ROOTLAB
Mycology made easy

V 1.7

THE ONLY DIY FULL GROWTH CYCLE MUSHROOM GROWING KIT ON THE MARKET

Congratulations! You are now the proud owner of a Rootlab Mushroom Growing Kit – the only mushroom growing kit that guides you through the full growth cycle of this magnificent fungi. Unlike other kits that teach you only about the fruiting stage, the Rootlab kit steps you through inoculation, colonisation, and most importantly, to the fruiting stage.

The Rootlab kit maximises the quality and quantity of mushrooms produced as it teaches you how to manage critical environmental factors such as humidity, temperature, and sanitation.

Growing your own mushrooms using the Rootlab Mushroom Growing Kit will be fun, educational and tasty – very, very tasty!

SAFETY FIRST

Rootlab products are not suitable for the small percentage of people who are allergic to mushroom spores.

As spores are small and lightweight, growing them in the house (especially the Reishi specie) is not recommended as spores will spread.

If bags start to contaminate, they should be discarded immediately by wrapping them up in a plastic bag and disposing of them in a general waste bin. This happens when you do not maintain the sanitary conditions outlined in the instruction.

WE'RE HERE TO HELP

The Rootlab Mushroom Kit is not like the other kits. You are nurturing your fruit from the beginning, so you may find you need a little help along the way. We're just an email away! Shoot us a message on info@rootlab.com.au, including a photo if you can – and we'll get back to you ASAP.

Please – we'd love to see photos of your successful grow and to hear any feedback you may have. Some parts of the instructions were not clear. We update our instruction every month as per the feedback we receive.

And be prepared to get addicted – once you've grown your first batch of mushrooms, you'll want to try **ALL** the mushroom varieties in the Rootlab range. (See Appendix A)

CONTENTS OF THE KIT

- One bag containing Masters Mix Substrate (50% Hardwood sawdust and 50% Soy pellets)
- Mushroom culture Syringe of 10ml with needle
- Isopropyl swabs (x 3)

YOU WILL NEED

- Mask
- Gloves (If you have a pair. Alternatively, clean your hand thoroughly with warm water and soap)
- Flame source (lighter or match).
- A misting bottle (First boil the water and wait for it to cool down and the fill your spray bottle).
- Knife

Our bags are designed to be used immediately as they are not colonised. Do not refrigerate unless they are fully colonised. Fully colonised bags can be kept in the fridge until they are ready to fruit. (You will learn about colonisation soon).

The Rootlab Mushroom Growing Kit is a small yield kit designed for beginners who are seeking for educational purposes only. It is not designed to provide substantial amounts of mushroom. As your expertise increases you may like to invest in a larger kit: more food = more mushrooms!

Rootlab Mushroom Growing Kits have been sterilised in a pressure cooker at 121° C at 15 psi to ensure that the kit is free from living organisms and their spores.

The kit can be stored for 1-2 weeks. If not inoculating immediately, remove the tape and store the bag at room temperature in an upright position to allow for air exchange.

Store the syringe in a zip lock bag in the veg compartment of the fridge (away from direct fan). Pink Oyster and Yellow Oyster culture cannot be stored in the fridge.

There is no need to store the Rootlab Mushroom Growing bag in the fridge.

MUSHROOM GROWING STEPS

IMPORTANT

- Maintain a sanitised environment.

To successfully grow kit mushrooms a very sterile environment is required. It is impossible to simulate the mushroom's natural ecosystem. Therefore, a sterile environment is required to support growth. Sanitise the environment with 70% isopropyl alcohol (available at hardware stores) or a multipurpose cleaner.

- Wear mask and gloves.
- Inoculate mushrooms in an area with minimal air flow.

LET'S GET STARTED!

1) **Inoculation *(introducing the mycelium to the nutrient medium):***

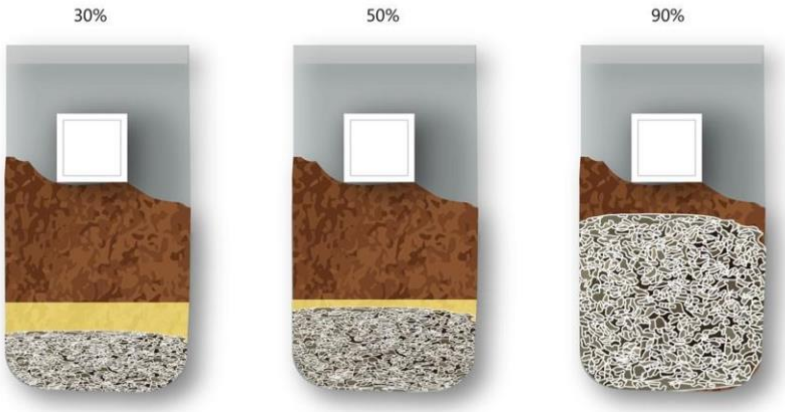
- Before inoculation, check for any contamination, leakages or holes in the bag.
- Wipe gloves and injection port with an isopropyl swab.
- Shake the syringe vigorously to break up the mycelium in the syringe.
- Sterilise the syringe by holding in a flame for a few seconds until it gets red hot.
- Allow the needle to cool for ten seconds OR cool the needle by gently depressing the syringe to allow a couple of drops of liquid out of the syringe. You will hear a soft hissing sound.

- Insert the cooled needle into the injection port and slowly release 10ml of the culture into the bag by depressing the syringe.DO not clean the syringe with alcohol swab.
- **DO NOT INSERT A HOT NEEDLE INTO THE BAG.**
- Remove the needle and gently rotate the bag in all directions to distribute the mycelium evenly into the nutrient medium. DO NOT SHAKE VIGOROUSLY or mix the substrate with grains at this stage.

2) Colonisation *(mycelium growth - no mushrooms present)*:

- After inoculation, incubate the bag at approximately 24^{o}C in a dark spot for approximately two weeks.
- When the bag is 50% colonised break the bag with clean hands to distribute the mycelium evenly around the entire substrate block. (Mix the grains into substrate evenly).
- Taking your time, gently shake the bag. This process mixes the grains and substrate evenly. We shake the bag three times during the colonising process to assist the mycelium in colonising evenly.
- Return bag to dark spot for another 2-3 weeks (until fully colonised).
- **Do not place bag on heat mat to keep It warm as this will cause all moisture in the bag to evaporate.**
- Please prioritise a place with plenty of air exchange over a dark spot. Avoid placing it In a cupboard or a tub. A shelf in your kitchen or bedroom away from a window or direct sunlight would be sufficient.

Shake bags at these stages of colonisation:



TO KEEP IN MIND:

After two to four weeks, the substrate will be completely white with no uncolonised substrate remaining. It is a clever idea to take note of what the average storage temperature was and how long colonisation took, for future reference.

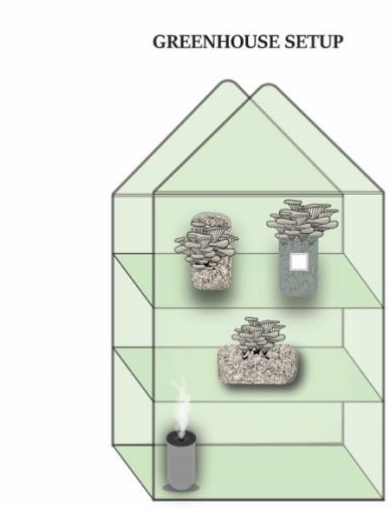
If a fully colonized bag is not used (ie. put into fruiting) within two weeks, the vigour of the mycelium will start to diminish and die off from day 14. If not fruiting immediately we recommend storage of the bag in the fridge. Note that pink oyster and yellow oyster varieties should not be stored in the fridge.

As the colonised bag ages a yellow liquid will be produced. This is called mushroom pee and it is a sign that the mycelium is stressed or old. These natural metabolites will not harm your produce but it is a signal that the mycelium is no longer at its optimum health and could be susceptible to contamination.

3) FRUITING YOUR BAG – THE FUN PART!

Mushrooms are 90% water. During colonisation, the mycelium consumes all the water in the bag. We need to give the mycelium a good soak before they will fruit. (More details on how to soak soon).

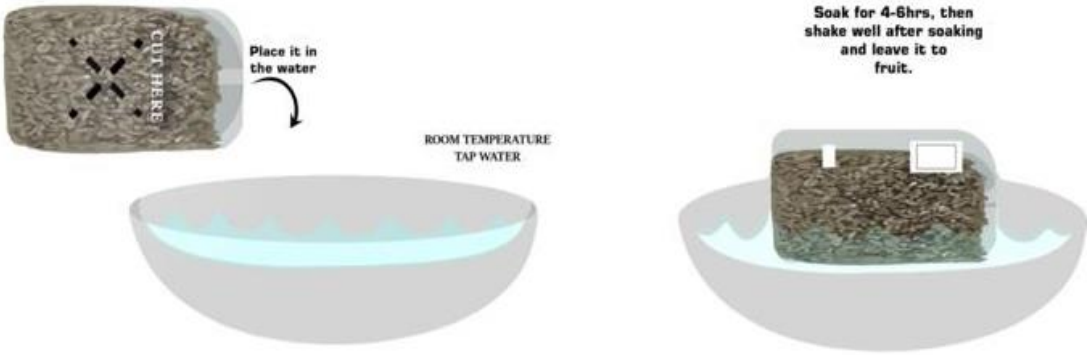
Recommended place for fruiting:- Somewhere humid like a Laundry room or a greenhouse.



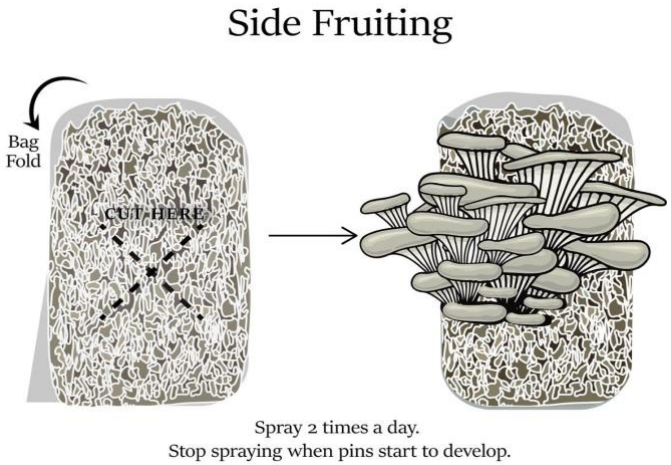
4) Fruiting *(mushrooms start to grow from the mycelium block):*

- Mycelium dies when it meets a dry surface, therefore it is essential to maintain humidity.
- Humidity induces pin formation (baby mushrooms) which is a key factor for mushroom growing success.
- Mist twice a day with boiled and cooled water. Stop spraying when the baby mushrooms form(Very important).
- Depending on the mushroom variety fruiting will occur in one of two ways - “Side Fruiting” or “Top Fruiting”.

For side fruiting varieties:



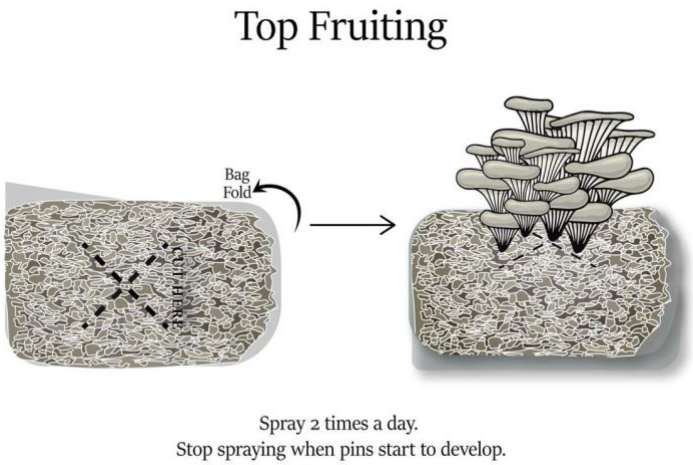
- Soak the bag in room temperature or cold water for 4-6 hours. The mycelium will soak up all the water it needs. Cut an 'x' on the position where the mycelium will face the water as pictured above.
- Side fruiting varieties can be fruited directly from the bag by cutting an "X' in the middle of the bag.
- Ensure proper humidity of 80-85% is maintained by misting twice daily.
- If in doubt about the level of humidity, place them in a shotgun fruiting chamber. Instructions on how to make a fruiting chamber can be found on YouTube.
- Alternatively, side fruiting varieties can be placed in a greenhouse tent with a small humidifier to help with fruiting. Otherwise, a laundry room or some other humid place in your house works!



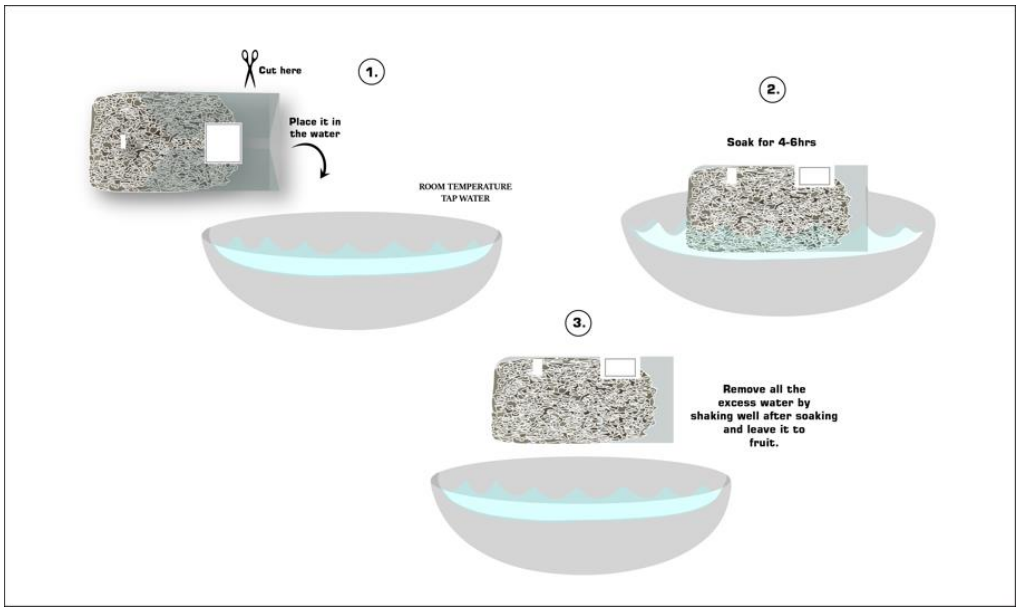
For top fruiting varieties:

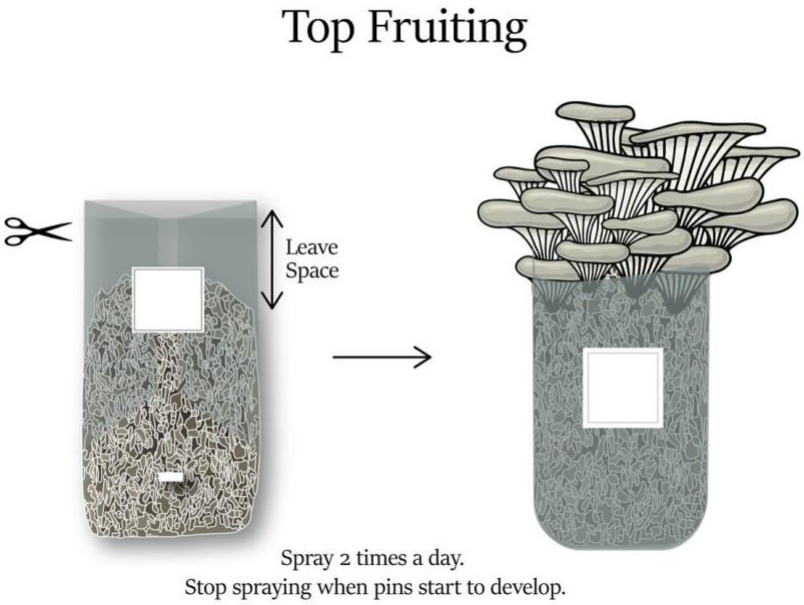
- Top fruiting varieties can be fruited directly from the bag by cutting an "X' in the middle of the bag and laying it sideways as pictured below.
- Ensure proper humidity of 80-85% is maintained by misting twice daily.
- If in doubt about the level of humidity, place them in a shotgun fruiting chamber. Instructions on how to make a fruiting chamber can be found on YouTube.

- You can also place top fruiting varieties in a greenhouse tent with a small humidifier to help with fruiting.
- Some species like Oysters can be fruited form the side or top. See Appendix A to to identify if your variety is fruited from the side or the top.



If growing Enoki, Golden Enoki, Giant King or Black king oyster cut the bag directly below the heat seal on top and hydrate as picture below.





5) Mushroom harvesting:

- If you have followed *Steps 1- 3* carefully, you will have mushrooms ready to harvest after approximately 2 -3 weeks.
- Once they are at their optimum size, harvest the mushrooms by removing the fruit completely. A mushroom's life cycle is 3-5 days. It is important to harvest before the mushroom cap (if it has one) turns up, as this is when the mushroom will sporulate. Caps will turn up by around day four **(not precisely).** Knowing when to harvest the mushrooms will come with experience.
- Remove residual parts of the mushroom using a sanitised knife from the fruiting block to avoid contamination and allow for a second flush.
- Mushroom growth is a 3-7 day life cycle. Mushrooms need to be harvested in this time before they go into spores. If they go into spores, they are still consumable but will not have an exceptionally long shelf life. It is best to consume mushrooms immediately.
- Mushrooms can be stored in a paper bag in the vegetable compartment of your fridge.

6) Obtaining a second flush (harvest) of mushrooms:

- Once the first flush(harvest) has been removed, you can prepare the block for a second flush.
- Simply soak the mycelium block in a bowl of fresh water at room temperature for 4-6 hours.
- Remove the block gently and thoroughly shake.
- Return kit to growing area and refer to Step 3. However, this time check constantly for contamination as the fruiting block will have lost some of its immunity during the first flush.
- It is possible to obtain a third flush, however the chances of contamination are higher as the mycelium becomes older.
- Compost the mushroom block, throw them in the garden or simply discard after the mycelium has run its course.

Brush your mushrooms gently with a paper towel – do not wash – and toss into your favourite stir fry, pasta or salad. Remember to cook them well!

The mushroom's nutritional value is contained in a protein called Chitin, the same protein that lobster or crab shells are made of. Mushrooms require to be cooked well to break this layer and release all nutrition. **ENJOY!**

See next page.

FAQs

Q. Why do we use grains along with substrate?

Each of the grain kernels, when introduced to a substrate, will spread across a substrate and act as inoculation points where mycelium starts to grow. These mycelia will quickly take over the substrate as the grains are mixed with the substrate in every direction.

GLOSSARY

Important words to know before you proceed.

Colonisation - The stage in which mushroom mycelium spreads its roots all over the substrate, like a plant putting out its roots.

After the substrate is colonised, the mushroom secretes enzymes to break down the substrate so that it can be absorbed by them.

Colonisation requires a warm temperature, around 24^{o}C for most species. Too hot and the contamination thrives; too cold and mycelium metabolism slows down drastically.

Fruiting - Mycelium has fully colonised a substrate and, with nothing else to do, directs its energy towards propagation and keeping its genes alive. They form mushrooms that are fruiting body with spores. Every species requires a specific temperature and humidity to fruit.

Incubation - the process where we place the mycelium in the perfect temperature and darkness to colonise.

Inoculation - The stage in which mushroom culture is introduced to a nutrient medium(food). The culture is usually contained in a nutrient liquid in a syringe or a nutrient agar petri dish.

Mycelium - A root-like structure of fungus that spreads, looking for water and food. Once mycelium gains sufficient energy from the food it will fruit. This fruit is what we call mushrooms.

When mycelium takes over a substrate introduced via grain spawn they fully colonise the substrate and then secrete enzymes to ward off contamination.

FUN FACT: Penicillin is the most common antibiotic - and it is an enzyme secreted by fungus to ward off bacteria.

Sterilisation - The substrate or grains are put under extreme heat (121 °C) and immense pressure (15 psi), killing all organisms and their spores.

Substrate - Food for mycelium. Just as plants need nutritious soil to grow in, mushrooms need wood, manure/compost, straw or insects.

FUN FACT: Mushrooms that naturally grow in insects are called parasitic mushrooms, the most common example of which is Cordyceps.

Please see next page.

Appendix A: fruiting chart

Growing mushrooms outside their fruiting temperature would lead to no growth or deformed mushroom. Mushrooms will also not grow well in a sunny, windy environment, so a shady , less windy area with humidity is preferred.

Mushroom Species/Strain	Fruiting temperature	Side or top fruiting	Comment	Difficulty
Yellow Oyster (Pleurotus Citrinopileatus)	20° - 30°C	Both		Beginner
Pink Oyster (Pleurotus djamor)	18° - 30°C	Both	Likes fruiting in Summer. Do not keep the liquid culture syringe in the fridge as it is a tropical species and mycelium dies when it is exposed to cold.	Beginner
Giant Blue Oyster (Pleurotus Ostreatus Sapidus)	20° - 30°C	Both	Colonises quickly but takes a long time to fruit.	Beginner
Phoenix Oyster (Pleurotus pulmonarius)	14° - 24°C	Both, best from side	Extremely easy to grow.	Beginner
Black King Oyster (Pleurotus ostreatus-Hybrid)	15° - 21°C	Top		Medium
Coral Tooth (Hericium coralloides)	12° - 20°C	Both, best from side	Easy to fruit. Ensure correct humidity to prevent fruit yellowing.Wait for the fruit to reach size of	Beginner

Mushroom Species/Strain	Fruiting temperature	Side or top fruiting	Comment	Difficulty
			you palm before harvesting.	
Lion's Mane Native Australian (Hericium Coralloides)	12°- 22°C	Both, best from side	Easy to fruit. Ensure correct humidity to prevent fruit yellowing. Wait for the fruit to reach size of you palm before harvesting.	Beginner
Swordbelt (Agrocybe aegerita)	10° - 18°C	Top		Beginner
Winter White Oyster (Pleurotus Ostreatus)	12° - 22°C	Both		Beginner
Chestnut (Pholiota Adiposa)	12° - 21°C	Top	Hard to fruit without proper humidity. Greenhouse setup recommended.	Advanced
Nameko (Pholiota microspora)	10° - 20°C	Top		Medium
Golden Enoki (Flammulina velutipes)	17° - 21°C	Top fruiting as shown in the instructions above.		Medium
Enoki (Flammulina velutipes)	8° - 12°C	Top fruiting as shown in the instructions above.	Can be fruited by refrigerating the bag as it thrives in the cold.	Beginner
Blue Pearl Oyster (Pleurotus Columbinus)	15° - 20°C	Both	Best to grow in Winter.	Beginner

Mushroom Species/Strain	Fruiting temperature	Side or top fruiting	Comment	Difficulty
Giant King Oyster (Pleurotus Eryngii)	15° - 20°C	Top	Will only grow in winter, or cold temperature.	Medium to Advance.
Tan Oyster (Pleurotus ostreatus)	15° - 24°C	Both		Beginner
Reishi (Ganoderma Steyaertanum)	23° - 25°C	Side	Produces lots of spores. Takes a long time to fruit but colonises fast.	Beginner
Princess of Pearl (Pleurotus Ostreatus)	12° - 29°C	Both		Beginner
King of Pearl (Pleurotus Ostreatus)	10° - 30° C	Both		Beginner
Lion's Mane Beard (Hericium erinaceus)	18° - 24°C	Side		Beginner
Lion's Mane Pride (Hericium erinaceus)	18° - 24°C	Side		Beginner
Lion's Mane Heat Tolerant Wild Strain (Hericium erinaceus)	18° - 35°C	Side		Beginner
White Elm Oyster (Pleurotus ulmarius)	10° - 18°C	Side		Beginner
Brown Shimeji (Hypsizygus tessulatus)	12° - 18°C	Top		Beginner
Ivory Shimeji (Hypsizygus tessulatus)	12° - 18°C	Top		Beginner