

Myoscaping (Growing Mushrooms) Workshop Notes 7/18/09

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Why grow mushrooms?

- Growing mushrooms allows for the efficient use of space since they can act as a filler for small spaces around the garden and yard.
- Mushrooms can be grown in waste products generated from forests, the production of grain and beer, animals (composted manure), and from human trash such as paper and coffee remnants. It makes sense to utilize this waste material to grow something that people can eat versus sending it off to a landfill.
- Mushrooms are now being utilized for medicinal purposes to treat people who are HIV positive, or who have cancer.
- Mushrooms help to restore the ecology by filtering pollutants from water.
- Ruminant animals (the cow is one example) cannot eat raw straw, but they can eat straw after mushrooms have been grown on it. People can eat the mushrooms that have grown on the straw and then feed the straw to the animals.
- Biocontrols are being developed from mushrooms (natural fungi) that can battle bug pests that are threatening tree (for example chestnut and butternut trees) and plant species.
- Mushrooms are able to break down and eliminate biochemicals such as nerve gas.
- Felt hats as well as hat decorations have been crafted from mushrooms.
- There is a particular mushroom that when hollowed out can be used to transport hot coals for fire making.
- Mushrooms are used in food processing.

Parts of a Mushroom



The mushroom is the fruit of the organism. The gills produce the spores (seeds) that have a starch reserve. The spores germinate and create hyphae, and these find a good substrate on which to grow. These spores have a gender (which is found on the marker) and they find a sexually compatible spore to create mycelium, but this process can also happen asexually. The hyphae sometimes create a line that produces "fruit" (mushroom) as a result of natural crisis so people can simulate a crisis by doing things such as flood the hyphae with water to make them think that a flood is occurring. A mycelial network can create lots of mushrooms. If started in an open space of lawn mycelia will send spores outward each year to create ever widening rings of mushrooms.

Humans are closer in genetic make-up to mushrooms than to plants. Over the last 20-80 years modern industrial mushroom cultivation has been established. The button mushroom is cultivated the most. Philadelphia is a major producer. Caves and barns are utilized for growing.

Human mushroom cultivation (ants and termites have been cultivating mushrooms for a very long time) began in France in 1600. China began cultivating mushrooms in 1000 AD.

Cultivation

The key to mushroom cultivation is **isolating and growing a pure culture**. This could be from a wild spore on a Kleenex tissue, but you will need to isolate it from contaminants. You can use an inoculation grain (make sure there is good air flow) and once that first batch of mycelium is growing you can spread the grain into 10 more jars. You have to maintain sterility. The other option is to buy the mushroom spawn from a supplier.

Mushrooms can be grown in a tray with a bulk substrate, among perennial crops, or in a plastic bucket placed on its side, just to name a few. You would place sawdust in the bucket made from broad leaved hardwoods with no rot resistant substances on them. Holes should be cut into the bottom of the bucket to allow for air circulation so that the medium does not become too moist.

Log culture or stump culture utilizes the plugging method and is ideal if you would like to move away from sterilization methods and toward bulk and wild mushroom growing. With this method it is important that you give the mushrooms a good head start so that they are able to compete with external organisms once they are large enough to go out against the world. From a permaculture perspective using a log for a mushroom growing medium is brilliant because the tree put energy into making bark, which acts as a defense against insects and parasites, and we then use a log from the tree to cultivate the mushrooms.

It is important if you are cultivating wild mushroom spores that you familiarize yourself with the poisonous varieties of mushrooms so that you do not accidentally cultivate one of those. Some of the good mushroom varieties to cultivate include: wine cap stropharia, shitake, oyster, chicken of the woods, and maitake. Shitake WR14 can be purchased in the form of a hardwood plug that was sterilized, then inoculated with mushroom spores.

The ideal growing log will be 3-4 ft. long, and 3-8 inches in diameter. It can be red oak, or another hardwood such as maple. There should be no surface growth (branches growing out), surface wounds (missing bark which would allow other organisms to grow in the log and compete with the mushroom) and no discoloration at either end, which is known as spalting. You should prepare this log for mushroom growth 2-3 weeks after it is cut from a tree to allow for the trees natural defenses to break down, but within 3 months because after 3 months other organisms will start growing in the log and compete with your mushroom spores. If there is a small wound in the log then you can insert a mushroom plug at that spot and cover the entire wound with cheese wax for protection.

Using an electric drill with a 5/16" bit drill holes as deep or a bit deeper than the purchased mushroom plugs every 5-6" down the length of the log and every 3" going around the log. Keep the drill at high speed, and pull it back out instead of reversing it out in order to pull the wood shavings out with the drill. Use a hammer or mallet to drive the plugs into the drilled holes. Make sure that every plug is either flush with the surface of the log or a little deeper so that competitor organisms are not encouraged.

After all of the pellets are driven into the log you can use a dauber to apply melted cheese or bees wax over the top of each pellet to seal it in. You do not need to seal the two ends of the log since that will reduce water absorption. You can purchase the cheese wax by the pound from cheese or mushroom supply stores. Melt it over low heat.

When finding a place for your log keep in mind that if it is outside it should be in a place where it can be rained on, out of direct sunlight, and not near soil that is moist. A pallet makes a good base for the log. During the winter you should place a tarp over the log if it is under deciduous trees so it does not dry out. The log should maintain at least a 30% moisture content. **If it is rained on at least every 2 weeks that should be enough**, but this will vary with changes in the weather. You can also set up a base of two logs that have not been planted with mushrooms and then lay two on top of those going in the other direction like Lincoln logs until you run out of logs. Do not build the pile too high though because you want it to remain stable and not fall over.

If you are keeping your planted log indoors then you will probably need to water it more often. If you submerge the log in water the mushroom spores will think that a flood has come and will begin to produce mushrooms because they think that their death is imminent.

It can take up to a year for your mushroom spores to produce mushrooms. Do not discard the log until two years have passed. At that point the spores are not going to produce.

If you would like to try your hand at growing wild stropharia you can dig up the mushroom in the wild making sure that there are some roots or spores attached to the bottom and plant it in mulch. You can also plant just the mushroom butts in a box that is layered with mulch, sawdust, cardboard, then mushrooms. Water the box and its contents down well.