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SIES College of Arts, Science & Commerce (Autonomous)
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GULMOHAR

# DEPARTMENT OF BOTANY
## Presents
# GULMOHAR NEWSLETTER

## FROM THE EDITOR'S DESK

Welcome to a new edition of the Gulmohar newsletter for the year 2021-22. In this edition, we have put up some fascinating articles and photographs.

We bring you an article about Radiotropic Fungi and all you should know about the most crucial Plastic Degrading Fungi. Did you know about the Tibetan Caterpillar Fungus? If not, then check out our article on it! In our next article, learn about Nematophagus Fungi. Next, we have an article on secondary metabolites from Fungi. Do you know how easy is to grow edible mushrooms and their benefits don't miss it out!

Finally, yet significantly, we have added bioluminescence fungi don't miss to scan the video for the same. Last but not least, don't forget to check out our amazing photo gallery of students and teaching faculty!

**HAPPY READING!**

## WHAT'S INSIDE!

# INTERESTING FACTS YOU DIDN'T KNOW ABOUT RADIOTROPIC FUNGI

**Introduction: What are Radiotropic Fungi?**

Radiotropic fungi are a group of organisms that can be found in environments with high levels of radiation.
Radiotropic fungi are not only found in radioactive areas but also in places with high levels of radiation such as nuclear power plants. Radiotropic fungi are a type of fungus that has the ability to grow and reproduce in environments with high levels of radiation. Radiotropic fungi are fungi that are capable of growing in the presence of ionizing radiation.
Radiotropic fungi are a type of fungus that can grow in the presence of ionizing radiation. This is because they produce a type of protein called Radiotropin, which protects them from the harmful effects of radiation exposure. Radiotropins bind to DNA and protect it from damage by ionizing radiation, preventing mutations that can lead to cancerous cells.

**8 Interesting Facts You Didn't Know About Radiotropic Fungi**

This is a list of facts about Radiotropic Fungi that you probably didn't know.

1. Radiotropic fungi are the fastest growing fungi on earth.
2. The average growth rate of radiotropic fungi is 0.02 cm per hour or 6 inches per day.
3. Radiotropic fungi are found in temperate and tropical climates, in soil and on plants, dead organic matter, and as parasites of other plants or animals.
4. They can be found all over the world including in North America, South America, Africa, and Asia.
5. They are usually considered to be saprotrophs because they break down dead organic matter for food but some can also act as parasites that attack living plants or animals for food.
6. Radiotropic fungi are the most common type of fungal biomass on earth.
7. Some types of radiotropic fungi produce antibiotics that can kill certain kinds of bacteria.
8. They have been found from soil to the deepest oceans and have probably been present for over 500,000,000 years.

**How are these Radiotropic Fungi Beneficial to Human Health?**

- Radiotropic fungi are not harmful to humans. They are found in many places, such as the soil and even our own homes. Radiotropic fungi have been around for millions of years, and they are beneficial to human health because they produce natural antibiotics that can fight off bacteria.
- Radiotropic fungi may be beneficial to human health because they produce natural antibiotics that can fight off bacteria.
- They can help protect humans against radiation. This is due to their strong cell walls and chemical compounds that give them their ability to resist radiation.
- They are a group of fungi that have the ability to grow in radioactive environments. They are also resistant to radiation.
- They are beneficial because they can help the environment by decomposing toxic substances and cleansing radioactive soils.

**How are Radiotropic Fungi Different from Other Fungi?**

The main difference between radiotropic fungi and other fungi is their ability to sense magnetic fields. Other types of fungi do not have this ability and so cannot move towards targets as radiotropic fungi can. Radiotropic fungi are often used in the medical field. They can be found in places where there is high radiation such as at nuclear power plants and atomic testing sites. Radiotropic fungi are a type of fungus that can produce or absorb an electromagnetic signal. They have been found to be able to sense when they are near a target and then move towards it. This is because they have specialized cells called magnetosomes that allow them to sense magnetic fields.

**What are the Most Commonly Known Examples of a Radiotropic Fungus?**

Radiotropic fungi are of two types. One type is a parasite that infects plants and animals and the other type is a symbiont that lives in a mutualistic relationship with the host.
Some examples of radiotropic fungi are:
- Parasitic fungi: *Pythium*, *Rhizoctonia*, *Fusarium*, *Verticillium*
- Symbiotic fungi: Ascomycetes

**AUTHOR**: RAGHAVI VASANTH KUMAR

**Reference**: https://en.wikipedia.org/wiki/Radiotrophic_fungus

# PLASTIC DEGRADING FUNGI

A lead author and researcher for the British Antarctic Survey, David Barnes once wrote, “One of the most ubiquitous and long-lasting recent changes to the surface of our planet is the accumulation and fragmentation of plastics.” The natural raw materials used in the making of plastic include cellulose, coal, natural gas, salt, and crude oil through a polymerization or polycondensation process. However, the chemicals added to plastics are absorbed by human bodies and some of these compounds have been found to alter hormones or have other potential human health effects. Plastic debris, laced with chemicals and often ingested by marine animals, can injure or poison wildlife. Meanwhile, India is generating 3.5 million tonnes of plastic waste annually, Union Environment Minister Bhupender Yadav said as he launched several green initiatives for plastic waste management.

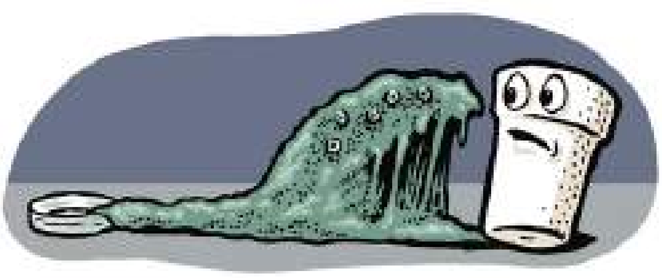
Globally to date, there are about 8.3 billion tons of plastic in the world, whereas some 6.3 billion tons of that plastic is trash which is about 80% of the total. The types of plastic found commercially are as follows:

1. Polyethylene Terephthalate (PET or PETE)
2. High-Density Polyethylene (HDPE)
3. Polyvinyl Chloride (PVC or Vinyl)
4. Low-Density Polyethylene (LDPE)
5. Polypropylene (PP)
6. Polystyrene (PS or Styrofoam)
7. Other

Plastic pollution created a huge menace and that resulted in the compulsion to limit its use today. That created more streamlined research to get rid of plastic not only by reducing its use but also by trying to approach degrade its trash from all over the world.  Fungi are able to degrade synthetic compounds; e.g., persistent organic pollutants (POPs), polycyclic aromatic hydrocarbons (PAHs), benzene, toluene, ethylbenzene, and xylenes (BTEX compounds and pesticides. The metabolic versatility of fungi and the ability to degrade complex compounds indicate that biodegradation of plastics in the environment could be a potential metabolic trait of some fungi. To date, some plastic degrading fungi have indeed been identified mostly from the Ascomycete phylum to which also Aspergillus, Fusarium, and Penicillium belong. The ability of several dozen fungi to digest the synthetic polymer polyester polyurethane (PUR), a type of plastic was  tested by researchers at Yale University in 2011. Several members of the Pestalotiopsis genus of fungi were capable of degrading PUR and converting it into organic matter in both solid and liquid suspensions was found by them. Two members of this genus were able to survive solely off PUR in anaerobic, or oxygen-free, and aerobic, or oxygenated, environments. The discovery of Pestalotiopsis’ ability to decompose plastic led to further research into plastic decomposition by fungi. Researchers have now found that many species are capable of plastic bioremediation including the common, edible Oyster mushroom. The Oyster mushroom is capable of decomposing plastic while still creating an edible mushroom.

In an article named 'Plastic degrading fungi *Trichoderma viride* and *Aspergillus nomius* isolated from local landfill soil in Medan' (E Munir et al 2018 IOP Conf. Ser.: Earth Environ. Sci. 126 012145), it was concluded that "Selected isolates used in the study were identified through molecular analyses. Sequencing of amplified DNA showed that potential isolates resembled to *Trichoderma viride* and *Aspergillus nomius* with 97% and 96% similarities. As far literatures have been surveyed on LDPE degrading fungi, limited work has been reported on the ability of these two fungi in degrading plastic molecule. Most reported fungi capable of degrading LDPE are other types Aspergillus, Penicillium, and Mucor. In conclusion, fungi isolated from landfill soil have the capability in degrading LDPE. Two potential isolates obtained in the study have been successfully identified as Trichoderma viride and *Aspergillus nomius*. Then, these results enriched the information on plastic degrading fungi.

The most critical action we can take to combat the plastic problem is by reducing its consumption. However, these plant degrading fungi provide an organic solution to removing the plastic that is already polluting our environment.



**AUTHOR**: ANKITA CHAUHAN

**Reference**: colorado.edu scientificamerican.com plasticseurope.org recyclecoach.com m.economictimes.com

# In Search of Fungal Gold

**INTRODUCTION:** A rare species of parasitic plant life has been allowed to return from its vulnerable standing due to a new analysis that has known properties and peaceful ways of cultivating it. the fungus, known as *Ophiocordyceps sinensis*, has been enjoying a legendary standing among Chinese and Tibetan communities. however, its popularity is currently so widespread, that it is at risk of disappearing altogether. *O. sinensis* survives by parasitizing the burrowing caterpillar larvae of ghost moths (*Hepialus humuli*) across the Tibetan tableland and therefore the Himalayas, high at altitudes of between 3,000 and 5,000 meters. It's has been found in Nepal, Bhutan, Tibet, China, and India.

Every summer, the ghost lepidopteron caterpillars shed their protecting coatings and move underground to hibernate Here the fungus will invade a caterpillar's body by infecting it with tiny, airborne spores. Once inside, the fungus will eat the caterpillar alive, slowly killing and mummifying it in a vertical position. By early spring, the fungus will emerge right out of the dead caterpillar's head and up through the soil for easy harvesting.

**Why so popular**: Known as yartsa gunbu—or "summer grass winter worm"—by Chinese consumers, the nutty-tasting fungus is highly valued for its purported medicinal benefits, for instance, as a treatment for cancer and aging and as a libido booster. Far away in the booming cities of Beijing and Shanghai, demand for the fungus has soared." According to ancient Tibetan texts, men who eat it are promised "the delights of thousands of beautiful women." That's why top-quality yartsa sells for around $2,000 an ounce - more than the price of gold. In China, yartsa is a status symbol."

**Problems caused**: In some parts of the fungus' range, such as China's Qinghai Province, disputes over access to pastures where the species grows to turn lethal each year —a sign of the economic importance the fungus now holds, Because it is so valuable, yartsa gunbu has led to violence. Last August in Nepal, seven men went missing after a dispute over yartsa gunbu and two of them were later discovered dead at the bottom of a steep ravine. And it's not just the people we have to worry about.

The fungus now holds such immense value - for some local families, it makes up 70 to 90 percent of their income - that its exploitation is now risking the health of the alpine regions that support it.

harvesting areas are several hours away, which means there's no way to sneak out and still make it back to the daily meetings. If you miss just one of the meetings, you'll risk being stuck with a hefty fine.

Most importantly, everyone in the village has the right to collect the fungus, and anyone who does is required to pay a tax that will go towards maintaining the village infrastructure. It also means the species has an entire year to replenish its population.

"Local rituals and certain Buddhist beliefs have helped keep the harvest under control,"

Religious decrees prohibit harvesting on certain sacred mountain slopes. This creates a natural sanctuary, ensuring that part of the landscape will remain undisturbed and allowing fungal spores to spread for the next season.

Residents in a Nepali village, high up in the Tsum Valley, are using the profits gained from harvesting yartsa gunbu to build special lodges for foreign tourists, which is bringing even more money in for the locals, and they've been trading in their fungus supplies for gold to sure up their wealth. "Tibetans are using the cash to improve their standard of living, and in some cases are reducing dependency on agro-pastoral activities by becoming entrepreneurs."

**Conclusion**: "Thus, the yartsa gunbu trade is transforming social and economic life in ways that development initiatives in China and the highlands of surrounding nations have been unable to match."

This fungus is such an important part of the economy for the locals who collect it, it's fantastic to see the methods they're using to ensure its ongoing survival.

**AUTHOR:** VEDANT KHOKRALE

**Reference:** https://www.nationalgeographic.com/, https://www.ncbi.nlm.nih.gov/, https://en.m.wikipedia.org/, https://www.pnas.org/

# NEMATOPHAGUS FUNGI

**INTRODUCTION:**

Nematophagus (nematode destroying) fungi are fungi which can catch, kill and digest nematodes. Nematodes or roundworms are cylindrical worms which can be either parasitic or free-living in nature.

Nematophagus fungi are present in lower fungi groups as well as higher fungi groups. Lower fungi groups include oomycetes, chytridiomycetes and zygomycetes and higher fungi groups include ascomycetes, basidiomycetes and deutromycetes.

## DIFFERENT TYPES OF NEMATOPHAGUS FUNGI:

There are different types of nematophagus fungi like predatorial / nematode-trapping fungi, opportunistic/ovicidal fungi, endoparasites, toxin-producing fungi and fungi which possess some special attack devices.

Fungi are present in all sorts of soil environments where their main nutrition source is saprophytic but are modified to be parasitic in nature too. Capturing and digesting nematodes provides them with an additional nutrient source.

The fungi have developed complicated hyphal structures like hyphal nets, knobs, branches or rings. These modifications are seen in the predatorial type of fungi. In the endoparasites, nematodes are attacked by spores. The spores can be swallowed or can be attached to the surface of the nematodes. Oyster mushroom *(Pleurotus ostreatus)* produces toxins through hyphal stalks which paralyze the nematode and the hyphal tips grow through the mouth of the worms and digest them. The egg parasitic fungi infect nematode eggs using a specialized cell called an appressorium. An appressorium is a flattened hyphal organ which enters the eggshell using pressure.

In nematode-trapping fungi, two factors form the relationship between fungi and nematodes. The nematodes prompt the formation of the structures in which they are later held captive and the fungi get nutrition from the nematodes which act as an additional food source.

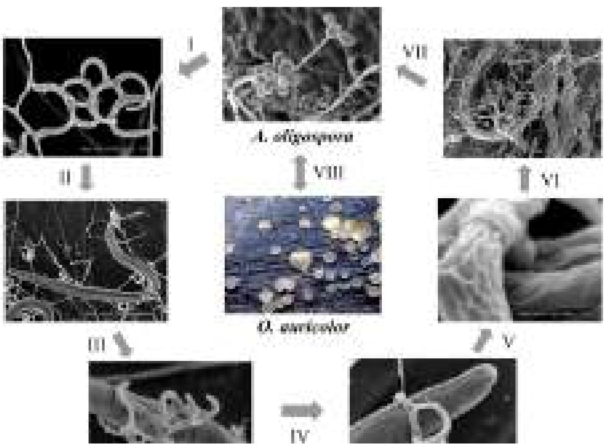
**BIOLOGICAL CONTROL:**

The interest in nematophagus fungi has increased due to their ability to be used as biocontrol agents. These fungi can be used to control the excessive number of nematodes which eat and thereby harm the crops.

Biological control of plant-parasitic and animal-parasitic nematodes is an important characteristic that features nematophagus fungi. Many nematicides like methyl bromide are banned due to health and environmental effects. Thus, biological control solutions are needed. There are two ways to use this biological control. First, by adding large amounts of fungi to the soil or by stimulating the existing fungi with activity.

**CONCLUSION:**

The use of nematophagus fungi as a biological control in fields could help reduce the usage of chemical pesticides and fungicides. Thereby, reducing the risk of adverse effects of pesticides on long-term health. Nematophagus fungi could help destroy many of the harmful nematodes present in soil and keep the plants protected from parasitism. The microbial action of the fungi also helps in recycling nutrients and making simple nutrients available to the plants, thus acting as a food source for the plant's growth.




**AUTHOR**: CHAITRALI DESHPANDE

**Reference**: https://www.researchgate.net/publication/228034002_Nematophagous_Fungi

# SECONDARY METABOLITES FROM FUNGI

Plants and fungi are rich sources of thousands of secondary metabolites (SMs), which consist of low-molecular-weight compounds (the number of the described compounds exceeds 100,000) that are usually regarded as not essential for life while their role is quite versatile.

Fungi produce a number of structural classes of secondary metabolites including polyketides, terpenoids, shikimic acid-derived compounds, and non-ribosomal peptides. Moreover, hybrid metabolites composed of moieties from different classes are common, as in the meroterpenoids, which are fusions between terpenes and polyketides. Analysis of available fungal genomes revealed that ascomycetes have more genes of secondary metabolism than basidiomycetes, archeo-ascomycetes, and chytridiomycetes, whereas hemi-ascomycetes and zygomycetes have none.

Fungi are known to produce a wide range of secondary metabolites such as pigments, antibiotics, vitamins, amino acids, and organic compounds that have several useful biological activities such as antifungal, anti-inflammatory, antioxidant, antimicrobial, and anticancer and also have a wide range of biotechnological applications in food, pharmaceutical, and cosmetic industries as well as in agriculture. Antibiotics such as β-lactam, cholesterol-lowering drugs, lovastatin, and penicillin are some of the important fungal metabolites that have diverse biotechnological applications in pharmaceutical industries and in the field of medicine. On the other hand, several of these fungal secondary metabolites also have potentially harmful biological activities such as mycotoxins and phytotoxins.

There are various biosynthetic pathways followed by the fungi to produce secondary metabolites such as β-lactam, cyclic peptide, diterpenes, diketopiperazines, polyketides, sesquiterpenes, and a combination of these pathways. There are wide ranges of fungal communities producing potentially important secondary metabolites including *Penicillium notatum*, *Cephalosporium acremonium*, *Penicillium griseofulvum*, *Streptomyces griseus*, *Monascus purpureus*, *Micromonospora purpurea*, *Tolypocladium inflatum*, *Aspergillus niger*, *Aspergillus parasiticus*, and *Beauveria bassiana*. The potential biological applications of secondary metabolites of fungi will be useful for sustainable development.

| **Secondary Metabolites** | **Producing Fungus** | **Application** |
|---|---|---|
| Astaxanthin | *Phaffia rhodozyma* | Pigment |
| I Carotene | *Blakeslea trispora* | Pigment |
| Cephalosporin C | *Acremonium chrysogenum* | Redource for the production of cephalosorins |
| Cyclosporine A | *Tolypocladium inflatum* | Immunosuppresant |
| Giberellic Acid | *Gibberella fujikuroi* | Plant growth regulator |
| Griseofulvin | *Penicillium griseofulvum* | Antifungal Agent |

**AUTHOR**: NADAR JEBA RESHMA
**Reference**: https://www.sciencedirect.com

# HOW TO GROW EDIBLE MUSHROOMS ? AND THEIR BENEFITS

Edible mushrooms are the fleshy and edible fruit bodies of several species of macrofungi. They can appear either below ground or above ground. The Oyster mushroom or `Dhingri' belongs to the genus Pleurotus. It is a basidiomycetous fungus whose basidiocarp is distinctly shell, fan, or spatula-shaped (oyster-shaped) with different shades of white, cream, grey, yellow, pink, or light brown depending upon the species. It is a very protein-rich food produced from various agrowastes without composting. Always clean and sanitize the equipment you are using for better production. Keep your hands clean while handling the spawn and the bags. Good quality straw makes a lot of difference in order to grow mushrooms at home. Maintaining a proper moisture level and light also plays a big role in production. Steps involved in the cultivation of Oyster mushrooms are Substrate preparation, Spawning, Cropping, and Harvesting. Their brief account is as follows:

**Substrate preparation**: **The popular methods of substrate preparation is given below**:

**1) Hot water treatment**: The substrate (agro-waste) after chopping (5-10 cm) is soaked in hot water (65°C to 70°C) for 60 to 120 minutes at 80°C. Hot water treatment makes the hard substrate like maize cobs, stems, etc. soft so the growth of mycelial takes place very easily. The leached water contains a lot of soluble sugars and phenolic compounds. The substrate after cooling at room temperature is sent for spawning. This method is not suitable for large-scale commercial cultivation.

**2) Steam pasteurization**: In this method, pre-wetted straw is packed in wooden trays and is then kept in a pasteurization room at 60-80°C for a few hours. The temperature of the pasteurization room is manipulated with the help of steam through a boiler. The substrate after cooling at room temperature is sent for spawning.

**Spawning**: Freshly prepared (20-30 days old) grain spawn is best for spawning. Old spawn (3-6 months) stored at room temperature (20-30°C) forms very thick mat-like structures due to mycelium aggregation. Spawning is done in a pre-fumigated room (48hrs. with 2% formaldehyde). The spawn is mixed at the rate of 2 to 3% of the wet substrate. One bottle of the spawn of 300g is sufficient for 10-12kg of wet substrate. Spawn is mixed thoroughly or in layers with the substrate and is filled in polythene bags (60 x 45 cm) of 125-150 gauze thickness. Each bag is provided with 10 to 15 small holes from all sides to drain out excess water. Perforated bags give higher and early crops than non-perforated bags due to the accumulation of high carbon dioxide. All the bags are tightly pressed from all sides to make compact rectangular blocks and are tied with a nylon rope.

**Cropping**: The spawned blocks are kept in the incubation room for mycelial growth. Spawn bags can be kept on a raised platform or shelves or can be hung in the cropping room for mycelial colonization of the substrate. During the incubation, there is no need for any high relative humidity, so no water is sprayed. When the mycelium gets fully colonized in the substrate and forms a thick mycelial mat, the bags or blocks are ready for fruiting. All bags or blocks are arranged on wooden platforms or racks with a minimum distance of 15-20 cm between each bag in the tier.

**AUTHOR:** PRIYA AMBATOR

**Reference**: https://www.progressivegardening.com/biological-control/conclusions-hly.html

# BIOLUMINESCENCE BY FUNGI

## INTRODUCTION :

Many living organisms emit light, which is a phenomenon named bioluminescence. In most cases, light emission results from the chemical oxidation of a luciferin substrate catalyzed by a luciferase enzyme. The luciferin reacts with molecular oxygen, giving a high-energy intermediate (HEI) whose decomposition releases enough energy to produce the emitter oxyluciferin in the singlet electronically excited state. Fluorescence from this excited metabolite results in visible light emission used in nature for signaling and illumination. The luciferin/luciferase systems and the corresponding oxyluciferin of several bioluminescent insects, bacteria, and marine animals have been characterized. This knowledge has yielded major technological advances, such as genetically encoded labels using fluorescent proteins, pyrosequencing, ultrasensitive enzyme quantification using triggered chemiluminescent substrates, and imaging via bioluminescence resonance energy transfer.

## CHEMICAL COMPOSITIONS :

Bioluminescent fungi are spread throughout the globe. The four known lineages of bioluminescent basidiomycete fungi contain around 80 different species. Recently, our group reported the chemical structure of fungal luciferin and its biosynthetic precursor. The enzymatic oxidation of the precursor (hispidin) by an NAD(P)H (nicotinamide adenine dinucleotide phosphate OR its reduced form)–dependent enzyme, hispidin-3-hydroxylase, produces 3-hydroxy hispidin (1), which acts as the fungal luciferin. However, the molecular mechanism and reasoning behind fungal bioluminescence remained unclear. Here, we report the identification and characterization of fungal oxyluciferin.

Bioluminescence is a natural phenomenon of light emission resulting from oxidation of a substrate, luciferin, catalyzed by an enzyme, luciferase. A variety of species are bioluminescent in nature ; for many of them, the ability to emit light is a defining feature of their biology. Artificial integration of natural bioluminescent reactions into living systems has also become a reporting tool widely used in molecular and cell biology.

Approximately 100 fungal species from the order Agaricales emit light utilizing the same biochemical reaction. Although the ecological role of their bioluminescence is not fully understood, there is evidence that it might be used by fungi to attract spore-distributing insects. Fungal bioluminescence was known to utilize at least four components: molecular oxygen; the luciferin, which was recently identified as 3-hydroxy hispidin [a product of oxidation of the simple plant and fungal metabolite hispidin]; and two previously undescribed key enzymes, an NAD(P)H-dependent hydroxylase and a luciferase.

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## FEW MUSHROOM SPECIES :

**Bitter Oyster (*Panellus stipticus*)**

***Panellus stipticus*** is one of the brightest-glowing bioluminescent mushrooms on earth. These flat fungi are a dull shade of yellow-beige during the day, but they transform into dazzling decorations after dark. Bitter mushrooms, as they're commonly called, hail from the family Mycenaceae and genus Panellus, which it shares with other glowing fungi.

Although ***Panellus stipticus*** has a global distribution, only some strains of it—specifically, those growing in certain parts of North America—are bioluminescent. They glow from the gills and mycelia (internal threadlike hyphae), and most prominently during spore maturation.

**Green Pepe (*Mycena chlorophos*)**

Most of the world's glowing mushrooms belong to the genus *Mycena*. ***Mycena chlorophos*** pale-green glow is visible because it occurs in its fruiting body, not just in its mycelia. It's brightest when it's just one day old and the temperature is around 80 degrees Fahrenheit. This is consistent with the subtropical climate of its native Indonesia, Japan, Sri Lanka, Australia, and Brazil.

The glow of the green pepe, a common name given to the species by the Micronesian Bonin Islands, is also fleeting. Once its cap opens, the bioluminescence quickly fades.

**Eternal Light Mushroom (*Mycena luxaeterna*)**

Though their thin, hollow, gel-covered stems glow constantly, the ***Mycena luxaeterna***—aptly dubbed the eternal light mushroom—is rather nondescript in the daylight. You can typically see its hairlike stipe lit up in its signature eerie green only after dark. And no, the cap doesn't glow.

The eternal light mushroom's distribution is extraordinarily limited to the rainforest of São Paulo, Brazil.

**AUTHOR:** ANKITA KAMLESH SINGH

**Reference:** https://www.conservationindia.org/ & https://schoolworkhelper.net/

# FUN-GI FUN  FACTS

## EARTH STARS

Earthstars belong to a group of fungi called Gasteromycetes, or "stomach fungi". Their fruiting bodies are stomach-shaped sacs filled with dry spores. They are related to puffballs. Young, closed earthstars are onion-shaped.

## FAIRY RINGS

The name fairy ring comes from an old folk-tale. People once believed that mushrooms growing in a circle followed the path made by fairies dancing in a ring. Fairy rings are found in open grassy places and in forests.

## JELLY FUNGI

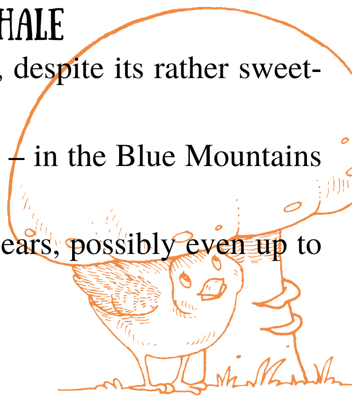
Jelly fungi make rubbery, seaweed-like mushrooms. They are white, orange, pink, rose, brown or black. They can be shapeless, shaped like cups, like railroad spikes or branched like coral. The common name of yellow to orange species is witches butter.

## SOME FUNGI TURN ANTS INTO "ZOMBIES"

Some fungi create zombie ants. Yes, you read that right: zombie ants! The fungus responsible is the *Ophiocordyceps unilateralis*, found deep in the Amazon rainforest. This sinister parasite infects the carpenter ant, growing through its body before eventually taking over its brain. It then compels the poor, hijacked insect to leave its nest and climb to a nearby plant – which just so happens to be in the perfect environmental conditions for fungus growth.

Here, over a number of days, it consumes the ant's innards and sends a long stalk through its head, growing into a capsule of spores. These rain down on other unsuspecting victims, continuing the grim cycle.

## THE LARGEST LIVING THING ON THE EARTH IS A FUNGUS - FORGET THE BLUE WHALE



The biggest living organism on the planet is a fungus known as the 'honey mushroom'. But, despite its rather sweet-sounding name, it kills trees, feeding off both live and dead wood for nutrients.

Discovered in 1998, the *Armillaria ostoyae* covers 2,384 acres – almost 10 square kilometers – in the Blue Mountains of the US state of Oregon.

Not only is it a giant, but it's also been around for a while. Scientists say it's at least 2,400 years, possibly even up to 8,650 years old!

## THEY HELP TREES TALK TO EACH OTHER

Did you know that fungi invented the internet? Sort of. Beneath every forest and wood lies a complex clandestine network of roots, fungi, and bacteria that connects trees and plants to one another. It even has a name: the 'Wood Wide Web.

This secretive social network of Mycorrhizal fungi is almost 500 million years old. The trees obtain nutrients that the fungi acquire from the soil, such as nitrogen and phosphorus – and in return, the fungi receive carbon-rich sugar from the trees' roots. It's this symbiotic relationship that allows trees to have underground conversations, such as issuing warnings about attacking insects, drought, and disease.

## MOST RAINDROPS IN TROPICAL FORESTS CONTAIN SPORES

Mushrooms are also largely responsible for the rain in rainforests. Here, fungi release masses of spores into the air – and as they float above the forest, they attract moisture. Essentially, they act as nuclei for the formation of raindrops in clouds, which are low-lying in these warm, wet environments. And when these tiny, somersaulting balls have collected enough water around them, they fall back to earth as rain. In fact, 90 percent of tropical raindrops have a fungal spore at their heart.

**AUTHOR**: VRUSHALI ANANT RANE

**Reference**: www.bbcearth.com

# PHOTO GALLERY (TEACHING FACULTY)

*Punica granatum*
**Dr. V. Vishnuprasad**
Location: SIES College Campus

*Hemigraphis alternata*
**Mrs. Sakshi Raj Kumar**
Location: Worli

*Nephrolepis exaltata*
**Ms. Snehal Unde**
Location: Jijamata Udhyan, Byculla

*Alstonia scholaris* (Saptaparni)
**Dr. V. Vishnuprasad**
Location: Akkalkot, Solapur

# PHOTO GALLERY (STUDENT)

*Tecoma capensis*

**Raghavi V Kumar (M. Sc. - I)**

Location: Ambernath

*Citrus aurantiifolia*

**Jeba Reshma (M. Sc. - I)**

Location: Thisayanvillai, TN

*Eichhornia crassipes*

**Ankita Chauhan (T. Y. B. Sc.)**

Location: Bahraich, UP

*Chrysanthemum*

**Khushali Sahni**

Location: Thane (West)

*Curcuma aromatica*

**Sanket Khambe (S. Y. B. Sc.)**

Location: SGNP

*Phyla nodiflora*

**Shubham Patkar ( Ex- student)**

Location: MIDC Dombivli

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