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# Decomposer plays a vital role in the carbon cycle

## Key Points

1. The stronger the ecosystem in nature, the more diverse the types of its decomposers.
2. Abundant species of fungi will increase the efficiency of the carbon cycle.
3. The protection of microorganisms urgently needs people's efforts.



▲ Fig. 1 Decomposers in the nature.

**E**cosystem refers to the collective name of all the interacting organisms and the environment in a specific environment. As one of the most important roles in the ecosystem, the decomposer undertakes most of the decomposition tasks. While helping to make full use of the energy in the ecosystem, it also acts as a bridge from organic carbon to inorganic carbon. It is the existence of decomposers that the carbon in the biological and inorganic worlds can circulate and flow, and energy can also rely on carbon as a carrier to deduct the vibrant earth in the process of flow.

Any ecosystem has a food chain, and the material and energy flowing into the ecosystem can flow through the food chain. Although there are many types of organisms in the ecosystem and they also play different roles in the ecosystem, they can be classified into three categories: producers, consumers, and decomposers according

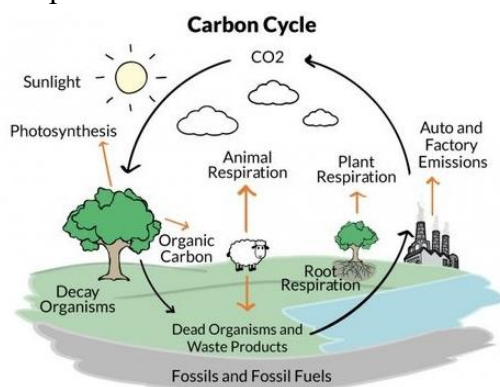
to the effects they cause in energy and matter. The bottom layer is the "producer", which uses sunlight to perform photosynthesis and uses water and carbon dioxide and other inorganic substances to synthesize organic matter green plants; the upper layer is the "consumer" at all levels, which rely on the producer to supply material and energy; After death, the "decomposers" will feed on their corpses. Because the decomposer has the ability to convert macromolecular substances into small molecular substances, decomposer and the existence of producers together construct the carbon cycle structure of the ecosystem.

However, there are a large number of organisms corresponding to the types of decomposers in nature. Will the biological competition between them affect the decomposition rate of the environment? What is the impact of the growth of the decomposer population on producers and

consumers? What are the factors that contribute to the efficiency of the decomposition? With these questions in mind, we will use the modeling analysis results to answer this question.

We chose fungi as an example, and conducted a study on the degradation of plant ground litter by fungi.

Under different climatic conditions, different types of fungi will also show different activities, and their decomposing properties as decomposers are also very different. Through separate grouping experiments, we found that as the main two decomposers of plant corpses, white fungus and brown fungus exhibit different characteristics in terms of degradation rate and environmental adaptability. When two decomposers with significant competitive relationship are placed in the same environment at the same time, the two fungi show stronger vitality and more adequate decomposition rate than a single species. After further modeling and prediction of experimental data, we found that when the biodiversity of fungi is very high, its role in improving the efficiency of the carbon cycle will become more important.



▲ Fig. 2 Carbon circle of the ecosystem.

Therefore, this conclusion can also explain why the stronger the ecosystem in nature, the more diverse the types of its decomposers. The larger the ecosystem, the higher the efficiency of material circulation and energy flow, because

when the total material is limited, only accelerated flow can meet the energy needs of each part of the ecosystem. It is with a sufficient variety of decomposers that can ensure the high efficiency of its material circulation, thereby further stabilizing the overall structure of the biosphere. This is why the larger the ecosystem, the more stable it is.



▲ Fig. 3 Pollution leads to devastating blow of microorganism.

Most of the decomposers in the environment are microorganisms (such as bacteria, fungi, etc.). They are often large in number, but they are very sensitive to environmental changes. At the same time, they are extremely weak in mobility and do not have the ability to migrate when the environment deteriorates. Therefore, when the environment is affected by human activities, it is precisely these vital, ubiquitous, but difficult to detect microorganisms that are destroyed first. At the same time, because the damage to the microbial population is difficult to detect in a short time, the protection of microorganisms has been lacking.

So far, various countries have basically promulgated various animal and plant protection laws, but laws and regulations for the protection of microorganisms have been absent for a long time. This shows that people are still far from enough about the role and understanding of microorganisms in the ecosystem.