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Importance of Soil Biodiversity and it's Contribution

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DESCRIPTION

Maintaining biological diversity is essential for ecosystem health. Therefore, it is believed that anthropogenic actions that lessen ecological diversity endanger ecosystem performance. Since a significant percentage of the biodiversity found in terrestrial ecosystems is buried under the surface in soils, it is yet unclear how changing soil diversity and composition will affect how well ecosystems function. It is the diversity of life, such as bacteria, fungi, earthworms, and termites that resides in the soil. Up to 6 billion microorganisms and a wide variety of diverse species are generally present in a teaspoon of dirt. It is crucial for both the environment and the agricultural industry to maintain soil biodiversity. The biological diversity of any substance on Earth is by far the greatest in soil. A wide range of species, including the carbon and nitrogen cycles, are found in soil. These organisms interact and contribute to numerous global cycles. For insects and other creatures, including microorganisms like bacteria and fungi, soil serves as an essential home.

According to studies, life below ground has a direct impact on life above ground. This is particularly true for vegetation, as plants interact with a greater variety of below-ground species than they do with above-ground ones. All earth's ecosystems depend on the diversity of organisms that live in soils because soil organisms are crucial for the cycling of ecosystem nutrients, are required for plant growth and nutrition, improve water infiltration and storage, provide resistance to erosion, control pests, parasites, and disease, help capture carbon, are essential to the world's gas exchange cycles, and decompose organic matter. Since it can improve sustainability through enhanced soil structure, soil water movement, nutrient availability, and suppression of pests and diseases, soil biodiversity is acknowledged as having a crucial impact on agriculture. Numerous ecosystem services provided by soil organisms have an impact on the environment, the economy, and human health. Below is a discussion of how soil organisms contribute to three separate fields: agriculture, human health, and climate management.

Agriculture is commonly recognised that crop production and soil quality are related. More fertile soil is also more resistant to climate-related dangers. Because of this, crops produced in good soil yield more and have higher nutritional qualities. Soil biodiversity, in addition to nutrient availability, boosts crop resilience. Bio-control, which improves ecosystem performance and naturally lowers pests including harmful insects, mites, weeds, and plant infections, can employ soil biodiversity to lessen reliance on artificial fertilisers and pesticides.

Human Health-Some people could view soil microorganisms as a danger source of diseases that can affect humans, animals, and crops. However, research has revealed that these animals can support us in maintaining and enhancing our health. The nutritional content of our food can be increased by soil biodiversity, which also enables plants to create important phytonutrients like antioxidants. Our immune system, hormone balance, and general health are all improved by eating plants that are rich in antioxidants and other nutrients. Therefore, healthier diets and healthier individuals are a result

of soil biodiversity.

Climate regulation is significantly influenced by soil organisms, which also help to reduce Green House Gas (GHG) emissions and store carbon. 10% to 12% of all anthropogenic GHG emissions are attributed to agriculture each year, primarily as a result of the use of synthetic fertilisers, inefficient land management techniques, methane release by ruminants, and manure storage. Soil organisms can increase the availability of C and N, hence lowering the need for synthetic fertilisers that release greenhouse gases in agriculture. Additionally, when fertilisers are used, these organisms can change the nutrients in a way that lessens their volatilization, lowering GHG emissions. Soil biodiversity is also crucial for soil carbon sequestration.

The most diverse soils are those that support natural, non-agricultural ecosystems. In agriculture, soils with higher soil biodiversity typically receive fewer manufactured inputs (such as chemical fertilisers and pesticides). As a result of the greater availability of food supplies from roots and litter, which sustain a greater range of species in the soil, grazing systems that promote plant diversity typically have higher soil biodiversity. Unless they increase the amount of carbon and nitrogen added to the soil, which will enhance soil microbial populations, cropping systems often have poor soil biodiversity. The soil stability and biodiversity will both grow as a result of crop management practises that increase soil organic matter.

CONCLUSION

Increased populations of surface-feeding organisms, such as earthworms, are supported by the addition of organic matter to the soil, such as crop residue. Crop rotation and reduced tillage are examples of management practises that increase the amount and quality of organic matter that soil organisms have access to while also creating a more stable environment that promotes soil biodiversity. The effects of agricultural intensification on above- and below-ground biodiversity are detrimental. Traditional, industrial agriculture frequently uses harmful soil management techniques and is excessively reliant on harsh chemical inputs like fertilisers and pesticides. These agrochemicals are detrimental to soil life and soil function. As previously mentioned, soil biodiversity can aid in the fight against climate change; however, as temperatures rise, soil biodiversity may decay, posing a bit of a Catch-22. The increased photosynthesis caused by the excess carbondioxide in the atmosphere raises the need for nutrients. This in turn increases competition for resources among creatures and plant types. The accumulation of salts (or ions) in soil, known as soil salinization, has a detrimental effect on the environment's quality and agricultural production. Salinization can happen either naturally or as a result of human activity, such as excessive fertiliser use and specific irrigation techniques. A smaller and more stressed-out microbial community and nutrient deficiencies are the results of high salt concentrations. Exposure to salt affects an organism's ability to breathe and grow, which results in their demise. Even at salt concentrations thought to be safe for plants, this is nevertheless true. Salinization hence endangers the ecosystem's overall biological diversity.