

## Maitake, “Hen of the Woods”, *Grifola frondosa*

Maitake, or Hen of the Woods, is a highly sought-after late summer/fall fruiting polypore mushroom foragers search for at the base of Oak trees. Fortunately, this is not just a mushroom to be foraged, but it can also be cultivated using a variety of methods.

In 2017 and 2018 we did extensive research on parameters that we hypothesized may impact the success of growing Maitake or “Hen of the Woods” on logs. We evaluated three different sets of variables on spawn run success and fruiting: 1) log characteristics 2) methods of treating the logs prior to inoculation, and lastly 3) log placement for fruiting.

### 1) Log Characteristics:

We evaluated characteristics of the logs such as size, age (time since cut), and moisture content. To test different log sizes, we sterilized each using the pressure cooking method (logs bagged, sterilized at 15 psi for 2 hours, cooled, then inoculated). We evaluated spawn run visually by assessing spawn run speed, mycelial robustness, and noted any contamination if present. Spawn run and fruiting success (for first 2 years) was rated on a 0/+/++/+++ scale (Table 1).

Rating	Spawn Run	Rating	Fruiting
0	none	0	none
+	some	+	small cluster
++	good	++	medium cluster
+++	excellent	+++	large cluster

Table 1. Rating system for evaluating spawn run and fruiting success.

Log	Size	Spawn Run	Fruiting
Sticks	1-2" x 10"	+++	0/+
Small Log	6" x 10"	+++	++
Large Log	10" x 10"	+++	+++

Table 2. Spawn run and fruiting success by log size.

We found that all logs showed very successful spawn run, but larger logs were capable of fruiting larger maitake clusters (Table 2). Small sticks supported successful spawn run, but did not consistently fruit and yielded small clusters. It is important to note that cultivated maitake are generally smaller than foraged maitake and the term “large” is relative to the other treatments.

To evaluate log age and moisture content on overall success of spawn run and fruiting, we harvested Oak logs in October and inoculated them 7 months later as many were starting to show evidence of dryness (cracking on the cut ends of the log). We treated all these logs following the pressure cooking procedure and compared them to logs that were freshly cut, treated, and inoculated within 1 month of cutting. To evaluate log moisture content, we treated and inoculated logs that were showing signs of dryness, and rehydrated some logs by soaking for 15 minutes, 3 hours, and 6 hours then treated and inoculated. Logs showing signs of dryness still displayed good spawn run and fruited well (Table 3). Logs soaked longer than 15 minutes showed an increase risk of contamination and some did not fruit in the

first two years after planting. There was variation in these results and logs from each treatment fruited very successfully compared to freshly cut and inoculated logs indicating to us that soaking is simply not necessary and may not be recommended unless logs are fully sterilized due to increased risk of contamination.

Soaking Time (hrs)	Moisture Content	Spawn Run	Fruiting
0	Somewhat dry	++	+++
0.25	good	+++	+++
3	wet	++*	++
6	very wet	++*	0/++

Table 3. Spawn run and fruiting success by log moisture content. All logs were 7 months old and treated by pressure cooking. \*Indicates the log had contamination (typically green mold) during spawn run.

## 2) Methods of Log Treatment

We evaluated three different methods for treating oak logs prior to inoculating with Maitake - boiling, steaming, or pressure cooking. For each treatment, we also evaluated whether the log should be bagged in an autoclavable bag during boiling (Table 4).

Boil Time (hrs)	Bagged?	Spawn Run	Fruiting
0.25	no	+**	0
0.5	no	+**	0/+
1	no	+**	+
0.25	yes	+**	0
0.5	yes	+**	0/+
1	yes	++*	++

Table 4. Spawn run and fruiting success using the boiling method at various intervals and whether the log was bagged during treatment. \*Indicates contamination.

We observed that logs boiled without a bag (submerged right into the boiling water) tended to be very wet and prone to contamination regardless of boiling time. Spawn run and fruiting success were best in logs boiled at least 1 hour. We concluded that boiling can be effective, but logs are far more prone to contamination.

Steaming logs was more effective for the longer steaming duration (6hrs vs 3hrs) and the risk of contamination was significantly reduced by steaming the log while bagged (Table 5).

Steaming Time (hrs)	Bagged?	Spawn Run	Fruiting
3	no	+*	++
6	no	+*	++
3	yes	++	+++
6	yes	+++	+++

Table 5. Spawn run and fruiting success using the steaming method at two different intervals and whether the log was bagged during treatment. \*Indicates contamination.

Based on our work, we found that sterilization (using the pressure cooker or autoclave) was the most effective method for treating logs prior to inoculation. Contamination was nearly zero, and all logs were equally successful across treatments (Table 6). There was no difference between treating for 2 or 3 hours so we concluded that only 2 hours was necessary.

<b>Sterilization (hrs)</b>	<b>Bagged?</b>	<b>Spawn Run</b>	<b>Fruiting</b>
2	no	+++	+++
3	no	+++	+++
2	yes	+++	+++
3	yes	+++	+++

Table 6. Spawn run and fruiting success using the sterilization method (either autoclave or pressure cooker (15psi)) at two different intervals and whether the log was bagged during treatment.

### 3) Log Placement for Fruiting

For the final part of this study, we tested log planting variables (fully buried, partially buried, upright vs horizontal orientation) on fruiting success. We saw fruiting across all treatments, however there was a slight increase in logs planted upright vs horizontal. Fully buried logs were slightly more successful in comparison to partially buried logs (with at least 1" of log above the surface of the soil). Based on these results, we recommend fully burying logs in the upright position.

#### Conclusion:

Some variables such as log size (larger logs were more productive) were more influential on overall maitake mushroom yield than others, but it is important to note that we measured success within all treatments across all variables, making maitake a rather simple mushroom to grow. Our longest known maitake cultivation log fruited for its 7<sup>th</sup> year on our experimental grounds. Ultimately, we found that natural weather conditions proved to be the most influential variable on fruiting in any given year – some falls were more productive than others, but such is the way for foragers finding hens in nature too. Best of luck growers!