How to Grow Shiitake Mushrooms

1) Hydration of grain: All cultivated mushrooms start growth on grain. I’ve been working with wheat. The grain must first be hydrated, which is similar to cooking rice. It is then loaded into mason jars, which are fitted with a filter to allow gas exchange.

2) Sterilization of grain: Because grain is prone to contamination by fungi and bacteria, it must be sterilized prior to inoculation. I’ve been using an autoclave, which uses high heat and pressure to sterilize the substrate. This can also be done at home in a pressure cooker.

3) Inoculation of grain: After sterilization, the grain jars are cooled and placed in a sterile inoculation area. Sterility is required to keep out contaminants. I’ve been using a flow hood, but it can also be done at home in an easily built glove box. Sterile grain can be inoculated with mycelium, or depending on the species, spores. I started with a 10 mL syringe of liquid mycelium culture. After the first jars became colonized by mycelium, I started inoculating with grain spawn.

4) Incubation of grain: After inoculation, the grain jars are incubated at room temperature as the mycelium eats the grain. When a jar is completely covered with mycelium it is “colonized”. This takes about a month and it can occur in light or dark conditions. The colonized jars can be used to inoculate more sterile grain or to inoculate bulk substrate. I’ve been incubating the jars in Finch Greenhouse on WMU’s main campus.
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5) Spawning to bulk substrate: A jar of colonized grain is known as “spawn” and can be used to inoculate bulk substrate, which is what mushrooms actually fruit from. Bulk substrate holds more water than grain, providing the conditions necessary for mushroom formation. Like grain, it must be sterilized and inoculated in a sterile area. Inoculating bulk substrate is known as “spawning”. We use a half-quart of grain spawn per bag of bulk substrate. The bulk substrate formula consists of 20 parts hardwood shavings : 2 parts wheat bran : 1 part gypsum.

6) Incubation and browning of spawn bags: After being spawned, the bulk substrate bags are incubated at room temperature in light or dark. In two to three months, they are completely colonized with white mycelium. They are then allowed to “brown” for about two weeks, as pictured. At this point, they are ready to enter fruiting conditions.

7) Harvest time: After browning, the spawn bags are opened and you are left with a solid block of colonized bulk substrate. This block is placed in a humid environment with plenty of fresh air exchange. Mature mushrooms are ready in about a week. Lots of mushrooms fruit at once in what’s known as a “flush”. Each spawn block produces 3-5 flushes before succumbing to contamination.