



Heavy Metal Pollution Enhances Soil Respiration and Reduces Carbon Storage in a Chinese Paddy Soil

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China's paddy soils are crucial both for food security through high cereal productivity, and for climate mitigation through high soil carbon storage. These functions are increasingly threatened by widespread heavy metal pollution, resulting from rapid industrial development. Heavy metal-polluted soils generally have a reduced microbial biomass and reduced soil respiration, as well as reduced functional diversity through changes in microbial community structure. Here we show that heavy metal pollution enhances soil respiration and CO₂ efflux from a Chinese rice paddy soil, and leads to a soil organic carbon (SOC) loss, which is correlated with a decline in the fungal-to-bacterial ratio of the reduced soil microbial community. The pollution-induced SOC loss could offset 70% of the yearly SOC increase from China's paddy soils. Thus, heavy metal pollution impacts long term productivity and the potential for C sequestration in China's paddy soils.