



Gourmet Mushroom Cultivation and Marketing

*Non-timber Forest Products:
Income Opportunities and Management
Strategies for Ohio Woodland Owners
Friday, Nov. 2, 2012*

Equipment Checklist

Equipment and Supplies:	Notes:	Typical costs:
Mushroom spawn	Choose between sawdust or plug spawn; 100 plugs => 2 logs, 1 lb. sawdust => 5 logs	Sawdust spawn/lb. \$4-\$10 Plug spawn/100 pcs. \$10-\$15
Hardwood logs	~40" long, 3-6" diameter, undamaged and freshly cut.	
Electric/cordless drill OR Angle grinder w/bit adaptor	Cordless drill gives you the option to work away from grid. Angle grinder is very fast and powerful, but more expensive.	Angle grinder \$89 Angle grinder adaptor \$35 (F&F)
Drill bits w/stop collars	For sawdust spawn: 12mm or 7/16" brad-tip, collar set at 1" For plug spawn: 5/16" brad-tip, collar set at 1.25"	Sawdust bit \$11-\$13 Plug bit \$9.50-\$13
Inoculator tool	Use for sawdust spawn. 2 styles available: thumb or palm	Palm \$30-\$35; Thumb \$33-\$35
Hammer, small	Use for plug spawn and for nailing on ID tags	
Tyvek or plastic sheets	To catch wax drips and debris; re-usable.	
Cheesewax, uncolored	Can also use beeswax, if you have it; figure 1/2 lb. wax per 2-3 logs, more if sealing ends.	\$3-\$5.50/lb.
Heat source and container for hot wax	Use hotplate, camp stove, crock pot, etc. with double boiler or thermostat control to avoid overheating; flashpoint for cheesewax is 450° F. Fire extinguisher should be at hand.	Granny-ware 1.5 qt. double-boiler \$15-\$20
Wax applicator	Small paintbrush, wax dauber, turkey baster	Wax daubers \$1.50/4
Aluminum label tags & nails	Don't get too cheap, these have to last 5+ years	\$4.50/50, \$8.75/100, \$28/500
Inoculation jig	Simple homemade jig to hold log in place while working.	
Moisture meter, lumber-type	Used to monitor moisture content; 30% MC or above required for mushroom production; accuracy not critical, but range 40% and above is.	Exttech dual lumber-building moisture meter \$85
Small broom & dustpan	For clean-up of bark, sawdust, wax drips, spawn, etc.	
Scraper and rags	To clean up wax on jig and/or Tyvek sheets... or floor, walls, ceiling.....	
Firewood dolly	Nice if you're doing lots of logs.	Landmann "log caddy" \$75-\$90
Soaking tank	Oblong stock tanks work GREAT! 55 gal. rain barrels also work for smaller numbers. Drain holes are convenient for winter storage and changing water..	100 gal. 2'Wx 4'L x 2'H \$89

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Sources for spawn, tools, books, and supplies:

Field and Forest (Peshtigo WI)	http://www.fieldforest.net/
Fungi Perfecti (Olympia WA)	http://www.fungi.com/
Everything Mushrooms (Knoxville, TN)	http://everythingmushrooms.com/
Mushroom People (Summertown, TN)	http://www.mushroompeople.com/

Recommended books:

<p>Growing Shiitake Mushrooms in a Continental Climate Kozak, M. E. and J. Krawczyk Peshtigo, WI: Field & Forest Products, Inc., 1993</p> <p>Joe's Book of Mushroom Cookery Czarnecki, Jack NY: Atheneum, 1988</p> <p>Mushrooms in the Garden (Pilze im Garten) Steineck, Hellmut, translated by Virginia Waters Eureka, CA: Mad River Press, 1984 (English translation) Stuttgart, Germany: Eugen Ulmer GmbH & Co., 1981 (German)</p>	<p>Mycelium Running: how mushrooms can help save the world Stamets, Paul Berkeley, CA: Ten Speed Press, 2005</p> <p>Growing Gourmet and Medicinal Mushrooms Stamets, Paul Berkeley, CA: Ten Speed Press, 2000</p> <p>The Mushroom Cultivator: a practical guide to growing mushrooms at home Stamets, Paul Olympia, WA: Agarikon Press, 1983</p>
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Websites, articles, and other on-line resources:

- Ohio Mushroom Society - <http://www.ohiomushroom.org/oms/>
All About Mushrooms by Harvey Ussery - <http://www.motherearthnews.com/organic-gardening/about-mushrooms-z10m0sto.aspx>
Mushrooms in the Garden by Terri Marie Beauséjour - <http://www.mykoweb.com/articles/gardenmushrooms.html>
Producing Shiitake Mushrooms: a guide for small-scale outdoor cultivation on logs by North Carolina Cooperative Extension - http://www.ces.ncsu.edu/fletcher/programs/herbs/crops/mushrooms/pdf/2011%20AG-478_Shiitake_Final.pdf
Mushroom Expert - <http://www.mushroomexpert.com/>
Mykoweb - <http://www.mykoweb.com/>
Agroforestry Mushrooms at Cornell University - <http://mushrooms.cals.cornell.edu/>
Marketing Forest Cultivated Mushrooms - <http://mushrooms.cals.cornell.edu/marketing.html>
Field Study of Technique for Combining Low-Cost, Herbicide-Free Control of Woody Invasives, in Particular Ailanthus, with Production of Edible Mushrooms by Janell Baran, NCR SARE Farmer/Rancher Grant 2007 - <http://mysare.sare.org/mySARE/ProjectReport.aspx?do=viewProj&pn=FNC07-670>

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Mushroom Species for Log and Terrestrial Cultivation

Name	Preferred substrates	Fruiting season	Sources
Almond Agaricus <i>Agaricus subrufescens</i>	manure or rich compost, prefers a companion crop, e.g., tomato, squash, melon, potato	70-95°F (not hardy) summer	F&F
Blewit <i>Clitocybe nuda</i> aka <i>Lepista nuda</i>	hardwood & pine duff mixed with organic matter	40-65°F fall	F&F
Shaggy Mane <i>Coprinus comatus</i>	lawns, meadows, wood chips, barnyards, manure-enriched soils, manure/sawdust bedding	40-60°F spring & fall	FP, EM
Reishi/Ling Chi <i>Ganoderma lucidum</i>	hardwood stumps and partially-buried logs; esp. oak, elm, maple; pony logs	60-95°F, summer & early fall	FP, F&F, MP, EM
Maitake/Hen of the Woods <i>Grifola frondosa</i>	hardwood stumps or buried logs; esp. oak, honey locust, elm, black gum, beech, maple	45-70°F fall	FP, F&F, MP, EM
Lion's Mane <i>Hericiium erinaceus</i>	thick-barked hardwood stumps or partially buried logs; esp. oak, elm, hard maple, walnut, sycamore	60-75°F summer	FP, F&F, MP, EM
Elm Oyster <i>Hypsizyguus ulmarius</i>	logs, tumps or partially-buried logs of elm; also logs of beech, maple, willow, oak; woodchip/sawdust beds;	40-80°F spring, summer, fall	FP
Shiitake <i>Lentinula edodes</i>	thick-barked hardwood logs and stumps, e.g., oak, ash, beech, hickory, hard maple, ironwood, and black cherry	40-85°F spring, summer, fall	FP, F&F, MP, EM
Morel, Black <i>Morchella angusticeps</i>	burn sites; sand-wood ash-gypsum-gravel-wood charcoal beds, over-seed w/native grasses	45-65°F spring	FP, F&F, MP
Morel, White <i>Morchella esculenta</i>	wood-based mulch beds in old orchards or woods; among perennial veggies in a mix of partially decomposed organic matter, wood chips & soil	45-65°F spring	FP, F&F
Oyster <i>Pleurotus ostreatus</i>	hardwood and softwood stumps and logs, esp. poplar; also straw, wood mulch, cellulose products such as toilet paper, hemp rope, or cardboard	40-75°F spring & fall	FP, F&F, MP, EM
Italian Oyster/Tree Oyster <i>Pleurotus pulmonarius</i>	conifer stumps and logs, esp. spruce, fir, pine	50-75°F summer	FP, F&F, EM
Wine Cap/King Stropharia <i>Stropharia rugosa-annulata</i>	fresh hardwood chips and sawdust; wood-based mulch	40-90°F spring & summer	FP, F&F, EM

Source key: FP = Fungi Perfecti, F&F = Field & Forest, EM = Everything Mushrooms, Mushroom People = MP (I've used FP, F&F, EM but MP has a decent reputation, too).