropriate numbers into the equation to determine log moisture content. If the moisture content is below 35 percent, the logs should be soaked to increase the moisture to 40 percent or more before pinning (just before fruiting).

Moisture Management

To manage log moisture, reference logs should be selected and weighed regularly. Choose a log from each wood species and size category. For example, if you have white oak and sweetgum in diameters ranging from 4 to 8 inches, select one 4-inch log, one 6-inch log, and one 8-inch log from each tree species (a total of 6 logs). Weigh each log immediately after inoculation and record the weights. Mark the logs with special tags or brightly colored paint. Weigh these reference logs regularly. To determine moisture loss, subtract

current weight from the initial log weight. Divide this difference by the initial log weight and multiply by 100.

$$\frac{[(\text{original log weight} - \text{current log weight})/\text{original log weight}] \times 100}{\text{X } 100} = \text{Percent moisture loss}$$

If the amount of weight loss (moisture loss) exceeds 10 percent of the log weight, all logs of that species and size should be soaked. Moisture management is one key to successful shiitake production.

As the logs decay, they become lighter. Every 6 months, calculate a new "original" log weight by obtaining the weight of the reference logs after they have been thoroughly soaked and the excess moisture is allowed to drain. This "new original" weight should be less than the log's original weight and should replace it in the above equation.

Log moisture content should be checked periodically throughout the growing season. Moisture content must be above 35 percent and preferably above 40 percent. If the moisture content falls below 35 percent, soak and sprinkle the logs until the moisture content is increased to 35 percent or more. Any water is satisfactory as long as it is free of suspended solids and organic matter. Chlorinated water from city or county treatment plants is suitable. Using a 150-gallon tank, about 30 logs require 30 gallons of water for soaking. The spent water should not be reused for soaking, as it may spread contaminants among logs, however, the water can be used for gardening or other crop production.

If a water source is not available, a water catchment can be constructed. A 10-foot x 12-foot structure, with roof overhand, has about 143 square feet of surface area for collection (Figure 15, next page). A one-inch rain will result in 89



Figure 15. A water catchment can provide enough water to soak 90 logs with just one inch of rain. The surface area of this catchment is about 143 square feet and it will collect 89 gallons of water from one-inch of rain.

gallons of stored water. The cost of the structure shown was \$1,200. The most expensive inputs were the collection containers (\$300) and the roofing panels (\$269). Less expensive materials and scrap wood can be used to reduce the cost of construction.

If large amounts of water are applied through an overhead irrigation system, do not allow the water to run for more than 8 hours at a time. Extended overhead watering will cause water to accumulate under the bark, which will cause it to fall off prematurely.

Allow 24 hours between irrigation applications. A fine spray or fog will increase humidity and log moisture without causing excessive surface moisture accumulation on the logs. However, all irrigation systems should be turned off at night because abundant moisture is generally in the air. Provide ventilation when humidity levels are high.

When logs start to dry, they are losing vitality and are susceptible to contamination. Watering, unless done carefully, may increase the growth of contaminants. If conditions are not windy, watering must be done carefully so the outsides of the logs do not stay wet for long periods. Brief, light watering may favor contaminants on the logs' surfaces without actually raising the moisture content of the logs' interior.