

Log Based Cultivation



Outline:



- ❖ Introduction to FFP
- ❖ Cultivation overview
- ❖ Mushroom Types:
 - ❖ Shiitake
 - ❖ Oyster
 - ❖ Maitake
 - ❖ Nameko
 - ❖ Other



The beauty & diversity of mushrooms!



General Cultivation Overview:



- ❧ Select a mushroom
- ❧ Acquire appropriate spawn type
- ❧ Acquire & treat the substrate
- ❧ Inoculate
- ❧ Spawn run
- ❧ Pin initiation
- ❧ Fruiting



General Cultivation Overview: Selecting a Mushroom



❧ Selecting a mushroom depends on:

Facility:

- ❧ Indoor
- ❧ Outdoor
- ❧ Hoophouse/
Greenhouse

Substrate:

- ❧ Logs
- ❧ Blocks
- ❧ Straw
- ❧ Compost
- ❧ Wood chips

Seasonality:

- ❧ Spring
- ❧ Summer
- ❧ Fall
- ❧ Winter

*****You can achieve 4 season mushroom production by utilizing various substrates and a combination of indoor/outdoor production of many mushrooms**



Olive Oysterling

Log Production



Maitake



Nameko



Oyster



Lion's Mane



Shiitake

General Cultivation Overview: Log Cultivation



There are a variety of shiitake and other mushrooms that vary in fruiting times

Outdoor Production

Mushroom	Substrate	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Jan	Feb
Shiitake	Logs												
Oyster	Logs												
Nameko	Logs												
Maitake	Logs												
Olive Oys.	Logs												
Lion's Mane	Logs												
Comb Tooth	Logs												

General Cultivation Overview: Log Cultivation



There are a variety of shiitake and oyster strains that vary in fruiting times

Outdoor Production

Mushroom	Substrate	Strain	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Jan	Feb
Shiitake	Logs	CW	■	■	■				■	■	■			
		WR		■	■	■			■	■				
		WW			■	■	■	■	■	■				
		Force Fruiting				■	■	■	■	■				
Oyster	Logs	CW								■	■	■		
		WR		■				■	■					
		WW				■	■							
Nameko	Logs								■	■	■	■		
Maitake	Logs							■	■					
Olive Oys.	Logs								■	■				
Lion's Mane	Logs			■	■			■	■					
Comb Tooth	Logs							■	■					

General Cultivation Overview: Log Cultivation



☞ Suitable trees for log cultivation – **must be HEALTHY!**

		TREE SPECIES																												■ = Recommended ● = Satisfactory ▲ = Questionable		
		Alder	Apple	Ash	Aspen, Box Elder, Cottonwood & Willow	Basswood	Beech, American	Bitternut Hickory, Butternut, & Sulpher Bud	Black Birch & Paper Birch	Black Gum & Tupelo	Black Walnut	Blue Beech & Hornbeam	Buckeye	Buckthorn	Cherry	Chinese Tallow Tree & Tree of Heaven	Elm	Eucalyptus	Hackberry & Mulberry	Hophornbeam	Ironwood	Maple, Hard (Sugar)	Maple, Soft (Red, Silver)	Oak	Palms	Pear & Sycamore	Sassafras & Sourwood	Sweet Gum	Tulip & Yellow Poplar			
MUSHROOM VARIETIES	Shiitake	■				●	■	●	●	●		■		▲	●			●		■	■	■	●	■				●	■			
	Oyster	●		▲	■	●	●						●			●	●		■		●	●	●		●	●		●	■			
	Lion's Mane & Comb Tooth				●		■		●		●	■							■			■		▲				●				
	Nameko	●	▲	●	■	●							■		■		●		●			■							■			
	Olive Oysterling			●		●	■						●		●						●	■		■								
	Maitake																							■								
	Box Elder				■												●					●	●									
	Reishi																					■	●	●	●				■			

9

Recommended are highly suitable, Satisfactory are moderately suitable, and Questionable can grow but yield low. Fields left blank are either unsuitable or untested.

Note: In Shiitake cultivation avoid Ash, Black Walnut, Elm, Black Locust. In Oyster cultivation avoid all Oak. For any of the above mushroom species avoid all Conifers.

Log Parameters



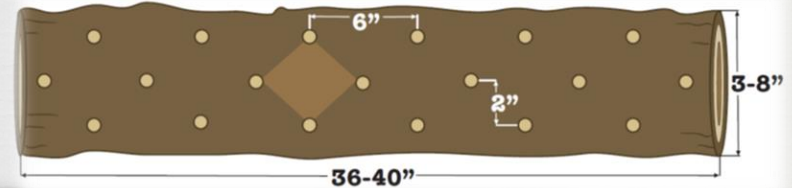
❧ Logs must be:

- Green
- Cut from living trees
- Dormant Cut
- Free from any obvious disease or insect problems
- Of a suitable species for the cultivated mushroom.

Log-based cultivation Process



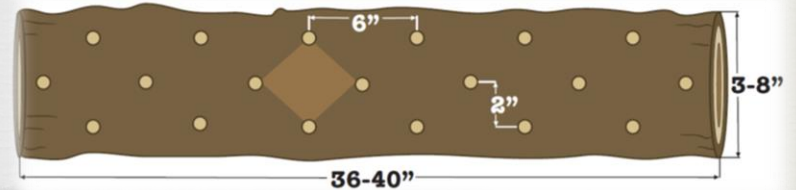
∞ Drill & Fill Method – Plug Spawn



Log-based cultivation Process



☞ Drill & Fill Method – Sawdust Spawn



Tools



& More Tools



& Still More Tools



Log-based cultivation Process



⌘ Log Incubation – colonization is occurring now



Log-based cultivation Process



☞ Mushroom production & harvest!

















Log-based cultivation of Shiitake



Shiitake Strain Chart

Strain Divisions and Characteristics	Strain Name	Image	Fruiting Temperatures*	Additional Details	Spring			Summer			Fall			Winter			
					3	4	5	6	7	8	9	10	11	12	1	2	
Wide Range •Best for beginners and for year-round commercial cultivation •Fastest spawn run, time to first fruit 6-12months •General temperature range 55-75°F •Can be force fruited for year round production if the above fruiting temps are provided •Mushroom quality and yield will be depressed in high heat and humidity	WR46		55-75°F	•Does best under cool nights and warm days such as found in high elevations •Short rests between fruitings in young logs •Quality can suffer with high humidity													
	West Wind		59-77°F	• Often better than other wide range strains in drought conditions •Short rests between fruitings in newer logs													
	Double Jewel		55-75°F	• Best production with cool nights and warm days • Tolerates humidity better than other wide range strains													
	Native Harvest		45-75°F	• Abundant natural fruiting in late summer through fall, also responds best to forced fruiting at this time • Fruits well on softer maples • Distinctive fine ornamentation on cap rim													
Warm Weather • These strains are bridge strains: some like a wide range, others more like cold weather strain. •General temperature range: 50-85°F •Mushroom quality is often better than wide range during warmest months •Spawn run time to first fruit 9-12 months. •These strains, as well as to a lesser extent the wide range are best choice when using soft hardwoods	Night Velvet		55-80°F	• Produces larger fruitings on older logs than wide range in the summer • Best strain for maples													
	WW70		50-80°F	• Excellent fall fruiter with long fruiting season • Especially good for extended fall harvest in the south													
	Bulochka		48-78°F	• Best at 50-77°F • Does well in high humidity/moisture areas • Good Indoor strain													
	Cold Weather •Growers in the south will utilize outdoor fruiting of these strains in the winter months •Northern growers should expect concentrated early spring and fall fruitings from these strains •The mushrooms produced are breathtaking in appearance and have outstanding flavor and texture. •Spawn run time to first fruit 9-12 months. •General temperature range 45-70°F •Do not respond well to force fruiting •Logs can be irrigated in the South in the winter months during appropriate fruiting times for that strain to initiate heavy fruiting.	Bellwether		48-64°F	• Earliest to fruit of all cold weathers • Exceptionally beautiful bell shaped cap • Heaviest fruiting occurs in spring												
Miss Happiness			44-68°F	• Excellent fall fruiter • Long fruiting season both spring and fall													
Snow Cap			44-68°F	• Likes high humidity for winter production in the south • One of the first cold weathers to be introduced • Can be force fruited with misting system													
Chocolov			40-62°F	• Earliest and latest fruiting of the season													
Jupiter			43-64°F	• Natural fruiting time; winter in the south, early spring and light fruiting in the fall, can be force fruited outdoors in the warmer winter areas with misting or soaking Dec thru March.													

*Fruiting temperatures are a general range

Indicates the time when mushrooms are MOST LIKELY to fruit naturally

Indicates the best time to force fruit logs (Force fruit logs by soaking for 8-12 hours in cold water)

Forcing Logs



❧ Production can be scheduled to meet market demand or demand of friends and relatives

Logs are submersed for 12-18 hours in cold water.



Environmental Modification



❧ Fruiting Blankets

- Modify local RH level around pinning mushrooms

- Slow wind speed

- Provide additional shade

- Temper daytime highs and nighttime lows

Environmental Modification



Log-based cultivation of Shiitake



Outdoor Production

Mushroom	Substrate	Strain	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Nov	Dec
Shiitake	Logs	CW												
		WR												
		WW												
	Force Fruiting													

Log-based cultivation of Oysters



Oyster Strain Chart

					Seasonal Fruiting of Oyster Mushrooms on Logs											
Resource Type	Strain Name	Image	Fruiting Temperatures*	Additional Details	Spring			Summer			Fall			Winter		
					3	4	5	6	7	8	9	10	11	12	1	2
Log and Substrate (such as straw)	Golden		60-85°F	<ul style="list-style-type: none"> More vibrant when exposed to more intense lighting. Slowest spawn run, be sure substrate is well treated, and use a high inoculation rate. 												
	Pohu		55-85°F	<ul style="list-style-type: none"> Prolific strain that is a suitable choice for experimentation on various substrates. Produces large parchment colored delicate clusters that are more sturdy in later flushes. 												
	Italian		50-70°F	<ul style="list-style-type: none"> Delayed pinning indoors on substrates during hot months, may need to move into fruiting area once colonized. Produces thick capped brown clusters with short tender white stems. 												
	Grey Dove		45-70°F	<ul style="list-style-type: none"> Large vase shaped clusters with multiple mushrooms Thick caps hold up well in storage and shipping Prolific, fast spawn run. Blue pins become grey with maturity, white stem. 												
Log Only	Blue Dolphin		32-45°F	<ul style="list-style-type: none"> Requires near freezing temperatures to initiate fruiting. Produces large hearty caps deep blue in color fading to dark grey. 												
	Polar White		45-55°F	<ul style="list-style-type: none"> Has beautiful pure white hearty clusters. Flavorful and crisp texture. 												
	Kira		40-60°F	<ul style="list-style-type: none"> Has adapted to a wide range of woodtypes with multiple fruiting across the season. Most fruiting occurs in the spring and fall. 												
Substrate Only	Pink		65-85°F	<ul style="list-style-type: none"> Spawn should not be refrigerated for more than five days as it is cold sensitive. Fastest spawn run on substrates. Mushrooms have short shelf life. 												
	King		55-65°F	<ul style="list-style-type: none"> The entire mushroom is edible including the stem. Prefers a cooler environment for fruiting, as listed to left. 												

Indicates the time when mushrooms are MOST LIKELY to fruit naturally on logs

Oysters grown on substrates indoors can fruit all year round if the temperature and humidity are properly controlled. Strain adjustments may need to be made when control of these factors is limited.

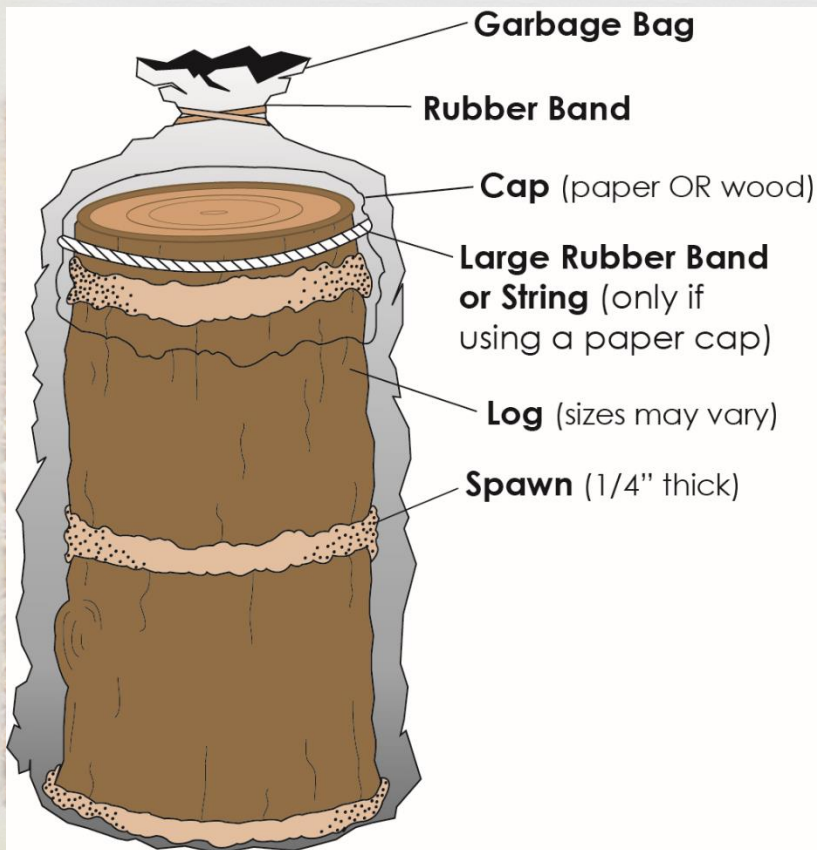
Please Note: Oyster mushrooms usually do not respond to cold water soaking for force fruiting, such as Shiitake logs.

*Fruiting temperatures are a general range

Log-based cultivation of Oysters



☞ Totem Method generally works best



Log-based cultivation of Nameko



Inoculation



Outdoor Production

Mushroom	Substrate	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Jan	Feb
Nameko	Logs												



Log-based cultivation of Olive Oysterling


Inoculation
 Outdoor Production


Mushroom	Substrate	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Jan	Feb
Olive Oys.	Logs												






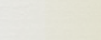


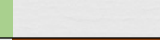





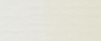




Log-based cultivation of Lion's Mane & Comb Tooth



 Inoculation

 Outdoor Production

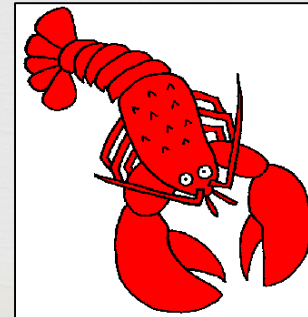
Mushroom Substrate	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Jan	Feb
Lion's Mane Logs												
												
Comb Tooth Logs												
												



☞ Totem Method works best

☞ Comb Tooth (Left)

☞ Lion's Mane (Right)



Log-based cultivation of Maitake



Inoculation



Outdoor Production

Mushroom	Substrate	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Jan	Feb
Maitake	Logs												



Log-based cultivation of Maitake



- ❧ Inoculate sterilized oak in Feb.
- ❧ Incubate indoors in special bag
- ❧ Bury shallowly outdoors in May
- ❧ Harvest late August

Wood Resources



Wood Resources



Wood Resources

