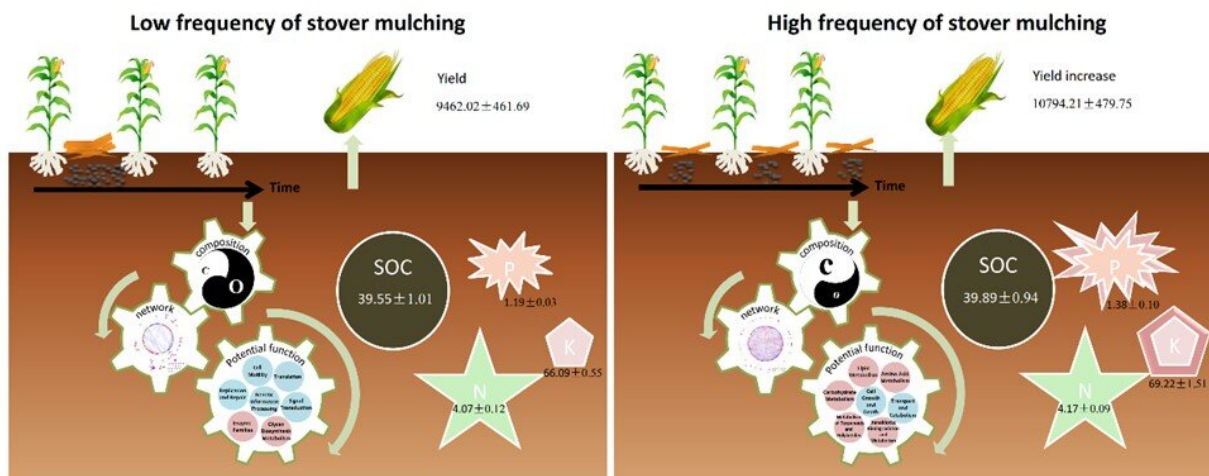


Frequent stover mulching builds healthy soil through bacterial community

January 4 2022, by Zhang Nannan



Graphic abstract. Credit: YANG Yali

Soil health refers to the ability of soils to perform vital living system functions in accordance with their potential and over time, and is the foundation of productive, sustainable agriculture. Conservation tillage, such as no-till and retention of crop residues, has been widely performed in global agricultural ecosystems to maintain soil health at a satisfactory state.

However, crop residues are also used for bioenergy production and livestock feeding. Therefore, it is important to determine which type of

residues management can ensure [soil health](#) and meet our needs for plant production. It is unclear how the quantity and frequency of residue retention influences [soil](#) ecosystem. It is hoped that an optimal combination of straw returning quantity and frequency will help achieve a win-win balance between straw returning and soil health and economic benefits.

A research team led by Liang Chao and Bao Xuelian from the Institute of Applied Ecology of the Chinese Academy of Sciences (CAS) recently conducted a 10-year experiment in China Mollisol to assess how the frequency and quantity of stover mulching affected the bacterial community, soil health, and crop productivity. The experiment consisted of two-level frequencies and two-level quantities of maize stover mulching.

The researchers found that frequency, rather than quantity, of stover mulching had a significant effect on the structure and functions of bacterial communities and maize production in agricultural soils.

High frequency of stover mulching resulted in high [bacterial community](#) α -diversity, which was dominated by copiotrophs, associated with complex intense networks and more metabolic potential functions. Low frequency of stover mulching encouraged oligotroph-dominated bacterial communities, which were related to simple networks and more potential functions that involved cell processes.

Besides, high frequency of stover mulching improved [soil fertility](#) and productivity by providing high nutrient availability and sustaining active bacterial communities.

When the stover [quantity](#) was limited, using small quantities for multiple additions could regenerate more stable and active bacterial communities, thereby improving soil fertility, according to the researchers.

These findings highlight [frequency](#) of retaining residues in agricultural management should be considered, which can improve the efficiency of plant residues utilization. And they provide a theoretical basis for specifying sustainable farmland practice for the next generation.

This study has been published in *Agriculture, Ecosystems and Environment*.

More information: Yali Yang et al, Frequent stover mulching builds healthy soil and sustainable agriculture in Mollisols, *Agriculture, Ecosystems & Environment* (2021). [DOI: 10.1016/j.agee.2021.107815](https://doi.org/10.1016/j.agee.2021.107815)

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