

Overview: Inoculate logs with shiitake spawn, cover spawn holes with wax, and stack outdoors. Keep logs shady and moist. Once fungal mycelium has penetrated log, fruiting will occur (after rain).

Step 1: Locate wood during winter

- Tree must be alive and well- no shelf fungi or lichens.
- Cut when sap is NOT flowing.
- Wait about a week, then use within a couple of weeks. Less critical in the dead of winter.
- Choose wood that supports shiitake growth:
 - Oak – longest fruiting and overall best wood, especially white oak
 - Wild cherry
 - Sweetgum
 - Sugar maple (chefs notice sweet taste)
 - American beech
 - Ironwood (American hophornbeam)
 - Paper birch, black birch

Generally, don't use: elm, evergreens, red maple, poplar, black locust, fruit wood and ash

Step 2: Order supplies

- Spawn - sawdust or plug? (See step 3)
- Drill or Angle Grinder (See step 5)
- Bits and/or adapter (See step 5)
- Hammer (for plug spawn) or Inoculator for bulk spawn
- Food grade wax and daubers to apply it (soy wax, cheese wax or beeswax)
- Schedule inoculation party

Step 3: Decide which type of spawn is best for YOU and quantity to buy

Sawdust (Bulk) Spawn

Less expensive (\$25/5.5 lb bag)

Requires \$35 inoculator

Best for large volumes

One 5.5 lb bag = 25 logs

Plug Spawn

More expensive (\$42/1000; \$31/500)

Need hammer/mallet only

Fine for small volumes

One 1000 count bag = 20 logs

Warm Weather (WW) Spawn - Produces during the hot summer months and also one heavy flush in the early fall. WW strains respond well to soaking and fruit well indoors during winter months. Spawn run is at least 6-12 months before their first fruiting. Produce well on soft maples.

Cold Weather (CW) - Longer spawn run (9-12 months). Fruit early spring and late fall (and sometimes winter when it's warm).

Wide Range (WR) - Logs inoculated in the spring may produce that same autumn. WR strains are known for their ability to be force fruited (in 8-10 week intervals) and recover vigor quickly after soaking.

Shiitake - WR46 Sawdust Spawn. Fastest spawn run, heavy first flushes and quick log recovery after fruiting. Good for newbies and high altitudes. Prefers white oak over red oak, slightly.

Step 4: Cut wood

- Make "liftable" pieces, at least 4 inches thick (up to 12) and 3-4 feet long.

- Handle carefully so bark doesn't get compromised
- Expect 3-4 pounds/log/lifetime. Oak lasts 4+ years

Step 5: Inoculate Logs

- Drill holes 4-6 inches apart in a diamond pattern, 2 inches from the ends of the logs
- Use 5/16" bit for plug spawn; 7/16" bit for bulk spawn
- Hammer a spawn dowel into each hole or insert bulk spawn with inoculator
- Heat wax to 350-400 degrees F (wisps of smoke should be present).
- Seal plugs with melted wax, using dauber or 1" foam paint brush
- Seal log ends?

Power Drill Method (for lower volumes)

- Power drill (~2500 rpm) (\$30-\$150)
- Drill bit - 7/16" with depth stop (\$12 - \$15)

Angle Grinder Method

- Mini angle grinder (10,000 rpm) (\$75-\$170)
- Angle grinder adaptor (\$35-\$40)
- Angle grinder drill bit - 7/16" with depth stop (\$13-\$20)

Cheese Wax, beeswax, or soy wax. Beeswax is often free, but can crack at very low winter temperatures. Paraffin wax is not acceptable for organic mushroom production.

Step 6: Move Logs to Shady Area

- Stack off the ground (criss-cross or A frame) and label logs with strain and date of inoculation
- Want 35-55% humidity
- Stack in shade (under evergreens or use shade cloth in summer)

Step 7: Harvest and Enjoy

- Harvest about 3-7 days after a good rain, when cap is still curled under
- Use a knife to cut mushrooms flush with the bark.
- Tap out any thrips in the gills.
- If "forcing", use cattle trough, kiddie pool, old canoe, etc. to soak logs:
 - Can force fruit up to 3 times/year, but will decrease life of logs to 2-3 years
 - Will get pinning (primordia) within a few days and mushrooms within 10
 - Must rest logs 6-8 weeks between forcing
- Cut off shiitake stems and freeze for making stock. They're too tough to eat.
- Cook by reverse-braising: heat stock and butter in pan to cover sliced shiitakes. Cover and simmer for about 15 minutes. Remove cover and raise heat. Add garlic at this time, if desired. Cook until liquid has evaporated. Roasted shiitakes are also amazing!
- Freeze any cooked, uneaten shiitakes. Dry any excess raw shiitakes.

Sources:

1. <https://www.uvm.edu/~susagctr/resources/ShiitakeGuide.pdf>
2. <https://content.ces.ncsu.edu/producing-shiitake-mushrooms-a-guide-for-small-scale-outdoor-cultivation-on-logs>
3. Field and Forest: <http://www.fieldforest.net/>
4. Mushroom Mountain: <https://mushroommountain.com/> LOCAL
5. Deep Woods Mushrooms: <http://deepwoodsmushrooms.net/> LOCAL
6. Asheville Fungi: <https://www.ashevillefungi.com/> LOCAL

Wood Types for Mushroom Cultivation

Shiitake

- Best: white oak, followed by red oak
- Chestnut, ironwood, wild cherry, sweetgum, American beech, paper birch, black birch, alder, bitternut hickory, hard maples (sugar and black), black willow, yellow birch and river birch.
- Avoid: Conifers, fruit trees, elm, hackberry, sassafras, soft maples, sourwood, tulip poplar, walnut, dogwood, black locust and most of the hickories.

Reishi

- Oak, elm, red maple, sycamore, beech, plum, peach, southern magnolia, hemlock, sourwood, mimosa, sweetgum and others.

Oysters

- Soft woods are best: Tulip poplar, aspen, cottonwood, beech, willow, maple sweetgum, Paulownia, and Tree of Heaven (Ailanthus).
- Phoenix oysters will also grow on pines and fir trees

Hen of the Woods (Maitake)

- Large diameter oak stumps or logs, 2 ft. in length. Half-bury logs horizontally or vertically to create a stump.

Chicken of the Woods

- Chicken of the woods will also grow on large diameter logs (as above for maitake), or those laying on the ground, such as fallen tree trunks (all hardwoods except locust, and most softwoods) and butt logs. It might also grow well on spruce, fir and hemlock.

Lion's Mane

- Short term - Tulip Poplar, Maple, Willow, Paulownia, Tree of Heaven (Ailanthus)
- Long term - Elm, Oak, Chestnut, Black Walnut

Chaga

- Birch trees.

Sources: Asheville Fungi, Fungi Perfecti, Cooperative Extension

Growing Mushrooms on the Ground

- Wine cap stropharia
- Blewits (*Clitocybe nuda*)



Prefers hardwood mulch

Use Mushroom Inoculated Wood Chips As Mulch



Growing Mushrooms on the Ground

- Buy spawn locally or over the Internet.
- Layer wood chips or mulch on the ground in a shady location. Water well.
- Add amendments (ashes, etc.) depending on the type of mushroom(s) you plan to grow.
- Sprinkle spawn over the surface of the bed.

Mushroom Gardening



1. Locate in a shady area
2. Make rectangular frame of hardwood logs
3. Cover ground with cardboard from flattened boxes. Water until saturated.
4. Sprinkle spawn lightly onto cardboard.

Mushroom Gardening

5. Add 3" of fresh hardwood chips. Mix in sawdust spawn. Level and pack surface down. Water to moisten chips.
6. Cover chips with thin layer of newspaper (or torn up cardboard). Sprinkle spawn lightly onto the cardboard/newspaper surface.
7. Repeat with 3 more inches of spawned wood chips. Cover with straw or leaves 1-2" deep to preserve moisture and shade chips.

Mushroom Gardening

8. Water every day for first week, every other day for weeks 2-4, and then once a month
9. Within 4-12 months, mycelium will spread throughout the chips and mushrooms will begin to form.
10. Check patch often. May fruit several times/year.



Mushroom Garden Tips

- Fungal mycelium will decompose the pile of chips over time. Compost, or
- Mix in more wood chips every spring to keep your mushroom patch alive and actively fruiting.

Growing Mushrooms on the Kitchen Counter



Kits: \$25-45

Homemade Indoor Mushroom Gardens

- Procure spawn (oyster best)
- Gather substrates – coffee grounds, sawdust, cardboard, cereal grains (uncooked), wheat straw
- Sterilize/pasteurize substrates (H_2O_2)
- Select container and assemble.

