

A COMPREHENSIVE PICTURE OF FUNGI

Abstract

As mutualists, pathogens, and decomposers, fungi play an important role in the environment. Mutualism may be seen in the symbiotic relationship of mushrooms with forest trees and algae. Mutualists provided host plants with disease resistance, drought tolerance, and/or growth augmentation. Pathogenic fungi are responsible for illness in humans and other creatures. Fungal symbionts exhibit a wide range of symbiotic behaviors, including mutualism, parasitism, and commensalism. Plant symbiotic fungi are assumed to have a single lifecycle that can grow (mutualism), decrease (parasitism), or have no effect (commensalism) on host plants.

Fungi degrade organic materials by producing enzymes that break down the decaying substance and then absorbing nutrients from the decomposing material. The goal of this article is to offer a full and exhaustive overview of both the good and negative functions of fungus, so that this article may be useful for environmental conservation and raising awareness about all aspects of fungi.

Keywords: Fungi, decomposers, enzyme, parasitism, pathogenic

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I. INTRODUCTION

Fungi have existed on Earth for billions of years (Sabramanian, C.V, 2013). Fungi, despite their appearance, are neither a plant nor an animal; rather, they are a very old species of vegetation. Today, there are about 1 million distinct kinds of fungus on the planet. We may detect around 120,000 fungi in a single teaspoon of dirt. Every day, fungi of some kind can be found. The most frequent fungi include mushrooms and truffles, yeast used to produce bread, and molds and mildew, which are both helpful yet unappealing.

Although certain fungus have numerous cells, they cannot produce their own food like plants because they lack chlorophyll (plants utilize chlorophyll to produce food from sunlight). Fungi are parasites that live on plants, animals, people, dead and decaying organic debris, and anything else that is warm and moist. They obtain nourishment by producing enzymes that degrade material on the surface on which they grow and absorbing the digested nutrients via their cell walls. Fungi primarily absorb water and digest carbohydrates and starches in order to thrive.

Fungi have evolved too many diverse settings and may be found in the air, on plants, even on human. All of these locations give the nutrition, warmth, and moisture that fungus requires. Some fungi have evolved to thrive in the desert, where water is limited, in extremely cold regions of the earth, and in fresh or saltwater, where there is either too much or the incorrect sort of water. Fungi have evolved to grow practically anyplace due to their lengthy existence.

Fungi, along with bacteria, are among the most effective organic material decomposers. Without them, dead plants and animals would just rot, and the nutrients from the decomposing matter would not be returned to the earth. Other plants, animals, and microorganisms that rely on that food would also perish, destroying the delicate balance of the environment.

Fungi are actually rather basic structures like mushrooms, toadstools, puff balls, and the hard fungus that grows like plates on the sides of trees is the same. They develop in clusters of filaments (like sewing thread) called hyphae, which are not usually visible.

The hyphae join together to produce mycelium, which can then develop a fruiting body, which is the visible component of the mushroom. Rows of 'gills' may be seen under the fruiting body of the fungus, which resembles an umbrella. Tiny minuscule spores are formed in these gills. Spores are the seeds of the next generation of fungus, and they are carried by the wind and rain to new locations. When the spores come into touch with the proper developing circumstances - usually food, moisture, and temperature - they germinate (begin to grow) and break through the surface.

Fungal spores spread in a variety of ways. They may be carried by the air, on animals, on your clothing, by traffic, washed away by rain or rivers, and even as you breathe, you are inhaling the microscopic spores! When you cough or sneeze, the spores are dispersed in new locations, and if the conditions are favorable, they will begin to proliferate. If the fungus does not have the necessary circumstances for growth, it will hibernate (go inactive) until the right conditions are met or until it is relocated to a better location.

II. ADVANTAGES AND DISADVANTAGES

Fungi are one of the most abundant kinds of life on the planet, and they may be found all around us. There are several species of fungus, some of which are quite valuable to humans. It has several commercial uses and is used to manufacture a variety of items including as pharmaceuticals, the antibiotic penicillin, food such as mushrooms, yeast, bread, and alcoholic drinks.

Fungi have a high economic value. Agaricus mushroom is edible. The importance of yeast (*Saccharomyces cerevisiae*, a sugar-eating fungus) in fermentation cannot be overstated. Penicillium is the source of the antibiotic penicillin. *Claviceps purpurea* yields an important medicine. Lichens are the most effective bioindicators. A large number of fungi degrade materials, which aids in the removal of pollutants.

1. Positive Aspect: Fungi play both positive and negative roles in the environment and nature. Overall we must emphasize on the benefits of its positive aspects like the utility and usefulness of medicines, vegetable like mushrooms, and the yeast for the fermentation process used in bakery.

- **Medicinal Mushroom: Cordyceps:** Himalaya is home to medicinal plants that are not found anywhere else. Because of their scarcity and extraordinary therapeutic effect, they are pricey on the global market. *Cordyceps sinensis*, also known locally as keedajadi or Yartsagengu, is one such abundant biological resource. Keedajadi is a fungus that develops as a parasite on the larvae of a certain type of caterpillar. The fungus grows in live larvae, killing and mummifying them before developing into a stalk-like fruiting figure. Caterpillars spend 5 years underground in Alpine grasslands and shrublands before pupating and being attached by the fungus while eating on roots. It can treat a wide range of diseases, including tiredness, cancer, and impotency. It can cure a variety of ailments such as fatigue, cancer and impotency. It is also known as caterpillar fungus (Khan et al, 2010)



Figure 1: *Cordyceps sinensis*

- **Largest Mushroom: Armillaria:** *Armillaria ostoyae*, often known as the honey mushroom, is larger than whales and elephants and is thought to be the largest and oldest creature on Earth. The mushroom covers 3,726,563 m² of Oregon's Malheur National Forest and is believed to be 8,650 years old (Smith et al, 1992). When Catherine Parks, Scientist at the Pacific Northwest Research Station in La Grande, Oregon, learned about a large tree die-off due to root rot in the forest east of Prairie City, she decided to look into the fungus more. Parks took root samples from 112 trees and used DNA testing to identify the fungus.

By comparing the 112 samples, she discovered that 61 were from the same organism, implying that a single fungus had grown larger than anything previously reported.

The honey mushroom may also be found in Michigan and Germany, but Oregon's mushroom is the biggest ever measured. Scientists studying this kind of fungus believe the enormous size is due to the arid environment in eastern Oregon. Spores have a difficult time forming new organisms, allowing the old-timers to expand; in the absence of competition from other specimens, this massive *Armillaria* has been allowed to develop and spread uncontrolled.



Figure 2: *Armillaria ostoyae*

- **Sugar Eating Fungus: Yeast:** Yeast is a kind of single-celled fungus. One gram, or 1/28 of an ounce, of cake yeast, a tiny creature with a lengthy name, requires 20,000,000,000 (twenty billion) yeast cells. The scientific term for the yeast used in baking is *Saccharomyces cerevisiae*, which translates as "sugar-eating fungus." Such a large name for such a little creature! They play an important part in the fermentation process for wine, beer, bread, yoghurt, and other foods. Anaerobically, compounds such as glucose are broken down into simple chemicals.

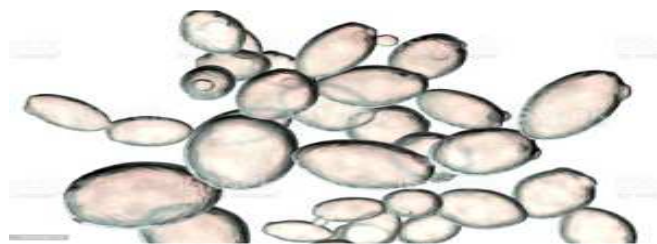


Figure 3: *Saccharomyces cerevisiae*

- **Biointicators: Lichens:** Lichen, also known as a lichenized fungus, is made up of two organisms that work together to form a single, stable unit. Lichens are fungi that have a symbiotic connection with an alga or Cyanobacterium (or both in rare cases). There are around 17,000 lichen species worldwide (Aneja and Mehrotra 2015). Lichens are strange creatures with no two identical. Lichens are a complex living form that is the result of a symbiotic relationship between two different creatures, a fungus and an alga. The fungus is the dominant partner, providing the majority of the lichen's traits, from its thallus form to its fruiting bodies.

Bioindicators are live creatures that respond to environmental changes in a particularly apparent way. Because they get their water and critical nutrients mostly from the atmosphere rather than the soil, resilient lichens are good bioindicators for air pollution, particularly sulfur dioxide pollution. It also helps that they can respond to air contaminants all year. They are less costly to employ in evaluating air pollution than other physical/chemical detectors.

Lichens may also be used to assess harmful elements and radioactive metals because they bind these compounds in their fungal threads, where they accumulate over time. The deposit may then be analyzed by environmental experts to understand the history of the local air.



Figure 4: Lichen

2. **Negative Aspect:** A fungus plays a very significant role to maintain ecological balance on earth (Boddy, L 2016). The purpose of this article is to create awareness among people about fungi so that they can reap on the benefits and avoid the ill effects of fungi.
 - **Mucormycosis: Mucor:** Mucormycosis is a dangerous and invasive fungal infection that can impact the brain and cause internal damage to the ear, nose, throat, and mouth (Swift, M. J. (2005). It is not infectious, but if not diagnosed early, it can be deadly. It is an uncommon but dangerous infection caused by a fungus called mucormycetes. It was originally known as Zygomycosis, and was colloquially referred to as 'Black Fungus'.

Mucormycosis mostly affects persons who have health issues or who use medications that impair the body's capacity to fight infections and sickness. It impairs the body's capacity to combat environmental infections. After breathing fungal spores from the air, it most usually affects the sinuses or the lungs. It can also occur on the skin following a burn, cut, or other sort of skin wound through which the fungus penetrates. It can also have an effect on the brain. People with co-morbidities, variconazole treatment, uncontrolled diabetes, immunosuppression from steroids, or a protracted ICU stay may be prone to fungal infection. Headache, fever, coughing, blood vomit, shortness of breath, and changed mental state are all warning indications.



Figure 5: Mucor

III. CRYPTOCOCCUS

Cryptococcus neoformans is a fungus that may be found all over the world. Individuals can become infected with *C. neoformans* by breathing in the minute fungus, although most individuals who are exposed to it never become ill (Ellis D.H. and Pfeiffer T.J, 1990).

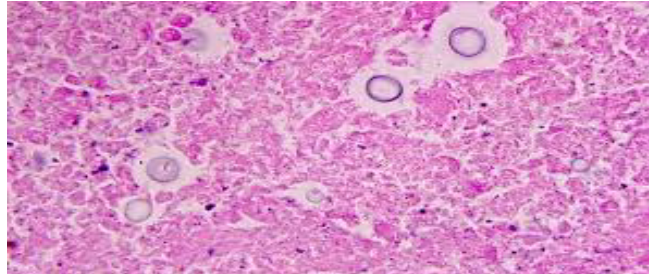


Figure 6: Cryptococcus

- 1. Keratinophilic Fungi: Chrysosporium spp:** Fungi are also essential in the breakdown of keratinous substrates (Deshmukh, S.K, 2003). In soil, keratinous materials from various sources such as hairs, feathers, nails, and hoofs are exposed to microbial degradation. Dermatophytes have been studied for their ability to degrade various forms of keratin. Dermatophytes and related fungi were thought to be the only keratinophilic fungus capable of attacking and perforating hair in vitro. Several writers have researched the variety of keratinophilic fungus in various settings throughout India (Bahuguna S. and Kushwaha R.K ,1989).

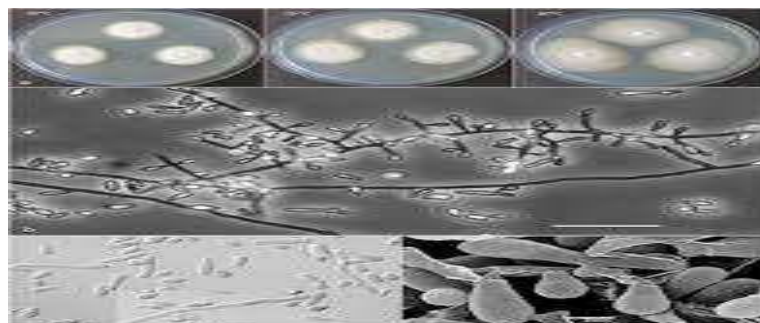


Figure 7: Colonies of keratinophilic fungi

- 2. Fungi as Bioremediating Agents:** Fungi are creatures that are gaining prominence owing to their wide bioremediation capabilities. Fungi are a diverse kingdom of the eukarya domain on the tree of life. Nonetheless, fungal taxonomy is a subject of disagreement and discussion. The most recent taxonomical update describes nineteen major phyla: Aphelidiomycota, Ascomycota, Basidiobolomycota, Basidiomycota, Blastocladiomycota, Calcarisporiellomycota, Caulochytriomycota, Chytridiomycota, Entomophthoromycota, Entorrhizomycota, Glomeromycota, Kickxellomycota, Monoblepharomycota, Mortierellomycota, Mucoromycota, Neocallimastigomycota, Olpidiomycota, Rozellomycota, and Zoopagomycota (Wijayawardene et al., 2020).

Although only one million fungal species are known (Wu et al., 2019), the real number of fungal species is estimated to be between two and four million (Hawksworth and Lücking, 2017). Fungi are chemoheterotrophic organisms that live in both land and aquatic environments. Nonetheless, fungi have received more attention in terrestrial areas, whereas aquatic, especially marine, ecosystems have gotten less attention (Zeghal et al., 2021). Despite the fact that the vast majority of known fungi are aerobic and hence thrive in oxic circumstances, anaerobic fungi have been identified in ocean oxygen minimum zones or animal digestive systems (Stief et al., 2014; Mura et al., 2018; Peng and Valentine, 2021).

Fungi are known as the ultimate degraders of complex organic matter, taking part in decay processes and breaking down wood, including lignin and cellulose, as well as other plant-based materials that are common agricultural waste products (Dinis et al., 2009; Janusz et al., 2017; Goodell et al., 2020).

- 3. Degradation of Pesticides:** Pesticides such as organochlorines, organophosphates, pyrethroids, and carbamates have been linked to negative consequences such as high environmental persistence, bioaccumulation, long-range transmission, and harm to non-target species (Kumari et al., 2014; Kumar et al., 2019). Pesticide exposure, for example, has been linked to several forms of human cancer, teratogenic and genotoxic abnormalities, as well as endocrine and neurological dysfunction (Kim et al., 2017; Shah and Parveen, 2021). Pesticides can be fatal in an instant, but some appear to have long-term health and environmental consequences (Pretty and Hine, 2012).
- 4. Fungal Biodiversity:** Fungi are especially excellent soil dwellers because to their incredible flexibility and capacity to adopt varied forms in response to poor or unfavorable situations (Sun et al., 2005). Because of their ability to produce a wide range of extracellular enzymes, they may break down diverse forms of organic matter, degrading soil components and so managing the balance of carbon and nutrients (ifáková et al., 2016). Dead organic matter is decomposed by fungi producing biomass, CO₂, and organic acids (Figure 1).

Many fungi have the ability to collect harmful metals in their fruiting bodies, such as cadmium, copper, mercury, lead, and zinc, making them a good biosorbent. Regardless of the fact that these elements may limit their development and reproduction (Baldrian, 2003). Fungal diversity and activity are influenced by a variety of biotic (plants and other organisms) and abiotic (soil pH, moisture, salinity, structure, and temperature) elements (López-Bucio et al., 2015; Rouphael et al., 2015). Fungi can live in a wide range of pH and temperature and may be found almost anyplace (Frc et al., 2015).

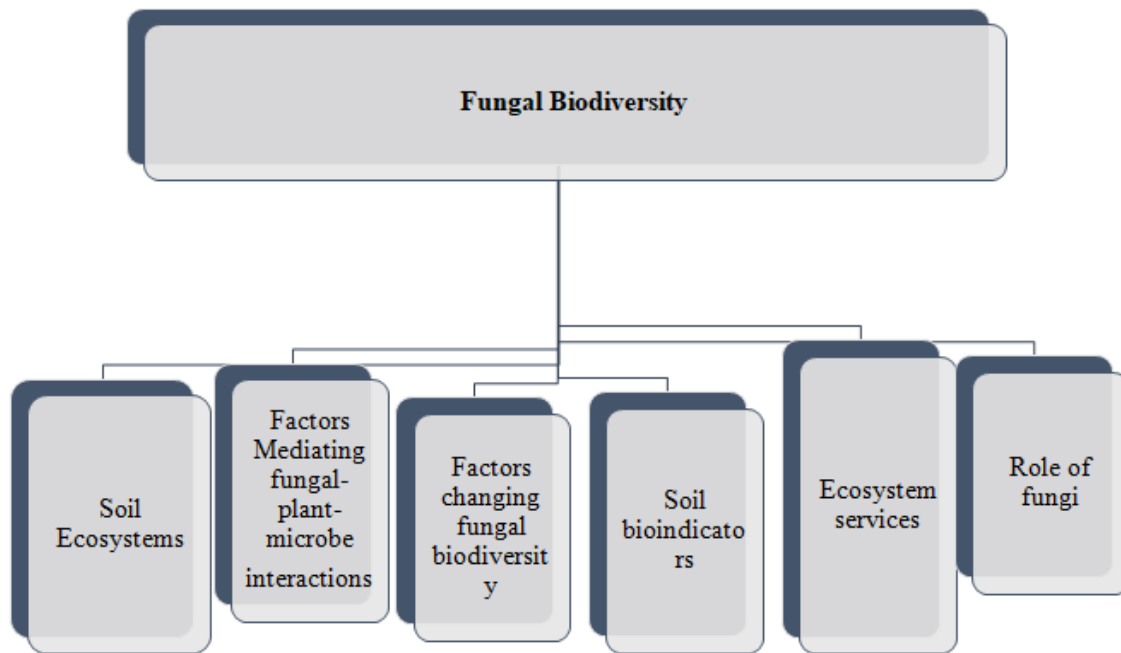


Figure 8: Fungal Biodiversity

5. **Role of Fungi:** Fungi play several functions in both natural ecosystems and human activities (Bagyaraj and Ashwin, 2017). Fungi is important decomposers, breaking down dead organic materials such as fallen leaves, wood and other plant debris. They aid in the recycling of nutrients back into the soil, allowing new plant development.
6. **Symbiotic Relationships:** Many fungi, such as mycorrhizae, create symbiotic relationships with plants. These connections improve plant nutrient absorption and feed sugars from the plants to the fungus. Fungi are edible and excellent food sources. Mushrooms, for example, are commonly consumed worldwide and are high in vitamins, minerals, and protein.
7. **Medicinal Uses:** Certain fungi produce antibiotics, like penicillin, which have been crucial in treating bacterial infections. Fungi also serve as sources for other pharmaceutical compounds. Bioremediation: Some fungi are used in bioremediation to clean up contaminated environments. They can break down or absorb pollutants like oil spills, heavy metals, and pesticides.
8. **Fermentation:** Yeasts are used in fermentation processes to produce alcoholic beverages like beer and wine, as well as leavening bread and other baked goods. Industrial Enzymes: Fungi produce enzymes that are used in various industries, such as the production of textiles, detergents, and biofuels. Research and Genetics: Fungi like yeast serve as model organisms in genetic and cellular research due to their rapid reproduction and relatively simple structure. While many fungi are benign, some are pathogens that cause illnesses in plants, animals, and people. Athlete's foot, ringworm, and numerous plant diseases are examples.

9. Ecosystem Balance: Fungi play an important part in preserving ecosystem balance by managing the populations of other species and altering nutrient cycles.

10. Soil Development: Fungi help in the development of aggregates that promote water retention and aeration by contributing to soil structure and stability. Endophytes are fungi that can live within plants without harming them. These endophytes can assist plants in resisting pests and coping with environmental conditions. Overall, fungi play a variety of and frequently interrelated tasks, demonstrating their importance in preserving ecological equilibrium, supporting human activities, and contributing to scientific developments.

11. Fungi in Ecosystem Services: Fungi have a variety of critical functions in ecosystem services that benefit the health and operation of natural ecosystems (Swift, 2005; Gardi and Jeffery, 2009).

Fungi are important decomposers, breaking down organic waste and returning nutrients such as nitrogen, phosphorous, and carbon back into the soil. This nutrient cycle promotes plant development and the overall productivity of the environment.

Fungi aid in the bonding of soil particles, resulting in stable aggregates that improve soil structure, water infiltration, and drainage. This improves soil fertility and resiliency.

Mycorrhizal fungi develop symbiotic connections with plants, facilitating nutrient intake in return for sugars generated by the plant. This improves plant growth, health, and disease resistance.

12. Carbon Sequestration: Fungi help to store carbon in ecosystems by decomposing organic matter and forming stable organic compounds in soils.

13. Bioremediation: Some fungi have the capacity to decompose contaminants such as oil, heavy metals, and pesticides, assisting in the detoxification and cleanup of polluted areas. Fungi may filter and cleanse water by trapping particles and impurities as the water travels through their mycelial networks.

14. Erosion Control: By producing a protective network that holds soil particles together, fungal mycelium helps stabilize soil and prevent erosion. Fungi contribute to ecological variety by inhabiting numerous niches and interacting with a diverse range of creatures.

15. Food Web Dynamics: Fungi provide food for a wide range of creatures, from insects to huge mammals, allowing for intricate food web interactions.

16. Disease Control: Some fungi have the ability to inhibit disease-causing species, functioning as natural biocontrol agents that aid in the maintenance of ecosystem health. Fungi are frequently the first to colonize damaged regions, facilitating biological succession by breaking down detritus and establishing a suitable habitat for subsequent species to develop. Fungi aid in the creation of ecosystems such as deadwood, which offers refuge and resources for a range of creatures.

These ecosystem services emphasize the crucial role fungi play in maintaining ecosystem balance and functionality, making them necessary components of healthy natural habitats.

17. Fungi as Soil Indicator: Fungi can be used as bioindicators of soil health and ecological conditions. Bioindicators are creatures or groups of organisms that are sensitive to environmental changes, and their existence, absence, or abundance can convey information about the condition of an ecosystem (Bagyaraj and Ashwin, 2017).

18. Biodiversity and Habitat Quality: Each fungus species has different habitat needs. The diversity and composition of fungal communities can provide information about the general quality of the soil environment. A diversified fungus community indicates a healthy and well-functioning ecology.

Fungi are susceptible to soil disturbances such as pollution, land use changes, and soil compaction. Changes in the composition of fungal species or a drop in some sensitive fungus might signal soil deterioration or disturbance.

Fungi are important participants in nutrient cycle processes. The presence of specific fungal groupings can indicate changes in nutrient availability and cycle patterns.

19. Soil Pollution: Some fungus can accumulate heavy metals and other contaminants in the soil. The presence of these fungus might indicate the extent of soil contamination.

20. Soil Health and Fertility: Some fungus creates symbiotic relationships with plants, which improves nutrient intake. The presence of mycorrhizal fungus can give information about soil fertility and plant health.

21. pH and Soil Conditions: Fungi have different preferences for different pH levels and soil conditions. Changes in the structure of the fungal community can signal changes in soil pH or other environmental conditions.

Fungi can be used as markers of soil erosion as well as the efficacy of restoration operations. Fungi colonization in restored or disturbed regions can reveal information about ecosystem recovery.

Monitoring fungal infections and their interactions with plants can aid in assessing disease risks and the overall health of agricultural or natural ecosystems.

Scientists evaluate the variety, abundance, and community structure of fungal populations in soil samples to employ fungi as bioindicators. To identify and quantify distinct fungus species, DNA sequencing and molecular methods are frequently utilized. Researchers and land managers may learn a lot about soil health, ecosystem dynamics, and the effects of various environmental stresses by observing changes in these fungal populations over time.

22. Factors Changing The Fungal Biodiversity: A variety of variables can affect and modify fungal biodiversity in environments. These variables have the potential to influence the composition, quantity, and distribution of fungal species (Wardle, 2002; Wagg et al., 2014; Hannula et al., 2017).

23. Changes in Land Use: The conversion of natural ecosystems to agricultural land, urban areas, or other human-altered landscapes can result in changes in fungal populations. Certain species flourish in disturbed settings, while others are vulnerable to changes in habitat structure.

Natural habitat fragmentation can lead to fungal population isolation, limiting gene flow and potentially leading to genetic diversity loss.

24. Pollution: Pollution from industrial activity, agricultural runoff, and air pollution can all have an impact on fungal biodiversity. Some fungi are susceptible to contaminants, whereas others may withstand or even thrive in polluted conditions.

25. Climate Change: Temperature, precipitation patterns, and humidity changes caused by climate change can all have an impact on fungal populations. Species suited to certain climates may struggle to live in unfamiliar environments.

26. Invasive Species: The introduction of non-native plant species can alter plant-fungi interactions, resulting in alterations in fungal populations. Construction, mining, and deforestation all have the potential to change soil structure and microbial ecosystems, including fungus. As a result, fungal diversity and abundance may alter.

27. Nutrient Imbalance: Excessive fertilization or nutrient runoff can lead to changes in nutrient availability in the soil, affecting the growth and composition of fungal communities. Disease

Outbreaks: Fungal pathogens can impact both plant and animal populations, affecting the dynamics of fungal communities. Natural Succession: As ecosystems undergo natural succession after disturbances, fungal communities may change as new species colonize and replace earlier inhabitants.

28. Host-Plant Relationships: Fungi that have symbiotic relationships with plants, such as mycorrhizal fungi, are influenced by the plant species present. Changes in plant species composition can thus affect fungal communities.

29. Hydrological Changes: Alterations in water availability and drainage patterns can impact soil moisture levels, which in turn can influence fungal diversity.

30. Fungal Plant-Microbe Interaction: Recreational activities, soil compaction, trampling, and other direct human actions have the potential to destabilize soil ecosystems and affect fungal populations.

31. Natural Disturbances: Natural disturbances such as wildfires, floods, and storms may have a significant impact on fungal populations, allowing certain species to thrive while hurting others.

Fungal interactions with other microorganisms, such as bacteria and other fungi, can influence fungal diversity and community structure. It is vital for successful ecosystem conservation and management to understand how these variables interact and impact fungal biodiversity. Fungal population monitoring and study throughout time can provide key insights into ecosystem health and resilience (Jayne and Quigley, 2014; Baum et al., 2015; El-Komy et al., 2015).

Interactions between fungi, plants, and microbes have a substantial impact on ecosystem health and production. These interactions are characterized by a complex interplay of many elements that impact the dynamics of fungus, plants, and other microbes (Treseder and Lennon, 2015). These interactions are mediated by a number of critical components, which include:

- 32. Host Specificity:** Fungi vary in their host specificity, creating symbiotic interactions with different plant species. This characteristic determines the amount to which fungi improve nitrogen absorption and benefit their host plants.
- 33. Mycorrhizal Fungi Forms:** Arbuscular mycorrhizae and ectomycorrhizae are two forms of mycorrhizal fungi that form associations with plants. The degree of nutrition exchange and communication between partners is determined by these categories.
- 34. Nutrient Exchange:** By expanding their mycelial networks and improving nutrient uptake and cycling, fungi improve nutrient exchange between plants and soil. This mutualistic nutrient exchange is critical to understanding ecosystem nutrient dynamics.

Fungi can improve plant health by increasing nutrient uptake, water absorption, and stress tolerance. In contrast, certain fungal infections can harm plant health, resulting in illness and decreased yield.
- 35. Chemical Signaling:** Plants and fungi emit chemical signals that play an important role in modulating interactions. These signals have the potential to recruit helpful fungus or to activate defense responses against infections.
- 36. Competition:** Fungi and other microbes compete in the soil for limited nutrients. This rivalry can have an impact on the creation and survival of some fungal-plant relationships.
- 37. Environmental Conditions:** Soil pH, moisture, temperature, and nutrient availability all have an impact on fungal-plant interactions. Different fungus grows in different environments, influencing the makeup of microbial communities.

Plant genetic features can impact the sort of fungal partners that they connect with. This genetic diversity adds to the variety of fungal-plant interactions. Interactions between fungus and other soil microbes, such as bacteria, might impact the result of fungal-plant interactions. Some microbes may help or hinder these interactions. Environmental disturbances, such as land use changes and pollution, can alter fungal-plant-microbe interactions, impacting both positive and negative elements of these connections.

38. Natural Succession: As ecosystems grow, fungal-plant interactions evolve as new species invade and replace others. This succession has an influence on nutrient cycling as well as ecological stability.

Understanding the delicate balance of these components is critical for ecosystem management and conservation. Researchers can improve agricultural methods, rehabilitate damaged ecosystems, and promote sustainable land management techniques by examining fungal-plant-microbe interactions (Jayne and Quigley, 2014; Baum et al., 2015; El-Komy et al., 2015).

IV. CONCLUSION

Fungi, along with bacteria, are one of the best decomposers of organic material. Without them, dead plants and animals would just hang around and the nutrients from the dead material would not return to the ground. Other plants, animals and micro-organisms that rely on that food would also die and the delicate balance of the ecosystem would be lost.

We can say that the fungi are playing a double role by helping at one hand and harming at other hand. Just like a coin has two aspects, fungi also have two aspects. We have to be careful while dealing with the fungi that play a negative role and take advantage of the fungi that are beneficial to us. Thus a proper balance has to be maintained and a comprehensive picture of the fungi will be justified.

So far we have observed fungi plays negative role such as spreading disease like mucormycosis and Cryptococcus, skin disease like dermatomycosis, spoils food items such as pickles, bread and objects like leather and wood. The awareness of the negative role of fungi can certainly give us methodology and technique to get rid of such type of problems. In order to protect ourselves from pathogenic fungi some methods are carried out although more stringent measures are required.

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