

## KENTUCKY SHIITAKE PRODUCTION WORKBOOK

# Log Selection and Preparation

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## What to Select

Shiitake mushrooms (*Lentinula edodes*) grow well on many species of hardwood tree. The Shii tree, native to Japan where these mushrooms originate, is in the same family as our oak trees, so all kinds of oaks are useful for shiitake production, although oaks are also very valuable in the timber market. Growing shiitake may be a good reason for you to do some timber stand improvement (TSI) on your woodland and remove some smaller trees (about 6-inch diameter) of species that are less valuable in the market. Table 1 lists tree species that can be successfully used for producing shiitake mushrooms.

Remember that the trees you use for shiitake production should be *alive* and *healthy* (no rot or old broken limbs) at the time they are cut for inoculation!

## When to Select

Logs can be cut for shiitake production at any time of year, but most producers choose to cut logs at a time when the trees are dormant—late fall to late winter or early spring. The **best** time to cut logs is just before the trees begin to leaf out, when the nights are cool (right around freezing temperatures or just above) and the days are warmer (up into 40s or 50°s F). At this time the sugar-rich sap is rising in the trees to feed the buds and new leaves, and the mushrooms feed on that carbohydrate in the wood. The higher the sugar content, the faster the fungus will occupy the whole log. It's also easier to cut trees down when there are no leaves on them!

## How to Select

As noted above, look for small diameter trees that you might want to weed from your woodland anyway. Also look for trees damaged by windstorms or ice storms, as long as that damage has occurred recently. The longer a tree has broken limbs exposed to air, the more likely it is to have the beginnings of rot caused by other organisms. Shiitake can be aggressive in taking over the niche of a wood-consuming fungus in a newly cut log or

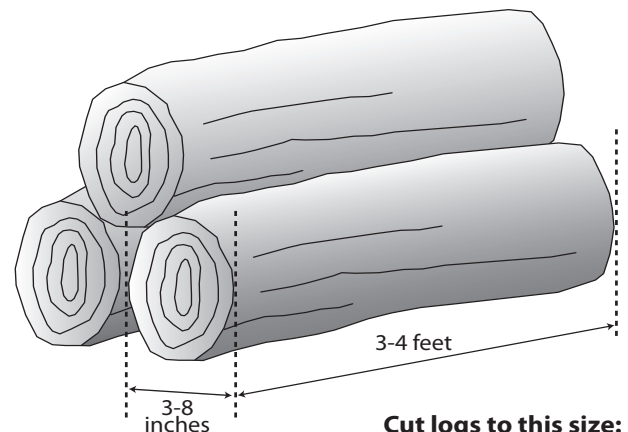
large branch and will resist the invasion of other fungus species, but it is not as successful in colonizing logs that have been exposed to other organisms for some time.

## Log Preparation

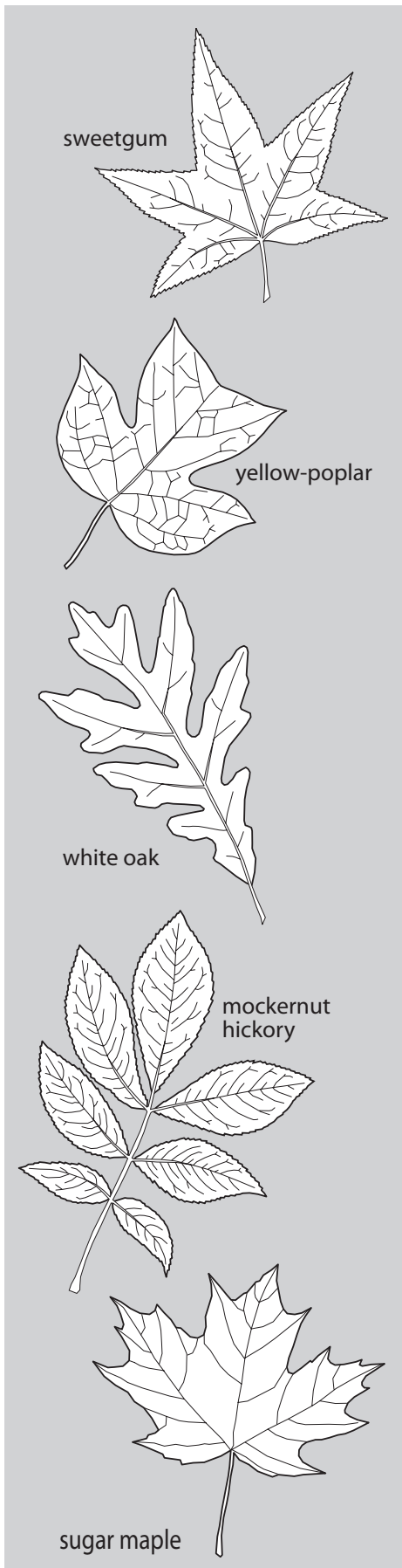
Once you have selected the trees from which you want to get your shiitake logs, cut the trunks and large branches of the trees into lengths that will be workable for you. The recommended length of the shiitake logs is between 3 and 4 feet in length and 3 and 8 inches in diameter. Remember that you will be moving these logs many times during their productive life, so consider how heavy they will be.

If you will be stacking the logs, it is helpful but not necessary to have straight logs. Crooked branches may be just as productive, and there are stacking patterns you can use that will allow for less straightness more easily. If there are side branches on the logs, cut them off flush with the bark of the log. Those exposed side areas will be waxed in the inoculation process.

Timing is important in the shiitake inoculation process. The logs should be cut *no more than two weeks* before you plan to inoculate them. Take the time to select your trees carefully, usually in the early fall when it is easy to identify the trees from their leaves. Mark the trees you want to cut with flagging or paint spots so you can



**Cut logs to this size:**



**Table 1. Wood species suitable for shiitake cultivation.**

Ranking	Common name	Scientific name
<b>best</b>	All oaks	<i>Quercus spp.</i>
	Black willow	<i>Salix nigra</i>
	Eastern hophornbeam	<i>Ostrya virginiana</i>
<b>good</b>	American beech	<i>Fagus grandifolia</i>
	American chestnut	<i>Castanea dentata</i>
	American elm	<i>Ulmus americana</i>
	Bitternut hickory	<i>Carya cordiformis</i>
	Black birch	<i>Betula lutea</i>
	River birch	<i>B. nigra</i>
	Slippery elm	<i>U. rubra</i>
<b>fair</b>	Yellow birch	<i>B. alleghaniensis</i>
	Alder	<i>Alnus rubra</i>
	American hornbeam, ironwood	<i>Carpinus caroliniana</i>
	Black maple	<i>Acer nigrum</i>
	Grey birch	<i>B. populifolia</i>
	Mockernut hickory	<i>C. tomentosa</i>
	Norway maple	<i>A. platanooides</i>
	Pecan	<i>C. illinoensis</i>
	Persimmon	<i>Diospyros virginiana</i>
	Red maple	<i>A. rubrum</i>
	Silver maple	<i>A. saccharinum</i>
	Sugar maple	<i>A. saccharum</i>
	Sweetgum	<i>Liquidambar styraciflua</i>
<b>poor</b>	Big tooth aspen	<i>Populus grandidentata</i>
	Flowering dogwood	<i>Cornus florida</i>
	Paper birch	<i>B. papyrifera</i>
	Pignut hickory	<i>C. glabra</i>
	Quaking aspen	<i>P. tremuloides</i>
	Shagbark hickory	<i>C. ovata</i>
	Yellow-poplar	<i>Liriodendron tulipifera</i>

Adapted from Oei, Peter. 1996. *Mushroom Cultivation*. TOOL Books.

find them again. Then order the materials you need for inoculation (spawn, wax, daubers, drill bits, inoculators) and plan for when you will have the time and possibly the help to inoculate. Most suppliers will send your order immediately, so you should receive it within days of placing your order. Cut your trees the weekend before the inoculation supplies arrive. (FOR-1: *Kentucky Trees and How to Know Them*, available from the Department of Forestry at the University of Kentucky, will help you identify trees on your land.)

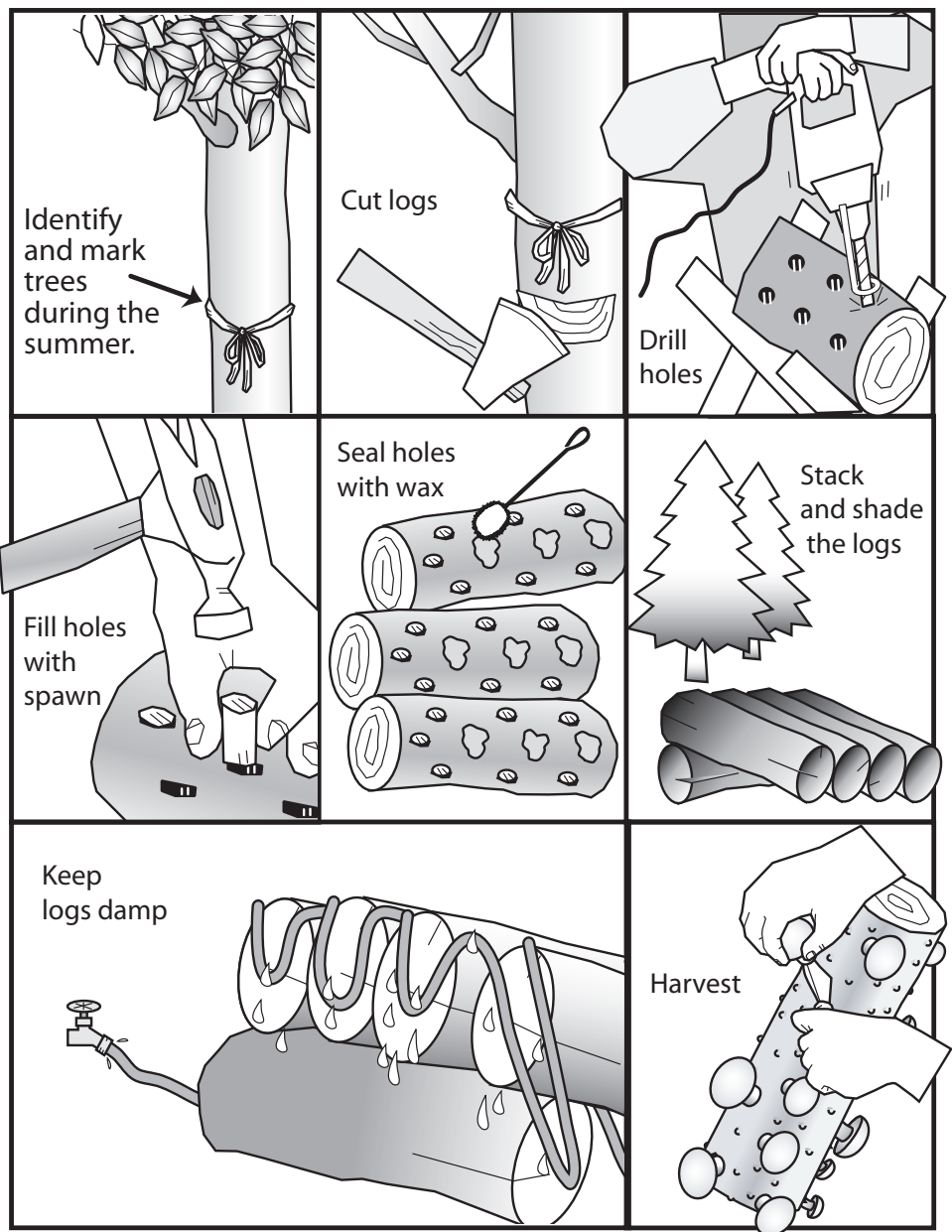
If the winter has been very dry, it is a good idea to soak the logs overnight in something like a stock tank either just before inoculation or immediately afterwards. The logs must have moisture inside for the shiitake spawn to colonize the log successfully.

Once the logs are cut and inoculated, place them in an area where they will get at least 80% shade and natural rainfall. Placing the logs where there are conifer trees such as pines or redcedar trees guarantees that they will have shade year round. Having logs exposed to full sunlight in early spring may slow down the growth of the shiitake spawn. If no conifer trees are available, consider using shade cloth (80 percent) to protect the logs until deciduous trees leaf out fully in the spring and provide the necessary shade.

## Summary

To select and prepare shiitake logs:

- Choose hardwood logs (Table 1) from healthy trees.
- Select trees for logs when you can identify tree species.
- Cut logs in late winter shortly before you will inoculate them.
- Inoculate logs within two weeks of cutting them.
- Soak to increase moisture content if necessary.
- Stack inoculated logs in a shady area where they will get natural rainfall.
- Wait about six months for the shiitake organism to produce mushrooms.



*Mushroom illustrations by Dennis Duross, Extension Communications Specialist*

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## Mushroom Turnovers

From Mushroompeople newsletter 1991

### Filling

- ½ pound fresh or reconstituted shiitake mushrooms, sliced
- 2 ounces fresh tofu, diced finely
- 3 tablespoons vegetable oil
- 1 large onion, finely chopped
- 2 tablespoons dry sherry (optional)
- Pinch of thyme
- Pinch of oregano
- ¼ teaspoon salt
- 1 teaspoon nutritional yeast
- 2 tablespoons flour
- Freshly ground black pepper, to taste
- ¼ cup sour cream
- 1 teaspoon tamari

### Directions

- In a skillet, warm oil, add onion and cook until limp.
- Add mushrooms, tofu and sherry and simmer 3 minutes, stirring often.
- Mix seasonings and flour and sprinkle on simmering mushrooms.
- Stir about 1 minute to brown flour.
- Add sour cream and tamari.
- Reduce heat and simmer until mixture is thickened.

### Crust

- 8 ounces cream cheese, softened to room temperature
- ½ cup vegetable oil
- 1-1½ cups flour
- 1 tablespoon nutritional yeast

### Directions

- Blend ingredients with a pastry blender until smooth and uniform.
- Chill for 30 minutes.

### Turnovers

- Preheat oven to 425°F.
- Roll pastry ⅛-inch thick and cut into 3-inch rounds.
- Place 1 teaspoon filling on each round and fold in half.
- Press edges together with a fork and prick holes in top crust with fork tines.
- Bake about 15 minutes or until lightly browned.

*Makes 3 dozen.*

## Mountain Fresh Shiitake Trout

From Ed Burluson, Mountain Fresh Shiitake Mushrooms

### Ingredients

- 2 tablespoons butter
- 2 tablespoons olive oil
- 1 teaspoon minced ginger
- 2 tablespoons minced garlic
- 2 tablespoons minced parsley
- 1 teaspoon soy sauce
- 2 scallions, sliced thin
- 4 ounces shiitake mushrooms, sliced thin
- 2 fresh trout
- fresh lemon

### Directions

- Combine butter and oil in heavy skillet over medium heat.
- Stir in ginger, garlic, parsley and soy sauce.
- Add scallions and mushrooms and sauté for 2 or 3 minutes.
- Remove from heat.
- Spread aluminum foil in roasting pan.
- Oil foil lightly.
- Place fish on foil and spread mushroom mixture over fish.
- Sprinkle with juice of lemon and seal foil over fish securely.
- Bake 30 minutes at 350°F.

*Serves 2 to 4.*

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