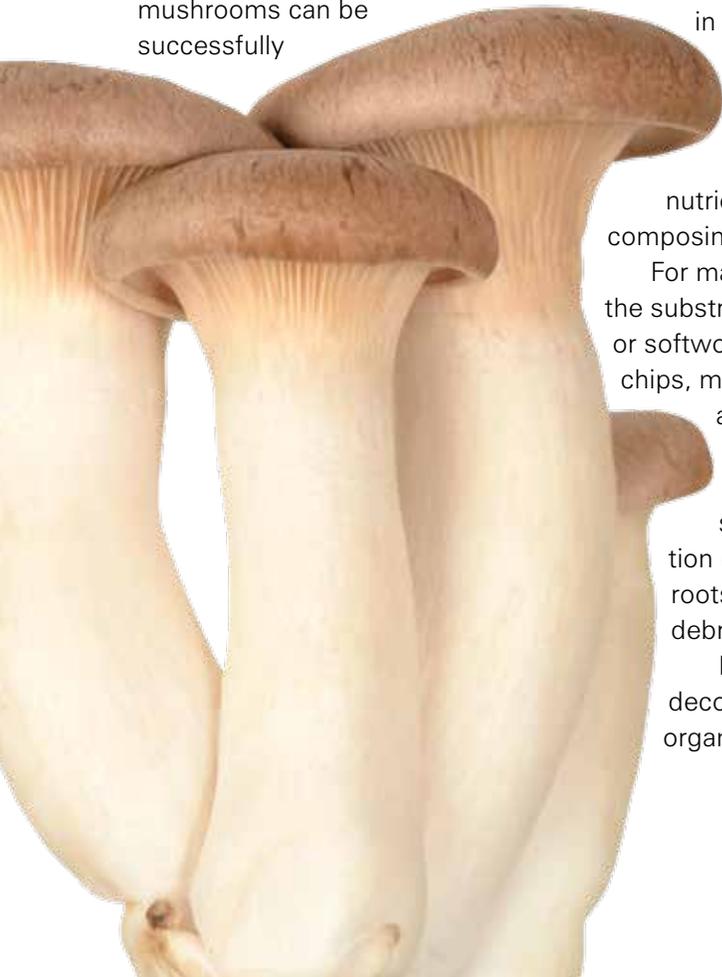


Unraveling the mysteries of MUSHROOMS

Chris Hilgert

Perhaps you think Wyoming's dry, arid climate isn't a great place to grow mushrooms. There are actually several culinary mushroom species that can be grown here.

Mushrooms can be planted, grown, and harvested in Wyoming gardens, landscapes, and even indoors. Some mushrooms require more care than others, and not all mushrooms can be successfully



grown at home. Similar to choosing the right plants, gardeners must select the right species and provide proper growing conditions to successfully grow mushrooms.

Growing Conditions for Mushrooms

Fungi grow very differently than plants. Plants have roots that grow in soil and require photosynthesis. Fungi have fungal mycelium (comparable to plant roots) that grow in substrate. Unlike plants, fungi do not need sunlight to grow and do not require photosynthesis because they get all the nutrients they need from decomposing organic material.

For many culinary mushrooms, the substrate may be hardwood or softwood stumps, logs, wood chips, mulch, or straw. Many fungi are referred to as "wood-rotting" fungi, meaning the mycelium is responsible for the decomposition of organic materials like roots, stumps, and surface debris.

Different fungal species decompose different types of organic material, and matching

the substrate to the desired fungal species (hardwood vs. softwood substrate) is important. Consistent water and moist conditions favor fungal growth. Indoor mushroom production, where humidity levels and temperatures are monitored and controlled, may enhance production in some species.

Mushroom Production

Mushrooms are the fungal fruiting bodies, or reproductive structures, that appear when conditions are right. Commonly, mushrooms consist of a stem and a cap. The underside of the cap often contains gills where reproductive spores are released. Spores are dispersed by the wind and rain. Spores can be a source of reproductive material, but growers can also purchase or propagate mycelium in appropriate substrate and use this spawn to inoculate stumps, logs, straw, and mulch.

The duration of mushroom production depends on species and many environmental factors. Under good conditions, three years of production is not uncommon and some species may produce for up to five years.

Mushroom movies

From the Ground Up
videos:

Growing Mushrooms in Wyoming

<http://bit.ly/wymushroom>

Inoculating Logs

<http://bit.ly/wymushroom2>

Growing Mushrooms on Straw and Mulch

<http://bit.ly/wymushroom3>

Growing mushrooms at home

Step 1. Choose the mushroom species

Here are three mushrooms that do well in Wyoming:

Pioppino: *Agrocybe aegerita*

Pioppino mushrooms are popular with home gardeners because they are relatively easy to grow. In the wild, this table-top shaped mushroom is often found growing in clumps at the base of hardwood stumps such as cottonwood, willow, and poplar. Cultivation outdoors is most successful in inoculated stumps or woodchip mulch from one of these tree species. Ideal temperatures are between 50-70 degrees F. Yields can potentially reach 1 pound of mushrooms per 5 pounds of substrate. Pioppino mushrooms often produce two flushes of mushrooms with two weeks of dormancy between flushes. In the kitchen, pioppino mushrooms are appreciated for their pork-like flavor. Popular in Italian cooking, pioppinos complement sauces, soups, and stews.

King Oyster: *Pleurotus eryngii*

There are many species and varieties of oyster mushrooms, including

king, phoenix, Indian, tamogitake, salmon, and flamingo. King oyster is known to be the most flavorful of the oyster mushrooms. It has a thick stem. In the wild, they can be found growing in a variety of hardwood species including cottonwood, aspen, and willow. Cultivation in the garden is successful with logs, stumps, and mounds of straw. Mushroom production can occur within 45 days with yields potentially reaching 1 pound of mushrooms per 5 pounds inoculum spawn. Optimum fruiting temperatures range between 50-60 degrees F. In the kitchen, king oyster flavors complement lamb, seafood, and pork dishes.

White Elm Oyster: *Hypsizygus ulmarius*

The white elm oyster looks similar to other oysters but is in a different genus of fungi. The white fruiting caps can reach 8-12 inches. Optimum fruiting temperatures are between 55-75 degrees F. White elm mushrooms grow in various hardwood species including cottonwood, aspen, and willow. Cultivation in the garden can be successful in logs, stumps, wood chips, and straw. Inoculated logs may take 6-12 months before you start seeing mushroom production, but your logs can produce mushrooms for several years. Use white elm oyster mushrooms in cream sauce and in omelets.

Step 2. Purchase the inoculum

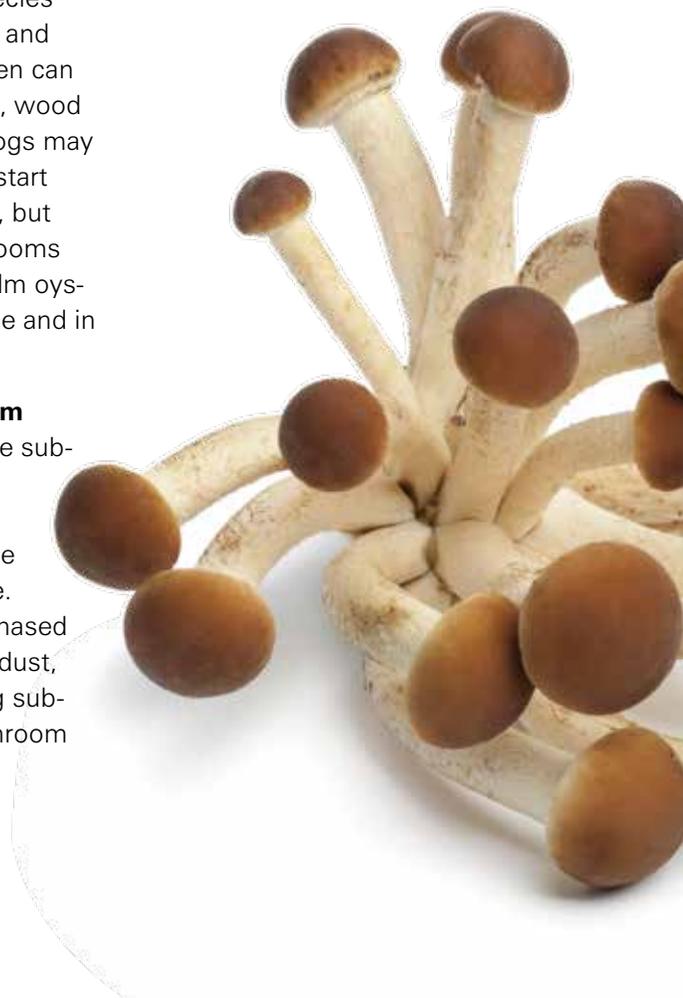
Growers typically inoculate substrate with fungal mycelium rather than spores. There are numerous sources to purchase substrate and inoculum online. Mycelium spawn can be purchased packaged in wood chips, sawdust, straw, grain, and wooden plug substrate depending on the mushroom type.

Step 3. Prepare Substrate and Inoculate

Mycelium spawn in straw should be used to inoculate straw or mulch substrate. Spawn in sawdust should be used to inoculate wood chips, mulch, stumps, and logs. Wooden plugs work well to inoculate stumps and logs.

Straw

Spread a layer of straw 2-3 inches thick over the ground. Next, hand spread the inoculum over the straw as evenly as possible. Finally, cover the inoculum with another 2-3 inches of straw. Fresh, sweet straw should be used for best results because aged, discolored straw has already started to decompose and may not support mycelium growth. Water regularly and expect to begin harvesting mushrooms within a couple of months after inoculation during the summer. Straw can be spread over a raised bed or in a garden. A sheltered location is recommended as strong winds can blow straw away.



Wood Chips and Mulch

Using the appropriate hardwood or softwood substrate, spread 1-2 inches of wood chips and mulch around trees (mulch rings), shrub beds, flower beds, raised beds, and vegetable gardens. Spread inoculum by hand and then cover the inoculum with another 1-2 inches of mulch. Water regularly and begin harvesting mushrooms in as little as two months.

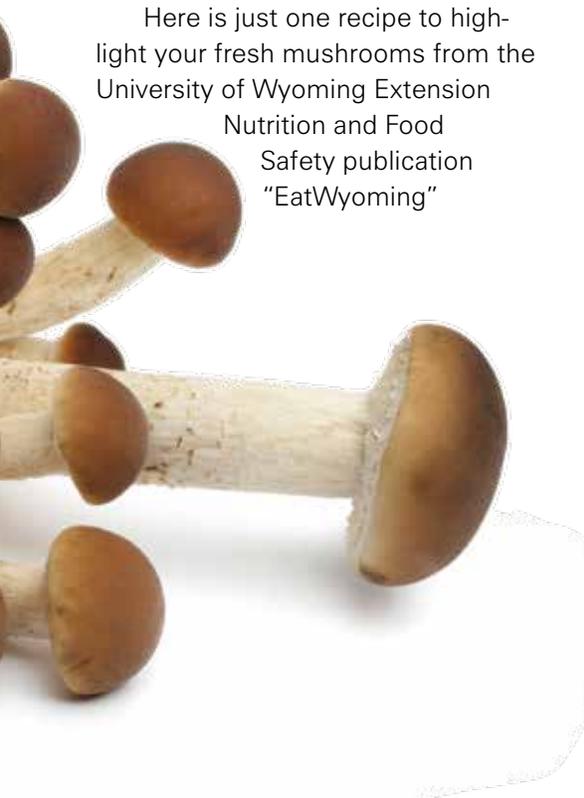
Logs and Tree Stumps

Use appropriate hardwood or softwood species for the desired mushroom species. Using a 1/2-inch drill bit, drill several holes in the bottom of the stump or log, and several holes along the bottom 6 inches of the sides of the stump or log. Once the holes are drilled, fill them with inoculum using a stick or your finger to pack the inoculum into the holes. The next step is to bury the stump or log at least 6 inches deep. All of the holes you drilled should be underground, but leave the top of the log or stump exposed above ground. Mushrooms will appear at the soil line around the stump.

Step 4. Eat the home-grown mushrooms

Here is just one recipe to highlight your fresh mushrooms from the University of Wyoming Extension

Nutrition and Food
Safety publication
"EatWyoming"



WALNUT, MUSHROOM, BLUE CHEESE HAMBURGERS

(Recipe adapted from Eating Well Cookbook 2004)

Yield: 6 servings

Spice-up a traditional burger with tasty and nutritious additions!

Ingredients

- 1 pound ground beef, bison or elk
- 6 teaspoons olive oil, divided
- 8 ounces mushrooms, cleaned and chopped
- 1 cup chopped onion (1 medium)
- 1 1/2 tablespoon balsamic vinegar
- 3/4 cup walnut pieces
- 1/3 cup blue cheese crumbles
- 1 large egg
- 1/2 cup fine dry breadcrumbs
- black pepper to taste
- 8 whole wheat buns



Directions:

1. Heat 2 teaspoons oil in large nonstick skillet over medium heat. Add mushrooms, onion and 1/2 teaspoon salt. Cook, stirring, until the vegetables are softened, 8-10 minutes. Stir in vinegar. Immediately transfer the mixture to a plate and let cool to room temperature, about 30 minutes.
2. Toast walnuts in a small dry skillet over medium-low heat, stirring, 4-6 minutes. Transfer and allow to cool.
3. Combine the vegetable mixture and nuts into a food processor. Pulse briefly until coarsely chopped. Add cheese and egg. Pulse briefly until mixed, but rough in texture. Transfer to a bowl, stir in breadcrumbs and pepper. Mix well.
4. Combine mixture with ground meat by hand. Form into patties.
5. Cook in skillet with a small amount of oil or on grill until thoroughly cooked (internal temperature of 160 degrees F).
6. Serve on toasted buns and garnish with fresh tomato, lettuce and your favorite condiment.

Make ahead tip:

Prepare through step 4. Wrap patties individually and refrigerate for up to 2 days or freeze for up to 3 months. Thaw in the refrigerator before cooking.

Visit <http://bit.ly/eatwyoming> for all EatWyoming recipes

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