



## AGRICULTURAL EXPERIMENT STATION

### *Growing Mushrooms in the Backyard as an Urban Gardening Project*

**James R. Allen, Iveracottis Short and Christy M. Aden**



One of the main limiting factors in growing fresh produce for home consumption in the District of Columbia is the lack of available land. Due to the lack of available land, not many specialty crops can be introduced as a viable agricultural enterprise in this urban area. However, in an effort to enhance productivity of the urban gardens of the Washington Metropolitan area and at the same time make more nutritious fresh produce become available for the diets of our citizens, researchers at the University of the District of Columbia (UDC) Agricultural Experiment Station are encouraging mushroom production in backyards of cooperating gardeners.

We are introducing mushrooms as a specialty crop in the urban gardens of the District of Columbia for many reasons. First of all, the mushroom production we are recommending will be done on logs which occupy a small amount of space. This is an important factor since the availability of land space is a major problem for gardeners in the District of Columbia. Secondly, contrary to what many individuals believe, mushrooms are a highly nutritious food (1). Shiitake, the variety we are recommending for production, contains a high level of protein (18%), vitamins B and niacin and the minerals calcium, magnesium, phosphorous and potassium. Thus, by producing mushrooms, our urban gardeners will be able to improve their diets by making it part of their daily food intake. Additionally, growing mushrooms in a backyard garden can be a means of enhancing the income of the gardeners since the mushroom produced can be sold in our local farmers markets. One log can produce as much as 2.5 kg (5.5 lbs) of fruiting body over a period of five years. Therefore, just a few logs placed in a few square feet of backyard space can produce enough mushrooms to not only enhance the diet of the gardener but also to increase his/her income.

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In order to produce mushrooms on logs, trees from which these logs can be obtained should be growing in the area. Based on production literature (2,3), logs that are cut from oak trees are the best but if oak is not available, sweet gum trees can be used. Fortunately, both oak and sweet gum trees are located in the Washington Metropolitan area; therefore, logs can be cut for growing mushrooms from either tree. Logs to be used for this purpose should be 2-6" (15-25 cm) in diameter and 3.0 ft long (approx. 50 cm). It is recommended that logs should be cut during the dormant stages of the tree (fall or early spring). Once the logs have been cut (Fig I.) they are inoculated with the mushroom mycelium.



Fig I. Logs on which mushrooms will be grown.

The inoculation procedure should be as follows:

First, logs should be cut from a healthy well-developed hardwood tree. Oak trees are preferable but sweet gum can also be used. As indicated before, logs should be approximately 3 feet long (approx 50 cm) and 2-6" (15-25 cm) wide (Fig I.).

For inoculation to introduce the mushroom mycelium into the log, three spawn types can be used: grain, paste, and plug (2,3). For beginning gardeners, the plug spawns are recommended. Spawn plugs are approximately one inch dowel rod made of wood or plastic with grooves in it to allow the mycelium to cling to the dowel (2). To inoculate the logs with spawn plugs, two simple pieces of equipment are needed. These two pieces of equipment are an electric drill and a hammer (Fig III). The electric drill is used to drill holes in the log. Once the holes have been drilled in the log, tap the spawn plug into the hole. (Fig II and IV).

## GROWING MUSHROOMS ...

After the logs have been inoculated, they should be stacked in a backyard or garden area where it is somewhat shaded but some indirect sunlight is available. For best results, the temperature range should be 22-26 degrees C (72-80 degrees F). During the dry season, logs should be watered. Watering can be achieved by soaking the logs in a garbage can filled with water from a backyard garden hose. Soak the logs overnight and then stack them in a leaning fashion. Continue the watering process for a week and mushrooms should begin to appear.



Fig II. Prospective gardeners being taught how to inoculate logs by Nereide Ellis.

Once the fruiting body has been formed, try to keep the logs in a cool shaded area (65 -70 degrees F) and apply enough water to keep them at about 10% moisture. This watering can is achieved with a watering hose attached to a backyard pipe.



Fig III. Drilling holes into an oak log for placing spawn plugs by Dr. James Allen

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Fig IV. Spawn plug being hammered into oak log by Drs. Allen and Short.

After inoculation, providing temperatures are cool (average 68 degrees F) and adequate watering, fruiting should start around spring or autumn. Time of harvesting will depend on the gardener. Based on observation at the Agricultural Experiment Station of the University of the District of Columbia, harvesting should occur when fruiting bodies are about 2-3 inches in diameter seems reliable (Fig V.).



Fig V. Fruiting bodies of Shitake mushrooms are being examined by Drs. Allen and Short at the University of the District of Columbia's Agricultural Experiment Station.

# GROWING MUSHROOMS ...

The shelf lives of Shiitake mushrooms are relatively short. Only about 3 days at 68-70 degrees F. Therefore, harvested mushrooms should be refrigerated as soon as possible. These mushrooms can also be preserved by drying at 30-50 degrees C (86-122 degrees F). Here Drs. Allen and Short are evaluating fruiting bodies that are ready to be harvested (Fig V.). When harvested, these mushrooms are ready to be eaten or preserved as described above. For more information on establishing backyard production of mushroom please contact Dr. Iveracottis Short or Dr. James Allen at the Agricultural Experiment Station of the District of Columbia.

## Suggestion for drying mushrooms

You can easily learn how to dry mushrooms with your oven. The basic idea is to apply external heat to get rid of moisture. You don't want to bake them too hot or you risk burning off some healthy compounds.

- Preheat your oven to 150 degrees.
- Slice the mushrooms into 1/2-inch pieces or, depending on the shape, you can cut them right down the middle.
- Arrange them on a baking pan or sheet that is NOT oiled. Don't pack them so tightly that they're lying on top of each other.
- Place the sheet (or sheets, if drying a large batch) in the oven and cook for one hour, making sure to leave the oven door slightly ajar so moisture can escape. After the hour, pull them out, flip them over, and cook for another hour. Continue this process until they're all dry.
- After drying mushrooms, store them in an airtight container in a cool, dark place. Don't leave them out in the open, in direct sunlight, or anywhere wet.

So what do you do with dried mushrooms? Reconstitute them in boiling water for 20 - 30 minutes, or simply grind them into a powder for a delicious addition to soups and stocks. The possibilities for drying mushrooms are endless.

## Literature Cited

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- 3 Ellis, Nereide, Allen, James and Short, Iveracottis, 2010. Shiitake Mushrooms Agricultural Experiment Stations,

**University of the District  
of Columbia**

Agricultural Experiment Station  
4200 Connecticut Avenue, N.W.  
Building 44, Suite 120  
Washington, DC 20008

James R. Allen, Ph.D.  
Phone 202-274-7140  
Fax 202-274-7113  
[jallen@udc.edu](mailto:jallen@udc.edu)

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[www.udc.edu](http://www.udc.edu)

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