What's Growing On?

BASTROP COUNTY MASTER GARDENER ASSOCIATION

March 2025

Grasshoppers

By Wizzie Brown

Most people don't start to think about grasshoppers until summer when they become very noticeable because of their large size. Unfortunately, that large size also means that they eat more and usually at that stage they have wings and can fly to wherever they want to go. If you want to reduce grasshopper damage in the garden, it's best to start looking for grasshoppers now and manage them when they are small nymphs and don't have wings to fly away.

Grasshoppers have chewing mouthparts that they use to feed on plants causing damage to foliage, fruits, and vegetables. They have an incomplete life cycle with three life stages—egg, nymph, adult—with the nymphal instars looking similar to adults but without fully developed wings. Eggs hatch in spring and continue into summer, taking 1-2 months for grasshoppers to reach the adult stage.

Turning over soil in areas before planting can expose grasshopper eggs which may lead to a reduced hatch rate. Controlling weeds in and around the property can help reduce food sources as well as egg laying sites. Grasshoppers also have natural enemies, and many may die from fungus, protozoa, nematodes and predators such as beetles, robber flies, birds and small mammals.

Early season grasshopper control can utilize low impact options such as vacuuming insects from plants, insecticidal soaps, horticultural oils during cooler temperatures, or botanicals (just remember that oils and botanicals are broad-spectrum and can kill beneficial and pest insects that come into contact with the pesticide).

For more information or help with identification, contact Wizzie Brown, Texas A&M AgriLife Extension Service Program Specialist at ebrown@ag.tamu.edu.

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TEXAS A&M AGRILIFE EXTENSION

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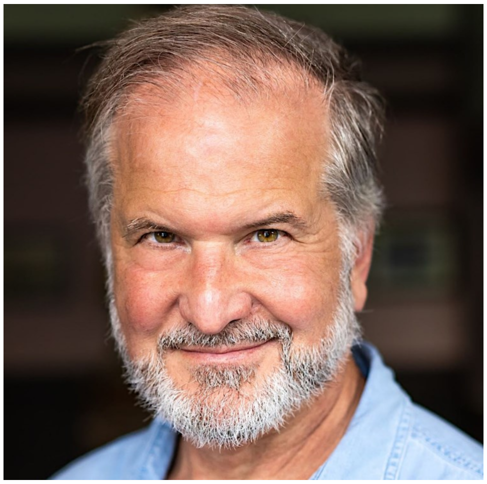
President's Column



Welcome to Spring! For Master Gardeners this is almost certainly the best time of the year. It fills my heart, as I know it does yours, to see the trees beginning to bloom, the perennials popping up their heads through the dirt, and the bees busily gathering nectar and pollen.

Thanks to all of you who helped with the Spring Plant Sale. As always, it was highly successful, grossing over $11,000. The profits from the plant sales have allowed us to not operate hand to mouth and continue to grow such wonderful projects as those at Bob Bryant and Cedar Creek parks. I am truly appreciative for all the enthusiasm, friendliness, and professionalism of our volunteers that makes these events such a success.

Speaking of Cedar Creek, please consider volunteering to assist as you can. Under Marianna's leadership great work is being done there. However, we have recently been short volunteers which makes things a lot harder for the volunteers who show up. Please check Howard's weekly email to check for the next volunteer times.

Have a great month and enjoy the glorious time of year!

Chris Toth, President

Growing Giant Bluebonnets

By Howard Nemerov

Driving along Highway 71, you can see Bluebonnets (*Lupinus texensis*) in season. Normally, these plants get about 6–8 inches across and have one flower spike. But what if you could grow giant Bluebonnets from the exact same seedstock, like the two-footer on the left? Here's a brief overview of the process.

During the second week of October, I scarify seeds by rubbing an edge on fine sandpaper, about 8 back-and-forth passes until the edge looks lighter than surrounding seed coat. Scarification is vital to produce high germination rates. In Nature, Bluebonnet seed germination may be 10–20%. I obtain close to 100% germination with scarification and indoor seed starting. Scarification ensures each seed can easily imbibe water and begin growing.

Using Pro-Mix BX the entire time, I immediately plant scarified seed in seed starting flats and grow under lights until seedlings mature and start to crowd each other, about three weeks. Since Bluebonnets have a tap root, I bump seedlings into 24-ounce cups to avoid crimping the developing root system, then continue growing under lights about another 30 days, planting them in ground in early December and watering them in.

Bluebonnets are winter hardy: They germinate in fall and then grow roots and rosettes over winter. I didn't cover them during freeze events. One planting is on the right, while many more are growing in my new pocket prairie beds. These then become next year's seed crop.

TEXAS MASTER GARDENER
TEXAS A&M AGRILIFE EXTENSION
Bastrop County

The Three Most Common Garden Fungi and What They Do To/For Your Garden

By Howard Nemerov

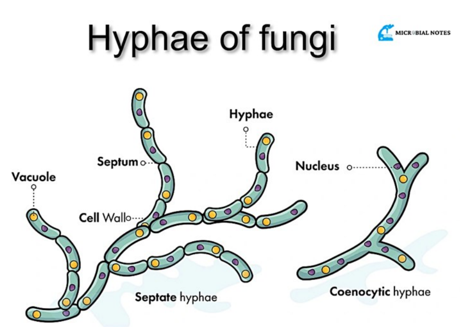
Life as we know it wouldn't exist without fungi:

> *In relation to ecological aspects, the bio-geochemical cycling of carbon in nature would not be possible without the participation of fungi acting as primary decomposers of organic material. Furthermore, in agricultural operations fungi play important roles as mutualistic symbionts, pathogens, and saprophytes, where they mobilize nutrients and affect the physicochemical environment, or can be exploited as agents of biocontrol or as biofertilizers.*[1]

Mutualistic symbionts, pathogens, and saprophytes are fungi you're most likely to encounter and we'll discussed them here, explaining similarities and differences so you understand how to work with them to improve your garden.

Most higher fungi are *filamentous*: "composed of aggregated long, branching threads termed hyphae (singular: hypha), organized to support spores for reproduction and dissemination."[2] Hyphae generally grow together to create mycelium, and theoretically there's no limit to how extensive hyphae can grow:

> *The hyphae of these aerial structures extend and branch within the supporting substratum as a network, termed a mycelium, from which the apically growing hyphae seek out, exploit, and translocate available nutrients.*
>
> *The hyphae of individual fungi may (theoretically) extend endlessly via apical growth, provided they are supported with appropriate nutrients and other environmental conditions.*[3]



Courtesy of Microbial Notes

Hard working hyphae gather nutrients so that fungi can grow and reproduce, no matter what species or their function in the ecosystem. [4]Like plants, fungi require elements like nitrogen, phosphorus, and potassium. Fungi also need magnesium, sulfur, and calcium, again like plants.[5] Fungi obtain energy (carbon) from sugars, whereas plants produce their own sugars via photosynthesis.[6] How fungi obtain nutrients determines if a species is "good" or "bad."

The good, the bad, and the buddies

Two phyla of higher fungi—Ascomycota and Basidiomycota—are macrofungi (filamentous): After producing enough hyphae and gathering enough nutrients to reach maturity, they produce spores during sexual reproduction. Mycorrhi-

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New Website Features

Check out our website, which features project slideshows, a new photo gallery section, and an events calendar to check out upcoming activities. Find news articles and our newsletters. Thanks to Dave Posh for keeping the info timely for us https://txmg.org/bastropcounty/

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zae—symbiotic fungi—also have their own phylum called Glomeromycota.[7] Some species of Ascomycota, Basidiomycota, and Glomeromycota are called "mushrooms" because they produce fruiting bodies above-ground; not all species do so.


Courtesy of Beautiful Oregon

The Ascomycota and Basidiomycota phyla contain both "good" and "bad" fungi. To obtain sugars, "good" fungi gather carbohydrates by decomposing non-living organic matter like fall leaves and fallen trees. These fungi are called "saprotrophs," using digestive enzymes to decompose complex carbon fibers in woody material to extract carbon and nutrients.[8] *Morchella americana*, the Texas native and prized edible Morel species, is a saprotroph in the Ascomycota phylum (left).[9] Basidiomycota includes curious saprophytes like Bird's Nest Fungus (right).[10]


Courtesy of Garden Betty

I photographed this *Coprinopsis picacea* (Magpie Inkcap)—another Basidiomycota—in my garden, decomposing wood chip mulch obtained from a tree service (right). Saprotrophs provide environmental benefits because their decomposing activity releases organic matter and nutrients from carbon-rich materials to enrich the soil and feed plants, making saprotrophic fungi a vital, win-win part of the soil food web that provides for everything from single-cell organisms to insects to higher animals.[11]

Fungi, too, are underappreciated by gardeners, and yet they play a key role in the soil food web and are an important tool for those who garden using soil food web principles.[12]


Courtesy of Micologia Agroforestal

Sometimes people ask about shelf fungi growing on their shade tree, and want to "treat" it. Many bracket fungi are saprophytic, like this *Trametes versicolor* (Turkey Tail, left): It "breaks down the dead wood of a tree, using it as nutrients for itself while helping clear the forest for new growth.[13]

As for treatment, remember that fruiting bodies mean miles of mycelia inside the tree. Trying to eradicate a mycelial

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Volunteering

Master Gardeners volunteer in the community to teach others about horticulture. We follow the research-based recommendations of Texas A&M AgriLife Extension. Members who complete 50 hours of volunteer service in the year after training earn the designation "Texas Master Gardener." We use our title only when engaged in Texas A&M AgriLife Extension activities.

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network large enough to support fruiting bodies is nearly impossible and the real question is, how much of the tree has died and can it be saved? This is a question for an arborist.[14] Saprophytic fungi growing on a living tree is a symptom of a larger problem; treating it will not help the tree.

Parasites also exist within these two phyla. As the appellation implies, these fungi gather their sugars from living plant material. This includes Ascomycota that produce powdery mildew on grapes and Dutch elm disease, to name a couple of more well-known and economically significant plant diseases.[15]

Courtesy of Affordable Tree Services

Basidiomycota includes economically significant fungal diseases like *Desarmillaria tabescens* (Honey Mushroom, left), which causes Mushroom Root Rot: a slow, gradual decline of "a wide range of orchard and shade trees as well as shrubs."[16]

Pseudoinonotus dryadeus (Oak Bracket) is a Basidiomycota like Turkey Tail above, but this fungus is parasitic. Its spores enter "primarily through wounds that expose sapwood or heartwood. Injuries from pruning, sunburn, lightning, or cultivating equipment can expose susceptible wood."[17] Once infected, mycelia grow into the root system, so again it's best to consult an arborist as soon as these "conks" appear.

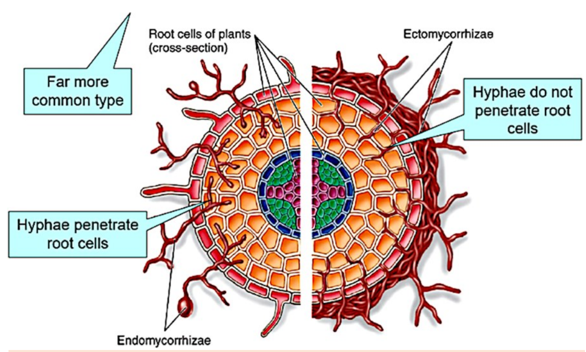
Courtesy of Ultimate Mushroom

All these fungi are looking for nutrients and sugar (carbon); some are just "friendlier" about it.

Courtesy of Helena Campos

Mycorrhizae—the third group discussed here—don't all produce "mushrooms." Those classified as vesicular-arbuscular (aka endomycorrhizae) produce spores in the soil.[18] Ectomycorrhizae like *Amanita muscaria*—which partner with conifers—produce striking but poisonous mushrooms (left).[19]

Unlike parasitic fungi, mycorrhizae penetrate root tissue only enough to form a two-way interface (right).



Courtesy of PlantScience4U

Yes, mycorrhizae obtain sugars from living plants like parasitic fungi, *but…*

Mycorrhizae ***partner with living plants***, gathering nutrients and water from the soil far beyond a plant's root system and exchanging those life-giving resources in exchange for a plant's sugars, with this exchange occurring in the rhizosphere (plant's root system).[20] Both parties benefit from this exchange, which is why mycorrhizae are also called *partners*.

Mycorrhizal spores need to be *in* the soil to create this symbiosis: I mix a mycorrhizal product into

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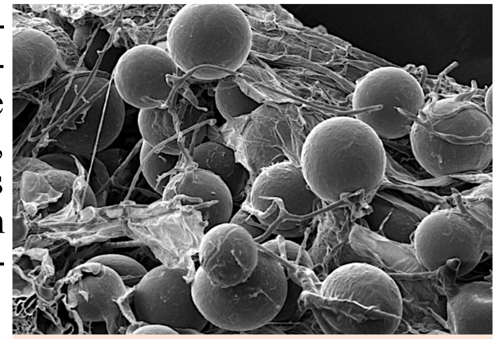
potting mixes, though it could be used as root dip or seed coat, and you can apply directly to roots when planting.[21] All these methods are strategies to ensure that spores encounter live roots.

Endomycorrhizae produce spores in the soil because mycorrhizae co-exist with plants in the rhizosphere (a plant's root zone). Where better to meet new roots and form new relationships than where the roots are? Mycorrhizal spores wait like dormant seeds in the earth, awoken by roots questing through the soil for food and water. This is why mycorrhizal spores are often called "propagules," which "germinate" when a probing root encounters them (right). This one-minute video shows how this process works.[22]



Courtesy of Valent Biosciences

Saprotrophs and mycorrhizae both provide plants with nutrients. The difference is that saprotrophs do this indirectly, by breaking down organic matter to release nutrients into the soil for plant roots to find and utilize, whereas mycorrhizal hyphae gather nutrients from the soil where roots haven't reached and actively provide them to plant roots.

These fungi aren't interchangeable

Courtesy of Healing Mushrooms

The reason I wrote this primer is because during a mycorrhizae presentation, people commented, "I spread mushroom blocks in my garden" as if that means there will be mycorrhizal activity. Mushroom blocks contain edible species like Oyster (left, growing on block) and Shitake (below right, growing on block). These types of saprophytic fungi need carbon: growing these usually requires a substrate like mushroom compost, sterilized sawdust, or logs.[23] ***They cannot gather sugar from living plant roots.*** What they *can* do is break down mulch composed of fall leaves and wood chips, helping fertilize the soil and reduce fertilizer expenditures. Adding mushroom blocks to your garden can increase your saprotroph population and provide tasty mushrooms.

Courtesy of Hazel Grove Farm

Mycorrhizae, on the other hand, cannot gather sugars from dead plant materials. However, unlike parasites which invade living plant roots and steal their nutrients to the point of weakening of killing the host, mycorrhizae *partner* with living plant roots to develop a *symbiotic* relationship to exchange value for value, life for life.

Considering the unique physiological needs of each of these three phyla, it's vital to understand that saprophytes don't act like parasites, nor can they replace mycorrhizae when it comes to helping plants extract nutrients from soil. Each phylum has a unique role in cycling nutrients through a functioning ecosystem.

Endnotes

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(*Continued on page 7*)

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