

Growing Mushrooms in Urban Environments

Mushrooms have a great potential for two aspects of urban agriculture. They can consume organic “wastes” often abundant in urban areas such as coffee, sawdust, woodchips, compost, etc while producing a delicious and nutritious food.

Additionally, in a separate application from food production, certain species can be used to “clean” toxins from a contaminated site. This process is known as myco-remediation.

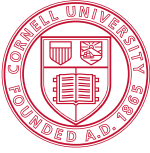
In urban environments, mushrooms are unique in their ability to be highly adaptable and able to grow in small spaces, indoors and out. This factsheet provides some of the basic background on the use of mushrooms the urban landscape and resources for further study of this topic. Visit www.CornellMushrooms.org for more detailed factsheets and videos on mushroom cultivation.

What are mushrooms?

Mushrooms are in the kingdom fungi, which also includes yeasts and molds. These are highly adaptable, fast growing organisms that digest materials in their environment and reproduce through microscopic “spores” that are dispersed into the air. There are several types of mushrooms that have various strategies for living in their environment, including decomposer/saprophytic (which break down organic materials), mycorrhizal (which form beneficial exchanges with plants), and parasitic (which feed of plants and animals). For the purposes of this factsheet, we are focusing on decomposing/saprophytic mushrooms for our purposes.

Key Terms

A mushroom is the fruiting body of the organism, or the part we eat. The mass of white tissue that fruits these is known as **mycelium**. The food source that the mycelium grows into and uses for energy is called a **substrate**. When cultivating mushrooms for any purpose, a grower purchases mycelium from a company (like a seed company), which is called **spawn**. The process of bringing mycelium into contact with the substrate is called **inoculation**.



Special Considerations

It is critical to note that mushrooms are *extremely* sensitive to their environment, acting like a sponge and soaking up almost anything in their path. This means that especially in urban environments, its important to ensure that the substrate (soil, woodchips, etc) is **free of contaminants if the mushrooms are intended for consumption.**

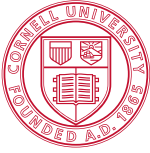
Also important is to engage in proper identification techniques before consuming any mushroom. There are many resources to help with this. While the likelihood of mushroom poisoning is actually very low, it's important to know what you are working with. Be especially cautious when working with children. **"When in doubt, throw it out!"**

Growing Edible Mushrooms

While there are many possibilities to choose from, the easiest mushrooms to grow for home or sale are **Oyster** (*Pleurotus* spp.), **Shiitake** (*Lentinula edodes*), and **Red Wine Cap** (*Stropharia rugoso-annulata*). As the table below shows, oyster mushrooms grow on the widest range of materials. Shiitake prefers hardwood logs or sawdust, which may prove hard to find in the city. *Stropharia* can be integrated into existing garden beds that are mulched, provided the soil is free of contaminants.

Species	Grows on:	Notes:
Oyster (<i>Pleurotus</i> spp.),	coffee grounds, sawdust, straw, shredded paper, spent brewery grain,	Often grown indoors; need to create a "recipe" to balance carbon/ nitrogen ratio for each
Shiitake (<i>Lentinula edodes</i>)	hardwood logs, compressed sawdust blocks	Grown indoors or outside under shade. Source logs from arborists/city public works.
Red Wine Cap (<i>Stropharia rugoso-annulata</i>)	woodchips or straw mulched beds	Can be grown indoors or out in combination with other cropping systems.

Visit www.CornellMushrooms.org for factsheets specific to each of these species.



Using Mushrooms for Myco-Remediation

Many people get excited at the prospect of using mushrooms to “clean up” contaminants in the urban environment. While there has been considerable research into this, its important to remember that each site must be treated on a case-by-case basis and the applications must be thoroughly planned and monitored by laboratory testing. Just inoculating a site with fungi is no guarantee of success.

Common Contaminant	Species shown to be effective	Notes
Pesticide residues, oil and gasoline products	Oyster, Red Wine Cap, Agaricus spp, others	Mycelium phase, not fruit, is most important
Heavy Metals	Turkey Tail, Galerina spp, many others	These become toxic, as heavy metals cannot be broken down

Further Resources

Visit www.cornellmushrooms.org for a comprehensive list of articles, videos, research, and more.