

Soil aggregates response to tillage and residue management in a double paddy rice soil of the Southern China

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ABSTRACT ORIGINAL

Soil aggregate stability is a key indicator of soil quality and environmental sustainability of agroecosystems. The protection of organic material within aggregates against microbial decomposition is regarded as an important process in soil organic carbon stabilization but detailed knowledge about this process is still lacking. The objective of our study was to examine the multiple year effects of plow tillage with residue removed (PT0), plow tillage with residue incorporation (PT), rotary tillage with residue retention (RT), and no-till with residue retention (NT) on soil water stable aggregates (WSA) under a double rice (*Oryza sativa* L.) cropping system in the Southern China. Results showed that the NT system increased the proportion of >2 mm aggregate fraction, and reduced the proportion of <0.053 mm aggregates at 0–5 cm depth in 2011. Compared with PT0 and PT, significantly higher large macroaggregate (>2 mm) associated-C contributions to TOC were observed in the surface layer (0–10 cm depth) under RT and NT. A significant positive correlation between TOC and macroaggregate (>2 and 2–0.25 mm) associated-C was observed at 0–20 cm soil depth in the paddy rice ecosystem. Therefore, conversion to NT, could enhance the formation of stable macroaggregate, macroaggregates associated-C, and total C contents in paddy soil of Southern China. © 2017, Springer Science+Business Media B.V.