

Mushrooms: The Forgotten 'Vegetable'

A spotlight on one of our most versatile and tasty garden allies

What if I told you that you could grow an abundance of delicious mushrooms in your garden, easily, successfully, no matter where you live and what type of yard or soil you have? Sound interesting? I suppose that depends on whether you like to eat mushrooms or not. Even so, there are many reasons to kindle a friendship with these important, if more mysterious bunch of characters.

Many people are gardeners to one extent or another. Some tend to flowers and ornamentals, others to a veggie patch, and often a blend of both. Wherever you may find yourself on this spectrum, one thing that you likely *aren't* growing is mushrooms, at least not on purpose. I'm sure most of you have seen various mushrooms growing on your property, either on your mulch, trees, rotting haybales or even your well manicured lawns at one time or another, but it's statistically unlikely to be something you encouraged. Some of you more curious types might have taken a closer look and asked yourselves: "are those edible", but most of you likely paid little attention and carried on your way. Gardeners are much more likely to be able to recognize and name the various weeds and noxious plants growing in their yard than they would their resident fungi.



Woa! A giant puffball.



Ooo, lobster mushrooms!

For the most part, mushrooms occupy a fairly neutral space on our lists of 'friend or foe'. What little most of us *do* know, is that the mushrooms we see don't seem to cause any harm to our various landscapes, so they're not 'foes' per se, but also that some of them are poisonous (about 3%) ...which limits our interest in them. Furthermore, many of them come and go so quickly that we don't even have time to worry about them unless our dog or toddler picks one up and starts chewing on it. Even when we see some that we're almost certain are delicious edibles (like morels), we still leave them alone...just in case.

Much of this malaise is cultural. Unless you or your parents are from somewhere in the 'Old World', you likely weren't exposed to the pleasures of mushroom foraging, cultivation and cuisine at a young age. Your fondest memories of fungi are more likely to involve your mother's occasional use of Campbell's cream of mushroom soup. Luckily, this trend is slowly but surely being bucked, with general interest in fungi on the rise for some time now, and with this increased awareness will come more acceptance and appreciation. Social media will take care of the rest to make it go 'viral'...or 'fungal' I should say.

There *is* comfort in knowledge. Likely born of a survival mechanism, we don't tend to want to eat what we don't recognize (dogs and toddlers excluded). In modern times, and especially so in urban settings, this also extends to a kind of inherent distrust of our own land and abilities; as if 'real food' had to be grown elsewhere, and by 'professionals'. We have become so used to buying our food from the store and having others (companies) tell us which foods are safe to eat that we are now reluctant to stray. Globalization has

also made us very picky. You might have an old tree in your yard that produces bushels of nice red apples every year, but they're not your favourite so you still go to the store to buy Honeycrisps instead...and leave the ones from your tree to the birds, wasps and rabbits.

With that said, let's bolster our sense of courage with a bit of knowledge, cozy up to some new fungal friends and start growing them in our own backyards, shall we?!

While all mushrooms are fascinating in their own right and many can be useful to gardeners in a number of different ways, I will focus on only one for the sake of this article: **The Garden Giant**. That's right, this aptly named mushroom is the best suited for home gardens, and often produces prodigious specimens that can easily dwarf even the mighty portobello, to which it bears a passing resemblance. It's official Latin name is *Stropharia Rugosoannulata*, but it also goes by 'King Stropharia' and 'Wine Cap' mushroom due to its burgundy color. If you've never heard of it before, it's because it's not typically available commercially (in supermarkets). It is native to our Canadian forests however (as well as Europe's) and considered to be a choice edible, with a long history of cultivation as food.



While we zoom into this particular variety, we'll also cover a few basics about mushrooms in general. Specifically, we'll look at them from a gardener's perspective in order to better appreciate their potential value and contribution to our garden spaces.

The way I see it, there are three *main* roles that mushrooms can play for us as gardeners:

1. Value added space management.
2. Compost/soil manufacturing.
3. Food production.

Value Added Space Management

To fully appreciate mushrooms, you must first understand that most of them are allies and companions, not competitors to plants. I say 'most', not 'all' because there are definitely some pretty annoying funguses out there that every gardener has dealt with at some point, like the various blights, molds and mildews that can negatively affect our plants. As a rule of thumb though, the vast majority of plants either benefit from or downright *need* mushrooms to live. You see, unlike plants, mushrooms don't have the ability to capture energy directly from the sun. They, like us and all other animals, need to obtain their energy indirectly by either digesting food (organic matter), or by 'stealing' it from a living plant. In fact, all of the currently known mushrooms can be placed into one of four categories based on how the organism feeds itself:

1. Saprotrophic: These are the decomposers of the world, thriving on *dead* organic matter. This is the largest category and it encompasses the majority of all known mushrooms, including the **Garden Giant**



Reishi mushroom (saprophyte) growing on a hemlock stump

and many other of the tasty edibles we are familiar with, like Shitake, Portobello, Oyster and Morels. They release acids and enzymes that break down dead tissue into smaller molecules that they can absorb (very much like us, only outside of their body since they don't have a digestive tract). Thus, decaying wood, plants, and even animals can become food for a saprotroph. They play a huge part in the nutrient cycling of their respective ecosystems.

2. Mycorrhizal: These are obligate plant partners. Mycorrhizal mushrooms form a mutualistic relationship with plants. The mycelia (mushroom 'roots') of these fungi enter into a beneficial union with the roots of plants by either weaving into the root cells (endomycorrhizal) or wrapping around the roots themselves (ectomycorrhizal). The mycelia provide additional moisture, phosphorous, and other nutrients to their hosts. In return, they gain access to sugars (such as glucose) that the hosts

produce through photosynthesis. This allows plants to grow bigger, faster, and stronger than their nonmycorrhizal counterparts. Many of you might already be familiar with these as it is getting more and more commonplace for farmers and gardeners to inoculate their crops (and flowers!) with a mycorrhizal fungus for better plant establishment and growth.

While this category only encompasses about 10% of all known mushrooms, it is estimated that 95% of all plants form mycorrhizal partnerships with fungi! The vast majority of these do not make fruiting bodies and therefore are never seen. They are difficult to grow outside of their natural environment as they are dependant on their plant hosts. Some of our tastiest known edibles are part of this category however, like the famous Chanterelles, Truffles and Porcini mushrooms.



My favourite mycorrhizal mushrooms: Hedgehogs and Chanterelles

Chaga, a common parasitic mushroom



3. Parasitic: These are the opportunists. Parasitic mushrooms also need plant hosts, although in this case the relationship is one-sided. These fungi will infect the host and eventually kill it. Most true parasitic fungi do not produce mushrooms and are too small to be noticed on a tree until it's too late.

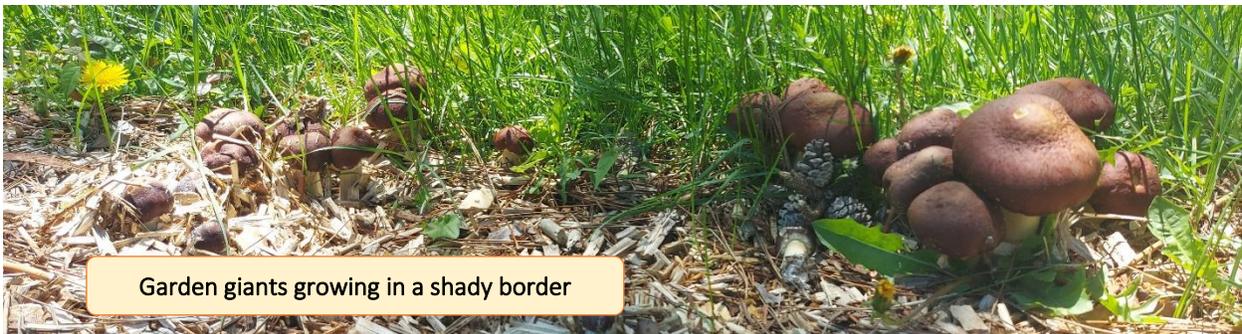
4. Endophytic: These are mysterious symbionts. Endophytes partner with plants by invading the host tissue. However, unlike parasitic fungi, the host remains healthy and seems to benefit from increased nutrient absorption and resistance to pathogens. Unlike mycorrhizal fungi, most endophytes *can* be easily cultivated in a lab without their host present. Much is still unknown about this newer, evolving category of mushrooms, but most of them do not produce visible mushrooms either.

The takeaway from all this is that a saprotrophic mushroom like the **Garden Giant** is not competing with plants for the same resources. *In fact*, they can both benefit from each other's presence in the garden. The mushroom benefits from the microclimate of shade and humidity that the plant provides, while the plant benefits from the increased bioactivity and nutrient cycling that the mushroom provides. What this means for a gardener is that you can add mushrooms to your garden beds without sacrificing any space for your

plants! How is that for value added space management?! By simply adding mulch (mushroom food) and spawn to your existing gardens, you can obtain a double harvest from the same space (plants and mushrooms). Now that's efficiency! And for market gardeners and farmers, that means more bang for your buck.



If that's not something you're interested in, or capable of doing because of your particular aesthetic or growing methodology, then consider growing them in the dark, 'unused' corners of your property. Mushrooms don't like a lot of light and thrive in total shade. Think of all the areas you have where nothing else grows well because it's too shady... mushrooms will love it there. Typical spots are: forest edges, north facing borders of houses and other structures, and at the foot of large shrubs and trees. And nothing says you can't have more than one patch! I personally have them growing in several different areas and have plans for several more. It's always a win-win-win scenario (soil-plants-people). The worst thing that can happen is that you have too many mushrooms and can't eat them all. That's a problem I can live with.



Compost/Soil Manufacturing

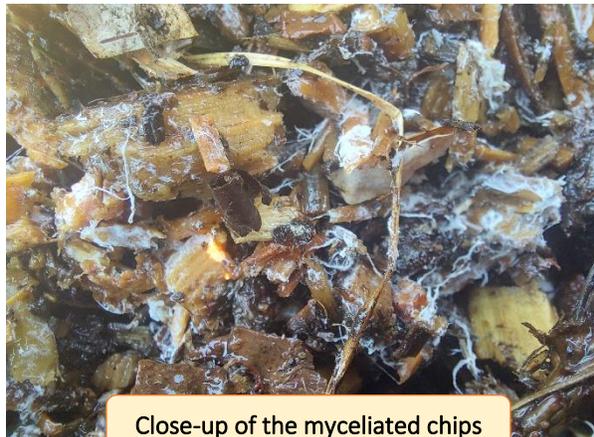
Compost is arguably the single best thing you can add to soil to improve it/fertilize it. As a gardener, you never seem to have enough of the stuff. Why? Because it's hard to make a lot of it. Anyone with a kitchen compost can attest to how pathetically small the residual pile is after a year of composting. You'll never make enough for your whole garden *that* way. Even with larger piles of garden and yard waste, you're still forced to use it 'sparingly' and wish you could have more. Not to mention the fact that a 'proper' compost

pile needs to be cared for and turned regularly, which can be a pain (I don't think the designers of the typical stationary home composters put much thought into it). It's not a fun job and almost everyone slacks off on it.

Enter saprophytes! These workhorses will do all the labor for you. Wherever you decide to grow them, they will transform their substrate into compost/carbon rich soil, and quickly. No fuss, no muss. In addition, if you want extra compost to spread around, all you need is a big pile of wood chips (and/or other carbon rich materials like straw, hay, brush, leaves, cardboard, corn husks, etc.) and some mushroom spawn. Simply spread the spawn into the chips, water it, then walk away and let nature do its work. **Garden Giants** are particularly 'voracious' and will enthusiastically convert carbon-based debris into fertile soil...and *tons* of huge mushrooms in the process! The more substrate the mushrooms have to grow on, the larger and more plentiful they will tend to be (kind of like letting a squash plant grow in your compost pile). The largest specimens on record have weighed up to 5 lbs, though this is not common. I've personally had many in the neighborhood of 1 lb, which is still massive when you consider that the average portobello cap is less than 1/5th of a pound.



Pile of wood chips inoculated with garden giant spawn



Close-up of the myceliated chips

Hay and straw will only take a few months to decompose, while wood chips will take a year or two, depending on the species of wood, the size of the chips and of the pile. Soft hardwoods like poplar, aspen, alder, basswood and birch will decompose quickly. Softwoods and harder hardwoods like oak will take a little longer. As a rule of thumb, mushrooms prefer deciduous trees over evergreens, but **Garden Giants** will easily tolerate up to 50% softwoods, so feel free to mix it up. If all you have is softwoods, you can try mixing in a good portion of straw and they will still thrive.

Vegetable/plant matter is about 90% water by weight, on average. That's why your kitchen compost pile shrinks so much over time. All that water ends up running off or evaporating. By contrast, fresh wood is only about 50% water (even less for straw), so the same amount of wood chips will yield 5 times more compost by the time the mushrooms and worms are done with it. Now that's what I call effective, high yielding and trouble-free composting!

Food production

Of course, the most obvious benefit that mushrooms can provide for us is their food value. There's nothing more satisfying than making meals from your own fresh produce, and mushrooms are no different. Actually, they *are* different... because after all, mushrooms are *not* vegetables. In fact, mushrooms are closer to the animal kingdom than to plants. They are 'meatier' than vegetables and are usually treated as such in a meal. Their flavour profile (umami) and texture are also very different than that of plants. This means that adding tasty fungi to your list of homegrown goodies will not only increase the variety on your plate, but also increase the range of dishes and flavours that you can achieve. That's different than simply growing 'another vegetable' in your garden.



Mushrooms also have unique nutritional qualities, such as their ability to make vitamin D when exposed to UV light (much like our own skin). This makes them the only vegetarian source of this vitamin. They also have a very different fibre makeup than plants. Cellulose dominates the structure of plant cell walls and is the most abundant organic compound on the planet. Mushrooms 'eat' cellulose, but have *none* in their own cellular structures. Theirs are composed of a chitin-glucan complex, unique to the mushroom kingdom, and myriad signature polysaccharides (fibres). Many of these, like the well-known beta-glucan of Cheerios fame, have been and are being studied for their immune system modulation abilities, among other things. And the list goes on...

Now, most foods can be looked up online for their general nutritional profile, but some, like the less commercially available mushroom varieties (including the **Garden Giant**) and other 'wilder' foods, can not. Therefore, in the name of science, I took it upon myself to get some real-life answers by carefully preparing and sending out mushroom samples, from my own patches, to a reputable laboratory for analysis (MB Labs in Sidney, BC). As it turns out, complete nutritional analyses are prohibitively expensive, with each vitamin costing several hundred dollars to test for, per sample! Not worth it...

What I *did* end up ordering is protein content, moisture content and a full mineral profile for each sample (still hundreds of dollars, but worth it). Here then is a summary of the findings, with current RDA values for comparison.

Mushroom Samples (Values per 100g serving)					
Nutrients	Stem	Cap	Whole	Mixed Mushrooms	RDA
Calcium	2.3 mg	2.7 mg	1.16 mg	3.7 mg	1000 mg
Chromium	2.29 mcg	3.3 mcg	10.5 mcg	3.9 mcg	35 mcg
Copper	630 mcg	383 mcg	383mcg	366 mcg	900 mcg
Iron	0.45 mg	0.752 mg	***	1.14 mg	8 mg
Magnesium	5.78 mg	10.5 mg	6.7 mg	11 mg	400 mg
Manganese	0.065 mg	0.164 mg	0.154 mg	0.176 mg	2.3 mg
Molybdenum	6.3 mcg	7.1 mcg	4.9 mcg	8.9 mcg	45 mcg
Phosphorus	40.4 mg	69.9 mg	50.7 mg	70.3 mg	700 mg
Potassium	246 mg	246 mg	194 mg	249 mg	4700 mg
Selenium	3.5 mcg	5.7 mcg	4.8 mcg	4.5 mcg	55 mcg
Sodium	3.21 mg	2.5 mg	1.03 mg	4.4 mg	1500 mg
Zinc	0.36 mg	0.72 mg	0.53 mg	0.54 mg	11 mg
PROTEIN	1.11 g	4.39 g	2.23 g	6.75 g	N/A

*** Not accurate due to contamination



Garden Giants tend to have large stems, which are also quite good to eat when harvested young. I was curious to see the difference in nutritional value between the caps and stems, and since many people eschew the stems of the mushrooms they buy, I thought it wise to have them both analysed separately, as well as ‘together’ for comparison.

I took a good-sized specimen and cut it lengthwise down the middle (see pictures above). I sent one half to be analysed ‘whole’, then I separated the cap from the stem of the remaining half and sent those to be analysed individually. I also took a smaller specimen from each of my 4 patches and sent them as a ‘mix’ to be analysed as a blended whole. Mushrooms, like plants, will contain varying levels of nutrients based on where/how they are grown and their current stage of development. I figured this would provide a realistic benchmark for each nutrient.

As you can see, the caps are definitely more nutritious than the stems, and the ‘mix’ bag even more so. All of the samples shared very similar moisture levels, averaging 89%, so the large discrepancies cannot be explained this way. The protein content of the caps and ‘mix’ are surprisingly high; even higher than the richest vegetable sources of it (even the mighty kale tops out at 4-5%). While I don’t condone the eating of food solely for its nutritional qualities, I do find it quite interesting to know.

OK, I'm in! Now what?

Getting started is very easy. Garden Giants are like 'gateway' mushrooms. Your sure-fire success with them will open the door to the mushroom universe and soon you'll be wanting to try your hand at several more varieties. Oyster mushrooms are a close second for ease of cultivation.

It all starts with ordering some spawn online (unless you know somebody that can supply you locally). Once you receive it, spread some in between layers of carbon-rich mulch where you want it to grow, water it and wait. Mushrooms need moisture, so keep an eye on the moistness of the mulch throughout the season... but this is no different than what you're already doing for your plants. I like to start with a base layer of straw (pre-soaked in a wheelbarrow overnight), sprinkle with spawn, then cover with 2-4 inches of wood chips.



One big advantage with mushrooms (and specifically Garden Giants) is that they are a perennial crop. Once you have them, you can keep the patch active virtually forever, so long as you keep feeding it fresh debris. Not only do you not need to buy new spawn, but you can actually take some chunks of your existing patch and use *it* as spawn to make new patches elsewhere, or share with friends (like dividing hostas, daylilies or daffodils).

In all seriousness, the main issue you will quickly run into is keeping up with the harvests. If the timing is right and your substrate is appropriate (and not too thick), you can expect your first flush of mushrooms in as little as 6-8 weeks! In most cases you can expect a spring-started patch to fruit by fall. Thicker layers will take longer to fully myceliate, but if you don't manage to get a flush by fall, you can count on a huge flush the following spring! Spring is an ideal time for spawning in the garden, but patches can be spawned almost any time of year. The last one I made I spawned August 1st and was harvesting mushrooms by the end of September!



**My main patch, between two pines,
with a 6lbs flush in June**

Garden Giants are hugely productive. If you only want to grow them as food for yourself, you won't need a large patch. I keep track of my harvests and my 'main patch' is a small rectangle between two red pines, measuring about 3 feet by 10 feet. This patch alone will produce 40+lbs of mushrooms in a single season (here in Zone 4 the season is between May and October, outdoors, though in my greenhouse I can get flushes as early as March and as late as November). A single flush can easily be 5lbs after a heavy rain. For common mortals that's usually too much to eat all at once.



They will only keep fresh in the fridge for a week or so. A good strategy is to process a bunch into cream of mushroom soup which can then be frozen in batches, but my favourite option is to simply dehydrate them in slices. They are so easy to process and they dry very quickly (only a few hours in the dehydrator). In this form, they will keep for years if needed and can be used at your leisure. I also find their aroma and flavour is enhanced this way. I'll throw them into my soups and stews all winter long and make gravies and sauces with them. I like to grind some up into a powder with a coffee grinder and mix it with flour or cornstarch to make my roux. You can also throw in some broken up slices for a chunkier mushroom gravy. Delicious and nutritious!



Dehydrated garden giant slices

In conclusion

Garden Giants can increase the fertility, microbial diversity and overall structural health of your soil. They can be both a companion and supplement to your other crops, adding capacity and resilience to your gardens. Owing to their different needs, they can flourish even when the conditions are difficult for plants. Too wet and cold in the spring, no problem. Too shady, no problem. They are also easy to cultivate; no green thumbs needed.

Store-bought mushrooms are expensive. Those of you who *love* mushrooms would probably eat them even more often if they were more affordable and fresher. For all but the 'diehards' among us, mushrooms likely fall at the bottom of the list of priority grocery items, especially during these times of record-breaking food prices and high inflation. Most of us treat mushrooms like 'toppings', accoutrements... i.e., optional. Rare is the meal that is mushroom based (save perhaps for the portobello 'burger'). Even stuffed mushrooms tend to be more of an appetizer than a main course.



Hardy little baby giant in late November!

Growing your own can give you the freedom to use them more consistently and liberally. The abundance they provide is literally hard to keep up with. You'll be finding ways to use them that you never would have if you had purchased them from the store. A whole new world awaits!

BIO: Lawrence has been a hobby farmer and mycophile for the better part of two decades, and while foraging for edible and medicinal mushrooms is one of his favourite activities, he keeps a soft spot in his heart for his good friend and versatile ally, the Garden Giant.