



Retaining fine woody debris improves soil quality of urban plantations via a "chemical-biological" dual pathway

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Litter removal, a common urban forest management practice, interrupts soil organic carbon (SOC) input, leading to low SOC content and poor soil quality. This study focused on six urban monoculture plantations (*Picea koraiensis*, *Larix gmelinii*, *Pinus sylvestris* var. *mongolica*, *Fraxinus mandshurica*, *Betula platyphylla*, *Juglans mandshurica*) at Harbin Urban Forestry Demonstration Base in Northeast China. Four fine woody debris (FWD) retention treatments were set based on carbon content: control (CK, 0 gC·m⁻²), low (LC, 250 gC·m⁻²), medium (MC, 500 gC·m⁻²), and high (HC, 1000 gC·m⁻²). From April 2022 to September 2024, soil physicochemical properties, carbon pool characteristics, and soil quality index were continuously monitored. Results showed FWD retention affected soil quality mainly via a "chemical-biological" dual pathway: chemically enhancing soil nutrients and SOC; biologically improving soil properties by increasing microbial biomass and enzyme activity. FWD retention amount significantly influenced soil traits, with MC and HC treatments showing favorable effects across all plantations. Given the inconvenience of measuring FWD carbon content in practice, this study recommends retaining FWD at a dry weight of 1–2 kg·m⁻² to comprehensively improve soil quality in Northeast China's urban forests.

Biography

Ling Yang has completed her PhD at the age of 29 years from Northeast Forestry University of China and postdoctoral studies from School of Life Science. She is the leader of the "Stress-Resistant Germplasm Innovation and Utilization of Forest Trees" Team, Beijing Forestry University. She has published more than 100 papers in reputed journals and has been serving as an editorial board member and guest editor of repute.

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