

WHAT ARE FUNGI?

The fruiting body of fungi is called a mushroom. Fungi are a group of spore-producing organisms that feed on organic matter and are more similar to animals than plants.

All fungi start with a tiny spore1 (1). When it lands on soil, dead leaves, or other organic matter the spore will reproduce and create mycelium (2) , or the roots

of fungi. With the right conditions, the mycelium rapidly expands and will form into a baby mushroom (primordium 3). The mushroom (4) then grows, releases more spores, and the cycle continues.

Fungi also work with microbes to break down and cycle nutrients to make them available for other living creatures, like earthworms and arthropods. This We share over 50% of our DNA with fungi, and they are the largest and oldest living organisms on the planet!

organic matter feeds all of the living things in the soil food web, including the plants you grow. Long before humans could live on the planet, fungi have been cycling nutrients, partnering with plants, helping to build healthy soils and making a living, breathable planet for us possible.



BENEFITING FORESTS WITH FUNGI

Fungi are important for healthy forests and trees. They form relationships with many varieties of plants and trees. In this guide we'll explore using two different kinds of fungi.

MYCORRHIZAL FUNGI

that form beneficial Funai relationships with plants are known as mycorrhizal fungi, and include nearly all plants (about 90%) on earth! Through mycorrhizae, trees and plants can receive sugars from their plant hosts, and in exchange provide the plants with water and nutrients, such as nitrogen and phosphorus from the soil.

Ectomycorrhizae prefer woody plant species such as trees and shrubs as their partners. They assist trees and forests in adapting to seasonal and landscape changes, such as drought or disease. Many farmers and gardeners will inoculate their crops with mycorrhizal spores for better growth. Common examples include chanterelles and truffles.

SAPROPHYTIC FUNGI

Saprophytic or decomposer fungi can be a great addition to your home garden. Many of the common mushrooms you find in vour supermarket such as "White Button," "Cremini." or "Portobello" are saprophytic. They feed on dead plant and animal remains, and break down organic matter. This helps ensure that minerals and other important substances are available in the form that other organisms can use.

Decomposer fungi can be used to enrich your compost, and also can be combined with wood chips as a fungal-rich mulch cover.

Check out CTMS's Mycology in the Garden series on YouTube to view instructional videos!





GROWING AN[®] EQUITABLE TREE CANOPY

Over the past several decades, forest ecosystems and urban environments are experiencing a loss in biodiversity and a reduction of the benefits that humans and other organisms depend on. Credit: City of Austin, Urban Forestry Program

This is true for many areas including Central Texas. A recent report from the USDA's Northern Forests Climate Hub shows that the urban forest in Austin will face significant challenges from climate change and urbanization, including from extreme heat, drought, and flooding. This is likely to get worse over the coming years especially in cities where there is a sparse tree canopy.

This is a justice issue. Recent research conducted through a City of Austin Community Tree Priority Mapping (2020) project found the urban forest canopy is not equal. There are more trees on the wealthier west side (78%) as compared to neighborhoods in East Austin (22% canopy coverage). This reflects histories of systemic racism from practices such as redlining, which limited access to home loans and homeownership for BIPOC communities.

HOW CAN YOU HELP?

CARE FOR TREES WITH MUSHROOMS! Here are two methods you can use fungi to help your trees stay healthy.

METHOD ONE: USE MYCORRHIZAL INOCULANT

Try using a Mycorrhizal Inoculant, a beneficial fungi that allows you to enhance the growth and defense of your plants.

You can get them in powdered form at a variety of hardware stores and online. We recommend trying Wildroot Organic ® Mycorrhizal Inoculant, or you can add mycorrhizal mycelium from healthy soil in nearby forestlands.

Before adding the inoculant, make sure you have dug a tree pit and your tree is ready to plant. (Fig. 1) Next, thoroughly mix in about 1 tablespoon of the inoculant to 1-2 gallons of water in a bucket or container. (Fig. 2)

Remove the tree from the pot it came in, gently massaging the roots and loosening the soil. Next position the base of the tree horizontally over the tree pit so the roots are hovering over the pit. Then slowly pour the inoculant and water mixture over the root area. Ask a friend to help you rotate the tree as you pour the solution over the roots. (Fig. 3)

Place your tree into the pit, pouring any remaining liquid into the tree pit. Then surround with healthy soil, and place mulch around the base of the tree leaving space around the trunk. (Fig. 4)















METHOD TWO: MAKE AND USE MUSHROOM MULCH

Try adding mushrooms to your mulch for some added benefits! It can keep moisture in the soil, and creates a habitat for beneficial bacteria and microorganisms.

To start, collect a few "mushroom blocks" from local mushroom farms like Hi-Fi Mycology and Smallhold. CTMS has a recycling program where you can pick up free blocks across Austin.

Use a 5 gallon plastic bucket to measure out your materials. Start by breaking up 3-4 mushroom blocks into smaller pieces. We recommend stomping on them with your feet while they are still in a plastic bag, then dump the pieces into your bucket. (Fig. 1) Measure out about 8 gallons. (Fig. 2)

Next, in a larger bin, add 25-30 gallons of mulch into a plastic tote. You can get 27 gallon plastic totes at the hardware store, but be resourceful and use what you got! We recommend avoiding cedar mulch or really hard woods.. Add a little bit of moisture if the mulch is really dry. Combine the mushroom spawn mixture thoroughly with the mulch. (Fig. 3)

Then let sit for 10-14 days with the cover on, but not closed all the way. It's important to let the mycelium breathe! When ready, apply to the base of the tree, and make sure to leave a clear area around the base of the trunk. Then water your tree! (Fig. 4)



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ORGANIZATIONS

Ecology Action of Texas ecology-action.org

Fungi Foundation ffungi.org

treefolks.ora



Fruitful Commons fruitfulcommons.org



North American Mycological Association namyco.org



GET STARTED TODAY!

Grab a mushroom block for your garden and trees!

CTMS partners with local mushroom farms to divert "spent" mushroom blacks out of the waste and teach people how to grow mushrooms and build healthy soil. Mushroom blocks are available across the region for free or donation. In addition to supporting your new tree, you can grow them alongside your vegetables or perennials. Common varieties available include Blue Oysters, Yellow Oysters and Lion's Mane.







Check out the Central Texas Mycological Society Mushroom Block Giveaway site to request a map of pickup locations.

Mushrooms of the Gulf Coast States by Alan E. Bessette, Arleen F. Bessatte, and David P. Lewis

National Audubon Society Field Guide to North American Mushrooms by Gary Lincoff

Entangled Life by Merlin Sheldrake

Secrets of the Soil Paperback by Peter Tompkins WEBLINKS







ree Roots and Mycorrhizae www.austintexas.gov

Information About Oak Wilt tfsweb.tamu.edu

What You Should Know About Soil - TX Master Naturalist txmn.org

WHAT'S INSIDE?

This guide will show you how to use mushrooms to care for trees and improve soil quality. Learn more about our Healthy Soils, Healthy Trees initiative, and how to get acess to a muhsrooom block here in Central Texas!



Brought to you by

HEALTHY SOILS, HEALTHY TREES

This guide is made possible through the Healthy Soils, Healthy Trees program, a community science and art initiative exploring the connections between soil health, urban forests, and mycology in Central Texas. Organized by the Central Texas Mycological Society in partnership with Ecology Action of Texas.

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