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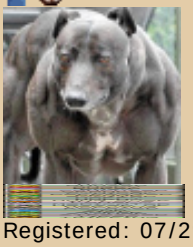

Registered: 07/29/07
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Last seen: 21 minutes, 12 seconds

Re: All Of RR's Notes On Mushroom Cultivation Forum [Re: tripsis]
#8468496 - 05/31/08 06:52 PM

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METABOLITES/LIGHTING

METABOLITES

*That quote above by stamets in TMC written in 1985 when he was fairly new to cultivation was a mistake. He corrected it very well in the 1990's when he wrote 'Growing Gourmet and Medicinal Mushrooms', where he correctly stated they are antibiotic compounds.
Furthermore, the journal of medicinal mushrooms publishes articles on a regular basis identifying the various antibiotic compounds in various species of mushroom mycelia metabolites.
The first mass use of metabolites in medicine was in WW2 when the production of metabolites from the Penicillium mold saved thousands of Allied soldiers lives due to a product that was named Penicillin after the mycelium metabolites it was made from. I'm completely in awe that you folks don't know this. It should have been taught in elementary and junior high school, both in history and science. It's not brand new news.
Furthermore, there is a time and place for vulgarities. I'm no prude and no religious freak by a long shot, but in science one need not use vulgar terms if he wishes to be taken seriously. I'll be the first one to let out a four-letter tirade over politics when I'm having a few beers down at the pub, but not here, and not in conjunction with mycology. I hope this clears it up. I'll stay on it until people stop using the wrong terms. It's no different than correcting someone for referring to an uncased bulk substrate incorrectly as a 'casing' or referring to manure as a spawn, rather than a substrate, etc. It's simply incorrect and should

be corrected or new growers trying to learn get fed the wrong information. METABOLITES

*Mushroom mycelium secretions do not equate to human urine in any way, shape or form. That is disinformation and it makes the hair on my neck stand on end when I see it constantly repeated. They are unrelated. In fact, the secretions from many fungi are used to make antibiotics. Read up on the production of penicillin, tetracycline, erythromycin and other antibiotics that are made from the secretions of fungi. This has been known for a long time in professional circles. For some reason, people around here keep repeating the same old 'mushroom piss' crap and others read it and repeat it ad nauseum. The secretions, which contain acetone and other volatile compounds can actually be fermented and distilled out of the liquid culture the fungi mycelium is being grown in. In commercial penicillin production, large fermentation tanks of over 30,000 gallons are common. It is not the penicillium mold itself that they make penicillin from, but its secretions. Please stop using urine as an analogy for the antibiotic secretions of our precious fungi. METABOLITES MYCELIUM PISS

*Actually, I have harvested metabolites and used them on other molds, which they kill. Often, when a grain jar is left too long after full colonization, metabolites will begin building up in the bottom of the jar. These can be poured right on an infection in another tray. If caught in time, many molds can be neutralized this way. I doubt it's the antibiotic properties of the metabolites at work against molds, but rather the solvents. Antibiotics are effective against bacteria, which isn't a contaminant of casing layers. METABOLITES FIGHT

*Mycelium produces metabolites in response to contaminants or stress. These are antibiotic compounds that the mycelium produces to kill competitor fungi or bacteria. They are not in any way, shape or form related to the urine that is secreted by mammals. The metabolites produced by mycelium of the penicillium fungus for example are used in human medicine as antibiotics to kill bacteria. The metabolites produced by mushroom mycelium serve a similar purpose. METABOLITES PURPOSE

*Actually, metabolites don't attract bacteria; they're a response to it. They're antibiotic. It sounds like you have some bacteria in the jar and they're being excreted by the mycelium to help fight it off. You can lay the jar on its side, and then rotate it once per day. This keeps uncolonized parts out of the liquid, helping them to finish up. The above assumes it's a grain jar. If it's a pf jar, disregard. Laying on its side and rolling can disturb the vermiculite filter leading to contaminants entering. METABOLITES

*Experiment. Put some bacteria on a petri dish, and then put down a line of metabolite. Watch how they stop the spread of the bacteria. Without a lab, I doubt you could make your own antibiotics, but penicillin and the other common antibiotics are made from fungi metabolite. I've also found that mushroom metabolites will kill trichoderma mycelium on a petri dish. In fact, it would probably kill off any competitor fungi, even other mushroom species. USES FOR MYCELIUM METABOLITES

*Mycelium often produces metabolites of different colors depending on what infection they're fighting. This red color was on the top of the vermiculite barrier where the mycelium had worked it's way up to where contaminants had entered through the vent hole and were laying dormant on the vermiculite barrier. When the mycelium reached that spot, it produced metabolites (antibiotic compounds) to kill the mold spores or bacteria that were present in that location. METABOLITES

*The metabolites are antibiotic secretions, so when they're in large amounts, it usually means something is up. High lonization temps will also lead to metabolite

production, so remember to colonize jars at room temperature. A jar with a good filter will contain any contaminants that are within, so don't toss it out. Don't use any jar with a lot of metabolites for grain-to-grain transfers, but if they colonize fine, they're good to use for spawning to bulk. METABOLITES

*Colonized poo trays sometimes emit a little honey yellow, to as dark as Tobacco juice colored metabolite type waste on the top of the tray. So long as it colonized nicely & the metabolite waste doesn't turn into a gusher. It's good to go. Been there & done that a few times, especially with big bulk trays that had a strong cow/poo mixture in them. The stuff is commonly called MYC PISS. If it's fully colonized, add a casing cover & go for it. METABOLITES

*There will be no live bacteria in the metabolites. They're acids and often ethylene based to kill bacteria and are produced in response to it. There may be bacteria in the grains, but not in the metabolites. That's why grain jars should be used at full colonization, not weeks later. The metabolites are the myceliums defense mechanism. I've used the metabolites from Hypsizygus ulmarium to kill bacteria and trichoderma on a petri dish. METABOLITES

*It's metabolites since they're yellow. That is a sign of too much bacteria and/or excessive temperature. Is that uncased manure? I'd suggest gently dabbing the excessive off with a clean dry paper towel. The metabolites help to fight infections, but too much of a good thing isn't always good. Dry it off, and increase air exchange. You want high humidity, especially if fruiting uncased, but you also want lots of fresh air. METABOLITES

*The manure isn't eating the holes in the aluminum, the mushroom metabolites are. I have a mushroom that was sent for metals testing after harvesting from the tray pictured below. I should know within a few days if aluminum was conducted up into the fruit body. We know that heavy metals end up in the fruits, but as far as I know, nobody has ever had a fruit professionally tested for aluminum contamination. METABOLITES

*It sounds like metabolites and is often caused by excess temperature, which leads to bacterial contamination. Metabolites are antibiotic and are secreted in response to the bacteria or molds. Incubate at room temperature for best results and lowest contamination rate. I haven't even owned an incubator in ten years. They're not necessary and cause far more problems than they solve. METABOLITES

*The metabolites are generally produced in response to bacteria that are stimulated by high incubation temperatures. My rule of thumb is if you can see visible metabolites in the bottom of the jar, it's ok to spawn to bulk, but don't do a g2g with it, or the dormant bacteria will come back to life in the fresh grains. Next time, incubate your grains at room temperature. METABOLITES

*The excess moisture you see is metabolic discharges from the mycelium trying to fight off the contaminants, and/or metabolites from the molds trying to fight off the mushroom mycelium. Start over, and use a very light syringe, or better yet, prove your spores on agar, and transfer a proved, clean mycelium culture into your rye and watch it take off. METABOLITES

*A large amount of metabolites generally means a bit of bacteria in the jar. The metabolites are antibiotic secretions, so when they're in large amounts, it usually means something is up. High colonization temps will also lead to metabolite production, so remember to colonize jars at room temperature. METABOLITES

*Mycelia metabolites are not urine. They're antibiotic and much more like medicine than pee. In fact, they also help to break down the substrate for the mycelium, much like the saliva in our mouth (which is also not urine) helps break

down our food, making it available to the mycelium. METABOLITES

*Elevated temperatures are a major cause of that. The high temperature stimulates bacteria, and then the mushroom mycelium must secrete antibiotic metabolites to deal with them. It's important to use room temperature for colonization, especially with larger substrates. CAUSES FOR METABOLITES

*Antibiotic drugs such as penicillin are, and have been made from fungal metabolites for over fifty years. It is not a theory. I have used a syringe to draw metabolite from a grain jar and placed it on bacteria in a petri dish. It kills the bacteria dead within hours. WHAT ARE METABOLITES

*Mycelia metabolites are not urine. They're antibiotic and much more like medicine than pee. In fact, they also help to break down the substrate for the mycelium much like the saliva in our mouth (which is also not urine) helps break down our food. METABOLTITES

*Antibiotics such as penicillin are made from fungi metabolites. They're a powerful anti-bacterial. They also help the mycelium to break down substrate materials. There are still a lot of unknowns to be researched, but they're not urine or feces, that's for sure. METABOLITES

*I'm convinced many growers who think they 'cut away lipstick mold' and succeeded, actually cut away harmless metabolites from their jars. Metabolites are produced by the mycelium in order to attack competitors. They're a weapon. METABOLITES

*Metabolites are a natural secretion of fungi both as a defense mechanism against competitors and to break down food sources. Molds produce as much or more metabolites than mushroom mycelium. METABOLITES

*It's just metabolites from the high temperature. NEVER use a jar with a lot of metabolites for grain-to-grain transfers, but you can use it to spawn to bulk or lay in a tray and case. METABOLITES

*They're actually antibiotic compounds used to neutralize competitor fungi and bacteria. That's why medical antibiotics are made from them. METABOLITES

*An excess of metabolites can point towards bacterial contamination, over-colonization of a substrate, or too high a temperature. METABOLITES

*Yes. Excessive heat will cause the mycelium to produce more, so if there's a lot of metabolite, try to reduce temperature. METABOLITES

*The metabolites will do no harm. You can leave the substrate soaking in it. They destroy contaminants, not cause them. METABOLITES

*A large amount of metabolites generally means a bit of bacteria in the jar. METABOLITES

*Actually, metabolites don't attract bacteria; they're a response to it. METABOLITES

LIGHTING

*Light has absolutely NOTHING to do with telling the mycelium that it has reached the surface. The increased fresh air, with the corresponding drop in CO2 levels sends the mycelium that message.
Light is also NOT just to establish the direction the fruits grow. In fact, air currents have a greater effect on direction of growth than light. If you doubt this, place a fan on your crop and watch.
A few seconds of light per day will NOT help to generate a good pinset. In fact, light is a secondary pinning trigger, but an important one. The difference between three or four pins, and hundreds of pins on a substrate can be directly correlated to the length, intensity, and frequency of the light applied, provided the primary pinning triggers have been fulfilled.
The light needs to be intense enough to penetrate 1/2" into the substrate. Not all pins form on the surface. Many originate from deeper in the substrate or casing layer.
Higher frequency light above a color temperature of 5,000 Kelvin will generate far more pins than a 'red' source of light such as incandescent lamps.
Fungi are a living organism that is much more closely related to mammals such as humans, than to plants. People need to quit looking at mycelium as a different kind of plant, which it isn't. Mycelium has been shown to have circadian rhythms just like mammals, and this is the reason that 12/12 light cycles work best. This planet, and all surface life on it are based on the 24-hour day. For best results, learn to work with nature rather than against it. Mycelium has an amazing ability to cope with less than optimal conditions, and will often fruit when a grower does everything wrong. However, do everything right and watch your performance go through the roof.
*Recent experiments (over the last 23 years) have shown the error of that statement in TMC. Many experiments have shown conclusively that fluorescent lamps in the 6500K range produce better pinsets and healthier, meatier fruits than other forms of light. Stamets himself does not repeat that 'flash of light' triggers pinning nonsense. In fact, he recommends fluorescent lamps in the 6,500-Kelvin range for 12/12 just as I do. In addition, there's a huge difference in saying something can result in 'pins', and helping to trigger a very nice flush. Light, and the intensity/frequency of light is extremely important if one is interested in greater than mediocre performance. Many species, such as agaricus and P cubensis, can pin in the total absence of light. That doesn't mean light isn't required for best results, especially with light sensitive species such as P cubensis and P ostreatus. TMC FAULT, LIGHTING, WHY

*You want full spectrum light for best results. Indirect light from a window is fine. Hyphal knot formation is stimulated more by light at the higher end of the scale than at the lower end of the scale. A color temperature of around 6500K is just about perfect. This is the color produced by 'natural daylight fluorescent' tubes. For the geeks, I'll explain color temperature briefly. We all know when we heat a piece of metal, it first begins to glow red. We see this when we heat a syringe needle over a flame. If we continue to heat it, the metal will eventually glow white hot. As we heat it more and more the white color begins to take on a blue hue, provided the metal doesn't melt down into a puddle first. This is why tungsten in a vacuum is often used for light bulb filaments.
The Kelvin color temperature system is essentially the color a piece of dark metal will glow when heated to a specific temperature. The Kelvin scale starts at absolute zero, roughly -237C. This is Zero K. The scale follows the Celsius temperature scale and remains constant. Therefore, water freezes at 237K and boils at 337K. If you heat a piece of metal to a temperature of 4,763C, the resulting glow will have a color temperature of 5,000K. The color scale is used as 'corrected' color temperature when fluorescent or other gas type lighting fixtures are used. A 'natural daylight' fluorescent tube with a color temperature of 6500K

would glow with the same color as a dark object heated to a temperature of 6,263C.
Color temperature is not an indication of the intensity of light, only its color. Mycelium forms fruits best with light at the 'blue' end of the spectrum, thus a higher color temperature is required for best performance. Look for lighting with a high color temperature such as fluorescent. Cool white fluorescent has a color temperature of 5,000K and natural daylight has a color temperature of 6,500K. Avoid UV light that is too high, and has been known to damage mycelium, as well as cause mutations, and cancer in humans.
Incandescent light bulbs by contrast, have a color temperature of around 3000K, which puts them in the 'red' end of the spectrum, and they are the worst choice for fruiting mushrooms. WHAT YOU WANT!

*Many things. I've found the brightest light stimulates more pins. You need to look at pinning triggers like the instruments in a band. One instrument can be slightly off, and the band still plays the song. Often one instrument can be taken away and the music still sounds ok. However, if all are working together, it's awesome.
Perhaps the projects you remove from light after exposure are maintaining a higher humidity due to no heat from the lights. Humidity is a pinning trigger just like light. Maybe the ones you remove from the lights get better air circulation. Fresh air is a pinning trigger just like light.
For the record, light has no effect on colonizing mycelium, good or bad. The old advice of "incubate in total darkness" is bunk. Stamets wrote those words in TMC 20 years ago, and he disavows that advice today. I concur. The only real time that keeping in the dark has an advantage in my experience is during casing run, when the introduction of light after casing colonization can serve as one of the pinning triggers along with air exchange and proper humidity. Bare in mind, you want a constant rate of evaporation from your substrate to achieve the best pinset. If you're at 100% humidity, there will be little to no moisture evaporating from your casing layer, and pinsets will suffer.
To repeat, light is a pinning trigger, but it isn't the only one, and it's greatly overrated. For the best pinsets, you have to balance several triggers at once. Screw up on any of them, and pinsets suffer, regardless of what you do with light. LIGHTING

*Normal room lighting has no effect on colonizing mycelium, either good or bad. This is one of the old myths perpetuated by stamets 'The Mushroom Cultivator', that was incorrect 20 years ago when it was written. He corrected his own mistake in GGMM, but fewer people have read that one because it centers more on edibles, than on psilocybe mushrooms. My own research says light doesn't make one whit of difference to colonizing mycelium in jars. The time to protect from light is during spawn run of bulk substrates and casing layers. During the initial colonization of grains or brf cakes, it doesn't matter. Light is required for primordia formation as well. Bulk substrate colonization is the last step prior to fruiting. The only reason for keeping a bulk substrate, and especially the casing layer dark during colonization is for the timing of the pinset initiation. It allows you to introduce all the major pinning triggers simultaneously, resulting in an explosion of pins. A bulk substrate will colonize just fine if exposed to light from day one, but then you aren't maximizing potential by synchronizing the pinning triggers. LIGHTING

*TMC is a classic and I still refer to it a lot. In the last twenty years we've learned a few things though. One, as hyphae said is the mycelium metabolite. Another is that colonizing mycelium need not be kept in total darkness. I think Paul fixed that one in GGMM, but I know at his beginners and masters seminars he points

that out, and his own incubation rooms filled with hundreds of species, are under 8 to 12 hours per day of fluorescent lighting while work is being done. That has been my experience as well. Light doesn't become a significant pinning trigger prior to full colonization and the introduction of fresh air exchange. This one is probably nitpicking, but I don't like the TMC method of preparing grain jars which is add dry grain, add water and a pinch of gypsum, and PC. We now know that if you'll take the time to rinse the grains very well before cooking, they don't stick and clump up later. There's a couple of others I can't think of now. Nothing major though. It's a great reference work. TMC FAULTS LIGHTING

*While enough light to read by might give a minimum pinset, you want bright, high frequency light to induce a massive pinset. An hour or two in a window with even direct sunlight is great to kick start a pinset, but don't let the tub overheat. For the rest of the cycle, find a way to get the fluorescent to shine through the clear part of the tub. Put the light in front of or behind the tub. It doesn't have to come just from the top. The white lid will reflect side light down just fine. My entire greenhouse is lit from the back with fluorescent fixtures attached to the wall the greenhouse sits against. Cool white fluorescents produce 5000k, which is very close to natural sunlight. Incadescents are a much redder light and only produce at around 3200k, which is not nearly as effective. You want high frequency light for best results. The natural daylight fluorescents are the best, putting out light at around 7000k, but are much more expensive than cool white. Good luck. LIGHTING

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*Plants require much more light than mushrooms because they derive energy from the light source. In addition, most mj growers switch to a redder light at fruiting time, not the high frequency 'blue' light we get from our fluorescents. Perhaps you're confusing the Kelvin color temperature scale with intensity? My fluorescent fixture provides light to six shelves, each one eight feet long and three feet deep. That's 144 square feet, thus less than 1 watt per square foot of shelf space. The foil helps to prevent the trays in the back from being shaded by those in front. I challenge the best mj grower in the world to try to grow plants under that. Compact fluorescent bulbs work great as well for fruiting chambers and mini-greenhouses. In addition, LED technology has progressed considerably in the last few years. I'm sure it won't be long before LED fixtures are made with controllers to adjust color temperature. LIGHTING FREQUENCIES, PLANT LIGHTS

*"Of course myc doesn't need dark but we use it to our advantage as a pinning trigger"
Exactly. After spawning the grains or brf or whatever into manure, it's a good idea to cover with foil to keep it in the dark during substrate colonization and casing colonization, and then remove the foil for light and sudden air/gas exchange to trigger pinning. However, I've found no benefit or harm from allowing the grain jars to be exposed to light from day one. If a few pins form in the grains, it is actually a good thing. Contrary to popular belief, a few pins in the

grains can be spawned right into the manure or straw (or used in grain to grain transfers) and they do not rot or otherwise cause contamination. There is evidence they actually help to give a faster, more uniform pinset in the eventual flushes. Stamets believes it's the hormones or other chemical triggers in the pins that do this. LIGHTING

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*Light is very important after full colonization, when an increase in FAE is made. Enough light to 'see the tray' is absolutely NOT enough light unless you're happy with shitty pinsets. Brighter light is better. Higher frequency (blue) light such as is emitted by 'natural daylight fluorescent' tubes which produce light at 6500K are best from mine and Stamets tests. Cool white fluorescent tubes would be a second, lower cost choice and will work fine. Incandescent bulbs which emit 'red' light at 3000K are the worst choice. In addition, 24-hour light is extremely counter productive because hyphal knots form, and the fruit bodies seem to grow the most during the period of darkness. You can all prove that by simply measuring your growing mushrooms when you turn the light on, and again when you shut it off. You'll find growth is higher during the dark phase. LIGHTING

*Use full spectrum light, or a light that is in the higher frequency range. Don't use 'blue' lights or a 'blue' tub. Such is not in any way, shape, or form what the mycelium needs to perform well. The use of 'blue' led's or blue tubs is based on a misunderstanding of what Stamets was talking about in GGMM when he recommended high frequency lights, such as natural daylight fluorescent. This has all been covered ad-nauseam in previous light threads. It absolutely amazes me that people still repeat the 'any light will do' or 'if you can see, your mushrooms have enough light', or 'only a few minutes is enough' etc., etc. If one is satisfied with shitty pinsets, the above is true. If you're less than satisfied with shitty pinsets, use a light in the 6,500-Kelvin range. Incandescent grow lights are one of the worst possible choices. LIGHTING

*At full colonization, light becomes very important. The only real time you need to put your trays in the dark is during casing run. This allows the casing layer to colonize partially without the additional pinning trigger of light acting on it. At the

proper time, you expose to light, increase FAE, and have full colonization all at the same time. This results in the best possible pinset. Read Hyphae's pinning strategy in his sig for more information on timing these events. There is no point in putting it into the dark now that it's already pinning. The fluoros you have will be plenty, but try to attach or hang them higher so they can give better direction to the fruits as they grow. It will also help hyphal knots to form if you'll have the light above the casing layer because it will penetrate deeper into it, thus helping to trigger knots. Good luck. LIGHTING

*Light is extremely important to good mushroom formation, and it's nothing to do with which way is up. Gravity takes care of that function. The post quoted above is only one of many times I've typed that. The problem is every time this question gets asked, people repeat the same 'stuff they've read' and thus if one of us fails to catch the misinformation, then somebody gets a grow compromised by using a desk lamp or some other less than desirable lighting source, rather than the best possible lighting. There's enough confusing points in mushroom growing to keep a board like this busy forever. Ask about things you're not sure of, or of the details you don't understand after searching. However, for the basic questions, the answers are all right here at your fingertips. Good luck to all. I'll try to be less pissy. LIGHTING

*In my experience, it's better to expose to light from day one. If you'll just let your bags or jars colonize on a shelf in a room of your house, they'll be exposed to normal room light. This will help to initiate pinning as soon as the substrate is ready to support fruitbodies. Colonizing your jars in the dark only delays pinning, and delay is not good in this hobby. Get light on it right away. I seriously disagree with keeping cubie mycelium in the dark at any time. I expose to light from the time the spores germinate on agar. Sometimes there are even a few pins in the jars when I break them up for the casing. That is no problem. Just mix them in and case it. If you give light from day one, your yields will go up, and you won't face overlay problems. EXPOSING LIGHT FROM DAY ONE

*Lighting is EXTREMELY important for a good pinset. Cubes will fruit in very low light conditions, but bright fluorescent light will help to trigger the pinsets the old timers show all the time that makes folks drool. Actually, you're probably right. The mushrooms don't care that much about light, but the mycelium sure as heck does. Lights, especially fluorescent, should be outside the terrarium, but near enough to flood the fruiting chamber in bright, high frequency light. Don't put the ballast outside and the lamps inside. The tombstones have a fairly high voltage potential across them, and wrapping a warm item in plastic in a wet environment is . . .dumb. There isn't much more useless than 'blue' mood lights, especially from led's. LIGHTING

*There's a world of difference between 'blue spectrum' and what you get when a red light (incandescent) shines through blue plastic. (Dim) By 'blue' they mean high frequency light, such as would be emitted by a metal halide bulb, or natural sunlight fluorescent. You'll want to get better lighting to get the best pinsets. It's better than nothing, but only ten percent of the electricity to run an incandescent is turned into light. The other ninety percent is turned into heat. Fluorescent fixtures are the opposite. 90% of the energy is turned into light and ten percent into heat. They're also closer to the frequency that is ideal for pinning. http://www.shroomery.org/forums/showflat.php/Number/6611363#6611363 LIGHTING

*All lights will produce heat. The light needs to be outside the fruiting chamber. Electricity and 100% humidity don't mix. Don't use blue Christmas lights. They're NOT the correct color temperature. By 'blue' we mean light at the high end of the spectrum. It will still look white to your eyes. As said, 6500 Kelvin fluorescent lights give the best bang for your buck. They're usually labeled 'natural daylight'

on the package, as opposed to 'cool white' which are 5,000K and 'warm white' or 'kitchen and bath' which are 3000K, which is referred to as 'red' light, even though they still look white to our eyes. You can also simply place the terrarium in a room with a bright window and let the natural sunlight do the job. LIGHTING

*2700K are awfully red. It might be nice for room light and for reading because it's 'warm', but you want light in the bluer end of the spectrum, so shoot for a frequency above 5,000 Kelvin. Lumens do matter to an extent. We're not deriving energy from the light, but it does need to be bright enough to penetrate into the casing layer. Bright fluorescent light from a 'daylight' type tube seems to help generate the best pinsets over a wide range of species. I have a four-tube 48" fluorescent fixture with 6500-Kelvin tubes in all four slots. This light is plenty for my mini-greenhouse. I have it hanging from the ceiling so it shines into the front of the greenhouse. Reflective foil is on the back wall of the GH. LIGHTING

*It sounds like something else growing in the area. MH is known to cause early pinning in jars because of the high frequency light output of MH. However HPS is more of a red light at the lower end of the spectrum, so it shouldn't be that bad. I'd still move the jars away from it. The heat could cause problems. There is no need to keep colonizing jars in the dark, but there is also no need to expose them to very bright lights either. When fruiting time comes, you'll probably do better to get a natural daylight fluorescent. The 6500K color temperature seems to stimulate primordia formation better than the lower color temperatures of lamps such as incandescent and HPS. LIGHTING

*You want bright light for 12 hours per day, not normal room light, which is usually at the red end of the spectrum if it's from incandescent bulbs, and is the worst possible choice. Incandescent bulbs produce light at 3000K. Cool white fluorescents are a higher frequency light and perform much better, with a color temperature of 5000K, and natural daylight fluorescent produce light at the 'blue' end of the spectrum with a color temperature of 6500K. You don't want blue lights. Light at the high (blue) end of the spectrum will look white to your eyes. You don't get high frequency light by using a bulb with a blue dye on the lens. LIGHTING

*Not at all. They will do best with 12 hours of light. I'd put them in the dark when they're about 90% colonized, then when they are at 100%, birth and begin giving them light at that time. This allows the four major pinning triggers of full colonization, steady rate of evaporation from the substrate, fresh air exchange, and light to all happen at the same time. Such has been shown to give the best pinsets. Light does not become a significant pinning trigger until the other factors have also been met. Many growers dunk at the time of birthing to pump the moisture content up for the first flush. LIGHTING

*Light has neither good nor ill effects on growing mushroom mycelium. It will not hurt, nor help, but there is no need to keep your jars in the dark. Stamets makes this clear in GGMC. He used to recommend incubation in total darkness (TMC), but he no longer recommends this. I concur. If you visit fungi perfect you will see he has 10,000 square feet of incubation space that is exposed to overhead fluorescent lights during the full workday. My jars sit on a shelf in an open room as said above and they're exposed to light from the day spores are started. TMC FAULT, LIGHTING

*The Kelvin scale refers to the color temperature of the light. Briefly stated, if you took a piece of white paper and looked at it under 2,000K such as you'd get from hps, it would look yellow. If you looked at it under 5,000K fluorescent tubes such as you'd find in an office or school classroom, it would look white. If you look at it under 7,500K fluorescent, it would have a blue tint to it. That's what is meant by 'blue' light. You can pick up an inexpensive fluorescent fixture and 7500K fluorescent tubes fairly cheaply at your local hardware store. LIGHTING

*My current setup is a larger fluorescent fixture that holds four 48" tubes, and I have it hanging vertically so it shines in from the front to bathe all five shelves in bright light. I have it about 12" from the door of the GH, so the farthest any substrate is from the light is about 36". The fruits tend to grow toward the light a bit, but that problem is fixed by rotating the trays 180 degrees every couple of days so growth is even. I'm glad to see you got the right frequency of light. 6500K are awesome. You'll never go back to silly night-lights or cool white fluorescent after using one of those. They really do make a difference in pinsets. LIGHTING

*I've still never seen a 150-watt cfl that small. At any rate, with multiple shelves or long shelves, tubes will spread the light out better, thus giving more coverage. I use 5 shelves in my mini-greenhouse, with a 48" fixture hanging vertically in front of the unit, which holds four fluorescent tubes with a color temperature of 6,500K. By hanging the light fixture vertically, the fixture lights the entire greenhouse between all shelves. With only one bulb, you're limited in coverage. They'd be great for tubs and the like, but there is no need for 250 watts. It will burn five or more times the electricity your projects require. LIGHTING

*They do care if they don't get air. You'll get a very poor pinset without several air exchanges per day at the very least. Four to five per hour are recommended. Water beads on the inside of the terrarium have NOTHING to do with humidity. They indicate a temperature differential, nothing else. You want your light outside the terrarium. Fluorescent ballasts generate a high voltage, and that doesn't go with near saturation humidity at all. In addition, a fluorescent ballast and light inside will heat your terrarium a lot. It will be over 90F in there within a few hours. Also, the heat will lower humidity, not raise it. LIGHTING

*Mushrooms grow towards the light. Very true. However, as an experiment, you can put the light above and a fan blowing from right to left. Watch what happens. In the absence of any wind, the mushrooms grow towards the light. You can also screw with your mushrooms if you're bored. Every morning, rotate your trays of pinning/fruiting mushrooms by 90 degrees, and leave them until the next morning, then rotate them an additional 90 degrees. They'll grow up in a spiral. LIGHTING

*You can't argue that light makes a big difference with growers that are happy with crappy pinsets. However, if you want the best pinset and growth you can get, and then use bright light with a color temperature of 5,000 Kelvin to 7500 Kelvin. Of course, there's other parameters that are just as important, if not more important than light. Failure to pay attention to ALL the pinning triggers is like trying to win the Indy 500 with a clogged up air filter or dirty spark plugs. LIGHTING

*It's true that they tend to grow more during the period of darkness, but that's only part of the equation. The other part is that pins for second, third, and future flushes often form during the time of first flush. If you go cheapie on the light after the first flush is set, you hinder primordia development for future flushes. Mushroom mycelium has circadian rhythms just like humans. Give them a day/night cycle and they'll be much happier over the course of several flushes. LIGHTING

*One, a 25W incandescent bulb only puts out the amount of light that a 2.5W fluorescent bulb would put out. Over 90% of the electricity used by a light bulb goes toward making heat, and only 10% of the electricity goes toward making light. With fluorescent, that ratio is reversed. In addition, incandescent bulbs put out light at the red end of the spectrum, and fluorescent lamps put out light near the blue end of the spectrum, which is much better for fungi. LIGHTING

*I've been saying for years that both light and total darkness are vastly overrated when it comes to mushroom growing. Some strains seem to be better at pinning in low light conditions, while others require much more. The other pinning triggers of full colonization, steady evaporation of moisture, and air exchange are much more critical than light. As a general rule however, pinsets will be better with bright, full spectrum lighting over dim/darker conditions. LIGHTING

*The reason intensity is important is because the light needs to penetrate the casing layer to the substrate below. Frequency is also important with light at the higher end of the spectrum, such as natural daylight fluorescent with a light temperature between 6,000K and 7,500K providing the best results. Cool white fluorescent tubes are generally in the 5,000 Kelvin range, and regular incandescent bulbs run about 3,000K, which is the worst possible choice. LIGHTING

*They need light for much more than to know which way is up. A lot has been written about this. Bright, intense light is going to stimulate a much better pinset than dim, low light. 12/12 has shown over the years to give the best performance. I don't even have my lights on a timer anymore unless I go out of town. I plug them in when I get up, and unplug them sometime in the evening. They rarely get exactly 12/12, but close. LIGHTING

*Bright, high frequency light at 12/12 will deliver the most prolific pinsets. You want maximum FAE, high humidity, and bright light, especially with cased substrates. The light needs to be bright enough to penetrate the casing layer for best results. 'Some' pins will form with low levels of light, but if you want the WOW factor, use bright fluorescent light or sunlight from a window. They do best with a period of darkness each day. LIGHTING

*Light has little to no effect on colonizing mycelium. I expose all jars to light from day one. I also incubate on a shelf in an open room at room temperature. If you visit fungi perfecti, you'll see that stamets has 10,000 square feet of incubation area, all of it exposed to fluorescent lights for 8 to 10 hours per day. He no longer recommends incubation in total darkness as he did 20 years ago when he wrote TMC. I concur. TMC FAULT, LIGHTING

*Two things. First, don't install lights inside a terrarium. Even a small light will create heat that causes other problems. Second, if it's incandescent, it's the wrong color temperature. You want a high frequency light such as natural daylight fluorescent for best results. Simply hang it above the terrarium. Bright, intense, high frequency light provides the best pinsets, so get a good one. I use four, 4' natural daylight fluorescent tubes. LIGHTING

*Many fluorescent tubes will have the light temperature stamped on them at the end. Cool white bulbs are in the neighborhood of 5000k while the kitchen and bath fluorescent tubes are warm white, and at 3000K, similar to regular light bulbs. The higher 'k' numbers will deliver better pinsets, because they match outdoor sunlight closer. Fortunately for us, cool white fluorescent which is superior, is also the least expensive. LIGHTING

*UV light strong enough to STERILZE will F/U your eyes, skin, cause cancer & other BS. If it is contained, as in well sheilded..... it works great, but you still need filtration. Best is hepa filter run into UV light sheilded in metal ductwork. Instance I refered to was UV light in metal ductwork behind filter, because it killed anything that got past the filter. The ductwork fed into a "clean" room area & it was fully sheilded. UV LIGHTING

*Natural Daylight fluorescent has been shown to produce the best results. Your milage will vary depending on the genetics of your strain using other types of

lights. However, mushroom primordia seem to develop best in the 5,000 Kelvin to 7,500 Kelvin range which is exactly what is delivered by most fluorescent tubes. The Natural Daylight tubes are rated between 6,500 and 7,500 Kelvin depending on manufacturer. LIGHTING

*Brighter lighting will work better than dim, far away lighting. The light needs to penetrate the casing layer. Don't listen to those who say if you can see what's happening, there is enough light. That is incorrect. You can get small fluorescent fixtures intended for under kitchen cabinets for less than ten dollars. Put one a few inches above your plexiglass. Put it high enough that heat isn't transferred, but bright light is. LIGHTING

*The only reason for keeping a bulk substrate, and especially the casing layer dark during colonization is for the timing of the pinset initiation. It allows you to introduce all the major pinning triggers simultaneously, resulting in an explosion of pins. A bulk substrate will colonize just fine if exposed to light from day one, but then you aren't maximizing potential by synchronizing the pinning triggers. LIGHTING

*If you're going to use LED's, use white ones. Your mushrooms need full spectrum light, not mood light, and some evidence points to light at the higher end of the spectrum being somewhat better at setting primordia. Bright light will penetrate deeper into the casing layer, stimulating more pins than dim light. Avoid lights that produce excess heat such as incadescent or halogen. LIGHTING

*The color temperature(not light temperature) of any specialty bulb should be stamped on the package. Normal incandescents are in the 3000K range, which is too low. HPS is even worse, in the 2000K range. You want light at the other end of the spectrum. Cool white fluorescent is around 5000K and natural daylight fluorescent is 6500K, making it the best choice for the money. LIGHTING

*I said use 6,500 Kelvin natural daylight fluorescent for best results. There is no contradiction. Mushroom cultivation was in its infancy 25 years ago. We've learned a lot since then. Lamps with a color temperature of 6,500 Kelvin are NOT low frequency-they're considered 'blue' light. Use natural daylight fluorescent with a color temperature of 6,500 Kelvin for best results. LIGHTING

*Use natural daylight fluorescent with a color temperature of 6,500 Kelvin for best results. I said use 6,500 Kelvin natural daylight fluorescent for best results. There is no contradiction. Mushroom cultivation was in its infancy 25 years ago. We've learned a lot since then. Lamps with a color temperature of 6,500 Kelvin are NOT low frequency-they're considered 'blue' light. LIGHTING

*Normal room light has no effect on colonizing mycelium, either good or bad. Usually, when mycelium stalls, it's due to lack of air exchange. If you have a verm filter, take the lid all the way off for a few minutes and then put it back on. If the mycelium starts to grow again, you know that was the problem. Make sure the inoculation/gas exchange holes are open. LIGHTING

*Correct. A 60 watt light bulb on the ceiling is enough to trigger a few pins. Failure to use proper lighting doesn't mean the entire project is going to fail. It simply means it will be less than what could be achieved by a tad more work. It's sort of like driving your car with one tire flat. You'll still get there, but not as fast, and people will point and giggle. LIGHTING

*Xmas lights have been used for yeats with poor to mediocre results. Don't put too much faith in the experiment done several years ago. Many, many tests since then have shown otherwise. Most any light will stimulate some pins to form, but the higher frequency lights in the 5,000 Kelvin to 7,500 Kelvin range will help to provide the best pinset possible. LIGHTING

*Yes you do. They require light right up until harvest. It provides direction for growth. In fact, many species such as oysters will turn into a mass of coral without adequate light. Shiitake won't grow at all. Cubes without light will twist around, not knowing which way to grow. Performance will suffer. 12/12 right up until harvest is the proper procedure. LIGHTING

*Even MH is at the 'red' end of the spectrum, just not as red as the old SV or HPS. MH has a color temperature of around 4,000K and HPS is around 2000K, but cool white fluorescent is 5,000K and natural daylight fluorescent is 6500K. Regular household light bulbs are around 3000K. The higher the color temperature in Kelvin, the more 'blue' the light is. LIGHTING

*I've measured many flushes of various species on a day to day basis and found that most mushrooms grow more during the period of darkness than during the period of light. The change in temperature caused by cycling the lights 12/12 is also positive. Mushrooms are not plants, but as said above, light does indeed have a major effect on them. LIGHTING

*The main pinning triggers are full colonization, an increase in fresh air that comes with the decrease in CO2 levels, and a steady rate of evaporation from the substrate. Once those conditions have been met, light becomes a secondary pinning trigger. A few minutes of light will work, but 12/12 has been shown to produce superior product. LIGHTING

*That's why growers who use a very bright fluorescent light in the higher part of the color spectrum have much better pinsets and yields than those who use ambient room, or worse yet, only a few minutes a day of dim light. The light should be bright enough to penetrate well into the casing layer, which should also be loose and airy. LIGHTING

*Light is only a secondary pinning trigger, not the main one. Full colonization of the substrate, with an increase in air exchange are the two biggies. For best results, all the pinning triggers should be introduced at once. You'll have to say more than 'kit' to get help, and 'dirt' is what you get under your fingernails. Mushrooms don't grow on it. LIGHTING

*They require light right up until harvest. It provides direction for growth. In fact, many species such as oysters will turn into a mass of coral without adequate light. Shiitake won't grow at all. Cubes without light will twist around, not knowing which way to grow. Performance will suffer. 12/12 right up until harvest is the proper procedure. LIGHTING

*Light at the higher end of the spectrum is far superior to light at the low end of the spectrum. Incandescent light bulbs with a color temperature of 3,000 kelvin are considered 'red', and natural daylight fluorescent with a color temperature of 6,500 kelvin are considered 'blue' which is superior. Search the above terms for much more. LIGHTING

*Lots of people are satisified with 'less' light. It's just that if you want the best possible results, go with the best of all possible setups, which means best light, best substrate, best temperature, best humidity, etc. By all means if anyone is satisifed with less, go for it. Many of use raise growing to an artform, but not all. To each his own. LIGHTING

*Just use a plain fluorescent bulb, and keep it above the terrarium, not inside it. Heat isn't an issue that way. As said, there's a big difference between short wavelength light(blue spectrum) and a light that makes your walls 'look' blue. However, the whole blue light thing is overrated. Use a full spectrum lamp. LIGHTING FRUITING

*All you need to do is rotate your tubs every day or two to offset the light from an angle. Even if you don't, it's cool to see them grow towards the light. There's really no reason they need to grow straight up, and growing at an angle actually gives the caps more room to spread out without interferring with each other. LIGHTING

*Just use a plain fluorescent bulb, and keep it above the terrarium, not inside it. Heat isn't an issue that way. As said, there's a big difference between short wavelength light(blue spectrum) and a light that makes your walls 'look' blue. However, the whole blue light thing is overrated. Use a full spectrum lamp. LIGHTING

*If it's incandescent, it's the wrong color temperature. You want a high frequency light such as natural daylight fluorescent for best results. Simply hang it above the terrarium. Bright, intense, high frequency light provides the best pinsets, so get a good one. I use four, 4' natural daylight fluorescent tubes. LIGHTING

*What you're giving is great. There are no hard and fast rules. Some experienced folks give more light, some less, but all get great pinsets, so don't worry too much about light. A few hours a day is fine, so placing your project near a window where it gets diffused sunlight, but no direct sunlight is ideal. LIGHTING

*You want lights that are high in the color spectrum, thus a color temperature of 6500 to 7000 Kelvin works great. It will look bright white to your eyes. Christmas lights are a poor choice. They do have some full spectrum LED's out now, or you can use 'natural daylight' compact fluorescent lamps. LIGHTING

*If a light 'looks' blue to your naked eye, it means the blue has been filtered out of the spectrum. It's counterproductive. The blue light is at the high frequency end of the spectrum. The best source of blue light, if you want to experiment, is a Metal Halide lamp. SMART FRUTIING CHAMBER LIGHTING

*Incandescent is never recommended for mushrooms. Incandescent lamps emit a red light that is at the opposite end of the spectrum from what mycelium prefers for primordia formation. Use fluorescent, preferably 'natural daylight' tubes with a color temperature above 5,000 Kelvin. LIGHTING

*I said use 6,500 Kelvin natural daylight fluorescent for best results. There is no contradiction. Mushroom cultivation was in its infancy 25 years ago. We've learned a lot since then. Lamps with a color temperature of 6,500 Kelvin are NOT low frequency-they're considered 'blue' light. LIGHTING

*Higher intensity light helps deliver a better pinset than lower intensity light. A few hours is cool, but most growers report better success with 12. The darkness time need not be total darkness. turning on the light to see to see what you're during your mushies 'night' won't hurt anything. LIGHTING FC

*They never need total darkness at any time. Ambient light is fine. 'We' don't say mushrooms require only a small amount of light to grow however. Depending on the species, the results on pinset and performance from much brighter lights is well documented. LIGHTING

*And natural daylight fluorescent takes it a step higher than cool white. They're the best of all. Warm white=3000K, cool white=5000K, and natural daylight fluorescent=6500K. The higher the light temperature in Kelvin, the higher the frequency, or closer to blue light. LIGHTING

*The problem is when the lights are turned off, they will draw in moisture as they cool, then will be wet inside next time they're turned on. It's best to keep the lights outside of the terrarium or mini greenhouse unless they're battery

operated. LIGHTS, IN OR OUT OF FC/MARTHA

*And natural daylight fluorescent takes it a step higher than cool white. They're the best of all. Warm white=3000K, cool white=5000K, and natural daylight fluorescent=6500K. The higher the light temperature in Kelvin, the higher the frequency, or closer to blue light. LIGHTING

*I use four 4' natural daylight 6500K fluorescent tubes for my mini greenhouse. It works like a charm. The important thing is to keep the humidity to as close to 100% you can get while still allowing plenty of air exchange. All three are important pinning triggers. LIGHTING

*I've found the brighter the better. You might even move the cakes to where they can get some diffused sunlight each day. Even direct sunlight for a few minutes is a good thing. You might try some damp verm on top of the cake too. That seems to help with pinsets. LIGHTING

*If a light 'looks' blue to your naked eye, it means the blue has been filtered out of the spectrum. It's counterproductive. The blue light is at the high frequency end of the spectrum. The best source of blue light, if you want to experiment, is a Metal Halide lamp. LIGHTING

*5100K is fine. I think 6,500K to 7,500K is better, but when you compare to incandescent bulbs which burn at 3,000K, they're way better. Definitely, you don't want red. You also don't want any sort of colored cover over the bulb, and that includes blue. LIGHTING

*If it's a 'kitchen and bath' fluorescent, it probably has a color temperature of 3,000 Kelvin, just like incandescent. It will still work, but possibly not as well as 'natural daylight' fluorescent. Put it right up close to the fruiting chamber, but not inside. LIGHTING

*5100K is fine. I think 6,500K to 7,500K is better, but when you compare to incandescent bulbs which burn at 3,000K, they're way better. Definitely, you don't want red. You also don't want any sort of colored cover over the bulb, and that includes blue. LIGHTING

*12/12 is optimum, as is light at the high end of the spectrum. For the best bang for your buck, get natural daylight fluorescent tubes and run them 12/12. Mushrooms grow and hyphal knots form primarily in the period of darkness, so 24/7 is a mistake. LIGHTING

*To repeat, light is a pinning trigger, but it isn't the only one, and it's greatly overrated. For the best pinsets, you have to balance several triggers at once. Screw up on any of them, and pinsets suffer, regardless of what you do with light. LIGHTING

*Light has no effect on colonzing mycelium. The information from twenty to thirty years ago to keep them in the dark is just plain wrong. Light is not a pinning trigger until full colonization and a reduction in ambient CO2 levels. LIGHTING

*You want bright fluorescent light in the high frequency range. Look for 'natural daylight' tubes or whatever they call them in your country. They should have a color temperature of 6,000 Kelvin to 7,000 Kelvin for best results. LIGHTING

*NEVER use 24 hour light. They grow and form primordia during the period of darkness. Attics are usually horrible places to grow due to wild temperature swings. Light is required for primordia formation as well. LIGHTING

*12/12 from a high spectrum fluorescent, such as 'natural daylight' tubes with a

color temperature of 6,500 Kelvin, will outperform other sources unless you have a bright south window. Avoid direct sun. LIGHTING

*Incandescent is the worst possible light for mushrooms. While it might 'work', you'll get much better performance and pinsets if you'll screw in a compact fluorescent instead of an incandescent light bulb. LIGHTING

*Cool white fluorescent gives the most bang for the buck in my experience. You'll definitely see an increase in pinning activity with metal halides, but they use a lot of energy and produce a lot of heat. LIGHTING

*CFLs use a tiny fraction of the electricity an incandescent bulb uses to produce the same amount of light. If you buy a CFL for mushroom growing, look for one that says 6,500 K on the packaging. LIGHTING

*Light has absolutely NOTHING to do with telling the mycelium that it has reached the surface. The increased fresh air, with the corresponding drop in CO2 levels sends the mycelium that message. LIGHT

*Lighting is extremely important, and it's important to provide it at the right light temperature and intensity. Look for tubes with a light temperature above 5,000K. LIGHTING

*A 13 watt cfl does not produce 60 watts. It produces the lumens a 60 watt incandescent bulb does, but at a higher frequency, which is better for pin formation. LIGHTING

*I'd check the manufacturer website for that info. You can get a 6500K fluorescent fixture and tube for under twenty dollars at your local home megacenter. LIGHTING

*Diffused sunlight through a window is great. In fact, five to ten minutes of direct sunlight will often get a stubborn substrate to begin pinning. LIGHTING

*Bright light stimulates pinning. The light has to be bright enough to penetrate the casing layer. Dim light will result in poor performance. LIGHTING

=5000K, and natural daylight fluorescent=6500K. The higher the light temperature in Kelvin, the higher the frequency, or closer to blue light. LIGHTING

*Fluorescent lighting is great. Look for a color temperature in the 5,000K to 7,000K range. UV light is bad for mushrooms. LIGHTING

*For those of you who have a project that 'just won't pin' try switching to natural daylight fluorescent and watch them take off. LIGHTING

*You don't need a light right on the tub. You can have it near a window (recommended), or use just a regular ceiling light. LIGHTING

*That would explain the no pins. You want a light at the other end of the spectrum. I'd suggest fluorescent tubes. LIGHTING

*You can get a 6500K fluorescent fixture and tube for under twenty dollars at your local home megacenter. LIGHTING

*I use four 4' natural daylight 6500K fluorescent tubes for my mini greenhouse. It works like a charm. LIGHTING

*You don't want blue. You want full spectrum. That means they will look white. LIGHTING

*Light is a secondary pinning trigger, once full colonization has been reached.

LIGHTING

*Any cfl would be better than an incandescent light bulb. LIGHTING

/join #fungi (IRC) the Non Official Mycology Chat Where All Your Questions Shall Be Answered. Their will at least be a mycologist 24/7 to answer any questions. We're working on a bot too.

Edited by dumbfounded1600 (06/01/08 01:50 PM)

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Mycoholic

Registered: 07/29/07
Posts: 1,696
Loc: Somewhere over t here...
Last seen: 21 minutes, 12 seconds

Re: All Of RR's Notes On Mushroom Cultivation Forum [Re: dumbfounded1600]
#8468503 - 05/31/08 06:55 PM

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PART 1 OF 5 LC/AGAR/CLONING/STERILE PROCEDURE/HELP/PROBLEMS/OTHER

LC/AGAR/CLONING/STERILE PROCEDURE/HELP/PROBLEMS/OTHER

*Put a lid on the jar that has been drilled and fitted with a filter. In other words, if you're using a jar, treat it like a grain jar. I use a whiskey bottle with a filter in the lid for agar because it's easier to pour. Pour the dishes after the agar has cooled, but before it's solidified. I wait until I don't need an insulated glove or pot holder to protect my hands from the heat. This will prevent condensation. Pour the dishes in a vertical stack, and then slip the sleeve back over them as protection while they cool. The agar will settle out until after pressure cooking. Just before pouring the plates, give it a stir. By the way, you can PC any sealed container, except some plastic bags. I routinely PC water in jars and also test tubes of agar that are tightly sealed. They don't blow up. Pressure inside the jar and outside is the same, therefore there is little to no differential between them. Just don't do something stupid like pop the weight off the PC at the end of the cycle and you can seal jars just fine. Agar being sterilized for petri dishes in a jar or bottle should get a filtered lid, as I said above. The agar will settle out until after pressure cooking. Just before pouring the plates, give it a stir. By the way, you can PC any sealed container, except some plastic bags. I routinely PC water in jars and also test tubes of agar that are tightly sealed. They don't blow up. Pressure inside the jar and outside is the same, therefore there is little to no differential between them. Just don't do something stupid like pop the weight off the PC at the end of the cycle and you can seal jars just fine. Agar being sterilized for petri dishes in a jar or bottle should get a filtered lid, as I said above. You can use jars as petri dishes, but you'll tire of it quickly. They're much more of a pain in the ass to work with than petri dishes. Many growers new to agar use their jars, but once they switch to petri dishes, they don't go back. A simple strain isolation series can easily generate fifty or more dishes working simultaneously, and that's a LOT of jars to keep stacked up. AGAR

*A few years ago, I ran several experiments to prove/disprove stamets' theory that if you clone very young healthy pins, the hormones that stimulate pinning are active, therefore the mycelium that grows from those pins will in turn produce better flushes with abundunt primordia and fewer aborts. These pins were not sterile by any means, yet they were layed on the agar and the rapidly expanding mycelium simply overran any bacteria or molds that may have been present. You wouldn't get that same performance from a large fruit that was fully mature. Of course, I would never transfer those sections to grains because of dormant contaminant spores that may be present. Instead, a small piece of mycelium from the leading edge should be transferred to a new dish, which once grown out for a few days can then inoculate up to ten quart jars, or be transferred to LC to grow out the isolated strain for even larger inoculations. It was inconclusive on the hormone thing. This was already an isolated strain and an excellent performer. If anything, it may have pinned a day or two sooner, but there's too many other variables involved to be able to attribute it to just the hormones. Use pins. The pins grow very aggressively to eat for lunch any contaminant spores that might be on them. a large already slowed down fruit will not. I used Gentamicin Sulfate. AGAR

*The hot agar is a way to isolate away from contaminants. It's mostly used when cloning wild mushroom tissue that is infused with bacteria and molds within the mushroom itself. You pour the piping hot agar over the contaminated culture until it's completely covered with agar, and then watch it carefully over the next few days. The bacteria and molds are 'pasteurized' by the hot agar, but in this case, the mushroom mycelium is more resilliant and begins to grow up through the top layer of agar, reaching the surface in 48 hours or so. Shave off the mycelium with a scalpel as it appears on top without taking any of the agar. Do this with each growth that appears on top as soon as you see it, preferrably within an hour or two of its appearance. This tek separates healthy mushroom mycelium from the contaminants. After the transfers, each dish is inspected under the microscope to identify perfect vs imperfect fungi. The molds are tossed out and the mushroom mycelium is kept. AGAR/ISOLATES

*Do not turn them upside down. As workman said, keep temperature swings to a minimum. Keep the dishes in a vertical stack, and usually only the top one will have any condensation after a few days. It also helps if you wait to pour the petri dishes until the agar has cooled enough that it starts to thicken. You won't need heat protection for your hands at this point either. This is the best way to avoid condensation. Always colonize agar at normal room temperature. You'll need to transfer away from contaminants as soon as they're noticed. Antibiotic agar will help with bacteria if you're attempting to clone outdoor wild mushrooms, but the antibiotics aren't needed when working with indoor clones or spores.You want to wrap petri dishes with parafilm. It breathes, yet has a pore size that prevents contaminant spores from entering. Without parafilm, the slightest temperature variation will cause contaminants to be drawn into your dishes, where they might remain dormant until you spawn the agar to grains, at which time you'll wonder where all the green came from. I would imagine micropore tape would work also. Some growers use Glad cling wrap. I use Parafilm. AGAR

*Don't disturb them unnecessarily. Over time, the excess water will replace moisture that evaporates from the dish. The moisture is caused from the inside of the dish being warmer than the outside.
When you pour agar, let it cool until it begins to thicken a bit. You want it to cool in the bottle you sterilize in, not the petri dishes. When cool enough to pour without heat protection for your hands, fill your petri dishes, and leave them stacked in a vertical pile. This will equalize the temperatures between the dishes and reduce condensation to a minimum. If you don't have a flowhood, you should slide the plastic cover back over the stack to enclose them as they solidify.
An excellent bottle for agar is a used whisky or other liquor bottle with a long

neck and screw on lid. You can use polyfill or a synthetic filter disk cut to size in the lid. Just drill a 1/4" or larger hole in the lid. Cover with foil and PC. The filter will keep the agar from contaminating as the PC cools and until ready to pour. Don't remove the foil until just before you pour the dishes. POURING AGAR

*In a glovebox you can easily get a tiny piece of good mycelium from that dish and move to a fresh one. Get the mycelium from the opposite side of the dish to the contaminant. Once you have the mycelium on a new dish, about two to three days later, you'll see the mycelium crawling off the wedge to the new agar. At this point, transfer a tiny piece of the fresh growth to a new plate. If you make the second transfer before the mold germinates, you now have a clean culture. If not, continue doing transfers until you get ahead of the mold. It's easy to clean up cultures from contamination on agar. You need to wrap your dishes to prevent contaminants getting under the lid. Remember, any time the air temperature in your room changes, the agar expands and contracts, forcing air in and out of the dish. This causes contamination if you don't have a gas permeable wrap around the edges such as parafilm. Some growers use cling wrap with success, but I stick with parafilm. At any rate, get the edges wrapped. Good luck. AGAR

*One swipe of spores on agar will yield hundreds of strains. By selecting a dozen or so of the best rhizomorphic strains and fruiting each one separately, you can find the super performer that will cover every spot of your casing layer with healthy pins. It might take hundreds of multispore grows to find that strain, if ever, because multispore inoculated substrates usually end up with only one or two strains by the time they fruit because they've all combined. (anastomosis). This means the good fruiting and potent strains combine with the poor fruiting and bunk strains. You never know what you're going to get. Isolate on agar, then fruit separately and test each strain. When you find the best one, you can keep master slants in the refrigerator and grow that isolate forever. AGAR

*The reason you don't see rhizomorphs early on is because there's so many substrains active, they cover each other up. It usually takes two or three transfers to begin to see rhizomorphic growth. I'd transfer a tiny piece from each sector to new dishes. I usually make the first transfers as soon as the spores begin to germinate, when the total growth is the size of a dime or less. Repeat the process a few times. Don't try to isolate 'one' rhizomorphic growth. Instead, isolate as many as you can, and then fruit each one. Once you determine the best isolate, you can store it in master culture slants to use for years to come without degradation. AGAR

*A petri dish that is fully colonized is not one that I'd use to inoculate grain masters with, even if the dish was wrapped with parafilm. I'd suggest taking a small piece of mycelium from the petri dishes, and use it to inoculate fresh dishes. Allow that to grow for a few days, and then grab a very tiny piece of mycelium from the leading edge of the new growth. Transfer that fresh mycelium to a third dish and allow to grow 2/3 of the way across the dish. This clean mycelium can then be used to inoculate up to ten 1 quart/liter grain masters, which can each inoculate ten more via grain to grain transfers. AGAR/TRANSFER

*You simply lift the lid of the grain jar and drop the agar wedge in. Prior to that, wipe the surfaces of the petri dish and grain jar with alcohol, flame sterilize the scalpel, wear surgical gloves that have been washed with alcohol, and work as fast as possible, leaving the agar culture exposed for only a few seconds, and the grain jar lid open no more than 2 seconds. It may be stating the obvious, but the use of a glovebox or flowhood should be considered mandatory. Let the mycelium recover from the wedge into the grains for a few days before you shake. AGAR

*Sometimes, even with a clean sporeprint, you'll get a bit of contamination on the dish along with the mushroom mycelium. This is easy to transfer away from, by taking a small piece of mushroom mycelium and moving it to a new dish.

Always take mycelium from the leading edge of the growth because this is the farthest away from the contaminant. We also transfer individual sectors away from each other so individual strains can grow out to determine the best fruiting ones. When cloning wild mushrooms, there's almost always molds and bacteria present, so it takes several transfers to get a clean culture. ISOLATING ON AGAR

*It often takes a few transfers from the initial spore swipe for strains to differentiate. Take a series of transfers of pieces of mycelium from the leading edge of the circle of growth and transfer to new plates. As these start to grow out, you'll probably see some sectoring. Transfer each sector to a new dish, and continue until you have single sector isolates, and then fruit each one to find a few stellar performers. Be sure to keep them properly labeled so when you fruit out a great one, you can go back to the original petri dish that you've stored in the refrigerator, to get an earlier version of it to propagate and store in a culture slant. AGAR

*The purpose of agar is to be able to isolate mycelium away from contaminants, and to be able to isolate strains. By inoculating and leaving, if contaminants are present, they'll germinate and get a head start on the slower growing mycelium. I'd wait until you get back to inoculate. Often, bacteria and molds will be growing along with the mushroom mycelium, and you'll want to be there to make transfers. Agar isn't for expanding mycelium, so don't allow a dish to grow fully out. AGAR

*A single swipe of spores from a print, or a couple drops from a syringe might generate dozens or more sectors. I'd suggest transferring all of them to new dishes. You don't want to just isolate one strain, because it might be a dud. Isolate several promising looking strains and then grow each one out to determine the one(s) you want to keep for perpetuity in master culture slants. AGAR

*Cool the agar until just before it's too thick to pour. In addition, be sure to stack the dishes in a vertical configuration for colonization. Temperature differential causes condensation, so both the hot agar, and also the heat produced by the mycelium will cause condensation. Stacking the dishes helps prevent condensation from the latter by equalizing the temperature. AGAR

*You'll be much more likely to inoculate with molds and bacteria using powdered material. The dry tissue can also be grown out on agar without spores, but it takes a lot of transfers and patience. I'd suggest antibiotic agar. You can use up to 15mg of Gentmycin sulphate per liter of agar to help control bacteria. You'll just have to isolate away from the molds though. AGAR

*Can you get DEXTROSE (straight corn sugar) & LIGHT DRY MALT powder? Both can be had at wine & beer (home brew) places. If so? Level teaspoon of each, into quart water. Simmer on stove to disolve, filter, pour in jars, PC 5 to 8 minutes & you should end up with a fluid that is a light golden beer color (no chunks or flakes). AGAR/LC

*We don't use agar to expand the mycelium so large dishes are worthless. We use agar to clean up our cultures from contaminants in the two dimensional space of a flat plane. Therefore, smaller dishes are most effecient because you shouldn't leave a culture growing more than ten days or so on a dish before doing something with it. AGAR

*Never use a warming plate with petri dishes. Leave them in the bag they come in until they are IN your glovebox or in front of a flow hood. Wrap with parafilm, four squares per dish as soon as you inoculate. There is absolutely no reason to worry about keeping petri dishes in the dark. Light has zero effect on agar or colonizing mycelium. AGAR

*Unless the spores were from a cap that just dropped them an hour or two earlier, it takes a bit longer to see growth. You might see something if you put the dish under a microscope, but it takes a few days after germination for them to thicken up enough to see with the naked eye. AGAR/SPORES

*Always mix the dry ingredients first, then add a small amount of room temperature water and swirl it around until the powder is dissolved. Don't shake, just swirl. Then add the rest of the water and sterilize. Pour the dishes before the agar cools below 100F or it will begin to solidify. AGAR

*If two drops or even three land, it won't kill your plate. One is usually enough though, especially if you're doing strain isolations. Just be sure to put one drop on each of a dozen plates so you can isolate out a LOT of strains to find the best performer(s). AGAR

*Antibiotics such as Gentmycin sulphate will help protect against bacteria, but do nothing to slow down fungi such as trichoderma or the other contaminants of mushroom culture. Sterile technique is the key to avoiding contaminants of all kinds in our art. AGAR

*When working with wild prints, I'll often use antibiotic agar, and mix it with less malt. If you buy pre-mixed agar powder from fp or sporeworks, you can mix it a bit weaker than recommended. This will keep from feeding the mold and bacteria quite so much. AGAR

*Agar is for germinating spores and isolating strains from each other and away from contaminants. You can use agar wedges to inoculate jars, which you then use for grain to grain transfers to expand the mycelium. Agar itself isn't used to expand mycelium. AGAR

*You want the petri dishes open the least amount of time possible. I follow the 5 second rule. Never allow a petri dish or jar lid to be open for more than five seconds at any time. Never have more than one petri dish open at the same time. AGAR TRANSFER

*Lake water works fine, as does bottled or even tap water. I use regular tap water for everything except mixing agar. The organisms in the lake water won't help as they'll be 86'd by the PC. WATER, AGAR

*Fungi is perfect bacteriological agar made from the correct petri types of agar, has malt/peptone/yeat which is the best combo, and has alot more then those packets you get form those 10 dollar packets. AGAR

*Normally, the term nutrient agar is used to refer to agar that has blood or other ingredients to tune it specifically to bacteria, which is what we are trying to tune against. I recommend MEA. AGAR

*I don't remove it from the pressure cooker until it's below 150F, and I then wait to pour until I don't need any heat protection for my hands. That's about 115F or perhaps less. If you pour it too hot, you'll get a lot of condensation on your petri dish lids. AGAR

*The moisture on the lid is caused by the temperature differential. Don't store dishes upside down. Inoculate as soon as the agar cools. There is no need to wait. AGAR

*If not the pre-mix, you'd want to get some bacteriological grade, light malt extract, dextrose(optionally) nutrionally yeast, and peptone. AGAR

*I use extra water in the PC when doing agar or LC so the pressure will drop

more slowly due to the thermal mass of the extra water. LC/AGAR

*Yes. You can also transfer healthy mycelium away from the contaminant, thus cleaning up the culture. AGAR

*Extra light malt, dextrose, nutritional yeast, gypsum. Makes the strongest growth. LC/AGAR

*One fruit body MAY contain multiple sub-strins of the same original. Look into AGAR.

*Gentmycin sulphate makes a great antibiotic because it's autoclavable. AGAR

*Glad cling wrap instead of parafilm. AGAR/PETRI DISHES

*Often, the reason later flushes produce only a few larger fruits is because the pinning surface has been torn up by previous picking, and the few remaining spots to pin from are all that's left. . .thus larger fruits form. Cloning these does not insure you'll get large fruits next time. That said, large fruits are not desirable. Smaller fruits have more active product per gram than larger ones, so try to produce larger flushes of smaller fruits. When cloning, select a young, rapidly growing fruit for best results. You want a fruit that is rapidly dividing cells, so it will take off quickly on agar. I prefer to clone from clusters, because they'll tend to produce clusters on future flushes, giving the volume desired, but with smaller and more desirable fruits. CLONING

*Just so you take the tissue from the center of the stem after tearing it open with your hands. Use a flame sterilized blade. You can probably skip the alcohol. The air inside the bag should be still. I do similar when cloning wild mushrooms on backpacking trips. I take several petri dishes sealed up in a baggie, a clear trash bag to use as a glovebox, and a scalpel and alcohol torch. The scalpel is flamed outside the bag, then stuck in while still hot. When it cools, the clone is taken. Don't forget to wear latex gloves. CLONING TEK

*You can pour iodine over the stem to kill live bacteria on it, but it's really not necessary if you rip the stem lengthwise first to expose tissue that has never previously been exposed to air, thus generally free of contaminants. Outdoor mushrooms should be dipped in iodine no matter what before cloning, but with indoor grown ones usually it isn't necessary. Don't use alcohol on mushroom tissue. CLONING

*It won't affect your pinset because that's related to your technique, but it's well known that mycelium cloned from a cluster will produce mushrooms in clusters. That's not just cubes either. Edible growers have noted this for decades. The best oyster strains have been cloned from wild fruits that grew in clusters. In other words, clusters are a genetic trait. CLONING

*You can use iodine, or better yet, just tear the stem lengthwise to expose virgin tissue in the middle, and then cut a tiny piece out from there that has never been exposed to air. Use a flame sterilized needle or scalpel to get the tissue. CLONING

*I get iodine from a local drug store. It says "10% iodine solution" on the bottle. I like it for cloning because it kills bacteria without stressing out the mycelium the way peroxide does. When you're cloning, you want the mycelium to grow as fast as possible, and peroxide shocks it, and then it has to recover before it grows again. As we all know, molds grow faster than mushroom mycelium, so we don't want to do anything to slow down growth. IODINE CLONING

*I should also mention, when cloning clean indoor fruits, no iodine is needed. Simply split the stem as shown in the video, and scrape a touch of mycelium out of the center where it hasn't been exposed to air. The iodine/betadine is perfect for cloning wild outdoor mushrooms that have all sorts of bacteria and molds growing in conjunction with them. CLONING INDOOR FRUITS

*Small, rapidly growing fruits make the best candidates for cloning. If the mushroom has already matured, the cells have stopped dividing, thus it's not a good candidate. If you like clusters of fruits, clone from a cluster. If you like individual fruits, clone a loner. CLONINSTRAIN

*I've cloned wild mushrooms before by dipping in 10% bleach for up to fifteen minutes to kill bacteria before placing on agar. The bacteria is killed, but not the mushroom OR mold mycelium that might be along for the ride. CLONING BLEACH

*I often dip wild mushrooms, and dry mushroom tissue into a ten percent bleach solution before cloning, to kill off bacteria. The fungi survives just fine, but it kicks the bacteria out. CLONING MUSHROOMS

*As for cloning vs strain isolation, they're not related. By the time a substrate fruits, hundreds or perhaps thousands of strains have exchanged DNA, either weakening or strengthening the mass. What you get is a 'heinz 57' that may or may not be that great because the weaker genes and the stronger genes (mycelium) have all combined. An example would be mixed breed dogs. We've all seen good examples and others that are dumber then hell.
Strain isolation on agar begins when the spores first start to germinate. I make the first transfers as soon as I can see mycelium growing from the point of inoculation, long before sectoring can be detected. By doing this, and by continuing to separate each individual growth, you can isolate mycelium prior to the process of anastomosis combining dikaryons into a single mass.
You don't isolate looking for one super rhizomorphic strain. You isolate down to single sectors and then fruit out each one to determine the best performer. When you transfer mycelium to a grain master, the original petri dish the mycelium was taken from is placed into a clean refrigerator. By doing this, when you find the best performing strain, you then go back to your well marked petri dishes, thus your original P1 culture. This petri dish can be used to inoculate a few test tube slants that can be incubated for a week, then placed in cold storage. Whenever you need mycelium, a tiny piece the size of a grain of rice can be taken from the test tube and put on agar to grow out, while the test tube is placed back into the refrigerator. These stored test tube cultures preserve the low P value of your isolated strain for years.
I have a complete video tek on strain isolation and master slant preparation and use already filmed. I'll release it when I get the rest of the teks filmed, and editing completed. Hopefully soon. STRAIN ISOLATION VS CLONING

*Right. You isolate every single strain you can, and then fruit them all. While they're fruiting, the 'master' from each strain is in the refrigerator. After you determine the best performers, you go back to the appropriate masters and get them out. Those are the ones you transfer to culture slants for long term storage. Rhizomorphic mycelium tends to fruit better than cottony mycelium, but a single swipe of spores on agar is likely to generate fifty or more individual sectors (strains), and half or so of those will be rhizomorphic. Those are the ones I keep for fruiting, and discard the cottony sectors. ISOLATING STRAINS

*Don't wait for the first dish to fully colonize. As soon as it begins to grow, transfer mycelium away from the point of cloning to new dishes. This way, you can isolate healthy mycelium away from contaminants. You won't be doing strain isolation on a clone, so don't bother looking for rhizomorphs. Just get healthy mycelium. ISOLATING

*For strain isolations, you can't beat the three section dishes. You're only letting the mycelium grow for a few days before making the next transfer, so you can to three times the amount of work on each dish. The four section dishes are great too. I don't even order the plain dishes anymore. STRAIN ISOLATION

*Cloning a fruit from within a cluster will provide a strain that will produce clusters. It matters not which fruit you choose from within the cluster, but you'll have better success if you'll clone while they're still small and rapidly growing. CLONING/ISOLATING

*It's extremely rare for rhizomorphic isolates to be none fruiting. STRAIN ISOLATES

*1000ML LC a.k.a Liquid Culture
1%=1.92Ts
2%=3.84Ts
3%=5.76Ts
4%=7.68Ts
1%=0.64TB
2%=1.28TB
3%=1.92TB
4%=2.56TB

*Throwing spores into honey or karo has to be the worst possible way to make a liquid culture and I'll be glad when this current fad passes and folks can get back to established techniques. Just inoculate some grains or brf in the standard way and you'll be miles ahead. For those who wish to make LC for inoculation, here's a way to get 100 syringes full of inoculant in two weeks: 1) Inoculate a quart jar of rye berries or wbs with your spores. Upon full colonization, shake the jar to loosen each individual kernel. Be sure to give it the smell test to make sure it smells like fresh mushrooms. 2) PC a quart of distilled water in a jar with a filter disk or tyvek, etc. In a glovebox or in front of a flowhood, pour 2/3 of the quart jar of sterilized water into your jar of shaken grains. 3) Shake well and then pour the now mycelium rich water back into whatever was left of your jar of sterilized water. Use the jar lid to hold back the grains themselves from pouring out. You now have a full quart of highly concentrated mycelium water that can then be used as is, or diluted two or three times again, and used to fill syringes. Because the grains were shaken first, the mycelium is ripped into shreds and will be sucked through even small needles easily, although larger needles always work better for this.Remember, mycelium grows poorly in water unless under constant stir which oxygenates it. With grains, they colonize in two weeks or less because oxygen is throughout the jar in the spaces between the kernels. LIQUID CULTURE

*A glovebox is not advanced equipment. One can be made free with stuff around the house, so there's no need for people to work in open air or fecal and mold infested bathrooms and kitchens. There is also no way to generate 100 full syringes of liquid mycelium in very small pieces within two weeks from injecting spores into honey or karo. I'm sure if people blindly used the grain method I described above, many would still have problems too, because they're inserting unproved and possibly contaminated spore solution into grains, which also isn't proper mycological technique. However, agar can easily be poured in a glovebox, and the petri dishes used to isolate healthy mushroom mycelium away from any contaminants in less time than it takes to even know if a karo LC is contaminated or not. That agar wedge can then be used to inoculate the quart(or pint) jar of grains, that can then be turned into at least 100 syringes, or used for g2g transfer to get ten jars the old standard way. In addition, after the water is poured out of the grain jar, it can be placed back on the shelf to re-colonize, and

the process can be repeated again. I just strongly feel new growers are doing themselves a disservice when they simply inject spores into honey water and then sit there waiting for something to happen. At the very least, inject directly to grains so you can visually inspect the process. Perhaps Agar's lids with injection ports will help those who have never used grains to get off to a good start. LIQUID CULTURE

*You might want to read more than the last paragraph. I described a method to generate ten times as much LC in a shorter period of time without contamination. I'm not against liquid culture. I use it all the time. I'm simply dead against the idea of squirting a syringe into a bottle of karo/water. I insist on having at least some verification my LC is good before I inject a bunch of jars. The analogy of a new growers greatest fear doesn't hold water. If his pf jars contaminated due to contaminated spores/syringe, it does no good to have even ten gallons of contaminated LC on hand. If they contaminated due to his sloppy procedure, he's likely to have used the same sloppy procedure making an LC. In my posts, I always try to show a way to have the greatest possible success rate, not necessarily the cheapest, easiest or laziest method. LIQUID CULTURE

*Sort of, but if you want liquid culture syringes, all you have to do is grow out a quart jar of rye berries, and then when it's fully colonized, shake it well, and pour nearly a full quart of sterilized water into the jar. Shake well again, and then draw the myceliated water back out into syringes. As an alternative, you can pour the quart of myceliated water into a sterile gallon of water to dilute the solution. You'll then have enough liquid culture to fill a few hundred syringes, and it only takes two to three weeks to get to this point from spores. In addition, after harvesting the mycelium from the surface of the grains as described above, you can then still use the left over grains to inoculate ten to twenty additional jars of grains via grain to grain transfer in the traditional method. LIQUID CULTURE

*You want a fully colonized jar of grains to start with. Add sterilized distilled water to nearly fill up the jar, then shake well, and draw the now myceliated water back out. This is far faster and more dependable than making LC from spores because you can smell the rye jar before using to make sure it isn't contaminated. In addition, a jar of rye colonizes in two weeks, and will make at least 30 syringes. You won't get that performance from karo water. LIQUID CULTURE/COLONIZED SPAWN JAR

*You can harvest liquid mycelium from the rye or wbs several times. After shaking the jar of grains to break them up, you can pour nearly a full pint of sterilized water into the jar, then shake again. Since there are nutrients in the grain juice/mycelium, you only need to pull a small amount of this solution into each syringe. Finish filling the syringe with sterilized water, and the mycelium will grow into it, expanding by several factors within a week. LIQUID CULTURE

*The more air to a liquid culture the better. That's why experienced growers always use a magnetic stirrer running 24/7. This ensures the entire LC is constantly oxygenated. I still don't understand why growers are slowing down their work so much trying to grow liquid cultures in mason jars. You can expand mycelium at least ten times faster in grains than in liquid, AND you'll know if it's contaminated before you use it. LIQUID CULTURE

*If it's snow WHITE. It's right. FOR LC If you don't stir or agitate one every day, myc gets to the top & forms little islands that turn to thick pancakes. As, it has better gas exchange on the surface. How, I test for LC contams, is to STOP stirring one. If anything grows on the surface that isn't snow white. It isn't RIGHT. Most often contams show up as light gray / light blue growing on the surface. LC CONTAMINANT EYE

*In addition, many growers waste valuable time by injecting spores into sugar water. Many times, you don't know you have contaminants present until you use your 'lc' to inoculate grains or brf. By then, you would have long ago discovered the contamination and replaced the contaminated jars, had you been growing on grains or brf directly. LIQUID CULTURE

*Can you get DEXTROSE (straight corn sugar) & LIGHT DRY MALT powder? Both can be had at wine & beer (home brew) places. If so? Level teaspoon of each, into quart water. Simmer on stove to disolve, filter, pour in jars, PC 5 to 8 minutes & you should end up with a fluid that is a light golden beer color (no chunks or flakes). AGAR/LC

*Every tiny exposure to unfiltered air, increases the chance of a contam getting in. After jars are cool. With polyfil in one hole, simply stick syringe needle right through tape on other hole, inject & tape (with sterile tape) over the existing tape. That minimizes external air exposure. LC JAR

*I sterilize the water that will be used for the LC syringe. In a separate pan I boil the syringe for at least half an hour. Put a lid on the pot and leave the syringe in the boiling water right up until you're ready to go to work. LIQUID CULTURE

*You can store G-1 LC in 5, 50 or 100 vials of sterile water (years & years).Any time you want G-1 pull a tube out of the Fridge & go for it. Either start a new LC with it, or go to grains, then G2G. STORING LC

*If you allow LC to go longer than five days post eberbach, the mycelium begins to grow into a solid organism which is not nearly as effective to inoculate with as a few million individual colonies. LC

*1/2 teaspoon light dry malt, 1/2 teaspoon corn sugar to quart water, simmer, filter, add to jar, add lid w/filter, PC 15 minutes, innoc, store at around 82F. LC

*FOR LC...Marbles tend to break glass and not have that swirling tornado twirl when using. DON'T USE MARBELS FOR LC

*In fact, I have liquid mycelium cultures stored in the refrigerator for years that are still viable. LIQUID CULTURE

*Drain the WBS much longer, if you innoc with LC. (rids WBS of excessive moisture). INOCCING WITH LC WBS

*People have used bottled fruit juice for LC for years. It requires no sterilization. LIQUID CULTURE

*Extra light malt, dextrose, nutritional yeast, gypsum. Makes the strongest growth. LC/AGAR

*LC's are very prone to contamination, if ever exposed to open air. LC

*You won't add anything to the substrate to change the flavor. Mushrooms are NOT plants and don't have a circulatory system. Mushrooms grown on straw don't taste like straw and mushrooms grown on a bible don't taste like paper, and mushrooms grown on horse manure don't taste like horse manure. . .you get the point. FLAVOR OF MUSHROOMS

*In nature, thousands upon thousands of organisms can inhabit the same square inch of soil, thus each has his own niche and they all work together in harmony like instruments in a band.

Since we have no way to duplicate this indoors, we use sterile culture where the only organism allowed to grow is the mushroom mycelium.
It's a common misunderstanding that a contaminated substrate means a contaminated crop, which is incorrect. By that definition, all outdoor mushrooms would be toxic, yet they are not. If our sterile culture becomes contaminated, the contamination might kill off our mycelium, but will be of little harm to us. Eating mushrooms from a cake with green mold will NOT hurt anyone. CONTAMINATED NATURE MUSHROOMS

*Every mushroom that grows in the wild grows in conjunction with molds. In fact, I don't think I've ever picked an oyster mushroom from a log in the forest that didn't also have trichoderma growing on it. That's how common trich is. In fact, trichoderma inhabits nearly every cubic inch of soil on earth except extreme deserts and the arctic. On page one of Paul Stamets 'Mycelium Running', he starts with this sentence: "There are more species of fungi, bacteria, and protozoa in a single scoop of soil than there are plants and vertebrate animals in all of North America". However, we can pick wild boletes, chaneterelles, agaricus, matsutake, etc., etc., from this mold infested soil, and eat them without getting sick. We can pick Cubensis from a nasty pile of maggot infested cow shit and eat it without getting sick. If you put blue cheese salad dressing on your salad, you're eating huge chunks of the penicillium mold, because it's floating in the dressing. It never ceases to amaze me the fear that gets spread on these boards over harmless molds. If your fruits were covered with yellow or brown molds, I'd say toss them, as you would any moldy fruit or other food. Likewise if they were wet and became rotten from bacteria, because bacteria can cause food poisoning. However, as I've said for many years, just because there's a spot of mold on a cake, does not mean the fruits growing from that cake are contaminated. Mushrooms do not have vascular systems like plants, and do not suck up contaminant molds or bacteria from the substrate. If the fruit is fine and healthy, munch away. And, for those of you who don't know, please stop spreading myths and fear. MUSHROOMS FROM CONTAMINATED SUBSTRATES

*Once your mushrooms have fruited a few times, the subsrate is used up. You can't replace it with more fertilizer, because mushrooms are not plants that uptake water and nutrients to create energy in the leaves. Mushroom mycelium, which lives in the soil, eats its food, therefore after a few flushes, the food is gone. If you have a straw and dung loving species, you can bury the spent substrate into some horse or cow manure in a shady spot outdoors. Keep it slightly moist, and in a month or two, you'll probably see a nice flush. If you have a wood decomposing species, do the above, but with hardwood chips and sawdust. SPENT MUSHROOM MYCELIUM

*Next time you have a bunch of fresh cubes, cut off the stems and set them aside for another day. Take the caps and rub a little blue cheese or ranch salad dressing into the gills. Rub olive oil on the outside of the cap. Add salt and pepper to taste, then grill outside on the bbq until done(gill side up), usually only a few minutes. when the dressing in the gills starts to boil, it's done. It's hard to beat cubes for good taste when cooked. When raw, they're nasty as hell, just like any raw mushroom. The heat will degrade them slightly, but not much. Cook up about 50 grams of fresh caps and you'll be happy. COOKING WITH MUSHROOMS

*Mushrooms from a contaminated cake are safe to eat. They don't 'absorb' contaminants from the substrate or all wild mushrooms would be unsafe to eat. If the mold or bacteria is on the fruit itself of course, don't eat it. It's common in the commercial industry to harvest fruits from contaminated substrates and send them to market. There are no health regulations against it because it's not a risk factor. MUSHROOMS FROM CONTAMINATED SOURCE

*Getting nausea and the shits from eating raw mushrooms is not a sign that they

were contaminated. It's very hard for our systems to digest raw mushrooms, thus it's normal for the body to want to puke them out. Raw mushrooms are not digested, thus you excrete them in much the same form as you swallow them. Therefore, getting the shits a day after tripping is also common. EATING MUSHROOMS

*What do mushroom nutriment needs? SUBSTRATE: carbon / nitrogen ratio <17:1, nitrogen 2.6%, phosphorus 0.2-05%, potassium 1.5-2.5%, calcium 1.5-2.5%, available boron <2 ppm, available ammonium <10 ppm, soluble salts 3.0-5 OdS/m. This suffices from spawming to cropping. MUSHROOM SUBSTRATE NEED

*The reason is it's probably not out of food. It's old. You can't take some 100 year old dude and if you keep feeding him, he'll keep on living. It doesn't work that way. Things live for a given time, then die. It's nature. SPENT MYCELIUM

*I've used a combination of CO2, Argon, and Nitrogen gasses, and they still rot. You need to dry them though. KEEPING MUSHROOMS FRESH

*Molds would be visible, and bacteria needs water to survive. If they were cracker dry, they're fine. CONTAMINATED MUSHROOMS

*Mushrooms DO NOT HAVE circulatory/vascular systems. MUSHROOMS CAN'T SUCK UP SHIT LIKE PLANTS

*Mushroom genetics are far different than plant genetics. With mj, one can plant seeds that will generally produce a crop similar to the parents. Such is not the case with mushrooms. Each mushroom produces millions, if not billions of spores. Each spore has a set of genetics unlike any other spore. 'Think fingerprints'. Now, another analogy. Humans breed fairly true because a male and female produce offspring, thus the child is a 50-50 cross. Following that analogy, understand that mushrooms can have 20,000 or more 'sexes' represented in those billion or so individually unique spores. Thus, the chances of a collection of mushroom spores breeding true to the parents is very low. MUSHROOM GENETICS

*It's not just nutrients, because mushrooms aren't plants. Mushrooms eat their food just like humans and produce body heat as they metabolise the food, just like humans. They also release the carbon in their food as CO2 just like humans. Therefore, they need solid food, not just nutrients. Their preferred food in artificial cultivation seems to be grains, such as rye and rice. You can expand your harvest by using large amounts of less nutritious foods for the mycelium such as manure and coir. You won't find a 'nutrient' that you can add to the solid food that will enhance the crop much, if any at all. MUSHROOMS

*Nitrogen is for plants. Mushrooms eat their food. I speculate in a few years, you won't ever even hear the term 'nitrogen' in relation to fungi. Potency isn't related to substrate, so you can add all the junk you want and it won't make them more potent. You'll want to isolate for a strain on agar that is more potent, and then save it in master slants. MUSHROOMS

*You are correct. Mycelium doesn't have a vascular system. It's composed of long cells, stacked end to end to form a network. It doesn't take a circulatory system for heavy metals to be absorbed. Other substances are metabolized by the mycelium. That's why mushrooms can grow on manure, but we don't get e coli from eating mushrooms. However, according to stamets, if there's lead or mercury in the soil, they will absorb it. I've never personally tested for such. MUSHROOMS

*Mycelium does NOT absorb myco-toxins from other species such as molds and transmit them to the fruits! This is very well known in mycology. Every wild

mushroom grows in conjunction with hundreds of other fungi, yeasts, and bacteria, yet who has ever been poisoned by wild morels, chanterelles, cubensis, etc?? However, it's best not to use them because the contaminant molds have already eaten some of the substrate that you want your mushroom mycelium to eat. MUSHROOMS

*Mushroom mycelium consumes oxygen and releases the carbon in its food as CO2, just like humans. Plants do the opposite. Mushroom mycelium produces heat as it metabolizes its food, just like humans. Plants get energy from the sun, but mushroom mycelium gets energy from its food source, just like humans. MUSHROOMS

*Mushrooms can have up to 23,000 'sexes', and millions of spores on a print, so it's always a crap shoot. If you want a particular set of genetics, you need to isolate strains down to single sectors, then keep master slants. Single sector isolates can be crossed with other single sector isolates by dikaryotic mating on agar as well. MUSHROOM SPORES

*I haven't grown cubes in years. I grow legal edibles. We also harvest several hundred pounds per year of wild reishi. For those who are not aware, reishi brings $1,000 per kilo on the legal market. That takes a lot of drying space. Cubensis are a great way to learn the mushroom life cycle, but it only takes a few months to grow a lifetime supply. That's why most growers move on to other species, or lose interest in the hobby. I suggest to all to stop in at the gourmet and medicinal forum to exchange tips and ideas on legal edibles. Mushroom growing is great fun, and if you play your cards right, there's a lot of money to be made. MUSHROOMS

*Mushrooms from a contaminated cake are safe to eat. They don't 'absorb' contaminants from the substrate or all wild mushrooms would be unsafe to eat. If the mold or bacteria is on the fruit itself of course, don't eat it. It's common in the commercial industry to harvest fruits from contaminated substrates and send them to market. There are no health regulations against it because it's not a risk factor. MUSHROOMS FROM CONTAMINATED SOURCE

*All fungi help to break down material in the soil, which in turn makes the nutrients more available to plant roots. In fact, our nemesis trichoderma is a very beneficial organism in the soil for that reason. I've noticed also that burying spent and/or contaminated cakes into houseplants or the garden benefits the plants. They always green up and look much better a month or two later. MUSHROOMS AND PLANTS

*Mushroom mycelium consumes oxygen and releases the carbon in its food as CO2, just like humans. Plants do the opposite. Mushroom mycelium produces heat as it metabolizes its food, just like humans. Plants get energy from the sun, but mushroom mycelium gets energy from its food source, just like humans. MUSHROOMS

*Anastomosis is the pairing of dikaryotic mycelium with other dikaryotic mycelium. In other words, combining strains, but not species. For example, Penis Envy could combine with cambodian cubensis via anastomosis, but neither could combine with oyster, shiitake, or mold. ANASTOMOSIS MYCELIUM MUSHROOMS

*The mycelium runs out of food and/or it reaches the end of it's natural cell division life cycle. Both often occur at about the same time. Adding nutrients or more manure will be of little benefit, just as giving a steak dinner to a 100 year old man isn't going to make him 20 again. MUSHROOM MYCELIUMS LIFE

*As for helping with the CO2/O2, forget it. The mycelium produces way more CO2 than plants can metabolize, and the amount of plants that would fit in a mini-

greenhouse won't do squat as far as helping with O2 for the mushrooms. MUSHROOMS/PLANTS

*It's worse than a g2g because once a mycelial network flushes a few times, the natural cycle is to die back like a spawned out salmon. To get maximum growth, it's best to always use fresh spawn when going to bulk. LIFESPAN MYCELIUM

*Mushrooms depend on a LOSS of moisture from the substrate to fruit. If you saturate them, or keep a steady moisture level, they fruit poorly if at all. Mushrooms are not plants, which benefit from steady moisture levels. MUSHROOMS

*Mushrooms EAT their food, not drink it from blue water. Fungi is much more closely related to mammals than plants(fact). You wouldn't put miracle gro into your kids baby bottle would you? MUSHROOMS

*I once saw a chanterelle lift a rock that weighed at least ten pounds out of it's way as if it wasn't even there. It's amazing how much hydraulic pressure mycelium can build when it needs to. MYCELIUM

*Growing mushrooms is as much about water as 'nutrients'. In other words, a jar of brown rice won't fruit nearly as well as a jar with 1/3 rice flour and 2/3 verm. That's a fact. MUSHROOMS

*Hyphal knots are the very first stage of pinning. They're the size of the head of a pin. They develop into primordia, which then grow into pins. MUSHROOM LIFE CYCLE

*Growing mushrooms is part art, and part science, but it's not magic. Follow proper procedures, and you'll have success. Good luck. MUSHROOMS

*Nice. Fungi in the soil helps to break down the manure, making it more available to the plants as well. Both species benefit. MYCELIUM

*Mushrooms EAT their food, so you want to provide solid food. Don't use the liquid left over from soaking straw. MUSHROOMS

*Molds are fungi. I don't think there's an organism that can tell perfect from imperfect fungi. MUSHROOMS

*Plants and fungi rarely compete with each other, but often each benefits from the other. MUSHROOMS

*They're part and parcel of the same cell lines that colonize the substrate. MUSHROOMS

*Mushrooms don't 'suck up' toxins from a moldy substrate. MUSHROOMS

*A Mushroom Viel is Made Of Tertiary Mycelium. MUSHROOM

/join #fungi (IRC) the Non Official Mycology Chat Where All Your Questions Shall Be Answered. Their will at least be a mycologist 24/7 to answer any questions. We're working on a bot too.

Edited by dumbfounded1600 (06/01/08 01:51 PM)

Post Extras:

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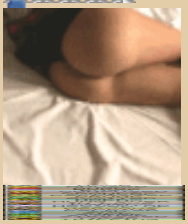
Neobean
Adept Mycologist



Registered: 10/07/01
Posts: 879
Loc: Canada
Last seen: 2 seconds

Re: All Of RR's Notes On Mushroom Cultivation Forum [Re: dumbfounded1600]
#8468514 - 05/31/08 06:58 PM

Edit | Reply | Quote | Quick Reply

Amazing. Thank you for this...
If I hadn't already rated you, I would rate you....

If y0u want s0meting gr0wn right, y0u g0tta gr0w it y0urself!!!

Post Extras:

Manage this thread

dumbfounded1600
Mycoholic

Registered: 07/29/07
Posts: 1,696
Loc: Somewhere over t here...
Last seen: 21 minutes, 12 seconds

Re: All Of RR's Notes On Mushroom Cultivation Forum [Re: dumbfounded1600]
#8468515 - 05/31/08 06:58 PM

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PART 2 OF 5 LC/AGAR/CLONING/STERILE PROCEDURE/HELP/PROBLEMS/OTHER

*Mycelium is the vegetative part of a fungus consisting of a mass of branching threadlike hyphae that exists below the ground or within another substrate. It is through the mycelium that a fungus absorbs nutrients from its environment. It does this in a two stage process. Firstly the hyphae secrete enzymes onto the food source which breaks down polymers into monomers. These monomers are then absorbed into the mycelium by facilitated diffusion and active transport. Mycelium is also a vital component in many ecosystems in that it helps increase the efficiency of water and nutrient absorption of many plants and also is vital to the decomposition and breaking-up of plant material to form the organic part of soil and to release carbon dioxide back into the atmosphere. MYCELIUM

*Mycelium grows by cell division. Primordia grows by cell division. Once they're fully formed mushrooms(ie pins), they grow by cell expansion, but not entirely. Basidia are single cells that produce spores at the ends of tube-like projections called sterigmata, and they're located on the gills. A larger cap will have more basidia, thus more spores. In other words, you'll get far more spores from a large cap than a small one. When we say mushrooms grow by cell expansion, it doesn't mean that no new cells are produced. It means these additional cells do not directly contribute to growth. MUSHROOMS/MYCELIUM

*Fungi, including molds, grow mycelium. Most mycelium looks similar. With few exceptions, one can't tell what kind of mycelium it is by looking. An experienced

cultivator on the other hand, can recognize the fragrance signature of different mycleia. Shiitake has a distinct smell, as does oysters. Ditto for morels. Cubensis has a distinct mushroomy scent. Trichoderma has a 'dirt' type smell to it. If I have an outbreak of trich, I can smell it when I open the greenhouse door, a few days before it's visible as a green spot when it sporulates. MYCELIUM

*One last thing you might want to try is to take a piece of mycelium from the agar and drop it into a jar of sterilized distilled water. Be sure to cover the jar with a filtered lid. Sometimes, dry mycelium will recover in pure distilled water. Don't add any nutrients to the water that might also feed molds or bacteria. If the mycelium begins to grow that way, simply suck it up with a syringe and transfer to agar. MYCELIUM STORAGE

*Mushrooms do not have roots OR root like structures. The mushroom fruiting body is mycelium, and it's genetically identical to the mycelium that is colonizing the substrate. No comparison can be made to plants/roots when discussing mycology. In fact, mycelium is a closer relative to humans and other mammals than it is to plants. That's a scientific fact. MYCELIUM

*Mycelium is much more closely related to humans than plants and that's a fact. Mycelium consumes O2 and releases CO2 as a waste product. Mycelium also produces body heat the way we do. I've often compared artificially increasing CO2 levels to putting a bag over your head and trying to run a foot race. You'd run out of air, as will your mycelium. MYCELIUM

*Aerial rhizomorphs, usually because they're searching for moisture from the air. You can tell from roadz pic above the cake is dry from the bluing. That's caused by the standing water in the perlite, which renders the perlite useless. Mycelium can be quite creative in finding ways to survive. MYCELIUM

*If a jar smells sweet, sour, like vinegar, the kitchen garbage or stinky feet, toss it. All those are caused by various bacteria. MYCELIUM SMELL

*Hyphae from two compatible spores can exchange genetic information and become dikaryotic, thus able to fruit. MYCELIUM

*'Fuzz' on the stems, contrary to popular myth is NOT a problem, and is NOT caused by high humidity. MYCELIUM

*Most mushroom mycelium once 'mated' holds two nuclei in each cell. MUSHROOM MYCELIUM

*Mycelium will suffocate and stall or die with no gas exchange, so I'd say it's very important. MYCELIUM

*I've generally found strains that poke spiky mycelium out end up being good fruiters. MYCELIUM

*The most aggressive mycelium I've worked with would be Morel. MYCELIUM

*Rhizomorphic mycelium is the type that forms primordia, so that's a good sign. MYCELIUM

*Mycelium has very little actives to extract. MYCELIUM

*Lysol is a surface sanitizer. Get some Oust for the air. When you spray oust, it completely fogs up the room. I do about 30 seconds with a can in each hand, which really leaves a thick fog that kills airborne bacteria AIR SANITIZER

*First things first. 96% alcohol is a terrible sanitizer, but a pretty good fuel. For a cell to be destroyed by alcohol, the alcohol must be admitted into the cell via osmosis. However, cells are very good at keeping out substances that would kill them. That's why we mix water with the alcohol. The water 'tricks' the cell wall into admitting the alcohol, and then it kills the cell when it evaporates back out again. Use 70% alcohol for best results. However, alcohol will do nothing against the contaminants that are INside the needle, so you'd be injecting them right into your substrate. Use flame sterilization, and there is no need to wait for the needle to cool. It will cool enough on the way from the flame to the jar, and the first drop or two of solution will finish cooling the needle so that the rest can flow cleanly. ALCOHOL

*It's an explosion hazzard, a fire hazzard, and worthless against airborne contaminants because it settles out of the air too fast. The only way alcohol kills cells is when it penetrates the cell wall, and then evaporates back out. Alcohol by itself, if it doesn't penetrate the cell wall isn't toxic. That's why 70% alcohol works better than pure alcohol. The water 'tricks' the cell wall into admitting it, and then the alcohol evaporates back out from the inside, destroying the cell. Cells admit moisture by osmosis, and therefore exclude toxins such as alcohol unless water is mixed in with it. ALCOHOL

*No. Pure alcohol kills little. That's why it's mixed with water. The reason is that alcohol kills when it evaporates away from whatever it is in. Cells, including bacteria cells admit water through osmosis, but reject toxins. By mixing water into the alcohol, the cell is tricked into admitting it, then when the alcohol evaporates away, it kills the organism. Bacterial endospores are in grains, but we PC for those. The use of 70% alcohol is great for tables, gloves, needles, etc. ALCOHOL

*70% is preferred, but it has nothing to do with rate of evaporation. Cells admit water through their cell walls via osmosis. Cell walls are particularly good at preventing the entry of toxins, so by mixing water with the alcohol, it 'tricks' the cell wall into admitting the mixture, which then kills the cell as the alcohol evaporates back out. I'm sure one of our resident chemists can put it in more scientific terms, but that's the jest of it. ALCOHOL

*99% alcohol is a poor sanitizer. The whole idea of using alcohol is to kill bacteria and mold spores. Cells don't admit substances without water. That's why up to 30% water is added to alcohol used to sanitize skin or other surfaces. It tricks the cell walls into admitting it, and then as the alcohol evaporates back out, it kills the cell. ALCOHOL

*Actually, the reason 70% is more effective is because living cells admit water through the cell membrane by way of osmosis. If there is water mixed in with the alcohol, it's admitted into the interior of the cell where it does the most damage. 99% alcohol can't penetrate the cell wall as effectively, therefore it's less effective. ALCOHOL

*Use denatured alcohol from the paint department in your local hardware store. It doesn't create soot. Flame, then use while still hot. Don't cool the needle first. The first few drops of solution will cool the needle, allowing the rest to flow cleanly. Repeat between jars to avoid cross contamination. DENATURED ALCOHOL

*Personally, I use 80% because it has enough water to penetrate cell walls of organisms, but not so much water it doesn't evaporate completely. The 70% takes too long to dry off my gloves or table when I wash them with it. I mix equal amounts of 91% and 70%. Works like a charm. ALCOHOL

*Just a note here too: 70% alcohol will do a better job of killing off contaminants

than 90% or 99% alcohol. The reason is that the cell wall is tricked by the water in the alcohol into admitting it into the interior of the cell, where the cell is then destroyed as the alcohol evaporates back out. ALCOHOL

*The higher water content is what allows alcohol to penetrate the cells walls by imitating h2o. WATER/ALCOHOL

*Alcohol is not a sterilizer. It is a sanitizer. Big difference. ALCOHOL IS

*Actually, bleach is approved for use in organic mushroom farms. I doubt seriously that the running water washed away the trich. It's possible it spread it even more, but only time will tell. Bleach also doesn't kill most fungi, including trichoderma. Good luck with that grow. I hope it works out. The trich sure won't impact your product or harvest, so if your second flush comes quickly, you'll be fine. BLEACH

*Bleach is not toxic to fungi, only spores. It's fine to clean out a glovebox or table if you mix it at ten percent, or also mixed at ten percent it can be used to disinfect a mini-greenhouse to kill flies and fly larvae between crop cycles. 30% bleach is too strong though. Don't go over ten percent or it isn't as effective. BLEACH

*Bleach doesn't harm mycelium much. I've soaked tissue for cloning for several minutes in a ten percent bleach solution. The bacteria is killed off, but the mycelium survives. Bleach seems to harm mycelium far less than peroxide. BLEACH

*Alcohol is the recommended surface disinfectant. Some use lysol, but remember lysol is 80% alcohol and perhaps ten times the price of buying alcohol at the local drug store. To clean your table, just pour it out of the bottle, then wipe with a paper towel. Save the expensive windex for windows. DISINFECTANT

*Use alcohol for your surfaces and ozium for the air. DISINFECTANT.

*You shouldn't need to do anything but clean the surface if you're using that tek. In fact, skip all the cleaners and just peel off a strip of mycelium like a banana peel, and then stick the needle into the freshly exposed flesh. Iodine is fine for cleaning the outside of the tissue, but use it at no more than ten percent. IODINE

*I want to scream every time I hear that. It's wrong. Lysol doesn't cause mutations. I can only catch it so many times, and this Lysol/mutant myth is spreading like a damn virus. Your new homework assignment is to spray Lysol near(not on) one of your fruiting cakes and report the results. Lysol is mostly alcohol and isn't good for mushrooms, but using it in the room isn't going to cause mutations. I spray the face of my flowhood with Lysol prior to transfers, so it's always blowing on something. LYSOL MUTATIONS

*To avoid confusion, people should mention the percentage of hydrogen peroxide they USE. If you have 30 count peroxide such as it is measured in Europe, it is at ten percent. If you dilute it three to one, you have 3.33% peroxide. If you purchase it at a drug or grocery store in the US, it comes in 3% concentration. If you dilute it ten to one, you have roughly .3% after mixing. As I said above, peroxide is toxic to mycelium, all mycelium, therefore it is hated by mushrooms and mold alike. If you have an outbreak of Dactylium, you can spray the casing layer with it to wipe out the cobweb. This doesn't hurt the mushroom mycelium because Dactylium rarely colonizes over the top of mushroom colonized casing layers. I've found it's a mistake to use as a preventative measure because it sets the mushroom mycelium back and makes it less aggressive, then the faster

recovering molds get the upper hand. Sterile technique will prevent molds in spawn, and fresh air exchange will prevent most molds in the growing environment, so go with that for best results. PEROXIDE

*The problem with peroxide on agar is it stunts the mycelium, and then oxidizes away to nothing, leaving the mycelium weak, but having no further effect on bacteria. For cloning, you can have far better results by dipping tissue into iodine before placing on agar. Gentmycin sulphate added to the agar will help prevent bacteria from growing, while not slowing down the mushroom mycelium at all. In all cases, strict attention to sterile procedure will outperform peroxide. I suppose that's what I meant to say, even if I was a bit harsh on ol' Rush. PEROXIDE

*Don't use peroxide on grains. Also, don't use tools to make the transfer. Peroxide will not sterilize spoons, forks, etc. Bang the unopened jar against a tire to break up the grains, and then pour the grains from the master jar to the receiving jars without touching them with anything. PEROXIDE

*Peroxide is toxic to fungi, all fungi. Personally, I no longer use peroxide in the humidifier, but I can assure you that isn't the problem. Peroxide in the humidifier only serves to help control molds within the humidifier itself. PEROXIDE

*Don't use peroxide in the mist water. Peroxide injures mycelium, so to use it for a preventative against contaminants might cause the very problem you're trying to avoid by stressing the mycelium, weakening it. PEROXIDE

*Peroxide does stress mycelium a great deal. We all know that. That doesn't mean it can't survive limited exposure, but it causes damage at the cellular level and that's a fact. PEROXIDE

*Don't use peroxide on your cakes for anything but cobweb control. Peroxide is highly toxic to mushroom mycelium and shocks it, allowing the faster growing trichoderma to take over. PEROXIDE

*Peroxide is no substitute for sterile procedure. Peroxide will wipe out cobweb mold on a casing layer, but it has little other use, imho of course. PEROXIDE

*Peroxide attacks mushroom mycelium too, so dunking in it can weaken the mycelium, making it more likely contaminants can get a foothold after the dunk while the mycelium is still weakened. PEROXIDE

*Don't assault your mycelium with peroxide. That's like throwing acid in your girlfriends face just to see if it sizzles. PEROXIDE

*Peroxide is toxic to fungi, all fungi. Some can tolerate it better than others, but none 'like it'. PEROXIDE

*Ozium air sanitizer is the best way to keep the air in your home or work space clean and smelling fresh. Ozium does not cover up the odors associated with sewer, pets, cooking and smoking - it eliminates them! . Ozium, the original air purifier, is a chemical agent that actually eliminates smoke and unpleasant odors and reduces airborne bacteria. Ozium actually cleanses the air through glycolized action. The Ozium glycolized formula acts directly on odor causing particles in the air. Ozium is distinguished from other products that simply mask odors. Ozium is an EPA registered air sanitizer and is safe to use residentially or commercially in homes, rental property, hospitals, nursing homes, hotels, veterinary clinics, restaurants, bars, laundry rooms, cars, mobil homes, offices, and just about anywhere there might be an odor problem. Do Not Breathe It Though! OZIUM

*Every time you do multispore inoculation you mix hundreds, if not thousands of strains in the same jar. It makes absolutely NO difference if the spores come from the same print or from prints from halfway around the world. The definition of a strain is NOT the name some vendor put on a print he mailed out. The definition of a strain is two compatible hyphae 'mating' to form dikaryotic mycelium. Hyphae from a PR print are just as capable of mating with each other as with hyphae from a Tex or any other print. It's the same species so they're all compatible. There is NO competition between strains of the same species. Once they become dikaryotic, they continue to fuse by a process known as anastomosis, again with NO competition. Hybridization between 'strains' occurs in every single multispore project. MULTI SPORE INOCULATION

*Every hyphal pairing makes a new 'strain' thus every grow is different and will have a different feel because there's millions of spores on each print and each spore has a unique genetic code. That's why there's far more variation in trip quality and macroscopic appearance from each crop from even the same print than there is difference between siblings of the same human or animal family for example. The 'cube is a cube' means just that. They have the same growth and nutritional/environmental requirements. Every trip will be different, so it matters little which named strain one chooses. You won't have the same trip twice, even from the same strain. In fact, you're very unlikely to have the same trip twice, even from fruits from the same substrate tray. MULTISPORE

*Multispore inoculation from a sporeprint is a roll of the dice. You can do ten grows from the same print and have ten crops that hardly resemble each other, other than being the same species. A fruit grown from multispore inoculation may or may not be an isolated strain. This is well known in the edible field. More than one substrain can be present in a single fruit. That's why clones from mushrooms grown from multispore inoculation do not always form single sector isolates on agar. I've seen this many times. However, if you isolate down to single sectors on agar, fruits from each single sector isolate will be genetically identical. However, if you fruit these and take sporeprints, you're back to square one. MULTISPORE

*What you're seeing is the effects of multi-spore inoculation. Often, several strains develop that are not compatible with each other, thus they don't form into a single organism via anastomosis. Therefore, more than one strain is fruiting on the same substrate. If you clone that big ol' choad, future flushes will have all choads, but whether you'll get enough of them to matter remains to be seen. I'd clone it, and then after you eat the thing, you'll know if it's a strain you want to keep or not. MULTISPORE

*When you grow from multispore inoculation, it matters little what the name on the syringe was. A cube is a cube and that's a fact. What this means is every grow will be different. When you buy a Cadillac, you can expect a luxury ride. When you buy a Ferrari, you can expect a fast car. When you buy a pickup truck, you can expect it to haul things. No such guarantees exist with cubes. Every multispore inoculation will be different, thus we say, "A cube is a cube". MULTI-SPORE

*If you want to mix strains, do so. You can have multiple strains in the same terrarium, or for grins and giggles, you can inoculate a cake with four different strains, one strain per hole. You'll probably not notice anything different from any other multispore grow. This has all been covered hundreds of times, and the information is right here for searching. Strains of the same species are generally compatible. MULTI SPORE

*Whoever made that syringe had no idea what he or she was doing. It's way too dark. Dark is bad. Fewer spores are better. That is a fact. A large number of

spores is also going to have a large number of contaminants attached. Using too many spores is counter productive. That was known over twenty years ago when paul stamets wrote 'The Mushroom Cultivator' because he made that clear in the book. MULTISPORE SYRINGE

*Very often with multispore inoculation, what you have is many different types of mycelium growing together and one on top of the others. What is often mistaken for one type of mycelium is actually this pile of various types, or even the same type. If your cakes are in the FC and fuzzing up, they're good to go. MULTISPORE

*Sometimes with multispore inoculation you even end up with a non-fruiting strain. Other times, you end up with a poorly fruiting strain. Often, you end up with an awesome fruiting strain. It's all a dice roll. MULTISPORE

*If using multispores culture on both, you will have a different results no matter what and each sub-strain will have different properties/levels of chemicals within them.. MULTISPORE

*The silly name on the syringe means nothing. Every grow from multispore inoculation is going to be different, just like every child born is different. It's all the same species. MULTISPORE

*In a spore print MULTISPORE = Millions of diff sub strains, within the strain you are using...Spores are like sperm, other then they mate with eatchother MULTISPORE

*Multispore will produce different results everytime, because theres millions of genetics. MULTISPORE

*Since multispore inoculation from a single print creates hundreds of strains, mixing two different prints would behave no differently. As has been said many times, a 'strain' is two compatible hyphae coming together to exchange genetic information, so it makes little difference how many prints go into making the multispore 'tea'. The mycelium doesn't give a darn what silly name somebody put on the print or syringe, it's only concerned with A and B mating types, and since all the cube 'strains' are the same species, hyphae from one spore will exchange information readily with hyphae from another compatible spore. Nobody can answer what the offspring will look like because nobody can say that mushrooms from GT will always be 'such and such' but PR's will always be 'this or that'. I've studied all types of spores under the microscope and I'm here to tell you, these so-called strains floating around with all the fancy names can't be identified either microscopically, or macroscopically from each other. That's why we stickied the strain thread up on top. It was to keep worthless discussion about 'strain' confined up there so it didn't litter the board with wasted bandwidth. SPORE MIXING

*Darker syringes will result in more contamination problems. There is always going to be a certain percentage of contaminant spores on any print. Therefore, if you use more spores, you get more contaminants. In addition, when you use a massive spore inoculation, you force the mycelium to spend a lot of time and energy combining all the genetics into a common network. Many growers think that more spores results in faster colonization. What it results in is the substrate turning 'white' faster, but there is no evidence at all the project will actually fruit sooner. I'm a firm believer in using the minimum amount of spores necessary to achieve a crop. Clear(to the naked eye) syringes perform better than dark syringes. Nobody can see individual spores with their eyeballs. What you see is clusters of a few thousand that are stuck together. The spores in the center of

these clusters are locked out of the moisture in the jars, so they rarely even get a chance to germinate. DARKER SYRINGES/SPORES

*I've ran several tests with the microscopes to determine spore viability. A brand new print will give about 1 spore in 100 that will germinate. After two weeks, that drops to about 1 spore in 500. At one month since taking the print, less than 1 spore in 1000 will germinate, and after one year, you're doing good to get 1 spore in 10,000 that is still viable and it drops even faster after one year. The thing to remember is take clean prints and store them properly. An old print will still work, but remember that you'll need to use many more spores to get the few that will germinate. Remember, when you use more spores, you also risk using more contaminant spores that may be hitch hiking along for the ride. Thus, fresh prints are better. VIABLE SPORES

*Using more spores is counterproductive. I agree they will 'colonize' faster by using more spores, but the problem is that not all strains are going to be compatible, therefore by using an excess of spores, an excess of strains are going to be created, some of which won't unite to form a common whole. The result is you have several separate mycelial networks, none of which has access to the total amount of food(BRF) in the cake. The best fruiting results from multispore inoculation comes from using minimum spores. Even better, a single sector strain you've isolated on agar in a petri dish. SPORES

*Using more spores to inoculate a grain or brf jar will result in faster colonization, but that's not always a good thing. You'll be left with many strains in the same substrate because not all are compatible enough to combine into a single organism by anastomosis. Therefore, each 'strain' will have a small piece of the substrate rather than being a single organism in control of the whole substrate, which is better for performance. That's why we practice strain isolation on agar prior to inoculating our grains. SPORE INOCULATION

*Actually, the life of spores on a print is three to five years, and less if the print was taken on acidic paper. In a syringe they last longer, provided the syringe was made properly. I have prints going back nearly 20 years, and even the ones I made four to five years ago won't germinate and grow anymore with very few exceptions. Good luck and check out "The Mushroom Cultivator" by Paul Stamets. You can get it from fungi.com or amazon.com. SPORE LIFE PRINT

*With multispore inoculation, it's common for two or more strains to make it to fruiting. They usually combine into a whole via the process of anastomosis, but some strains are incompatible and remain separate. They don't fight, being that they're the same species. Fruiting is not impaired either as you can see. The same often happens when someone injects one side of a cake with one strain, and another side of the cake with a different strain. SPORES

*I've been saying for many years, and paul stamets has been sayin for over 20 years(it's in TMC) not to use an excessive amount of spores. It's counter productive. Since no print is 100% clean, the more spores you use, the more contaminats you inject as well. Since molds and bacteria grow faster than mushroom mycelium, dark syringes give the advantage to contaminants over the mushrooms. SPORES

*For live mycelium, I inoculate a test tube slant of agar. When the mycelium has colonized the agar in the test tube, I pour a small amount of distilled water over the top of the mycelium, then place the test tube in the refrigerator for long term storage. Once per year, take out the test tube and transfer the mycelium to a new test tube and repeat the process. STORING MYC/SPORES

*With a powerful magnifying glass, you can sometimes see it on the second day. Using a microscope, I've observed fresh spores germinating within 20 minutes of

swiping on wet agar. That blew me away. I never thought they'd germinate that fast. It can take four days to two weeks to be visible to the naked eye, with closer to four days the norm. SPORES GERMINATING

*Spores drop due to internal pressures within the basidia that literally explode the spore away with force. Once dry, the process stops totally. To get more spores, put a drop of water on the cap so it stays wet longer. Nothing will speed it up, but lots of things can slow it down. You should have a readable print in three to four hours. SPORES DROPPING

*It's genetics, and something else I've discovered, is there are often basidia on the gills producing clear spores. Check your prints under a microscope. You might have good prints, but just can't see them. The clear spores have a far lower germination ratio, but many still do germinate and grow, if used fresh. SPORES

*There is some evidence that a heavy spore drop will inhibit future flushes. In addition, it makes a terrible mess, and furthermore it makes the fruits taste even worse than they normally would. Pick just before, or just after the veil breaks for best quality. SPORES DROPPING

*Spores drop spores when the pressure in the basdidia reaches a crucial point, and then the spores are blown into the air with considerable force. You make a print by setting a freshly cut cap on paper, glass, foil, etc., and waiting for nature to do its thing. SPORES

*I think prints will definitely last longer on glass or aluminum foil. Refrigeration might help, but I'd make sure it's a dedicated lab frige. There's too much mold and bacteria in the kitchen refrigerator. STORING SPORE PRINTS

*Spores can be frozen without significant loss of viability by suspending in a 10% aqueous solution of sterilized glycerol (glycerin U.S.P.; available at most pharmacies). SAVING SPORES IN FREEZER..IF

*The spores will be fine since the water in the syringes didn't freeze solid. Freezing would likely destroy the cell walls of the spores, but just being very cold is fine. SPORES

*Distilled water is the best method for storing spores or live mycelium. Spores strored in distilled water don't dry out the way they do on a print. STORING SPORES

*After a year, they're down to less than one spore in a thousand that will germinate. It gets worse from there. Prints are best used when fresh. SPORE PRINTS

*If done in a clean environment, spores can be scraped directly into grains or agar. They need not be re-hydrated first. FRESH SPORES

*Many minerals in tap water, and especially well water do effect the survival rate of spores in a syringe. SPORES

*The big deal is it makes a horrible mess and makes the mushrooms taste even worse. DROPPING SPORES

*That was enough for 4 jars. 2ml per jar is plenty. SPORE SOLUTION

*I quit taking prints on paper. There's a lot of lime and other chemicals used in pulp production and papermaking. I don't know if that's the cause or not, but I've found prints taken on foil last MUCH longer than prints taken on paper. You can use the same methods, just with foil instead of paper. I'd tear a foot or so off the roll first, and save it for the kitchen, then use the clean foil beyond that point for

your prints. I prefer to cover the printing cap with a tyvek sheet. I buy tyvek coveralls at the hardware store, and unzip them and do the printing on foil inside the torso area, then I zip it back up. You can tie knots in the arms and legs, and hood, so it totally seals your printing area up, yet still can breathe so bacteria is reduced. Heavy duty foil. It's several times the thickness of the cheap stuff. For immediate syringe making, you can use the non-stick foil. Spores slide right off it. They will slide right off the foil and into a shotglass still in the shape of the print. SPORE PRINTING

*If you're going to be streaking the spores onto agar, there's no need to be sterile in taking the print. I don't even put a glass or bowl over the cap. Just lay it on a piece of typing paper, and set a coffee filter over the top. After you streak the agar dish, watch it daily, and when the spores germinate and grow half a cm or so, take a small piece of mycelium from the FARTHEST away from the point of germination, and transfer it to a new petri dish. Discard the original. This allows the mycelium to outrun the contams, and you can get clean cultures this way. Of course, doing it this way, you'd just drop the agar wedges into your grain, as opposed to making syringes. One petri dish can innoc 10 quarts of rye or corn. Much faster/safer, imo. SPORE PRINTING

*If they're for printing, let the caps begin to drop spores prior to picking. Don't let the caps flatten all the way out because that wastes your spores and makes a mess all over your grow chamber. If they're for eating, pick just prior to veil tear for best overall quality. I agree that paper is a poor printing medium. Its porous surface attracts and holds contaminants, and the lime and acids used in production gives paper a wildly varied pH, which doesn't do much for the spores longevity. I use foil. SPORE PRINTING

*For printing, wait until the cap begins to flatten out, and you'll see spores on the stipe above the veil remnants as well. I disagree with the technique of printing under a glass. I'd suggest laying a sheet of tyvek over the printing caps. All you want is to keep dust off and restrict drafts. A glass can tend to keep the caps too wet, and bacteria may bloom. SPORE PRINTING

*Agreed, you don't need light. Personally, I don't let caps sit for more than 12 hours during printing because I don't want bacteria to be able to form in the stale air beneath the cap as it prints. The good news this way is you can get two prints from each cap. Although they will be lighter prints, they will work just fine. SPORE PRINTING

*Dark prints equal more spores, and since no print is completely clean, it also means more contaminant spores, which germinate and grow faster than mushroom spores. SPORE PRINTS

*After five years, especially if the print is on paper, there's little chance of success. It's not impossible, but less than one spore out of perhaps a million will still be viable. SPORE PRINTING

*It doesn't make them germinate one second sooner. It just causes such a mass of mycelium you SEE it sooner. It's a horrible idea by the way because your mycelium spends needless energy combining cells(anastomosis) in order to become a single organism. You're much better off using a minimum of spores. Dark syringes or the over use of spores is also a good way to get contaminants. Remember, more mushroom spores also means more contaminant spores that hitch hike along for the ride. Since it takes longer for all those strains that germinate to combine, it gives the contaminants a better chance of getting the upper hand. SPORE SYRINGE GERMINATING

*It becomes much worse when people make their own syringes and make them very dark. Some strains are not compatible, so when someone uses multispore

inoculation, it's common to still have two or three strains active at fruiting. Each strain carves out its niche and holds it. Most strains combine into a single organism through the process of anastomosis, but the non-compatible ones don't, therefore you'll have several different substrains growing in the same tray. DARK SPORE SYRINGES

*Having thousands of strains in the same jar may turn it white sooner, but in no way increases performance or yield. Time is spent combining all those pairings into a coherent whole. Fewer spores is much better, and in fact the clearest spore syringes often give the most massive flushes. The reason is that many strains are incompatible, so when you start off with a black syringe, there may be hundreds of incompatible strains at the end, greatly reducing harvest. SPORE SYRINGES

*If you flame sterilize, anything you do afterward will only make the needle 'dirtier'. Why not just flame and use? Forget the alcohol after flaming. There is no need to cool down the needle. Just use hot and let the first drop or two of solution cool the needle, so the rest can flow contaminant free. SYRINGES

*2CC's is plenty for quarts of grain. Shoot over to the side of the glass so the spore solution can run down. Don't shake until 20% or so colonized with mycelium. INOCULATING

*A torch lighter will leave the needle sterilized. Just make sure you get the needle to glow red hot. No need to wipe with alcohol afterward. INOCULATING

*A print should make up to ten or even more syringes, depending on size and darkness of the print. SPORE SYRINGE

*Astroglide or Jet Dry. SEX LUBE SPORE SYRINGES

*Inoculation' is the process of introducing spores to your substrate. 'Colonization' is the phase where the mushroom mycelium is working its way through the substrate, 'colonizing' it. 'Fruiting' is the stage you're at now. INOCULATION

/join #fungi (IRC) the Non Official Mycology Chat Where All Your Questions Shall Be Answered. Their will at least be a mycologist 24/7 to answer any questions. We're working on a bot too.

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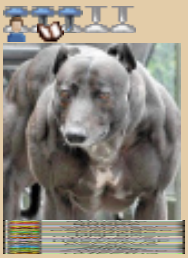

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Re: All Of RR's Notes On Mushroom Cultivation Forum [Re: dumbfounded1600]
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PART 3 OF 5 LC/AGAR/CLONING/STERILE PROCEDURE/HELP/PROBLEMS/OTHER

*Strains of the same species do NOT compete for nutrients and they do NOT fight it out. That's absolutely silly. Do the genes of a lady from Florida and a man from Texas fight it out when they make a baby? Of course not. Squirt as many different strains into the same jar or substrate as you want. It's no different than multispore inoculation from one print. It's all the same species. Everybody who's done it has reported the same results. A normal flush that looks just like any multispore inoculated flush. Most of the named 'strains' were simply named after the geological location the print was collected from, as if a man made line in the sand changes the genetics of biological creatures. If a guy collects a print in Florida and names it treasure coast, and another guy collects a print in Georgia and names it hillbilly, are they really different? Both grew in the same region, under the same weather conditions, and spores from both mix freely in the wind. It's the same with all the SE Asia 'strains' in circulation. Lines on a map drawn by the British 50 years ago do not cause the mycelium that's been evolving for millions of years to suddenly morph into new strains, marketing considerations aside. They're all Cubensis. There are distinct strains such as Penis Envy, various albinos and fruits that drop slightly different spore coloring, but the rest is marketing, not mycology and they all mix and match easily. My point was that putting spores from several named 'strains' in the same substrate does not result in a hybrid, since there's no verifiable difference between them. STRAINS

*Different strains do not fight it out. They do not compete for 'nutes', they don't make small fruits, they don't disrupt each others networks, and they don't get cut off from their own network. I speak from experience. Use the search feature and you'll see this issue comes up every couple of months at least, and this same disinformation gets repeated over and over again by those who have never done it. Here's a post I made in a similar thread several months ago with a picture showing two different strains fusing by anastomosis to create a third strain on a petri dish. http://www.shroomery.org/forums/showflat.php/Number/5545843#Post5545843 Cubensis is easy to cross. Some mycologists use

the term hybrid, but I prefer 'cross', instead using the term hybrid to refer to cross-species matings. Every single multispore inoculation results in hundreds of 'strains'. Where is this fighting? Remember, a strain is born when two compatible hyphae exchange genetic information to become dikaryotic. It doesn't matter one whit whether the spores those hyphae came from originated from the same sporeprint, or sporeprints from the opposite sides of the world. Vendor named strains are just that-names. If the species is cubensis, they will combine normally. That is a fact. MIXING DIFFERENT STRAIN SPORES

*Strain is irrelevant in mushrooms, unlike in mj cultivation where it's everything. A cube IS a cube. The long-time growers know this, thus the disreputable spore sellers constantly invent new names to stamp on the same old strains that have been around for years. Pick a strain from a shroomery vendor for your microscopy study. Sporeprints easily slide into a regular mail envelope. Cubes are cubes, and no named strain produces faster, more rhizomorphic, more potent, blah, blah, than any other on a continuing basis. Strain questions need to be in the strain thread at the top of the page please. STRAIN

*Strains of the same species do NOT compete for nutrients and they do NOT fight it out. That's absolutely silly. Do the genes of a lady from Florida and a man from Texas fight it out when they make a baby? Of course not. Squirt as many different strains into the same jar or substrate as you want. It's no different than multispore inoculation from one print. It's all the same species. Everybody who's done it has reported the same results. A normal flush that looks just like any multispore inoculated flush. STRAINS

*They may or may not share genetics(cross), but either way there is little to no harm in mixing vendor named strains because they're all the same species anyway. The chances are very high that they will combine into a single organism via anastomosis by the time fruiting comes. Search the posts. This has been asked and answered dozens of times in the last year or two. There's several grow logs in that forum where guys have mixed 'strains' in the same tray with no problems. MIXING STRAINS

*People, for the millionth time, the 'named strain' crap is completely irrelevant to growing. Cubes are a SPECIES, and they all grow under the same conditions in the same substrates, under the same temperatures, moisture contents, etc. It seems that everyone who makes a print these days gives it a name and calls it a new strain, which is total bullshit. As far as growing parameters are concerned, cubes are cubes, period. STRAINS

*Remember, a strain by definition is a pairing of two compatible hyphae into dikaryotic mycelium. The location the original print was taken from has no more to do with the size and shape of the fruits than being a human from New York or New Jersey or England has to do with how tall or how smart you are. Remember, cubes are all the same species, just like we humans are all the same species. WHAT IS A STRAIN?

*Some strains just don't attach well to the substrate, therefore they tend to pick themselves by falling over. Other strains are so well attached they leave a huge divot when you pick them. Multispore inoculation will give one strain one time and the opposite the next. It's just the luck of the draw. It's not related to anything you're doing, except handling them. They prefer to be left alone. MUSHROOM STRAINS

*Most likely, you'll end up with cubes. It matters little the name on the print. If it's a cube, it will grow cubes. If you mix spores from more than one print, you'll still grow cubes. Compare it to a human from Canada having a baby with a human from Mexico. The child will still be human. As long as they're the same species, the genes usually mix freely. MIXING STRAINS

*Crossing one cube strain with another is quite easy actually. Dikaryotic mycelium readily exchanges genetic information with other dikaryotic mycelium. However, such is not a hybrid. It's a cross. This site operator has a long history and is not a vendor here for a reason. I won't repeat the whole stp story here. Click. CROSSING STRAINS

*I've had a few sporeless strains pop over the years. If they have the other qualities desired, it's a great trait since there's no mess if you wait until after work to harvest a flush. Sometimes, they're only half sterile, and you get zebra stripes on the gills, SPORELESS STRAINS

*PE is definitely slower to pin than other strains. Correct, the PE6 is a PE/Tx hybrid. Hope you guys enjoy it. STRAIN

*For larger jars or substrate bags, I've got a little different technique to know how long.
The bacterial endospores in grains need about 30 minutes @ 15 psi, at sea level, to ensure they're killed off. That does not mean 30 minutes from the time your PC reaches pressure, but 30 minutes from the time the interior of the jar or bag of grains reaches full temperature. The way to achieve this is to always use the minimum stove setting that will hold 15 psi. If your PC rattles at 15, then use 14 so it doesn't rattle at all. Now, you'll notice after pressure is reached, for about 1/2 an hour or so, you'll have to constantly turn down the stove in order to prevent the weight rattling. Once you reach the point where you don't need to reduce the stove burner anymore, your substrate is fully heated all the way through. At this point, allow 1/2 hour to ensure the bacterial endospores in the very center of the substrate bag are killed off. If you're above 5,000 feet elevation, double the above time to one hour. PRESSURE COOK TIMES

*Total sterilization would take at least 24 hours in the PC and your grains would come out as a sticky mush. The one to two hours we use for 'sterilization' gives us a window of opportunity to get the jars colonized before the contaminants that survived the pressure cooker can get a foothold. Don't wait three days. Instead, if you're having contamination problems, simply cook up a few extra jars and always keep a blank or two at each step that you don't inoculate. If you do a grain to grain transfer, keep one jar back that you don't use for g2g. If you experience contaminants and your blanks are contaminant free, the problem was in your sterile technique. If both the blank and the inoculated jar contaminate, the problem was in your sterilization process. By using blanks at every step, you can always narrow down the problem to exactly the step you went haywire on. Once you get your procedures down pat, you won't need to use blanks. STERILIZATION JARS

*You can remove the jars when the pressure cooker returns to zero pressure, but I'd still wait a little while. If you remove the jars while they're too hot, they can loose some of their mosture content to evaporation. Overnight is not necessary, but if you're going to lt them sit anyway, the PC is a fine place to leave them. If you need to cook another batch, then there's no harm in removing them. Allow to cool to near room temp before inoculating. PRESSURE COOKING

*The biggest cause I see of dry jars is lifting the weight or relief valve to let pressure out faster at the end. That causes the grains that are at a temperature above the boiling point of water due to pressure, to suddenly loose all their moisture because the pressure that was holding the moisture in place disappears. Let the PC cool naturally until you can handle it without gloves or a pot holder before opening. PRESSURE COOKER

*Pasteurization of substrates doesn't take a few seconds. It takes an hour. The idea is to kill all of the mold spores, and some of the bacteria. The surviving bacteria keep the substrate 'alive', thus reducing the chances of molds forming. A few bacteria in a substrate will also improve fruiting, and some species simply will not fruit on a sterile substrate. PASTEURIZATION DISCUSSION

*You'll want to get your material to the proper moisture content before loading into bags or jars. Let the substrate sit for half an hour, and then re-adjust to field capacity. Oven bags are for cooking turkeys in the oven. They're not suitable for stovetop pasteurization, so use jars or filter patch bags, which don't need to be sealed first. PASTERUIZATION

*Sterilization is never complete because that would take overnight in the PC, which would turn the grains to mush. The hour or two we PC gives a window of opportunity for the mycelium to colonize and get a grip on the grains, but it's only a window. STERILIZATION

*If you are going to give it a SERIOUS go. All American PC is BEST PC EVER. Bigger the better. Build (at least) a GLOVE BOX. Better yet a HEPA FILTERED FLOW HOOD. FIND HORSE MANURE. Learn WBS & G2G. Learn PH of casing is important. BEST PC BULK

*Pasteurization only kills fungal spores, leaving the beneficial bacteria intact. After pasteurization, the substrate need not be kept sterile, so it's suitable for bulk substrates such as straw and manure that are too big for filtered jars. PASTEURIZATION

*Sterilization kills all life forms. After sterilization, you need to keep the substrate under sterile conditions until fully colonized or it will contaminate. That's why we use filter patch bags or jars with filters. STERILIZATION

*You should pasteurize the coir. Some, including me have used it unpasteurized with success, but additives such as compost and/or manure definitely need to be pasteurized, so just do it. PASTERUIZING

*I use 90 minutes for quart jars at 15 psi. At 10 psi, go for two hours. I wouldn't attempt corn at ten psi. Corn sucks anyway as a spawn. Just use rye or wbs. PRESSURE COOKER

*Trichoderma is killed at temperatures far below boiling, so there's no way it survived the PC. TRICHODERMA

*I can pasterize in a Crock Pot IF I can watch and control the temp! PASTERUIZATION

*We pasteurize bulk substrates because molds are killed at very low temperatures that are below pasteurization temps, but some of the bacteria survive. Bacteria in manageable quantities are not a contaminant in bulk growing, but molds are. A sterilized substrate is a prime breeding ground for whatever lands on it, thus if you sterilize bulk substrates, you'll have a higher rate of contamination. PASTEURIZING

*Kitchens are the worst possible place to work. There is more fecal bacteria floating around a kitchen than in the bathroom right after you take a dump.
I've noticed the new growers that are saying it's ok to be nasty are also buying syringes from vendors so have their sterile lab work already done by someone else. That isn't mycology folks. When you learn to harvest a crop, take prints, germinate spores on agar, isolate strains, and produce a killer fruiting strain that blows you away with its potency, you'll understand what I mean.
Lab work isn't supposed to be clean. It's supposed to be laboratory sterile. No cut

corners. When it comes to spawning a bulk substrate, who gives a shit if you pick your nose while working? It doesn't matter. If the grains were properly prepared and colonized in sterile conditions to full colonization, you can spawn to bulk outdoors if you want to. When you go to the Stamets seminars, you'll see Paul build a straw log or other project outside in the open air and it works fine. However, you can bet your ass the spawn wasn't produced outdoors in the open air.
Learn to be sterile where sterility is called for, and be clean where being clean is called for and you'll be fine. I live in a 40 year old condo building in a very damp climate and my entire building is infested with black mold, and it has wall to wall carpeting. It's unhealthy for us and we're trying to sell the damn thing so we can move, but every project I've done has been done in this mold infested place, yet I can grow successfully by following the advice given above, and even filmed my video DVD here, doing lab work and growing a dozen or more species from spores to the fruiting/harvest stage. Several of my terrariums sit within 18" of a wall that has black mold growing on it, yet it NEVER grows on my cakes.
For sterile work, surgical gloves are a must, surgical mask is a must(dust masks are for carpenters, not surgeons), a still air glovebox or laminar flow hood is a must, A closed, draft free room is a must especially if you're using a flowhood, and spray the air with oust at least two or three times before starting the flowhood. I let the flowhood run for at least an hour in that closed and oust sprayed room before beginning work, which gives me time to shower, wash my hair and brush my teeth, use mouthwash, etc.
Once your spawn jars are fully colonized, you can scratch your butt while you inoculate the coir if you want. Bacteria isn't a contaminant of bulk substrates. The important thing is to learn when it's important to be sterile. If someone else is doing your sterile work for you, then don't brag about how dirty you can be and get away with it. Anybody can be dirty and get away with it under those conditions. STERILE

*There are up to 600,000 contaminants per cubic foot of air in a normal room. That's a lot of little nasties to stick to your needle or the top of your jar where it will get pushed into the substrate when you inject. A room also has normal circulation and all those nasties are moving around. You can see this on a bright day when the sun is shining in through a window. You'll see the larger of these dust particles, but there are hundreds of times that many smaller ones that you can't see. A still air box stops the movement of these particles, greatly reducing the chances they'll get on your jar lid or needle. You can also improve your chances by washing the glovebox and leaving the sides and bottom wet. The moisture will attract the dust/contaminants and then they'll stick, leaving the air within, not only still, but with much less contaminants floating. You don't want a filter and fan on a glovebox. The only suitable filters for mycology are several inches thick and require a plenum behind them to build static pressure, which gives the laminar flow. If you used a filter/fan in a glovebox, the turbulence would defeat the purpose. Where a glovebox really shines is when doing agar work or grain to grain transfers. They're not as good as a laminar flow hood by any means, but they're far better than open, turbulent air. Water or peroxide. A wet surface will make the contaminants adhere to it and stick, rather than floating into your jars. STERILE AIR

*The standard they're testing is how the mask protects the wearer, which we don't have a concern for. Our projects are not going to give us a fatal disease. Respirators are tight fitting around the cheeks, to prevent you from inhaling air from the edges that doesn't get filtered. This is important if you need protection from airborne pathogens. Surgical masks are open at the cheeks purposely to allow a low pressure route of escape for your exhaled bacteria(breath). What passes through the mask generally has 99% of the bacteria filtered out, depending on brand. Hospital operating rooms have HEPA filters in the ceiling that draw the room currents up and away from the patient. By having the

doctor's breath leave in the direction of the ceiling, thus the filters, the patient is protected. This is our scenario as well. When the FDA says they don't test surgical masks, it means THEY don't test surgical masks. It doesn't mean they don't get tested. A surgical mask with the N95 rating is going to do our job just fine. However, a cheapie surgical mask works very well too. It's all I've used for years. The thing NOT to use is a construction type dust mask. SURGICAL MASKS

*Opinions are like something else every one has, so unless somebody wishes to quote some scientific texts to back up claims, let's not be spreading flames over our opinions. I can easily see how water 10,000 feet below the surface of the earth can heat to well over 100C without boiling. After all, think of the weight (pressure) a 10,000 feet deep well of water will exert on the water at the bottom. That's a lot more pressure then the walls of our PC's can contain. However, I doubt seriously the walls of an oven bag can exert that much pressure. There's no way to get every molecule of air out of a bag of coir or manure, even if it soaks in water for a month. In addition, even if it did, you'd be handling a bomb when you open the microwave. My background is engineering, not chemistry, so we should wait for one of the member chemists to chime in. The overall point is mute though, because sterilized substrates are much more likely to contaminate than pasteurized substrates. One shouldn't heat substrate or casing material above about 170F, or the chances of contamination are increased rather than decreased. STERILE

*Flaming needles is to prevent cross contamination between jars. Syringes should always be boiled before re-use. This isn't a tek, it's simply stating what has been said over and over again for years. There is also no need or reason to PC a syringe. Plastic doesn't harbor bacterial endospores, so anything that might be on a syringe will be killed off by simply boiling. You still need to flame the needle between jars. As hyphae pointed out, you certainly don't need a separate syringe for each jar.
Alcohol does NOTHING to prevent the contaminants that are inside the needle being injected into the grains. The size of the interior of a needle to a contaminant is comparative to the size of a human in a subway tunnel. Needles should always be flame sterilized. STERILE SYRINGES

*You can also cut the holes so they're fairly snug around your arms, then just wear latex gloves. Be sure to wash your hands and arms first, then put on a freshly laundered long sleeve shirt to cover the skin on your arms.(dead skin cells flake off all the time and they'll have bacteria) Remember, a glovebox does not have to be totally airtight or sterile. It only serves as a place for you to open or inoculate jars or petri dishes in a draft free environment. I haven't used attached gloves in years because they're such a pain in the butt to work in. Latex gloves give you really good control. Of course, do your glovebox work in a very clean room with no fans or air conditioners etc running. STERILE TECHNIQUE GLOVEBOX

*Nobody should ever recommend inoculations in open air, especially new growers that got started in the hobby during the winter when natural contaminant counts are low. In addition, the breath of the cultivator is the biggest source of bacterial contamination, and dust masks stop zero exhaled bacteria from reaching the work area. Dust masks are intended to stop the individual from inhaling large particles such as dust and dirt when mowing the lawn, but surgical masks are called for when doing mycology work. A surgical mask is designed to protect a patient from the surgeons exhaled bacteria, which is what we want to accomplish when doing sterile work. STERILE PROCEDURE

*Boiling water IS enough to sterilize a syringe. Plastic does not harbor bacterial endospores, and fungi like trichoderma and cobweb are killed by temperatures far below boiling. I fill a pot with water and drop the syringe in. After the water

has boiled for ten minutes, pull the syringe out and suck in the boiling water, swish it around and squirt it out. Do this a few times. The syringe will be sterile enough for mycology, I assure you. I've done it this way for years. BOILING/ STERILIZING SYRINGES

*Sanitize means to reduce the number of contaminants to a safe or relatively safe level as may be judged by public health requirements.
Disinfect means elimination of all recognized pathogenic microorganism but not necessarily all microbial forms.
Sterilize means the destruction of all microbical life by use of chemical or physical procedure. CLEAN MEANS

*I'd suggest an alcohol lamp to sterilize so you won't be anywhere near your kitchen during inoculations. Kitchens are full of molds and mold producing/ carrying foods such as bread and cheese, vegetables, fruits, etc., not to mention all the bacteria that lives and breeds in the sink drain and in all those hard to reach to clean spaces. There's no need to wipe with alcohol after flaming the syringe. Wait two or three seconds and inject. Work in a glovebox of course. STERILE

*Swabbing the needle with alcohol does nothing for the contaminants that have become lodged in the interior of the needle. In addition, look at a needle under a microscope. There's many little holes and imperfections on the surface that alcohol is very likely to miss and thus the contaminant molds or bacteria survive. Always flame before first use, and flame again between each jar to prevent cross-contamination. STERILE INOCULATION

*Clean clothes & work-place, along with good sanitary procedures. AND Hair covering (net/cap), face mask, exam gloves & Lysol/Oust. ARE YOUR BEST FRIENDS. These are common-place inexpensive items, found at most local drug/ pharmacy stores. Using these will cut down on contamination. I am amazed, why many don't use them. Then wonder why their jars/bags, syringes, prints or whatever get contaminated. HOSPITAL SANITATION

*The oven will increase contaminants by stirring up turbulence that swirls contaminants around. The oven tek is bogus. You'd be better off in a still room in open air than using the oven. An air temp of 150 won't do squat to a contam spore in the two seconds it takes to swirl into your jar. THE OVEN TEK

*Alcohol does NOTHING to prevent the contaminants that are inside the needle being injected into the grains. The size of the interior of a needle to a contaminant is comparative to the size of a human in a subway tunnel. Needles should always be flame sterilized. STERILE

*Spraying Lysol into the air is a waste of a good surface disinfectant. It does no good whatsoever. Use Oust to clean the air, Lysol or plain iso alcohol to clean tabletops. Other than that, it should be OK. Keep your cotton filter dry at all times or it will mold. STERILE

*If you fail to flame between jars, you can easily cross-contaminate between them. Flame between each and every jar. Alcohol is good for the surface of the jars and tabletops, but flaming is the way to sterilize a needle or scalpel, inoculating loop, etc. STERILE

*Lysol is a surface sanitizer. Get some Oust for the air. When you spray oust, it completely fogs up the room. I do about 30 seconds with a can in each hand, which really leaves a thick fog that kills airborne bacteria AIR SANITIZER

*Go to a drug store and get surgical masks. They're designed to filter 99% of your exhaled bacteria. One of those above is only good for 97%, and the other

one isn't even rated. You can do much better locally. SURGICAL MASKS

*There is always going to be a few contaminant spores on every print. There's no way to avoid them unless we grew on sterilized substrates in a hyperbaric chamber. STERILE PRINTS

*If you're not gloved up, wash like a surgeon with good soap, preferably something with exfoliant properties, and use hand sanitizer. STERILE PROCEDURE

*Anyone who recommends open air inoculations can be compared to a drunk who recommends drinking and driving. OPEN AIR INOCULATION

*If you want sterile(relatively) air, get a laminar flow hood. STERILE AIR

*You rarely see the old hands using any sort of 'positve pressure' box. A glove box need not be sterile or have sterile air. There is absolutely no way that a dust mask or even a vacuum cleaner hepa filter on a sterlite container with a computer fan is going to deliver better performance than a simple container with two holes cut for your arms, but otherwise closed up.
What you want in a glove box is to have zero air movement. You can lightly mist the inside air of the box with plain water, and this will attract whatever contaminants are floating around in the box to the water droplets, where they will fall by gravity to the bottom of your glovebox. After that, simply do your work wearing latex gloves. I use tyvek sleeves on my wrists, pulled down over the surgical gloves. Wash the gloves with alcohol before working. I have nothing at all attached to the glovebox. Just two 4" holes for my arms to stick through. The loose fitting sleeves seal around the holes well enough, and allows me to pull my hands in and out with ease to use my alcohol torch. (I don't like to use the flame inside the box due to excessive heat) My success rate with the glovebox described above is equal to that of my laminar flow hood. I prefer the flowhood because it's easier to work in front of and you have more room to move around. The problem with having a fan on your glovebox is it will cause turbulence inside the box, which will keep any contaminants in suspension where they are actually more likely to land on your project than without a fan. Best of luck.
A fan is the worst possible thing you can do to a glovebox. There is also no need to spray lysol or oust in a GB. Wipe it with a damp cloth and go to work. There is nothing sterile about a glovebox. STILL air is what you want. GLOVEBOX STILL AIR BOX

*Growers must realize that WE are the biggest source of contamination. I'll add to the above not to talk or sing, etc., while inoculating jars or doing other clean work.I Your breath leaving your mouth is traveling faster even than a flow hood can blow it back. It's also perhaps the largest source of bacteria in our jars. The bests surgical masks will stop 99% of the bacteria leaving your mouth, but think about that 1% of several billion that gets through. That's a lot of bacteria even with a good medical, not dust mask. I hold my breath anytime a jar or petri dish is open. Gloves are mandatory for consistent success. A box of them is less than the price of a single spore syringe. They'll save a lot of failures. CONTAMINANTS BY HUMANS

*If your box is draft free, then you can skip the mask and hairnet. Most of us use simple rubbermaid totes for gloveboxes, so breathing near the lid could get bacteria inside, so watch for that and either tape the seal or use a surgical mask. The air in the room doesn't need to be sterile by any means. As long as the glovebox has still air and you've sprayed inside with water, you'll be fine. Don't use flammable stuff in your glovebox. You can mist it with your regular mister with plain water, and whatever contaminants land on the floor or back and side walls, will stick there due to adhesion. GLOVEBOX/STILL AIR BOX

*The problem working bare armed is that several thousand dead skin cells per

hour fall off each arm. That is a fact of human metabolism. In fact, the overwhelming majority of 'dust' in a house or on the furniture is actually dead skin cells. If you work bare armed, those skin cells that flake off your arms now have a chance to fall by simple gravity into a jar or petri dish. With a freshly laundered long sleeved shirt, the shirt will catch the majority of those dead skin cells, thus protecting your project. The shirt does NOT need to be sterile, so please stop confusing the subject with this silly arguing. GLOVEBOX/STILL AIR BOX

*Soap lifts the oil and bacteria skin cells and washes away with water. There is no true "anti-bacterial" soap that will kill it all (THIS IS A MYTH). Even soap/ sanitizer can't even kill it all though. Skin is constantly shedding bacterial cells, You want the beneficial bacteria on your hands. True anti-bacterial soaps need to be left on for a couple minutes too. WASHING HANDS

*This is why I recommend soap and water only to clean a glovebox. Lysol and alcohol are both surface disinfectants, and you don't dump spores or mycelium on the floor of the glovebox anyway so they are of no use. Since all a glovebox does is prevent drafts that would blow contamination into your work, soap and water is all that is required to clean them. GLOVEBOX

*Skin, or eye exposure to hard UV light is KNOWN to cause cancer. I have used then in air sterilization. But, they were enclosed in 16 gauge sheet metal duct work. Which, the air was forced through in a hepa filter housing. Just be careful, malignant melanoma skin cancer is NO FUN. UV LIGHT CANCER

*Best way for filtered air exchange in a TIGHT clean room, or grow room is POSITIVE PRESSURE. Meaning, pump in hepa filtered air in a volume much larger than the outlet. Which creates mild positive pressure. Enough that nothing wisps in, except what you carry on you. FILTERED AIR

*Gloveboxes need not be sterile, and I never use lysol, etc., in mine. Fruiting chambers also need not be sterile. GLOVEBOX

*They use Banrot 40WP. I ran several experiments with this fungicide a couple of years ago. It is so powerful you can soak rye grain in it, then PC, then leave the lid off the jar for 24 hours in an open room, and the grains won't contaminate. It can also be applied to casing material, and I guarantee that no trich or cobweb will grow on it.
It works by preventing spore germination, so it has to be inoculated with live mycelium, as nothing will happen if you try to inoculate with a spore syringe. After determining that the Banrot 40WP works, I stopped the experiments because I see no reason to use chemicals to replace proper clean room procedure. A properly pasteurized, NOT sterilized casing layer will have no trouble surviving two flushes, which delivers 90% of the fruits you're going to get anyway. After two flushes, I recommend tossing the tray into your outdoor garden and replacing it with a fresh tray for the most effecient use of your growroom space. Thiophanate-methyl is approved by the FDA for use on mushroom crops and I ran some tests on it a few years ago. It's the active ingredient in Banrot 40WP. Banrot 40_wp is so powerful you can put it in a jar of grains prior to sterilization, then leave it sitting out with the lid off in a dirty room and it won't grow mold, but if you put live mycelium into the jar it will grow unaffected. However, it's a chemical cure for laziness so I don't recommend it. Just use proper procedure, then toss out contaminated projects. It seems I used 1 tablespoon of Banrot per the several gallons I soaked the 10 cups of rye berries in overnight prior to PC'ing. It's been awhile, so you might search some more and find the posts that I wrote when my memory was still fresh on it. FUNGICIDE IN CASING

*If fungicides have been used, they only effect spore germination. As long as you inoculate with live mycelium, there won't be a problem. You'll just have to do a test run. FUNGICIDES

*Dried Rhododendron leaves are nearly as effective if someone is really having trouble with trich or cobweb. Simply dry them, then grind up in your hands and mix with the casing material at the rate of ten percent. Pasteurize and use. Fungus spores won't germinate in the presence of Rhododendron leaves. RHODODENDRON LEAVES

*You can also suck them out with a vacuum cleaner hose, which is kind of fun. They normally bread in your houseplant soil then fly out of your mycelium to feed. They can be killed off in the houseplant soil by soaking the entire pot from the soil line below in the sink for 24 hours. This drowns the adults and larvae. I use sticky paper. Works like a charm. Place it near the entrances to your grow area, and also on the inside. They're likely breeding in your houseplants too. A good cure for both houseplants and casings with fruit flies is dunking. A 24 hour dunk will drown them and their larvae. If you'll cut a lemon or lime in half and leave one of the halves near your grow, they'll congregrate on the lemon rather than your mycelium. It's easy then to get them with the vacuum cleaner hose. Shot glass 1/4 full lof wine are good traps. Glass with coco cola in it, they drown from the sticky ness. Fly Straps, they work great. I'm not talking about little pest strips, but 2' x 4' mats. You might try some DE to see if it works, but it only works when dry, and it won't stay dry for long on a substrate. Disposal is probably the best option. You could bury them into manure or compost in a shady spot outside to get a crop. They looooove stale beer and wine. Leave a half full bottle of either lying around for a couple of days, not more, and they'll crawl in and drown in the stuff. change the bottle every couple of days. You can use the yellow duct tape, but put a layer of vaseline on it so they stick to it. That's what a lot of the farms around these parts do. DE will help if it's dry. You can even sprinkle it around the shelves, or try baiting them with a bit of honey on a piece of wax paper, surrounded by DE. One needs to be careful handling nematodes and growing mushrooms. Many species are death to fungi, while other types of fungi can trap and kill the harmful nematodes. BUG PROBLEM SOLVERS

/join #fungi (IRC) the Non Official Mycology Chat Where All Your Questions Shall Be Answered. Their will at least be a mycologist 24/7 to answer any questions. We're working on a bot too.

Edited by dumbfounded1600 (06/01/08 01:58 PM)

Post Extras:

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dumbfounded1600
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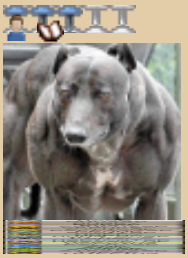

Registered: 07/29/07
Posts: 1,696

Re: All Of RR's Notes On Mushroom Cultivation Forum [Re: dumbfounded1600]
#8468527 - 05/31/08 07:02 PM

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PART 4 OF 5 LC/AGAR/CLONING/STERILE PROCEDURE/HELP/ PROBLEMS/OTHER

*My favorite method is to cut a lemon in half and leave it near the grow area. The gnats are attracted to the lemon much more than to the mushroom mycelium. You'll see the lemon covered in gnats, and then you sneak up with the vacuum cleaner hose and suck them all up. Works like a charm. GNATS

*They avoid turbulence, but it's also likely to dry out your substrates. Try this if gnats are a problem. Cut a lemon in half and drop it into the bottom of a quart jar. Keep the lid next to the jar. The gnats will be attracted to the citrus, and when there's a bunch in the jar, quickly put the lid on before they can get away, and dispose of them. GNATS

*Get a bag of DE from the garden center and sprinkle a thin layer on top of your casing. Completely cover the casing layer. The DE is extremely sharp to insects and will rip them to shreds when they crawl across it. DE is only effective until it gets wet, so you'll have to reapply it after misting. It's non toxic. BUG PROBLEM

*They're attracted by the smell of mycelium for a snack. I've never seen them set up home and breed in a cake or other project. While an irritation to see in our FC's, they're for the most part harmless. I chase them down with the vacuum cleaner hose if their numbers get too large. FRUIT FLIES BUG PROBLEM

*Another tip for ants is to put a bit of borax into a jar lid of honey or karo. The ants suck up the karo with the borax in it, then take it back to the nest to mix into the feed. Within two weeks, the entire colony including the queens is wiped out. ANTS ATTACK

*Dung/straw based substrate draw gnats (fruit flies). Your infested - already... Get electric bug zapper. BUG PROBLEM?

*Normally, they breed in your houseplant soil and then fly out to your mycelium to feed. They can be killed off in the houseplant soil by soaking the entire pot from the soil line below in the sink for 24 hours. This drowns the adults and larvae. FRUIT FLIES

*You can also get a bottle of red wine and drink all but the last inch in the bottom. Leave the bottle in the fruiting chamber as a trap. They're attracted to the wine, then can't get out of the bottle and drown. BUG PROBLEM

*Use 'Knock Out Knats' Bacillus Thuringiensis Thuricide to destroy gnats in your grow room. KNAT PROBLEMS

*Skin, or eye exposure to hard UV light is KNOWN to cause cancer. I have used then in air sterilization. But, they were enclosed in 16 gauge sheet metal duct work. Which, the air was forced through in a hepa filter housing. Just be careful, malignant melanoma skin cancer is NO FUN. UV LIGHT CANCER

*Sanitize means to reduce the number of contaminants to a safe or relatively safe level as may be judged by public health requirements.
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*Anyone who recommends open air inoculations can be compared to a drunk who recommends drinking and driving. OPEN AIR INOCULATION

*Clean clothes & work-place, along with good sanitary procedures.
AND Hair covering (net/cap), face mask, exam gloves & Lysol/Oust. ARE YOUR BEST FRIENDS. These are common-place inexpensive items, found at most local drug/pharmacy stores. Using these will cut down on contamination. I am amazed, why many don't use them. Then wonder why their jars/bags, syringes, prints or whatever get contaminated. HOSPITAL SANITATION

*The standard they're testing is how the mask protects the wearer, which we don't have a concern for. Our projects are not going to give us a fatal disease. Respirators are tight fitting around the cheeks, to prevent you from inhaling air from the edges that doesn't get filtered. This is important if you need protection from airborne pathogens. Surgical masks are open at the cheeks purposely to allow a low pressure route of escape for your exhaled bacteria(breath). What passes through the mask generally has 99% of the bacteria filtered out, depending on brand. Hospital operating rooms have HEPA filters in the ceiling that draw the room currents up and away from the patient. By having the doctor's breath leave in the direction of the ceiling, thus the filters, the patient is protected. This is our scenario as well. When the FDA says they don't test surgical masks, it means THEY don't test surgical masks. It doesn't mean they don't get tested. A surgical mask with the N95 rating is going to do our job just fine. However, a cheapie surgical mask works very well too. It's all I've used for years. The thing NOT to use is a construction type dust mask. SURGICAL MASKS

*Neither of the above. Go to a drug store and get surgical masks. They're designed to filter 99% of your exhaled bacteria. One of those above is only good for 97%, and the other one isn't even rated. You can do much better locally. SURGICAL MASKS

*Kitchens are the worst possible place to work. There is more fecal bacteria floating around a kitchen than in the bathroom right after you take a dump.
I've noticed the new growers that are saying it's ok to be nasty are also buying syringes from vendors so have their sterile lab work already done by someone else. That isn't mycology folks. When you learn to harvest a crop, take prints, germinate spores on agar, isolate strains, and produce a killer fruiting strain that blows you away with its potency, you'll understand what I mean.
Lab work isn't supposed to be clean. It's supposed to be laboratory sterile. No cut corners. When it comes to spawning a bulk substrate, who gives a shit if you pick your nose while working? It doesn't matter. If the grains were properly prepared and colonized in sterile conditions to full colonization, you can spawn to bulk outdoors if you want to. When you go to the Stamets seminars, you'll see Paul build a straw log or other project outside in the open air and it works fine. However, you can bet your ass the spawn wasn't produced outdoors in the open air.
Learn to be sterile where sterility is called for, and be clean where being clean is called for and you'll be fine. I live in a 40 year old condo building in a very damp climate and my entire building is infested with black mold, and it has wall to wall carpeting. It's unhealthy for us and we're trying to sell the damn thing so we can

move, but every project I've done has been done in this mold infested place, yet I can grow successfully by following the advice given above, and even filmed my video DVD here, doing lab work and growing a dozen or more species from spores to the fruiting/harvest stage. Several of my terrariums sit within 18" of a wall that has black mold growing on it, yet it NEVER grows on my cakes.
For sterile work, surgical gloves are a must, surgical mask is a must(dust masks are for carpenters, not surgeons), a still air glovebox or laminar flow hood is a must, A closed, draft free room is a must especially if you're using a flowhood, and spray the air with oust at least two or three times before starting the flowhood. I let the flowhood run for at least an hour in that closed and oust sprayed room before beginning work, which gives me time to shower, wash my hair and brush my teeth, use mouthwash, etc.
Once your spawn jars are fully colonized, you can scratch your butt while you inoculate the coir if you want. Bacteria isn't a contaminant of bulk substrates. The important thing is to learn when it's important to be sterile. If someone else is doing your sterile work for you, then don't brag about how dirty you can be and get away with it. Anybody can be dirty and get away with it under those conditions. STERILE

*There are up to 600,000 contaminants per cubic foot of air in a normal room. That's a lot of little nasties to stick to your needle or the top of your jar where it will get pushed into the substrate when you inject. A room also has normal circulation and all those nasties are moving around. You can see this on a bright day when the sun is shining in through a window. You'll see the larger of these dust particles, but there are hundreds of times that many smaller ones that you can't see. A still air box stops the movement of these particles, greatly reducing the chances they'll get on your jar lid or needle. You can also improve your chances by washing the glovebox and leaving the sides and bottom wet. The moisture will attract the dust/contaminants and then they'll stick, leaving the air within, not only still, but with much less contaminants floating. You don't want a filter and fan on a glovebox. The only suitable filters for mycology are several inches thick and require a plenum behind them to build static pressure, which gives the laminar flow. If you used a filter/fan in a glovebox, the turbulence would defeat the purpose. Where a glovebox really shines is when doing agar work or grain to grain transfers. They're not as good as a laminar flow hood by any means, but they're far better than open, turbulent air. Water or peroxide. A wet surface will make the contaminants adhere to it and stick, rather than floating into your jars. STERILE AIR

*Opinions are like something else every one has, so unless somebody wishes to quote some scientific texts to back up claims, let's not be spreading flames over our opinions. I can easily see how water 10,000 feet below the surface of the earth can heat to well over 100C without boiling. After all, think of the weight (pressure) a 10,000 feet deep well of water will exert on the water at the bottom. That's a lot more pressure then the walls of our PC's can contain. However, I doubt seriously the walls of an oven bag can exert that much pressure. There's no way to get every molecule of air out of a bag of coir or manure, even if it soaks in water for a month. In addition, even if it did, you'd be handling a bomb when you open the microwave. My background is engineering, not chemistry, so we should wait for one of the member chemists to chime in. The overall point is mute though, because sterilized substrates are much more likely to contaminate than pasteurized substrates. One shouldn't heat substrate or casing material above about 170F, or the chances of contamination are increased rather than decreased. STERILE

*Total sterilization would take at least 24 hours in the PC and your grains would come out as a sticky mush. The one to two hours we use for 'sterilization' gives us a window of opportunity to get the jars colonized before the contaminants that survived the pressure cooker can get a foothold. Don't wait three days. Instead,

if you're having contamination problems, simply cook up a few extra jars and always keep a blank or two at each step that you don't inoculate. If you do a grain to grain transfer, keep one jar back that you don't use for g2g. If you experience contaminants and your blanks are contaminant free, the problem was in your sterile technique. If both the blank and the inoculated jar contaminate, the problem was in your sterilization process. By using blanks at every step, you can always narrow down the problem to exactly the step you went haywire on. Once you get your procedures down pat, you won't need to use blanks. STERILIZATION JARS

*Flaming needles is to prevent cross contamination between jars. Syringes should always be boiled before re-use. This isn't a tek, it's simply stating what has been said over and over again for years. There is also no need or reason to PC a syringe. Plastic doesn't harbor bacterial endospores, so anything that might be on a syringe will be killed off by simply boiling. You still need to flame the needle between jars. As hyphae pointed out, you certainly don't need a separate syringe for each jar.
Alcohol does NOTHING to prevent the contaminants that are inside the needle being injected into the grains. The size of the interior of a needle to a contaminant is comparative to the size of a human in a subway tunnel. Needles should always be flame sterilized. STERILE SYRINGES

*Growers must realize that WE are the biggest source of contamination. I'll add to the above not to talk or sing, etc., while inoculating jars or doing other clean work.I Your breath leaving your mouth is traveling faster even than a flow hood can blow it back. It's also perhaps the largest source of bacteria in our jars. The bests surgical masks will stop 99% of the bacteria leaving your mouth, but think about that 1% of several billion that gets through. That's a lot of bacteria even with a good medical, not dust mask. I hold my breath anytime a jar or petri dish is open. Gloves are mandatory for consistent success. A box of them is less than the price of a single spore syringe. They'll save a lot of failures. CONTAMINANTS BY HUMANS BEING STERILE

*Nobody should ever recommend inoculations in open air, especially new growers that got started in the hobby during the winter when natural contaminant counts are low. In addition, the breath of the cultivator is the biggest source of bacterial contamination, and dust masks stop zero exhaled bacteria from reaching the work area. Dust masks are intended to stop the individual from inhaling large particles such as dust and dirt when mowing the lawn, but surgical masks are called for when doing mycology work. A surgical mask is designed to protect a patient from the surgeons exhaled bacteria, which is what we want to accomplish when doing sterile work. STERILE PROCEDURE

*Actually, that's a terrible idea and I cringe everytime I see it repeated. 'Sterilization' is never complete, but only gives a window of opportunity to get the grains colonized. Wait until the jars return to room temperature, and then inoculate. Glass is an insulator, so if they were even slightly warm on the outside of the glass, your spores are probably cooked and doomed. It never pays to be in a hurry in this hobby. Waiting twelve hours to inoculate is the proper thing to do, and you don't gain anything by doing it sooner. STERILIZING

*Boiling water IS enough to sterilize a syringe. Plastic does not harbor bacterial endospores, and fungi like trichoderma and cobweb are killed by temperatures far below boiling. I fill a pot with water and drop the syringe in. After the water has boiled for ten minutes, pull the syringe out and suck in the boiling water, swish it around and squirt it out. Do this a few times. The syringe will be sterile enough for mycology, I assure you. I've done it this way for years. BOILING/ STERILIZING SYRINGES

*I'd suggest an alcohol lamp to sterilize so you won't be anywhere near your

kitchen during inoculations. Kitchens are full of molds and mold producing/ carrying foods such as bread and cheese, vegetables, fruits, etc., not to mention all the bacteria that lives and breeds in the sink drain and in all those hard to reach to clean spaces. There's no need to wipe with alcohol after flaming the syringe. Wait two or three seconds and inject. Work in a glovebox of course. STERILE

*Swabbing the needle with alcohol does nothing for the contaminants that have become lodged in the interior of the needle. In addition, look at a needle under a microscope. There's many little holes and imperfections on the surface that alcohol is very likely to miss and thus the contaminant molds or bacteria survive. Always flame before first use, and flame again between each jar to prevent cross-contamination. STERILE INOCULATION

*A bic lighter is fine. A butane type lighter is hotter and won't leave carbon on the needle, but as long as you get it red hot it's fine. Allow to cool for 2 seconds and use. The needle will still be hot, but not red hot, and the first half drop of solution will cool it off safely, allowing the rest to flow cleanly. Use a glovebox. STERILIZING NEEDLE FOR INOCULATION

*The problem is the alcohol doesn't penetrate to the inside of the needle. I suggest flaming the needle red hot, then using the first couple of drops from the syringe to cool it down. That way, you know the inside and outside of the needle are sterile. In other words, heat it red hot, then allow to cool for only a few seconds and use. NEEDLE STERILIZATION

*If you flame sterilize, anything you do afterward will only make the needle 'dirtier'. Why not just flame and use? Forget the alcohol after flaming. There is no need to cool down the needle. Just use hot and let the first drop or two of solution cool the needle, so the rest can flow contaminant free. STERILIZING NEEDLE

*Alcohol does NOTHING to prevent the contaminants that are inside the needle being injected into the grains. The size of the interior of a needle to a contaminant is comparative to the size of a human in a subway tunnel. Needles should always be flame sterilized. STERILE

*Spraying Lysol into the air is a waste of a good surface disinfectant. It does no good whatsoever. Use Oust to clean the air, Lysol or plain iso alcohol to clean tabletops. Other than that, it should be OK. Keep your cotton filter dry at all times or it will mold. STERILE

*If you fail to flame between jars, you can easily cross-contaminate between them. Flame between each and every jar. Alcohol is good for the surface of the jars and tabletops, but flaming is the way to sterilize a needle or scalpel, inoculating loop, etc. STERILE

*70% is more effective at killing organisms than 91%, but in my opinion, syringe needles should be flame sterilized. Alcohol on a cotton wad will do nothing for contaminants on the inside of the needle. STERILIZING NEEDLE

*Sterilization kills all life forms. After sterilization, you need to keep the substrate under sterile conditions until fully colonized or it will contaminate. That's why we use filter patch bags or jars with filters. STERILIZATION

*There is always going to be a few contaminant spores on every print. There's no way to avoid them unless we grew on sterilized substrates in a hyperbaric chamber. STERILE PRINTS

*If you're not gloved up, wash like a surgeon with good soap, preferably

something with exfoliant properties, and use hand sanitizer. STERILE PROCEDURE

*Alcohol your gloves and tyvek wrist sleeves, spawn jars, flame and alcohol transfer tools, scalpels, etc. STERILE PROCEDURE

*If you flame between each jar, you eliminate the possibility of cross contamination. FLAMING SYRINGE NEEDLE

*If you want sterile(relatively) air, get a laminar flow hood. STERILE AIR

*Pasteurization should not be longer than 90 minutes or too many of the beneficial organisms will be killed off, thus leaving the substrate open for contaminants later. Water is a much better conductor of heat than air, thus water or steam pasteurization the preferred method. Water or steam will conduct heat into the substrate fastest, thus allowing you to more precisely control the total amount of time at pasteurization temperature. PASTEURIZATION

*Pasteurization of substrates doesn't take a few seconds. It takes an hour. The idea is to kill all of the mold spores, and some of the bacteria. The surviving bacteria keep the substrate 'alive', thus reducing the chances of molds forming. A few bacteria in a substrate will also improve fruiting, and some species simply will not fruit on a sterile substrate. PASTEURIZATION DISCUSSION

*You'll want to get your material to the proper moisture content before loading into bags or jars. Let the substrate sit for half an hour, and then re-adjust to field capacity. Oven bags are for cooking turkeys in the oven. They're not suitable for stovetop pasteurization, so use jars or filter patch bags, which don't need to be sealed first. PASTERUIZATION

*Pasteurization only kills fungal spores, leaving the beneficial bacteria intact. After pasteurization, the substrate need not be kept sterile, so it's suitable for bulk substrates such as straw and manure that are too big for filtered jars. PASTEURIZATION

*You'd have an easier time if you divided it up into several smaller bags or jars rather than one large one. You want to maintain 140F to 160F in the center of the bag for one hour for pasturization. PASTERUIZATION

*You should pasteurize the coir. Some, including me have used it unpasteurized with success, but additives such as compost and/or manure definitely need to be pasteurized, so just do it. PASTERUIZING

*Open water pasteurization sucks, at least put it in a quart jar. Reason being, because it loses nutrients and the screws up the water content. PASTERUIZATION

*I can pasterize in a Crock Pot IF I can watch and control the temp! PASTERUIZATION

*For larger jars or substrate bags, I've got a little different technique to know how long.
The bacterial endospores in grains need about 30 minutes @ 15 psi, at sea level, to ensure they're killed off. That does not mean 30 minutes from the time your PC reaches pressure, but 30 minutes from the time the interior of the jar or bag of grains reaches full temperature. The way to achieve this is to always use the minimum stove setting that will hold 15 psi. If your PC rattles at 15, then use 14 so it doesn't rattle at all. Now, you'll notice after pressure is reached, for about 1/2 an hour or so, you'll have to constantly turn down the stove in order to prevent the weight rattling. Once you reach the point where you don't need to reduce the stove burner anymore, your substrate is fully heated all the way through. At this point, allow 1/2 hour to ensure the bacterial endospores in the very center of the substrate bag are killed off. If you're above 5,000 feet

elevation, double the above time to one hour. PRESSURE COOK TIMES

*You can remove the jars when the pressure cooker returns to zero pressure, but I'd still wait a little while. If you remove the jars while they're too hot, they can loose some of their mosture content to evaporation. Overnight is not necessary, but if you're going to lt them sit anyway, the PC is a fine place to leave them. If you need to cook another batch, then there's no harm in removing them. Allow to cool to near room temp before inoculating. PRESSURE COOKING

*The biggest cause I see of dry jars is lifting the weight or relief valve to let pressure out faster at the end. That causes the grains that are at a temperature above the boiling point of water due to pressure, to suddenly loose all their moisture because the pressure that was holding the moisture in place disappears. Let the PC cool naturally until you can handle it without gloves or a pot holder before opening. PRESSURE COOKER

*POINT OF A PRESSURE COOKER....IN GENERAL: Canning and cooking foods faster/ with less nutrition loss.....MYCOLOGY: Makes it so you don't lose juices and all in roasts and stuff too. Steam steralization at temps higher then boiling water can exhibit. PRESSURE COOKER

*Sterilization is never complete because that would take overnight in the PC, which would turn the grains to mush. The hour or two we PC gives a window of opportunity for the mycelium to colonize and get a grip on the grains, but it's only a window. STERILIZATION

*If you are going to give it a SERIOUS go. All American PC is BEST PC EVER. Bigger the better. Build (at least) a GLOVE BOX. Better yet a HEPA FILTERED FLOW HOOD. FIND HORSE MANURE. Learn WBS & G2G. Learn PH of casing is important. BEST PC BULK

*Leaving unsterilized grains in a closed jar is a breeding ground for contaminants. The more contaminants you have in a jar, the more are likely to survive the 'sterilization' process. LEAVING JARS AFTER STERILIZATION

*I use 90 minutes for quart jars at 15 psi. At 10 psi, go for two hours. I wouldn't attempt corn at ten psi. Corn sucks anyway as a spawn. Just use rye or wbs. PRESSURE COOKER

*You rarely see the old hands using any sort of 'positve pressure' box. A glove box need not be sterile or have sterile air. There is absolutely no way that a dust mask or even a vacuum cleaner hepa filter on a sterlite container with a computer fan is going to deliver better performance than a simple container with two holes cut for your arms, but otherwise closed up.
What you want in a glove box is to have zero air movement. You can lightly mist the inside air of the box with plain water, and this will attract whatever contaminants are floating around in the box to the water droplets, where they will fall by gravity to the bottom of your glovebox. After that, simply do your work wearing latex gloves. I use tyvek sleeves on my wrists, pulled down over the surgical gloves. Wash the gloves with alcohol before working. I have nothing at all attached to the glovebox. Just two 4" holes for my arms to stick through. The loose fitting sleeves seal around the holes well enough, and allows me to pull my hands in and out with ease to use my alcohol torch. (I don't like to use the flame inside the box due to excessive heat) My success rate with the glovebox described above is equal to that of my laminar flow hood. I prefer the flowhood because it's easier to work in front of and you have more room to move around. The problem with having a fan on your glovebox is it will cause turbulence inside the box, which will keep any contaminants in suspension where they are actually more likely to land on your project than without a fan. Best of luck.

A fan is the worst possible thing you can do to a glovebox. There is also no need to spray lysol or oust in a GB. Wipe it with a damp cloth and go to work. There is nothing sterile about a glovebox. STILL air is what you want. GLOVEBOX STILL AIR BOX

*You can also cut the holes so they're fairly snug around your arms, then just wear latex gloves. Be sure to wash your hands and arms first, then put on a freshly laundered long sleeve shirt to cover the skin on your arms.(dead skin cells flake off all the time and they'll have bacteria) Remember, a glovebox does not have to be totally airtight or sterile. It only serves as a place for you to open or inoculate jars or petri dishes in a draft free environment. I haven't used attached gloves in years because they're such a pain in the butt to work in. Latex gloves give you really good control. Of course, do your glovebox work in a very clean room with no fans or air conditioners etc running. STERILE TECHNIQUE GLOVEBOX

*If your box is draft free, then you can skip the mask and hairnet. Most of us use simple rubbermaid totes for gloveboxes, so breathing near the lid could get bacteria inside, so watch for that and either tape the seal or use a surgical mask. The air in the room doesn't need to be sterile by any means. As long as the glovebox has still air and you've sprayed inside with water, you'll be fine. Don't use flammable stuff in your glovebox. You can mist it with your regular mister with plain water, and whatever contaminants land on the floor or back and side walls, will stick there due to adhesion. GLOVEBOX/STILL AIR BOX

*The problem working bare armed is that several thousand dead skin cells per hour fall off each arm. That is a fact of human metabolism. In fact, the overwhelming majority of 'dust' in a house or on the furniture is actually dead skin cells. If you work bare armed, those skin cells that flake off your arms now have a chance to fall by simple gravity into a jar or petri dish. With a freshly laundered long sleeved shirt, the shirt will catch the majority of those dead skin cells, thus protecting your project. The shirt does NOT need to be sterile, so please stop confusing the subject with this silly arguing. GLOVEBOX/STILL AIR BOX

*A glovebox can never rival a flowhood, although one can certainly screw up a glovebox by placing fans and filters on it.
A still air glovebox can be used with the same success rate as a laminar flow hood, but is much more cramped to work in. A flowhood gives you a sterile work space that is big enough for your elbows to move around in. GLOVEBOX VS AIR FILTER

*This is why I recommend soap and water only to clean a glovebox. Lysol and alcohol are both surface disinfectants, and you don't dump spores or mycelium on the floor of the glovebox anyway so they are of no use. Since all a glovebox does is prevent drafts that would blow contamination into your work, soap and water is all that is required to clean them. GLOVEBOX

*Glovebox Hands down beats oven box, too many contaminants in your oven also theres moving air coming in and out of it because it can't be closed unless you can fit inside it :p. GLOVEBOX

*Gloveboxes need not be sterile, and I never use lysol, etc., in mine. Fruiting chambers also need not be sterile. GLOVEBOX

*I just use soap and water to clean the inside. STILL AIR BOX

*Cheap timers won't have the switching capacity to run an air conditioner. You'll

need to get an intermatic timer in the metal box from an electrical supply. Sometimes you can get them at lowes or home depot, but make sure they have the 'amp' rating that matches or exceeds the nameplate 'amps' on your AC. TIMERS

*The Journal of Medicinal Mushrooms has as it's editor in chief, Mr. Solomon Wasser, and on the editorial board, another 'lay' person, Mr. Gaston Guzman. Perhaps you've heard of those two?
The issue I'm holding in my hand has articles from such 'lay persons and hobbyists' as Paul Stamets, Christopher Hobbs, John Holliday, Gaston Guzman, Toshihiro Hashimoto, Soloman Wasser, Gregory Plontnikoff, Daniel Winkler and others too numorous to mention.
I feel strongly on a board focused on mycology we should concentrate on mycology and not vulgarity, however, feel free to call it whatever you wish. BOOKS

*I'd recommend both of paul's cultivation books. The Mushroom Cultivator for a good basic mycology course, and Growing Gourmet and Medicinal Mushrooms for some more advanced tips, correction of a few mistakes in TMC, and detailed descriptions and pictures of common contaminants. These are mushroom growing books, not specifically psilocybe growing books. Those I've seen that only show how to grow cubes are lame and inaccurate at best. BOOKS

*Anytime a spot forms on a cap from damage, it's there forever. It won't 'heal'. The fuzz on the stem is fine, and doesn't mean humidity is too high. It seems to happen with some strains/substrains. Look closely at what you see. Think about when you hit your own body on something and it bruises. The color you see is your actual skin color. That's bruising. Now think about when you get a bad scrape or cut and if forms a scab. The scab sits above your skin as a separate layer. A scab on your body corresponds to mold on your substrate. The mold will be a layer above the substrate. DAMAGED FRUITS

*Everybody knows about the pure distilled water in a clean, smooth container being able to be superheated slightly above 100C and remain liquid. There's dozens of demonstrations on youtube and others. However, coir or anything else mixed with water can NOT be heated above 100C without the water changing state to a gas. It doesn't matter if there's any air above the water or not. DISTILLED WATER

*I found this "dust" of Bacillus Thuringiensis for begetables. It was not labled for fungus gnats, and it was not the substrate of this species indicated for controlling fungus gnats. It was really for chewing caterpillars, etc. It's called "Dipel 150 Dust." Five bucks for a pound. The values for treating soil are absurd (too low for me to apply to a casing) so I took a tea-straining teaspoon (one of those latch-and-strain teaspoons) and put it down in the container the bacillus dust and clipped it shut against the side of the conainer (while still inside) then brought it out and shook it over my casings. There was a layer of this dust that sort of looked like a fine, white snow. I applied this once, then a couple of days later again, then about a week later again. I applied it 3 or 4 times, and, as the bacillus thuringiensis propagated and interfered with the life cycle of the fungus gnats, the adult population began to wane. Over the course of around a month, I've gone from gnat-body-littered stickytape traps changed once a week or so, to, no visible adult gnats in the terrarium. It appears this particular product, though it takes a few weeks, will effectively disrupt and wipe out the fungus gnat life cycles on casings. EXPERIENCE

*36 years. In 1971, I brought home a cow pie that had cubes growing on it because I could see 'mushroom roots' covering the whole bottom of the patty. I mixed it into my compost pile and forgot all about it until the fall rains came when I found hundreds of cubes all around the base of the compost pile. I've

been hooked ever since. It actually took me well over a year to learn that mushrooms don't have roots. There were no books on cultivation at the time, and of course no internet. The Dallas, Texas public library was my only source of information. I finally found Alexander Smith's field guide to western mushrooms in the mid 70's, and learned a lot about mushrooms from that, even though it's not a cultivation book. EXPERIENCE OF ROGERRABBIT

*Actinomycetis. It will also grow on coffee grinds if you store them for any length of time. FIRE FANG

*They love the fruit bowls and anything else sweet. They're attracted to the smell of the mycelium, but they don't usually breed in our projects. They rarely cause much problem unless they're there by the thousands. I've never had a single contaminant that I could blame on them and I live in fruit fly/gnat heaven. Normally, they breed in your houseplant soil and then fly out to your mycelium to feed. Fruit flies have about a 20 to 30 day life span. They go from egg to larva to adult flies. The adult stage is about 7 to 10 days of the span & in that time, 1 adult can lay about 700 to 800 eggs. The flies do not lay eggs at temperatures below 54 F (12 C) or above 91 F (33 C). GNATS/FLIES INFO

*Half gallon jars often go anaerobic in the centers. It's also harder for the CO2 to escape the larger jars. Personally, I don't use anything larger than quarts, even though I have five or six cases of half gallon jars in storage. Try leaving the jars laying on their sides. Next grow, I'd suggest quarts for grains. In addition, the larger the container, the drier you make the grains. You'll use about 20% less water(per measure of grain) with half gallons than you'd use with quarts. HALF GALLON

*By Visions method if I remember correctly, you're not supposed to mist the sides. Let them dry out, and the dry straw serves as the contamination barrier. He poured water down from the top. I do it a bit different by placing in a bag or large tote with holes cut into it for gas exchange. This keeps the CO2 levels higher during colonization, which actually prevents the mycelium from turning as much of the subsrate carbon into CO2, which reduces the size of the substrate greatly. About a week after full colonization, I introduce to the normal fruiting conditions of high humidity and lots of air exchange. I don't fruit them in open air unless it's the rainy season outdoors, in which case I set them on the back porch to fruit. You can see a short, low resolution preview video of the way I do it on my website. LAUNDRY BASKET TEK DISCUSSION

*My system is to list the date first, parent species second, then strain third, and then each transfer beginning with the letter 'A' and going through the alphabet. Assume the species is Reishi, and the strain is my 'sheriff'.(sherrif strain got its name because a dumbass sheriff gave me a bogus ticket the day I cloned it, but that's another story) A swipe of spores made today on agar would be labeled 042607RS. Assuming three days from now I make a series of transfers of the first mycelium to germinate from spores, they would be labeled 042907RS A1, B1, C1, D1, etc. As the strains differentiate, the next series of transfers would be labeled (date)RS-A1-A, (date)RS-A1-B, etc. From the second original dish, the second set of transfers would be (date)RS-B1-A, (date)RS-B1-B, etc and right on down the list. It's important to be consistant with your system all the way to fruiting because when you find that awesome fruiting strain three months from now, you want to be able to go back to the original dish in the refrigerator that corresponds to the fruiting tray, pull it out and make a master culture slant from it. That way, you preserve the genetics of a great strain from a very early time in its life before many cell divisions have occured. LABELING

*Agreed. My bitch is that when people move to edibles/medicinals they have to un-learn all their bad habits, essentially starting the learning curve all over again. With cubes, they'll fruit on just about anything, regardless of how you prepare

the substrate, so they're like learning to ride a bike with training wheels. However, if you don't learn to ride without those training wheels, you'll look awfully silly someday when you grow up and have to bolt them on your harley. That's why I suggest pasteurization of bulk substrates and casing material. However, this has all been covered before, so do a few searches and you'll find all you ever wanted to know from both sides of this coin. LEARNING

*If you want good pics, get ready to spend some bucks. I've got a few cheapies that just sit on the shelf, and never get used anymore. You won't get quality for less than $1,000 and that's the low end. A decent C-mount microscope camera is going to cost $2,000 just for the camera. In fact, the camera will cost more than the scope. You can pick up a pretty good scope for $1,000 whether you want zoom or light microscope. I actually use my zoom more than the light in mycology. The zoom microscope is great for looking at mycelium on petri dishes, gills on mushrooms, and other stuff like that. If you want to see on the cellular level, you'll need a light microscope and a box of slides and covers. I had a whole section on microscopy filmed for my video, but had to cut it out because there just wasn't enough room on the 2 dvd set for it. Perhaps it will fit into one of the future releases. I'm already working on the next one. Stereo microscopes are for looking at something from the top. The lens and the light are on the same side of the object you're viewing. Stereo microscopes are for looking at gems, coins, bugs, and mycelium on a petri dish to examine for contaminants, etc. A zoom microscope is a stereo microscope with an adjustment to vary the magnification without changing lenses. Maximum magnification with stereo-zoom and zoom microscopes is usually around 20X to 30X. I have a pretty high end zoom microscope that goes to 50X, but the field of view at that magnification is pretty darn small, defeating the purpose of using a stereo microscope in the first place. A light microscope has the light on the opposite side of the lens from the object you're viewing, thus you see the light that shines through the object. Laboratory and medical microscopes are the light type. If you want to examine the internal structure of spores, or view mycelium to look for the number of nuclei in each cell or to look for clamp connections, you'll want a light microscope. If you order a stereo microscope, be sure to get LED lights, even if they're more expensive. Coin collectors and jewlers can use the cheaper halogen that seems to be standard on stereo microscopes, but the heat will cook your mycelium, and if you look at something inside a petri dish, the dish fogs up in three or four seconds from the heat, blocking your view. There's some pictures taken with a light microscope on my website on the introduction to mycology page http://www.mushroomvideos.com/1811640.html along with the mushroom gill shots which were taken with a zoom microscope, and the basidia pictures at the bottom of the page were taken with a scanning electron microscope. The pictures of verm and perlite in this thread http://www.shroomery.org/forums/showflat.php/Number/6610766#Post6610766 were taken with a stereo zoom microscope. LOOKING FOR A MICROSCOPE

/join #fungi (IRC) the Non Official Mycology Chat Where All Your Questions Shall Be Answered. Their will at least be a mycologist 24/7 to answer any questions. We're working on a bot too.

Edited by dumbfounded1600 (06/01/08 02:02 PM)

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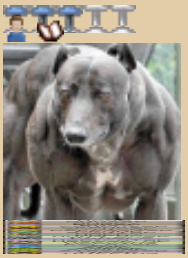

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Last seen: 21 minutes, 12 seconds

Re: All Of RR's Notes On Mushroom Cultivation Forum [Re: dumbfounded1600]
#8468529 - 05/31/08 07:03 PM

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PART 5 OF 5 LC/AGAR/CLONING/STERILE PROCEDURE/HELP/PROBLEMS/OTHER

*I know the owners of several local mushroom farms in my area and every single one of them got their start with growing magic mushrooms, then went into the legal business. They're business people and hard workers, but far from prudes. Just put down that you have experience and cautiously decline to talk about species during the interview and they'll get the point, but at the same time know you're being discrete. None of them will hire someone who brags about psilocybes because that could bring heat on them. That said, most of the jobs at mushroom farms are just labor. There's lots of compost to turn, trucks and tractors/forklifts to drive and floors to sweep and high pressure wash. Unless you get a job in the 'lab' it isn't going to be much to do with mushrooms unless you're a picker, and in that case you have to learn to work very fast, which is darned hard work, and stops being fun after the first fifteen minutes. MUSHROOM FARMER

*It's substrain related. Very good tendency in my opinion, because little damage is done to the casing layer when they fall over or are picked. MUSHROOMS FALLING OVER

*Early mushroom growers followed on the agaricus farmers knowledge and grew their mycelium in the dark and had good results. Therefore, the wrote that mycelium should be 'incubated in total darkness' and that myth is being repeated thirty years later, even though it is just plain wrong. MYTH

*Myth: If you can see the tray, it has enough light.
Reality: Bullshit. Bright, high frequency light is much better. Natural daylight fluorescent or metal halide will give the best pinsets.
Myth: You only need a few minutes of light per day.
Reality: Bullshit. 12/12 has been proved for years and years to be many times better.
You don't find the experienced growers making those silly statements.
Fluorescent light. MYTHS

*Sure, you can half-ass the light and still get a crop. You can half-ass a substrate and still get a crop. You can half-ass a fruiting chamber and still get a crop. You can half-ass on air exchange and still get a crop. You can half-ass on humidity and still get a crop. However, if you skimp on all of them, you get nothing. If you work hard on every aspect of growing, you'll get spectacular results. That's why those of us who know try to advise on the best ways to get the results most of us are looking for. NOOB SPEACH

*Don't use urea. If you feel you need a nitrogen boost, use chicken manure, but at no more than 5% of the total bulk substrate. Make sure the chicken manure has cured in the sun for at least a week or two and has zero smell. Otherwise, spread it out on cardboard in the sun until it's dry and odor free. NITROGEN

*Don't use blood meal because it doesn't do much good unless it's been composted in a pile. Fish emulsion does no good at all. Remember, mushrooms are not plants and need to eat their food to get energy. They don't get energy from the sun, so fertilizers are useless. NITROGEN ONLY WHEN COMPOSTED

*One needs to be careful handling nematodes and growing mushrooms. Many species are death to fungi, while other types of fungi can trap and kill the harmful nematodes. NEMATODES

*TMC is a classic and I still refer to it a lot. In the last twenty years we've learned a few things though. One, as hyphae said is the mycelium metabolytes. Another is that colonizing mycelium need not be kept in total darkness. I think Paul fixed that one in GGMM, but I know at his beginners and masters seminars he points that out, and his own incubation rooms filled with hundreds of species, are under 8 to 12 hours per day of fluorescent lighting while work is being done. That has been my experience as well. Light doesn't become a significant pinning trigger prior to full colonization and the introduction of fresh air exchange. This one is probably nitpicking, but I don't like the TMC method of preparing grain jars which is add dry grain, add water and a pinch of gypsum, and PC. We now know that if you'll take the time to rinse the grains very well before cooking, they don't stick and clump up later. OUTDATED MISINFORMATION TMC

*Grow them exactly like cubes, except use a thinner substrate of horse or cow manure no more than 2 inches thick, and a 1/4" peat based casing layer. Other than that, don't do anything different. They're not as cold temperature tolerant as cubes, so try to keep fruiting conditions in the 75F to 85F range. They usually take a few days to a week longer to pin than cubes as well. Shotgun terrarium will work fine. I don't like them anymore. The trip always seemed a bit on the dark side, not pleasant at all in my experience. Good luck. PAN CYANS

*PE's don't pin well unless you do strain isolations and find a really good fruiting isolate. What you have is about average pinset for multispore inoculation. PENIS ENVY

*Colonizing twice as fast isn't necessarily a good thing. If the mycelium is starving, it will search for food. Since the vermiculite is inert, it won't find it. We see the same thing when people use popcorn for spawn. The jars colonize twice as fast as rye, but have only half or less as much mycelium per jar. There is no advantage. POPCORN

*As we know, when mushrooms grow, they don't grow by cell division. The cells expand as they engorge with water. A small pin has all the cells it will have as a large mushroom. That's why a small fruit has nearly as much actives as a much larger fruit. The larger fruit is engorged with water, thus it's less potent by weight. That's a fact. Five grams of small mushrooms are far more potent than a single five gram fruit. That's also a fact. The picture of fahtsters above is in the pinning stage. Only a few of the caps have started to tear the veils. The picture from 24 hours later is on my video, and they're quite a bit larger. All bs aside, you don't compare the size of fruits from a four to six inch deep substrate to fruits from a half pint cake. This argument will be going on long after we're all dead and buried. I just won't have people trashing teks because they're unable to pull off grows with them. Ask any long-time grower who has used all methods, and most will tell you for large amounts of fruits, go with bulk substrates such as manure or coir. However, most of us aren't into selling mushrooms, and a few cakes are more than enough for personal use. There is no difference in potency between mushrooms from cakes and from bulk substrates, unless one lets the fruits from the bulk substrate get very large, at which time they're considerably weaker. Think of it like a balloon. If you blow it up bigger, you don't increase the amount of rubber in it. PSILO

*Sclerotia is a much better experience, and the taste doesn't gag you at all. I've found mexicana to be much more like acid than mushrooms. It's a cleaner trip, without the body numbing that makes it hard to move or communicate with cubensis. I've also found sclerotia to be a much more spiritual trip than cubes. In addition, it's shorter lasting, so it's not out of the question to do on a weeknight, when you have to be at work the next day. They're my favorite, along with ps cyans. I use rye berries, but they're simple as pie to clean up. Simply take a stone in your hands and rub the grains off with your fingers. The texture is similar to nuts, and the mushroom taste is mild and not unpleasant at all. SCLEROTIA

*You want your grain master to be fully colonized, then bang it a few times against a fully inflated tire to separate the kernels. With the kernels separated, you can carefully pour the loosened grains from the master to the receiving jar. Be sure your receiving jars have been prepared no more than 2/3 full, so that you can pour a tablespoon or two worth of grains from the master without overfilling the receiving jar. No jar should be filled more than 3/4 full after the g2g transfer, because you need room to shake it later.
Hopefully, you have a flow hood, but whether you're using a flowhood or glove box, try to get the transfer done within just a few seconds to limit the amount of time the lid is off each receiving jar. With time and practice you'll develop a technique where you twist the master jar as you pour so the grains will flow out smoothly.
Don't be distracted by the pictures of Paul doing g2g with bare hands. I cringe everytime I see those. Wear latex gloves and wipe them down with alcohol after putting them on. Also, wipe down the exterior of the master and receiving jars with alcohol before the transfer to limit the chances of contaminants from the exterior finding a way inside. SPEACH

*Don't kill the spiders. They eat fungus gnats that WILL cause you problems. A grow chamber need not be sealed up, nor sterile. You want air exchange to prevent trich and cobweb, so naturally the gnats will get in, and so will the spiders. Spiders are our friends. SPIDERS

*Often, a grower puts a tray in the refrigerator, and a few days later gets pins. Thus, the connection is made that the drop in temperatures caused the pinning. It makes sense right? However, what if he had a tray that he exposed to a ten degree temperature rise and a few days later he got pins? Could he not make the same case that the increase in temperature caused the pinning? In fact, this is what happens in nature. A summer rain(thunderstorm) comes, which 'dunks' the substrate, and then when the sun comes out, the mushrooms pop up very fast, often in 80's and 90's degree temperature. One could make a very good case that in nature, it's the increase in temperature that stimulates the pinset. It's a survival mechanism. They need to spread spores before the mycelium dries out again. I've done both of the above scenarios dozens, if not hundreds of times to get to the bottom of this. That's the reason I say what I do that temperature drop does not play a part in the pinning strategy of tropical species. In fact, some of the best pinsets came when fruiting conditions were five degrees or more warmer than colonization temperature. Cold shocking is the signal that fall fruiting mycelium needs to begin producing fruits. Shiitake, P cyanescens, p nameko, etc., to name a few require a cold shock to fruit. Cubensis, H ulmarium, Pan Cyanescens, etc., do not require a cold shock. The above is not to discourage experimenting in any way. However, get your ducks in a row, and have many duplicate projects made exactly the same way, and spawned, colonized, cased, etc., exactly the same way, and then cold shock some, and increase temps on others. Keep controls that fruit in exactly the temperature they colonize in. From my experience, if you do the above, your results will vary. Sometimes the cold

shocked tray will fruit sooner, but other times later, often much later. Ditto for the other parameters. This is what has led me to my conclusions. The other pinning triggers of full colonization, increased air exchange, and near 100% humidity far outweigh temperature considerations. Good luck to all.
Experimenting is how we learn. I store master slants in the refrigerator for years at a time. I've never had one single invitro mushroom from a tropical species ever form in a slant. Cause and effect can be tricky sometimes. For example, if you get drunk as snot and drive, you're more likely to get in a car accident. However, what if you have a cup of coffee in the morning and then get in an accident while sober? Did the coffee cause the accident, or was it just 'your time'? My experience says a tray that fruits after being put in the refrigerator was about to fruit anyway. The fridge probably delayed it by a day or so in fact. There used to be a mindset that mycelium could compare to weed, where (in the case of weed) changing the photo period would signal a change from vegetative growth to flowering. It was thought that a temp drop would change mycelium from vegetative growth to fruiting. However, after many side-by-side tests, I've personally ruled out such a phenomena, so I pass that info along. Feel free to experiment to either prove or disprove the above. In no way do I consider my experiences the last word on the subject. Mushroom cultivation, especially when compared to crop farming, is in its infancy and we're still learning. STORING REFRIGERATOR

*Or, spend $99 and buy a dorm type refrigerator brand new, and never put anything but mycology projects and unopened cans/bottles of beer in it. STORAGE MYCOLOGY

*Latex tubing can be used over magnetic bars in order to lower the noise of the magnet. STIR BARS

*Dextrose and Karo are pretty much the same thing, Glucose. SUGARS

*Water boils at 212F/100C. You can't boil at 300F without a LOT of pressure. It doesn't matter how hot your stove is or how rapidly the water is boiling, it will be at 212F/100C. TEMPERATURE

*Terra-Sorb Terra-Sorb is a "water crystal" made from a synthetic polymer related to super glue. This brand is made from potassium and there are others made from sodium. The crystals can absorb 400 times their weight in water, and then release it slowly back into their surroundings. They have been tested and shown to be non-toxic and environmentally benign. They have been used in mushroom cultivation and shown to not incorporate themselves into the fruit at all. Over time they will just break down to carbon dioxide and water. They drastically reduce the need for misting a casing and in some instances will eliminate the need all together depending on the fruiting chamber. Just looking for anyone's experience first hand with this product. It is not a secret that it works or exists and given it's ability I would think many others before me would have tried it. TERRA SORB WATER CRYSTALS

*Mutli/spore innoc, day six.
5 squirts, 1 each corner, 1 down center, about 2.5 cc per jar.
agar is GREAT, because you can tell if any culture is contam'ed - or not.
Liquid Culture (LC)is fastest - I ever had.
Matter of fact, once tried LC straight into pasturized compost substrate, supplimented with 25% PC'ed bulk WBS.
Worked GREAT (but, must have very aseptic enviro to incubate in). THE WAY IN

*It's well known that cold damages tropical species and thus they should never be 'cold shocked'. TROPICAL SPECIES

*You cannot get BETTER, FASTER, CHEAPER.....TRUE STORY

*Spawn: Noun form: Grains, brf, etc., fully colonized with mushroom mycelium.
Spawn: Verb form: To mix the above defined colonized grains into a substrate.
Substrate: Manure, compost, coir, coffee grinds, etc. Substrate is the food the mushroom mycelium eats. In the case of brf cakes, the brf is both the spawn and the substrate.
Casing: The non-nutritious, moisture-holding layer we place on top of a substrate as a water reservoir to supply the substrate with the extra moisture it needs to support the developing flush of mushrooms.
Patching: Applying a small amount of casing material over the mycelium that is poking through the casing layer. This allows that mycelium to continue growing, while waiting for more mycelium to reach the surface of the non-patched areas. This results in a more even pinset. VOCABULARY

*A pf jar for example is a substrate when fruited directly from the cake. However, a pf jar is spawn when used to inoculate manure or straw, etc.
Rye is a spawn when used to inoculate manure or straw, etc., but is a substrate when cased with peat-verm or verm-coir, although coir is better suited as a substrate than a casing material. If you mix the rye in as an inoculant, it's spawn, but if you lay it in a tray and apply a casing layer over the top of it, the rye becomes the substrate.
A bulk substrate is a large amount of material that supports mushroom growth that you spawn your mycelium into. Bulk substrates can be manure, straw, coir, worm castings, coffee grinds, etc. Grains can spawn to a bulk substrate, or serve as the substrate, but are never considered a 'bulk' substrate. WHAT IS

*Spawn as a noun is the grains or other material such as brf cakes that are fully colonized with mushroom mycelium.
Spawn as a verb is the act of placing those fully colonized grains into another uncolonized substrate for the purposes of expanding mycelium mass.
Spawn as an adjective is used to qualify a noun. Thus when used as "the spawned substrate", substrate is the noun and spawned is the adjective form of the word spawn. WHAT IS SPAWN

/join #fungi (IRC) the Non Official Mycology Chat Where All Your Questions Shall Be Answered. Their will at least be a mycologist 24/7 to answer any questions. We're working on a bot too.

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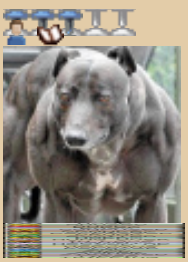

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Re: All Of RR's Notes On Mushroom Cultivation Forum [Re: dumbfounded1600]
#8468532 - 05/31/08 07:05 PM

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HARVESTING

*When harvesting your trying to get good food grade. Fruiting in the low 70's is perfect which benefits by giving better fruit quality. Harvesting your mushrooms should be easy on the casing and gentle. Gentle twist & pull is best. Object is to MINIMIZE casing cover damage. But, getting out clumps of shrooms, often leaves divots. Which you patch. Try not to leave any broken stem. Because that exposed tissue invites contaminates & rot. Better to have a divot in casing, which can be patched. Rather than leave torn stem tissue exposed. Good practice to pick those big fuckers, they take the uumph out of the rest of the flush. With practice, you'll develop a technique for twisting and pulling the mature fruits off that does very little damage. You can even hold a fork or spoon on the casing layer next to fruits you're picking to help hold the casing in place. Food quality is best just prior to the veil tearing. They just seem to go down easier, without that 'make you puke' horrible taste. When Picking A Flush: Remove the aborts, but leave any healthy looking pins. They'll start growing when you pick the present flush. You pick the fruits as they're ready. There is no reason to pick them all at once. You don't pick pins/primordia because they're required for the next flush. Air Dry! Then Put In Dehydrator They'll shrink a lot and let you put more into the dehydrator. HARVESTING

*Food quality is important. If you gag on every bite, then sit during your come-up time trying not to puke, it's no fun. There is no increase in the number of cells in a mushroom after the veil tears, therefore no new active compounds are made. The cells that are already there simply fill up with water. That means the actives that are in a fresly opened cap are the same actives that are in a huge, umbrella shaped, black spore covered cap, but you have to eat more to get them. When we say there is little to no loss of potency, that's what we mean. None was lost, but none was gained either. Only mass was gained, thus you gag more for the same amount. That's what I mean by poor food quality. As for developing allergies, mine have all come in the last few years as I've researched many species. I often have a few hundred jars and up to several hundred spawn bags going at any one time. This has been my full time job since I've been working on my dvd. I quit my job over a year ago, so I've been exposed to a lot of mushroom spores in that time. All of them legal edibles, by the way. The worst for causing allergic reactions is Hypsizygus ulmarium, but cubensis spores will clog up a humidifier filter in no time, and ruin the motor bushings as well. Cube spores will also foul hygrometers, and if you have a computer in the room with your grow, it will destroy the cooling fans, and if they get into the hard drive, will destroy it as well. HARVESTING

*Removing large chunks of substrate is from carelessness. You can easily back up the substrate with two fingers of one hand while twisting and pulling with the other. If the fruits are very well attached, simply do what the commercial farms do and cut the base off with a knife, then remove the stump later. Cut the stem off right at the substrate level and leave the stump there. Remember, mushroom tissue is mycelium. Anything below the substrate level doesn't need to be removed anyway. The strength of the mushroom/substrate connection is strain related, not casing/no-casing related. I have an isolated strain that the fruits fall over and unhook themselves from the substrate just as the veil tears, whether cased or not. That quality comes in really handy when I'm on an outside job working long hours. HARVESTING

*After picking a flush, allow the substrate to 'rest' for several days to a week. Let it dry out somewhat during this time. A substrate will not flush again right away. After the 'rest period', give it an overnight soak to bring the moisture content back up and place into fruiting conditions. Dunking right away is

counterproductive because the mycelium is dormant for a few days and the dunk only supplies moisture to the contaminant molds that might be present, then it dries out before that moisture is actually needed for the next flush. Never leave a substrate that is flushing without air exchange. It will suffocate and die. AFTER A FLUSH HARVESTING

*After harvest, it's a good idea to fill any divots created by picking with fresh casing material. Don't wait for it to colonize, because it rarely will. Don't re-case. Trays can be soaked for a few hours under running water. Just let the faucet fill up the tray and gently run over the sides and down the drain. Use jars of water or rocks to hold the substrate from floating. After four or five hours, most substrates will be re-hydrated. I like to wait up to a week after picking a flush before doing the above. During this rest time, allow the substrate to dry out a bit, and then soak as above and return to fruiting conditions. AFTER HARVEST

*If you choose to use desiccant, it's best to fan or air dry for a couple of days first. When you use desiccant, be sure to have the desiccant lifted off the floor of the tupperware or other container, so that moisture that drips from the fruits can run through the desiccant to the bottom of the container to collect. This will prevent the premature saturation of your desiccant layer.If the fruits are for use within a few days or so, just leave them in front of a fan until then. Dehydrators and desiccant are mainly for when you wish to package them up for later and need to make sure they're especially dry to prevent molding. DRYING

*Pick all the mushroom tissue when you pick a flush. Don't leave pieces behind. You can fill the divots with fresh casing material but don't recase the whole thing because it won't colonize anyway. Your mycelium has already gone from colonization mode into fruiting mode. I like to let a cased substrate sit for a week after picking to 'rest'. The reason is that they rarely flush right away anyway, so by letting it sit for a few days to a week, then watering heavily or dunking, you get an immediate second flush. If you water it heavily right after picking, it just sits there wet, which can encourage molds. HARVESTING

*Do NOT pick all the pins from the casing layer. Often, pins for the first two or three flushes are set at time of first flush. Picking them ruins future flushes. You can't pick individual fruits from a cluster without using a knife. Simply grab and gently twist the whole cluster, and it will come off as one piece. Be careful that you don't also pull up a large chunk of your casing layer. HARVESTING

*Mushrooms that are picked small and immature will be more potent by weight than they would be if allowed to fully mature, and that's a fact. As the cells engorge with water, there's no evidence that they increase in potency as well. The 'veil tearing' is just a signpost along the way that indicates a good time to pick. It has nothing in and of itself to do with potency. HARVESTING

*After picking a flush, it's a good idea to let the substrate sit idle for a week, and even to allow it to dry out a bit. After a week, soak it for six to twelve hours under water to re-hydrate. We refer to this as 'dunking'. After the soak, place it back into fruiting conditions, and the second flush usually pops fairly quick, provided the substrate has no contamination. AFTER FLUSH

*Nothing is set in stone, it's just something I've observed with lots of species. Most don't flush again for several days anyway, so during the time, let the substrate rest, and then give a soak to rehydrate and set back into fruiting. It more closely simulates natural the environment they evolved in, and helps to send out a stronger flush. AFTER HARVEST

*Cracker dry, then stored in vacuum sealed bags with oxygen absorber and food grade silica gel packets in each one. They'll keep for many years without degradation that way. I recently opened some from 1996, and there was NO

degradation that could be detected after ten years of room temperature storage. STORING

*Patching the divots is the right move, but the new casing material will not colonize, so don't wait for it to. After picking, I suggest letting the substrate sit untouched and dry for a week to recover, and then soaking for a few hours to rehydrate, then return to fruiting conditions. CASING AFTER HARVEST

*You can pick individual mature fruits from a cluster by cutting them off just above the base with a sharp knife. Don't wiggle or otherwise stress the rest of the cluster. The aborts will sit there just fine until the remainder of the cluster is ready to harvest. HARVEST

*The most bang for the buck comes from small fruits, prior to veil tearing. Even pins are great, and that's why you hear about aborts being so good. It's not because they aborted, but because they're at peak potency/gram at the pinning stage. HARVESTING

*With practice, you'll develop a technique for twisting and pulling the mature fruits off that does very little damage. You can even hold a fork or spoon on the casing layer next to fruits you're picking to help hold the casing in place. HARVESTING

*I've never used a dehydrator. Lay your fruits on a piece of cardboard and put a large box fan in front of them. When dry, transfer to Tupperware with desiccant for 24 hours to finish up, and then seal in vacuum pac bags. DRYING FRUITS

*Fill in the divots with fresh casing material. Don't scratch or re-case the whole thing. The mycelium is in fruiting mode so won't colonize any casing material you add now. AFTER HARVEST/CASING

*You pick the fruits as they're ready. There is no reason to pick them all at once. You don't pick pins/primordia because they're required for the next flush. HARVESTING

*When Picking A Flush: Remove the aborts, but leave any healthy looking pins. They'll start growing when you pick the present flush. HARVESTING

*I prefer to pick just prior to the veil tearing. They just seem to go down easier, without that 'make you puke' horrible taste. HARVEST

*Air Dry! Then Put In Dehydrator They'll shrink a lot and let you put more into the dehydrator. HARVESTING

*Good practice to pick those big fuckers, they take the uumph out of the rest of the flush. HARVESTING

DONE! I WANT THIS TO DISPUTE ANY BAD CULT ADVICE EVEN THOUGH THEIR ARE SOME MISINFORMATION OF SENTENCES AND OUTDATED INFO SO CHOOSE WISELY. PLEASE NO RATINGS. THIS IS SOMETHING I DID AND TOOK 3 MONTHS IN THE PROCESS.

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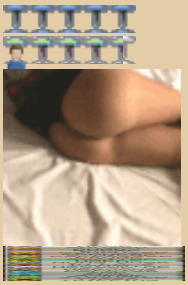

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Re: All Of RR's Notes On Mushroom Cultivation Forum [Re: dumbfounded1600]

#8468537 - 05/31/08 07:07 PM

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