

Growing Shiitake and Oyster Mushrooms on Logs

Producing nutritious and delicious Shiitake mushrooms from "waste" wood that might otherwise be bulldozed and burned at sites are cleared for logging or development, is an appealing concept. A "typical" 4" diameter x 40" long Alder log should produce ½ lb. mushrooms each spring and fall for approximately 3 years. At \$10/lb retail, this corresponds to a gross return of about \$30 over the life of the log

Although the labour input is substantial, other costs can be minimal. Spawn and sealant will cost in the neighbourhood of a couple of dollars per log. If logs are harvested from ones own property and inoculated, without outside labour then that cost might be considered zero.

In south-western B.C. Red Alder is considered the best species for Shiitake production. Other species such various Oaks, Maple, Birch, Aspen may be used, although with lower yields and management tailored to the specific requirements of that wood type.

The following figures are taken from "Growing Shiitake Mushrooms in a Continental Climate" by Kozak and Krawczyk: A 1000-1500 log operation produces approx. 30-50 LB per week year 'round. At \$6. per LB, that is equal to approx. \$10,000 net per year. This analysis presumes using little outside labour, little equipment, and pre-existing buildings.

LOGS: Should be cut green from healthy trees. 4-8" diameter x 3-4' long is considered optimal. Small logs have high surface/volume ratio, and moisture management is difficult. Large logs are heavy to handle and may have a high proportion of heartwood which contributes little to the mushroom's nutrition. The integrity of the bark is very important in limiting moisture loss and excluding contaminants. Logs with a thick ring of sapwood are preferred. Logs should be cut after the leaves have begun to drop in the fall and before the buds break in the spring. During this period nutrient reserves in the sapwood are highest, and the bark is most tightly attached to the wood.

INOCULATION: Drill holes 1/8-1/4" deeper than the length of the plug if using dowel plug spawn, and a diameter so that the plug fits snugly - 21/64" for Western Biologicals' dowel plugs in 2010

For sawdust spawn, holes should be approximately the depth of the sapwood (usually 1-1/2"). Hole diameter should allow easy filling with spawn (usually 7/16-5/8"). Other less effective methods include: saw-kerf method, "saw-cut and wafer-spawn," "butt-end only" inoculation, "slab sandwich," "hammer and chip," and "spores in saw-oil" methods.

If you are working with more than a few logs, consider getting some help - 2 people working very efficiently can do about 100 logs in a long day. Sawdust spawn is faster growing than dowels, but takes more time and effort to put into logs. Sawdust spawn dries out easily so it must be sealed over. It is appropriate to use dowel plug spawn for small numbers of logs and to use sawdust spawn for more than a few dozen logs. Inoculate as soon after felling as possible. Spawn needs a chance to grow before steady freezing sets in. Spawn will show white under the wax a couple of weeks after inoculation, and may grow up to 1" per week through the wood under ideal conditions (rarely in practice). The mycelium may show white on the ends of log after a few months but not if the end of the log is very dry

SEALING: Waxing reduces moisture loss, and protects spawn from contamination as well as birds and insects. Heat the wax to the point it begins to smoke but be careful as it is flammable at that temp. A deep fat fryer works well. Use a baster with "nail valve" for flow control. Cheese wax is good, but plain paraffin with or without addition of mineral oil or beeswax is fine. Water-based "Seal and Heal" is convenient to use and works well. Do NOT wax or seal the ends of logs.

LOG MOISTURE: Just before inoculation, test 5 logs per 100, selected from throughout the total so as to get good representation of the true log moisture. Cut 6" off end of a selected log, then cut a fresh 1" slab for testing. Weigh the fresh slab immediately and place in a 175-200°F oven for at least overnight. Weigh once and put back in the oven to check that it has dried to "constant weight."

$\% \text{Log Moisture Content (LMC)} = (\text{WetWt} - \text{DryWt} \times 100\%) / \text{WetWt}$

For example, a slab of Red Alder log, fresh cut in March/98, weighed 594 grams "wet" and 299 gm after drying at 200°F for 3 days

$\text{LMC} = (594 - 299) / 594 \times 100\% = 50\%$

$\text{Calculated Oven Dry Wt} = \text{log fresh wt} - (\text{LMC} \times \text{log fresh wt.}) / 100$
(CODW)

Write this, on each log tested, using a permanent label. With this information you can at any time determine the LMC merely by weighing the test logs and doing some simple arithmetic. That is, it is not necessary to sacrifice more logs after the first determination of CODW. Spawn run best if LMC is over 35%. 31% LMC is too dry, and the mycelium may be killed if LMC less than 23%

TEMPERATURE: 75°F theoretically for the fastest spawn run for Shiitake (85°F for Oyster), but logs are more susceptible to Hypoxylon and other disease at warm temps (over about 75°F), as well as to problems with moisture management. The lethal temperature for Shiitake mycelium is not much above body temp.(100°F) so if a log feels warm to the wrist then at least the surface is too hot. Lethal temperatures can occur in logs exposed to direct mid-day sun in less than an hour even during cool weather.

LAYING YARD: Should be close to water, since logs will usually need to be watered in summer. The site should be accessible and the lay-out of the yard should allow convenient access to the logs and facilities. There must be shading, at least in the summer. 60-80% shade cloth is recommended. Pine forest provides an ideal degree of shading, and air movement. Hill tops are likely to be too windy and drying, while a valley bottom may be a frost pocket, and have stagnant air which may result in increased contaminant problems because the log surface stays damp for long periods. **Slugs are a problem and may eat the mushroom "pins" as fast as they appear.**

PILING LOGS: A "dead pile" (logs piled like cord wood) is not good due to rain shadow for the lower logs, poor air movement between logs, etc. "A frame" pile is not space efficient. "Crib stack" has rain shadow problem, uneven drying on top. "Lean-to" is best. The lean-to pile can run a long distance with the lower ends of the logs on the ground and the

upper ends 8-12" off ground. Stagger between the rows to eliminate rain shadow. The cross pieces may be removed and the logs laid flat on ground in very dry weather. Rotate logs to get a more uniform spawn run.

FRUITING : Requires 35-60% LMC. Growth to full size will take 1-2 weeks from pin set at 65°F, and 2-3 weeks at 45°F

SOAKING: Logs may be immersed in water to stimulate out of season fruiting, but remember that oxygen solubility is low in warm water and mycelium may be suffocated by prolonged immersion in warm water. LMC must be greater than 35%, at the lowest, for fruiting. Immerse less than 6 hrs in water at 68°F, up to 2 days in water at 40°F. Stack the logs for access to the mushrooms, usually nearly vertical at this time. Forced fruiting out of season by soaking but there should be 8-12 weeks resting between each fruiting. Forced fruiting will shorten the life of logs. A layer of slime (bacteria and algae) may build up on the ends of logs and block water from soaking into a log. Slicing a millimetre or so off the ends of logs before soaking will dramatically improve log water uptake.

STRAINS: Cool weather strains fruit at about 50°F, good quality but slower to develop. Mid-temp. strains are more popular and the timing of fruiting may be manipulated by handling technique (water, temp., mechanical shock, etc.)

PROBLEMS: The occurrence of specific problems will vary with the local climate and environment and the species of logs used. However in the mild, wet Pacific Northwest, the following are most common:

- logs don't dry out enough to kill the living wood so initial colonization is slow. Consider keeping your logs indoors (say in a garden shed, garage or unheated basement) for a few months after inoculation. The logs will quickly dry out enough to kill the living wood and allow for rapid initial colonization and protection from extreme cold will allow the mycelium to continue growing even when outdoor temps are cold.
- leaving logs out in mid-day summer sun will quickly ruin your logs by over-heating them - very quickly, possibly within an hour!
- logs let to dry out too much
 - this is especially important during the warm, dry months of July and August
 - although it may be humid there, very little rain makes it through the foliage of large trees, so logs placed there may become too dry over time.
 - if you are inoculating more than a few logs, then take the time to determine LMC as explained previously.
- Having an accurate, objective measure of log moisture will facilitate good results.
- logs don't get enough moisture during fruiting season – it will be beneficial to soak them in a tub or by standing in a poly garbage can full of water, or with a sprinkler. In wet climates the ends of logs may become "sealed" with slime. Logs will take up water more efficiently if slime-covered ends are shaved off with a chain saw or other tool before the logs are soaked.
- Wrapping logs in poly or other wise interfering with the free flow of air around them in any way that allows the bark to remain continually damp will promote the growth of competitor fungi. Some of these are competitors with your mushrooms for log nutrients and some are actually pathogenic to the mushrooms.
- Cedar tree foliage seems to leach inhibitory material onto logs placed beneath them
- keeping log surfaces constantly wet such as by placing the ends in a creek or covering with a tarp may encourage molds and pests especially in warm weather and it's not a very effective way to maintain moisture throughout a log.
- Slugs can eat the developing mushroom "pins" so fast that you may think no mushrooms are growing, it is necessary to control slugs. You might pick slugs off your logs at night and use some sort of slug bait. Copper strips may be an effective barrier but do not put copper directly on your logs.
- many problems stem from human failings. Don't think mushrooms less demanding than other crops. Set up your logs so that it will be easy to monitor and maintain their needs – easily accessible and near a convenient water supply. Consider investing in a piece of shade cloth and building a frame to support it. A clean concrete surface will discourage slugs and insects that lurk in soil. Use some form of slug bait or effective deterrent.
- holes too small or too large for dowels may damage the living mycelium or allow sealant down around the spawn/plug, allowing access to mold spores and insects, or allowing the spawn to dry out, similar problems if the surface of sawdust spawn is rough and fissured.
- logs cut from trees in a decadent forest with abundant fungi growing on dead and dying trees, are more likely to develop contaminant fungi after inoculation than are logs cut from trees which are young, healthy and standing alone.
- natural rainfall in Spring and Fall is often not enough to promote very heavy fruiting, additional watering/soaking will likely be beneficial.
- spawning "lightly" to save on initial cost may be false economy because the longer the spawn run takes to complete, the more opportunity competitor fungi and insects will have to invade the log, and the longer the log life cycle the more opportunity for mistakes in log management

Recommended references available from Western Biologicals Ltd:
Growing Shiitake Mushrooms in a Continental Climate by M.Kozak and J.Krawczyk
Mushroom Cultivation by Peter Oei
The Shiitake Growers' Handbook by P.Przybylowicz and J.Donoghue
The Mushroom Cultivator by P.Stamets and J.Chilton
Shiitake Sampler (Cookbook) by Janet Bratkovitch
The Edible Mushroom (Cookbook) by Margaret Leibenstein

SEAL AND HEAL GRAFTING SEAL

Keep tightly closed, keep from freezing and store at room temperature. Stir/shake well before using and apply with a small paint brush. Add a small amount of water if it is too thick to work with. Seal and heal requires several hours at a temperature over 10°C protected from rain, to set before it will withstand rain and freezing. It is very much like latex paint except without added microbicides. Because it is a water base material it will tend to soak into the spawn if the surface of the spawn is very wet. For this reason it is a good idea to let the surface of the spawn dry out for a few minutes before sealing it over with Seal and Heal. Clean brush with warm water before it dries.

A FEW NOTES CONCERNING THE CULTIVATION OF MUSHROOMS ON LOGS - USING DOWEL PLUG SPAWN

Store your spawn in a clean place at room temperature or cooler. If it has patches of blue, green, or black mould on it, don't use it. Shiitake spawn has a sulphury smell, and may have brown patches.

Use hardwood logs such as alder, oak, birch, hophornbeam, maple, etc. Choose healthy trees. It is preferred to fell them during the cold months when the sap is down, after the leaves have begun to fall in the autumn and before bud break in the spring. At this time the cambium layer is not dividing and the bark is most tightly bound to the log. The integrity of the bark is important as it protects the log from contamination, keeps insects and other pests away from the growing mushroom mycelium, and also controls moisture loss. Bark of some species such as the vine maple, has a tendency to peel off as the logs dry out. If it is unavoidable that logs be cut during the summer months, extra care must be taken to avoid dislodging the bark while handling the logs. Logs approx. 4-10" in diameter and 24-40" long, straight and free of wounds are preferred. Logs should be inoculated as soon as possible after felling. Holes should be sized to allow dowel plug spawn to fit snugly into the holes (approx. **21/64"** - available from Western Biologicals, for a nominal 1/4" dowel), and deep enough (7/8-1" for a nominal 3/4" long dowel) so that there will be a small space under the plug after it is inserted. Finger pressure or a light tap with a hammer should be sufficient to insert dowel plugs. Aggressive treatment with a hammer will damage the live spawn. The top of the plug is made flush with the surface of the wood, or slightly recessed if the bark is thick. Sawdust spawn usually results in faster colonization than dowel plugs, but it is more time consuming to insert into the logs. Collar type drill stops are inexpensive and available from many hardware stores, but a bit of tape wrapped around the drill bit to mark the correct depth works fine. The holes of any given row should be staggered relative to the holes in adjacent rows. A common rule of thumb is to drill one row of holes for every inch of log diameter. Thus a 4" diameter by 40" long log might have an average of 4 rows of 6 holes (ie. 24 holes in total), and a 6" dia. By 24" long log might have 6 rows of 4 holes each (also 24 holes in total). Higher levels of inoculation result in faster colonization of logs and a lower rate of contamination. It is very beneficial to seal over the dowel plugs after inoculation. The sealant will not seep around **snugly fit** dowel plugs and only the outermost surface of the spawn will be damaged by the hot wax. A good seal will protect the spawn from pests and drying. Addition of 10% beeswax or medicinal mineral oil to paraffin will produce a tougher, more flexible seal. Keep the wax hot. If wax is applied too cold it will form a thick, brittle layer that will readily flake off. A water based grafting seal is a convenient alternative, but needs a warm, dry afternoon to set. Do **not** use asphalt based sealants. Logs that have been cut for more than a few months prior to inoculation, or that have growths of mushrooms or moulds on them, or that have been in contact with soil for more than a short time are not suitable. The integrity of the bark is very important, as breaks allow competitor fungi easy access to infect your logs, as well as allowing the logs to dry out excessively. In the first few weeks after fresh cut logs are inoculated it is best to keep them under cover, especially in the winter. The living wood will die as the logs dry out a little after inoculation, allowing the spawn to colonize the wood. Shiitake will not colonize living wood. Logs will benefit from some protection during the winter. A layer of evergreen boughs and a tarp, or an unheated shed will make a difference. Be sure to remove tarps when the weather warms up as good air circulation around the logs is important. In severe climates, snow cover is beneficial. Drying out of the logs is the most common problem. In warm weather, be careful of drying and overheating. Lethal temps (approx. 100°F) can develop within a few minutes under a tarp with the sun blazing down on it, and just as quickly develop under the bark of logs exposed to mid-day sun in the summer. Keep your logs shaded. It will be necessary to water your logs with a sprinkler occasionally during dry weather. Do not wet them continuously for more than a few days at a time without allowing them to dry out in between watering. Continuously wet bark will encourage algae and competitor moulds. If logs crack severely on the ends, they are becoming too dry and must be watered.

It is customary to place logs in a more or less horizontal position after inoculation. Turning the logs every few months will result in more uniform colonization. Stack to allow for ventilation between the logs, in a shady location. Maintain moisture as necessary. Colonization may be accelerated by incubating the logs in a heated environment (up to 75°F) but be careful that the logs don't dry out, and warm temps may encourage growth of some competitors. Shade from direct sun, as shiitake mycelium is killed by exposure to temperatures around 100°F (barely above body temperature). Forest shading may be used to advantage, but cedar tree foliage may leach substances inhibitory to your mushrooms and thick foliage may trap or shed rain to the extent that your logs will dry out if they are not watered.

Fruiting is triggered by changing temperatures in the range of 50 - 65°F, by sufficient water in the logs, and by mechanical shock! If the air temperature is within fruiting range, out of season fruiting of fully colonized logs may be promoted by heavy sprinkling or soaking your logs and by jostling them!!

18-24 months for a 4"x40" log inoculated with 25 dowel plugs, and 12-18 months for the same log inoculated with 50 dowel plugs are typical times to first harvest for shiitake in the cool Pacific Northwest. Logs inoculated in the spring will generally fruit sooner than logs inoculated in the fall. The time may also be reduced by maintaining a warm environment (not over 75°F) for your logs. Oyster mushrooms will fruit in about half the time required for shiitake. Logs are usually raised to a vertical position "teepee style" for fruiting, as picking is more convenient. Outdoor fruiting will occur seasonally, as the logs are wet by rains in the spring and fall.

Your spawn pack contains

CULTIVATION ON LOGS - SAWDUST SPAWN

Nov05

Keep bags of sawdust-base spawn as clean as possible. Keep spawn cool. It is not usually necessary to refrigerate sawdust-base spawn except that a full case of spawn will tend to over-heat unless refrigerated. Alternatively, remove (several of) the bags from the case and place them on a clean shelf with some air space between them and if any bags are left in the original box separate them so that there is air space between them. Do not crush or otherwise break the mass of spawn up into pieces until you are ready to use it. Well matured sawdust spawn may be covered with a brown "skin." Since the shock of travelling may have initiated the development of mushroom primordia on the surface of the block of spawn, it is a good idea to scrape ¼" off the top of the block and discard that material. At the same time the mycelium may exude dark fluid which should be discarded.

The logs you are going to inoculate should have been cut within the past few weeks. Fresh cut is best. Logs should be free of any obvious infestation with insects or fungi. But do not be too concerned with a little moss, algae, or lichen. Holes for sawdust-base spawn are typically drilled approximately ½" in diameter and about 1½" deep. You might be able to use a narrower hole but it will be slower going to pack the sawdust spawn down a small diameter hole.

If you intend to work from a sitting position, then make a work table to support the logs about 16-18" off the floor. If you intend to work from a standing position, then a table about 40" high will be comfortable. If you secure 2x4" or 1x2" cleats, spaced about 2" apart on the table, they will help keep the logs from rolling around. You might use a conventional hand held electric drill, or a drill press, or a router suspended over the work area by "bungee" cords, or even a hand-brace to drill the holes. Make 1 row of holes spaced 3-6" apart for each 1" log diameter. Thus a 4" diameter x 40" long log would have 4 rows of 6-12 holes drilled in it. A 5" diameter log would have 5 rows, etc. Make the holes approx. 1 1/2" deep. A drill stop may be purchased from a tool supplier, but it is not essential that all the holes be exactly the same depth. A piece of tape wrapped around the drill bit can be used to mark the desired depth. You could drill, spawn and seal each log one at a time, but it is more efficient to drill a few logs, and then spawn them all, then seal them. Place a drilled log on the table, held from rolling off by the pieces of 2x2. Break off a 2 or 3" diameter piece of spawn and hold it in your left hand, very closely over a hole in the log. Grasp the tamping rod tool in your right fist as if you were going to stab something. Then use the end of the tool to chip the edges off the piece of spawn and tamp it into the hole in a single motion. The hole should be filled more or less flush with the surface of the log, and the outer surface of the spawn should be packed to a relatively smooth surface. You may find it easier to break the spawn into smaller bits and put them in a funnel, which is held over a hole. Then tamp the material into the hole through the funnel. After a hole is filled, brush the bits of loose spawn away to leave a clean, smooth surface for sealing. If you place a sheet of paper or poly on the table under the logs, you will be able to collect the bits of spawn which fall away, and use the bits to inoculate logs with the aid of a funnel. If you use paraffin wax, it should be heated to "smoking" hot! The hot wax will generate steam on contact with the surface of the spawn and create pressure which will stop the wax from penetrating into the compacted surface of the spawn. A basting syringe modified by insertion of a short nail makes a good applicator for paraffin wax. The hot wax tends to drip out of the un-modified syringe uncontrollably, but the nail acts like a valve. In the down/"closed" position, the head of the nail blocks the flow of wax. When the tip of the syringe is touched to the log surface the head of the nail is pushed up and allows the wax to flow readily. Alternatively seal the filled holes with water-based "Seal and Heal," which you can apply with a small paint brush (or hot paraffin wax). When you have finished, wash the brush off with warm water. Seal and Heal must completely dry off before exposure to rain or dew, or it will wash away

Forest shading may be used to advantage when incubating your logs, but Cedar tree foliage may leach substances inhibitory to your mushrooms and thick foliage may trap or shed rain to the extent that your logs will dry out without extra water.

Caution – a full case of spawn, without cooling, will tend to heat up and damage itself. Either put the case in a clean cooler or remove the bags from the box with clean hands and place individually on a clean shelf at room temp.

12-24 months are typical times to first harvest in the cool Pacific Northwest. The time may be reduced by heavier inoculation by and maintaining a warm environment (not over 75°F) for your logs. Oyster mushrooms will fruit in less time. Sawdust spawn will usually colonize logs faster than dowel plug spawn.

Growing Oyster Mushrooms on Logs

While drilling holes and inoculating logs in the same manner as for Shiitake also works for Oyster mushrooms, there is a simpler method that works well enough for the faster growing Oyster mushrooms:

For this you will need:

Poly bags – Our local grocery store sells Jumbo-Garden size heavy duty, clear poly bags that are about 48" long. While some prefer black bags for this, I prefer **clear bags** since they allow easy inspection. It is possible to wrap logs in poly sheet or even Saran wrap or under **ideal** conditions not cover them at all.

Spawn – one bag of spawn will inoculate approx. 10-30 1-3" diameter x 18-30" long sticks or 6-12" diameter x 6" long slabs, depending on exact size, etc.

Logs of Alder, Maple, Aspen, Poplar, Birch or other suitable hardwood, approximately 1-12" diameter. Many broad leaf tree species will work with this method. The logs may be cut virtually any time of the year but should be relatively fresh, free of rot and insects, and the bark should be for the most part undamaged. Moss and lichens don't seem to have much effect one way or another, but avoid pieces with obvious mushrooms/bracket fungi growing on them and try to keep the logs free of soil.

A place for incubating the logs. A protected (indoor) place such as a garden shed, garage, or basement where the logs can incubate at 40-65°F for 2-3 months is preferred for this stage. Shading is important as direct sun can generate lethally high temps inside the bags, which act like a mini greenhouse. Cooler temperatures will take longer but otherwise do no harm.

Procedure:

1) For 1-3" diameter logs – "log bundle method:"

Cut pieces of log approximately 18-30" long – remember they need to fit inside your poly bags. At least the bottom ends of the pieces should be cut square so that they will stand up. Bundle 4-10 (depending on size) logs together with poly cord.

A bag full of logs can be heavy to move, so it's best that this next step be done close to the intended incubation place. With clean hands, **sprinkle a large handful of spawn evenly on the bottom of a poly bag**, then place a bundle of logs in the bag on top of the spawn. Sprinkle another handful of spawn on the top ends of the logs, stuff spawn into the gaps between the logs, and smear spawn on any large side cuts where branches were removed.

2) For 6-12" diameter logs – "sandwich" method:

Cut round slabs approx 4-8" long from intact logs. The cuts should be "square" as the pieces are going to be piled on top of one another. With clean hands, sprinkle some spawn on the centre of the bottom of a poly bag in an area that is roughly the diameter of your log slabs. Place one of the largest slabs on top of that patch of spawn, then spread spawn on its flat upper surface. Place another slab on top of the spawn, then more spawn on top of it, etc. ending up with a layer of spawn on the top end of the topmost slab. There may be roughly 2-3 slabs stacked up depending on their lengths. Here also some poly cord, strung lengthwise around the stack, might help to hold it together

For either of above approaches:

Close the bag with a twist tie, and plan on leaving it for 6-12 months while the mycelium colonizes the logs. The growing spawn will need a little ventilation – **about 10 nail holes** punched each in top and bottom of the bag should be enough. Larger holes may let **slugs and insects** into the bag, which may eat the mycelium. The presence of pests is one reason why this stage is best done indoors. It is unlikely that the logs will dry out too much while in the poly bag, but if they seem to be drying out, reduce ventilation and sprinkle a little water on them. It is necessary for the logs to dry out somewhat to kill the living wood cells since the mushroom mycelium doesn't really grow into living wood very well. Free water on the bottom of the bags may indicate excess moisture or widely varying temperatures, so drain it away.

After 6-12 months, when the white mycelium more or less covers the entire surface of the logs, preferably going into a mild, wet season such as early spring or fall it's time to fruit your logs. The objective is to provide a humid environment for the developing mushrooms and to maintain log moisture. It is not desirable to keep the mushrooms wet all the time or to waterlog the logs. Allow some ventilation for proper mushroom development and the mushrooms need some light to develop properly. There are many ways to provide suitable conditions:

- Roll the poly bag about 1/2- 3/4 way down the bundle of logs (make a hole in the bottom for drainage). Place a large clear bag over the bundle of logs as a humidity tent. Water the logs lightly every couple of days depending on the weather. A tub with moist sand/gravel/sawdust might be used to support your logs and help to provide moisture/humidity.

- Another approach is to remove the bundle of logs from the poly bag and place it, standing up, into approximately 6" deep holes in a shady part of the garden. Backfill the hole(s) with soil (clean sawdust or sand is better), with the top foot or 2 of the logs sticking up into the air. Make sure that the soil (sawdust/sand) remains damp from now on – a layer of leaves/wood chip/sawdust mulch with help to conserve soil moisture if the weather is dry.

Logs should be protected from drying out excessively during both winter (snow cover is fine, or mulch) and summer (shading, occasional watering/soaking, mulch), especially in dry climates. Logs typically begin to fruit about a month after being placed outdoors in suitable weather.

Watch out for slugs at all stages as they love both mushrooms and mycelium.