

EMBRACING THE DIGITAL ENVIRONMENT

2019 ASA-CSSA-SSSA International Annual Meeting | Nov.
10-13 | San Antonio, Texas

240-2 - Soil Carbon Dynamics with Intensification of Agricultural Systems



Tuesday, November 12, 2019



10:05 AM - 10:35 AM



Henry B. Gonzalez Convention Center - 305

Abstract

No-till is the key component of conservation agriculture adopted over 125 million hectares worldwide to address an ever-growing demand for soil and water quality, food security, and climate change adaptation and mitigation. Here we present the results of a global meta-analysis of studies assessing carbon storage and sequestration in no-till soils from the most important agricultural regions of the world. Overall, our results show that no-till soils store more carbon (up to one m depth) than tilled soils. The amount of carbon sequestration depended on the crop frequency and nitrogen inputs in association with decreased soil disturbance. Single cropping systems lack carbon inputs to maintain soil carbon throughout the soil profile. However, double-cropping systems led to a decrease in soil nitrogen that may constrain future carbon sequestration whereas the use of legumes alleviated nitrogen losses and supply extra nutrient to support carbon sequestration. A more detailed analysis of two long-term experiments in temperate and subtropical climates further suggested that increase C inputs are conserved in no-till systems to a depth of 1 m. Briefly, our findings indicate that no-till systems without intensification are a missed opportunity for mitigation, soil restoration, and food security. No-till systems with intensification can effectively mitigate climate change by either avoiding CO₂ emissions from tilled soils or by promoting soil carbon sequestration.

authors

Charles W. Rice

Kansas State University

Rodrigo S. Nicoloso

Empresa Brasileira de Pesquisa Agropecuária (Embrapa) / Brazilian Agricultural Research Corporation

Carlos Augusto Bonini Pires

Kansas State University

Telmo J. C. Amado

Federal University of Santa Maria

Downloads



Audio File

[Download](#)



Recorded Presentation

[Download](#)

View Related

[240 - CrossDiv Symposium--Soil, Water, Plant and Atmosphere Interactions and Soil Carbon Dynamics in Long Term Research Experiments I](#) >

[SSSA Cross-Divisional Symposium](#) >

Similar

Blue Carbon Accounting for Carbon Markets

Brian A. Needelman, 1213 HJ Patterson Hall, University of Maryland, College Park, MD

Into the Deep: Effects of Agricultural Management Strategy on Deep Soil Carbon Dioxide Concentration

Summer Rose Ann Lockhart¹, Chester Kent Keller¹, David R. Huggins², Lynne Carpenter-Boggs³ and Raymond David Evans⁴, (1)School of the Environment, Washington State University, Pullman, WA, (2)USDA-ARS, Pullman, WA, (3)Crop & Soil Sciences, Washington State University, Pullman, WA, (4)School of Biological Sciences, Washington State University, Pullman, WA

Evaluating the Effect of Long-Term Conservation Practices on Soil Quality and Soil Carbon Dynamics on Severely Eroded Soils of Southern Guam

Mohammad H. Golabi, Soil Labs, University of Guam, Mangilao, GU

Developing an Assessment of Soil Carbon Sequestration That Is Consistent across Soil Types and Duration of Conservation Agricultural Practice Implementation

Barbara C Bellows, *Texas Institute for Applied Environmental Research, Tarleton State University, Stephenville, TX*

Soil Carbon Dynamics as a Function of Soil Moisture in a Furrow Irrigated Orange Orchard

Alyssa Michelle Duro¹, *Claudia Christine E. Avila*² and *Samantha C. Ying*²,
(1)*Environmental Sciences, University of California-Riverside, Anza, CA*,
(2)*Environmental Sciences, University of California-Riverside, Riverside, CA*

© 2019 - Copyright Information, Privacy Statement and Terms of Use
American Society of Agronomy | Crop Science Society of America
5585 Guilford Road | Madison, WI 53711-5801 | 608-273-8080 | Fax 608-273-2021
Certification 608-273-8085 | Fax 608-273-2081



#ACSmtg