

plies, and the cost of labor. Joe Krawczyk, co-author of *Growing Shiitake Mushrooms in a Continental Climate*, identifies labor as the most significant investment. Other considerations include the method and scale of cultivation and how the mushrooms will be marketed.

Before committing time and money establishing a forest grown mushroom operation, familiarize yourself with the technical aspects of cultivation as well as the labor and materials required. Additional references are included at the end of this publication to provide more information about the technical issues and economics of producing mushrooms. Some of the organizations listed also sponsor seminars that may prove helpful in assessing the feasibility of producing mushrooms on your land.

The fact that shiitake, oyster, and other specialty mushrooms are now available in major supermarkets indicates that there is consumer recognition and demand for them.

Forest mushroom production has the potential to provide



supplemental income for forest landowners while supplying consumers with a fresh, healthy product grown in Rhode Island woodlands.

OTHER SOURCES OF INFORMATION

Farming Exotic Mushrooms in the Forest. Deborah B. Hill. *Agroforestry Notes.* USDA National Agroforestry Center. AF Note 13. July 1999.

Mushrooms - A Small Scale Agriculture Alternative. Diann Hunsinger. PENpages. College of Agricultural Sciences. Penn State University. April 1998.

Specialty Mushrooms. Daniel J. Royse. Penn State University. Department of Plant Pathology. *Specialty Mushrooms Homepage.* June 1998.

Growing Shiitake Mushrooms in a Continental Climate. Mary Ellen Kozak and Joe Krawczyk. ABC Printers, Marinette, Wisconsin. Second edition 1993.

Mushroom Cultivator: A Practical Guide to Growing Mushrooms at Home. Paul Stamets, J. S. Chilton. Agarikon Pr. Published 1984

Shiitake Growers Handbook: The Art and Science of Mushroom Cultivation. Paul Przybylowicz, & John Donoghue. Kendall/Hunt Publishing. 1988.

Growing Shiitake Mushrooms. Publication F-5029. Steven Anderson and Dave Marcouiller. Oklahoma Cooperative Extension Service. 1990.

Shiitake Production on Logs: Step-by-Step in Pictures. FOR-77. Deborah B. Hill. University of Kentucky, Cooperative Extension Service, 1999.

OTHER ORGANIZATIONS

• *Boston Mycological Club*
6 Oak Ridge Drive #4
Maynard, MA 01754-2470

• *Connecticut Valley Mycological Society*
10 Lounsbury Rd.
Trumbull, CT 06611-4429

• *Fungi Perfecti Online*
(www.fungi.com/info/cani.html)

• *American Mushroom Institute*
907E. Baltimore Pike
Kennett Square, PA 19348
(215) 388-7806

• *North American Mycological Association*
3556 Oakwood
Ann Arbor, MI 48104-5213
(313) 971-2552

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Rhode Island DEM:
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Division of Forest Environment
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Rhode Island Forest Conservators Organization
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USDA, Natural Resources Conservation Service
(401) 828-1300

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*How can I generate income
on my forestland?*



CULTIVATING MUSHROOMS as a sustainable land-based business

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Programs and activities are available to all persons without regard to race, color, sex, disability, religion, age, sexual orientation, or national origin.



OVERVIEW

Management for wood products, such as timber and firewood, is difficult to justify on an economic basis alone in Rhode Island due to the small parcel size and long term nature of forest management. Managing for alternative forest products, such as edible mushrooms, has the potential to produce supplemental income and develop into small businesses suitable for rural areas.

Increased interests in natural foods and ethnic cuisine has created a market for gourmet mushroom varieties, like shiitake, cremini, and oyster mushrooms. Small scale cultivation of forest grown mushrooms may be a viable economic activity for southern New England providing new ways for landowners to generate income, at least enough to pay property taxes.



INTRODUCTION

Mushrooms are fungi that live on decaying organic matter. Conditions found in the forest are ideal for the growth of mushrooms. The fungus needs relatively warm temperatures, moderate light, relatively high and consistent moisture, and a continual supply of nutrients in order to thrive.

PRODUCING MUSHROOMS

The strategy in cultivating mushrooms is to introduce a desirable fungus into a substrate (i.e. logs, sawdust, etc.) while excluding other fungi that would compete for the same space. The development of the fungus occurs in two stages: a vegetative phase and a fruiting stage, when the mushrooms are produced. The "mushroom" is actually the fruit of the budding fungus.

Shiitake is the most commonly cultivated mushroom although experience growers have successfully cultivated other varieties including oyster and cremini mushrooms.

THERE ARE SEVERAL BASIC STEPS IN THE CULTIVATION PROCESS.

- Trees are cut in late winter or early spring when carbohydrates in the tree are highest and



there is less chance of damaging the tree during harvest. Logs three to eight inches in diameter should be cut into pieces three to four feet long.

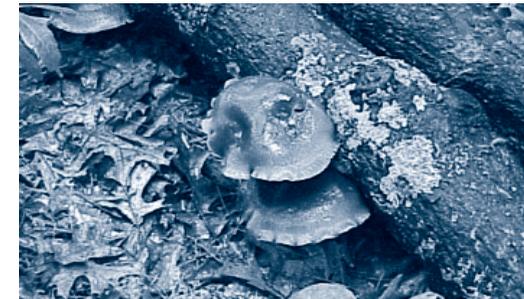
- Holes are drilled into the log, inoculated with mushroom spawn, and sealed with wax.

- Logs are stacked in a warm, shady location to allow the fungus time to colonize the log and spread. This is usually done in a forest that has been thinned so some sunlight reaches the forest floor. The purpose of stacking is to promote air movement and make harvesting easier.

- Once the fungus has fully colonized the logs fruiting (production of mushrooms) will occur. The logs must be kept moist to insure the fungus grows and will produce mushrooms.

- Once harvested, mushrooms must be stored carefully to maintain their fresh, healthy appearance. Mushrooms which are not sold within a few days of harvest can be dried to extend their useful life.

- After harvest, the logs are maintained to allow the fungus to replenish itself.



MARKETS

Producing mushrooms has the potential to become a viable economic activity in Rhode Island because of the increased interest in natural food and ethnic cuisine.

Marketing of specialty mushrooms is a relatively new enterprise in the U.S., with shiitake and oyster the most commonly cultivated varieties, but the domestic market for forest grown mushrooms is expanding readily. The demand for fresh and dried shiitake exists, particularly in metropolitan areas where it is marketed to health food stores, gourmet food stores and oriental restaurants. Worldwide demand for shiitake mushrooms is second only to the common white mushroom.

Most mushroom growers sell their harvest directly on the roadside, at farmers markets, or to restaurants, gourmet food shops, and health food stores. In other regions, shipping point firms (such as cooperatives, brokers, or grower packers) buy fresh mushrooms from local, small-scale growers.

ECONOMICS AND OTHER CONSIDERATIONS

As with any business venture, properly assessing the feasibility of a forest based mushroom enterprise requires analyzing the costs as well as potential income. Several of the major expenses include the cost of wood (or the costs associated with cutting it), the cost of mushroom spawn and other sup-