

Cultivation of fruitbodies and sclerotia on sterilised grass seed

This document gives instructions on how to prepare substrate suitable for the cultivation of:

- *Psilocybe mexicana* (mushrooms and sclerotia)
- *Psilocybe tampanensis* (mushrooms and sclerotia)
- *Psilocybe cubensis* (mushrooms; rye grain is preferred for this species)
- *Panaeolus subbalteatus* (mushrooms)

Preparation of the substrate

The substrate is based on grass seed. The most commonly sold form is rye grass seed (*Lolium perenne*) but we have also used mixtures of different species with great success. Make sure however that it is not treated with fungicides. If seed has been treated with fungicides it should say so on the packaging. You may have to look around a little bit to get some unexpensive seed (we buy ours from an animal feed store where it is sold as birdfeeding).

We use the following formula for 720 ml jars

- 110 grams grass seed
- 180 ml water

After the water and seed have been filled into the jars, the lids are put on but NOT screwed tight! The lids MUST remain loose! Then a double layer of tinfoil is crumpled over the lid and top part of the jar. Now the jars are ready for sterilisation.

NOTE: Different varieties of grass seed and even batches of the same variety can differ greatly in their ability to absorb water. Too much water results in a slimy clump of seed that cannot be shaken, too little results in substrate that is too dry and produces little or no mushrooms/sclerotia. You should experiment a little with these.

Alternatively you can soak the grass seed overnight in water and then fill the jars with soaked grass seed. This will produce a more homogenous substrate.

Sterilisation

The jars should be sterilised in a pressure cooker or autoclave, a normal pot will NOT suffice. First a layer of water is poured into the cooker. The jars are placed in the pressure cooker making sure that the lids are loose! Now sterilise the jars for one hour according to the directions supplied with your pressure cooker. If you are using bigger jars then the sterilisation time should be prolonged. (we sterilise 1.5 litre jars and spawnbags always for 2 full hours). Once the cooker is no longer under pressure the jars should be taken out and the grass seed in the jars should be shaken loose to mix the wet and dry kernels. The jars should then be allowed to cool in a clean place. Always check the jars for cracks before shaking! When the jars have cooled to room temperature inoculations can take place. As the jars are cooling down the lids should remain loose or else they will pull a vacuum.

Inoculation

When the jars have cooled down they are ready to be inoculated. Don't be hasty, be patient! If you inoculate the jars while they are still hot the spores or mycelium might get killed. You can use a spore syringe, mycelium syringe, agar squares or whatever kind of inoculant you want. The most important thing to remember is to **WORK CLEAN!** When using syringes always flame the needle before commencing inoculations. When using agar squares always flame the scalpel! Be careful!

ALCOHOL AND SPRAY LYSOL ARE HIGHLY FLAMMABLE!!!

Even a simple hood made of a cardboard box prevents prevent drafts and subsequently contamination. Do not expose the sterilised grain to air longer then absolutely necessary. Open the lids of the jars just a crack and work swiftly. After inoculation the lids of the jars are closed and the jars are shaken. Then the lid is loosened again so the mycelium will be able to breathe.

Colonisation

After inoculation the jars are put in a clean and draft free location. We normally put our jars at room temperature (20°C) or slightly higher. When mycelium starts to grow in only a few spots we shake the jars to redistribute the colonised kernels. This speeds up colonisation dramatically. Depending on the temperature, the species and the method of inoculation the grass seed can be completely colonised in 5-20 days.

When jars are incubated too long or at too high a temperature the mycelium will excrete yellowish metabolites. This situation is not good, these seed in these jars should be cased as soon as possible.

Casing (for the cultivation of mushrooms)

When the grass seed in the jars is completely colonised it needs to be cased. For this purpose we use 1-litre disposable plastic trays. The colonised grass seed of one jar is shaken loose and poured into a tray. If there are lumps within the seed these can be broken up with the clean rim of the jar. The surface of the grain is levelled evenly. Using a big spoon and a fork the grain is now covered with a thin layer (1.5-2.0 cm) of casing soil. We always try to keep the casing surface even while at the same time keeping it rough (with small valleys and hills). The cased tray is then covered with tin foil and put in a clean location (20-25°C). Within a few days you will notice the mycelium growing through the casing soil. Depending on the strain (some strains fruit earlier and easier than others) the casings are now ready to be exposed to air and light to start the fruiting cycle.

Recipe and Preparation of the casing soil

We use the following recipe:

- 10 parts of peat
- 5 parts of vermiculite
- 2 parts of limestone (Marl)

The ingredients are mixed in dry form and while stirring water is added. The amount of water of course depends on the moisture content of the peat. The object is to get as much water in the casing soil as possible without turning it into mud. If the casing gets too wet just add a little more dry ingredients. This casing soil is then filled into oven bags (made

of nylon), autoclave bags (PP) or jars and these are sterilised for one hour in the pressure cooker. When the soil has cooled down to room temperature it's ready to use.

We know that some authors advise against sterilisation of casing soil because it would kill all the beneficial organisms. We however have had only bad experiences with untreated or pasteurised casing soils. We just tell what works best for us!

Fruiting

Some cultivators use very elaborate set-ups with humidifiers, cool-mist devices and such. We have never found this necessary. The fruiting containers that we use consist of simple clear plastic bins that are covered with polyethylene sheeting. These bins are stackable and thus very space efficient. For air exchange some holes are melted in the sides of the bins. These holes can be covered with mesh to keep out flies. Basically, five cased trays are put in one bin and the evaporation from the casing surface is enough to maintain the proper moisture inside the bin. The holes provide some air exchange. We always cold-shock the harder-to-fruit strains (we put them in the fridge for one night before putting them in the bins). For easy fruiting strains (i.e. *Ecuador cubensis*) this is not necessary. *Psilocybe mexicana*, *Psilocybe tampanensis* and *Panaeolus subbalteatus* do not benefit from such a treatment. The casings are misted each day and the casing is never allowed to dry out. Directly after a flush is picked watering is increased because the maturing mushrooms pull a lot of moisture from the casing soil. It's very difficult to give explicit directions on a watering regime. You will have to develop a 'feeling' for it. Depending on the strain the first pinheads will appear 6-15 days after putting the casings in the bins. The mushrooms will mature in 5-7 days after which they can be picked. We normally let the casings produce 3 flushes, but they may (when watered properly) produce 5 or even 6 flushes. *Psilocybe mexicana* usually produces one big flush and a small second flush. Other mentioned species produce more constant.

Keep the surface of the casing as clean as possible by removing dead pinheads (aborts) as these can lead to moulds showing up on the casing surface.



Sclerotia

The mycelium of *Psilocybe tampanensis* and *Psilocybe mexicana* can produce sclerotia while still in the jar. Colonised grass seed need not be cased for this to happen. In our experience (with *tampanensis*) sclerotia will continue to enlarge until 4 months after inoculation. The jars should be put in a clean (preferably dark) location. Sclerotia of these species also form in the casing layer of cased trays.

