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Cover Crops and Sampling Dates Effect on Soil Carbon Pools under Conservation Tillage Cotton.

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Cover crops may influence soil C sequestration and microbial activities by providing additional residue C to soil. We examined the influence of legume (crimson clover), nonlegume (rye), blend (a mixture of legumes containing balansa clover, hairy vetch, and crimson clover), and rye + blend mixture cover crops on active and slow pools of soil C at 0-15 cm depth from 2001 to 2003 in irrigated and dryland cotton in Georgia. Total aboveground cover crop and cotton C input was 9 to 32% greater in rye + blend than in other cover crops in 2001 but was 24 to 59% greater in rye than in blend and rye + blend in 2002. In dryland cotton, PCM at the 5-15 cm depth was greater in June 2001 and 2002 than in January 2003 but MBC at 0-5 and 5-15 cm had opposite trend. In irrigated cotton, SOC was greater with rye + blend than with crimson clover. The PCM at 0-5 cm was greater with blend and rye + blend than with rye in April 2001 but was greater with crimson clover than with rye and rye + blend in March 2002. The MBC at 0-5 cm was greater with blend than with rye and crimson clover in April 2001 but was greater with rye, blend, and rye + blend than with crimson clover in March 2002. Soil active C pools varied between summer and winter due to differences in temperature, moisture, and substrate availability in dryland cotton. In irrigated cotton, lower C/N ratio of legume cover crops increased C mineralization in the spring but greater residue C from legume and nonlegume cover crop mixture and succeeding cotton increased soil C storage.

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