

Texas Tech University, Plant and Soil Science Spring Seminar 2024

Title: Carbon dynamics in regenerative cotton systems of the semi-arid Texas Plains

Speaker: Nicholas Boogades, Ph.D. student

Location: MCOM 153 (Texas Tech University)

Date/Time: Thursday, April 18th / 12:00 – 1:00 PM

Abstract

Sustainability and climate change mitigation are recent focuses for agricultural producers and researchers as society begins to look at every industry through the lens of a climate conscious magnifying glass. The agricultural sector is unique however, as agricultural production systems and soils that support them can act either as carbon (C) sinks or sources depending on management practices. The Texas Plains, a semi-arid region responsible for a third of annual U.S. cotton production, is challenged with providing an environmentally conscious cotton crop to its domestic fashion industry which requires not only sustainably produced cotton, but in larger amounts than ever before. To meet this goal, the region must develop alternative cotton cropping systems that benefit sustainability by sequestering C. Increased soil C in these systems will reduce negative environmental impacts while increasing resiliency by providing increased water storage, soil stability and slow-release nutrients. Regenerative agricultural practices are thought to benefit C sequestration; however, this has not been evaluated in semi-arid cotton production. Our goal is to evaluate how regenerative practices impact C loss from regenerative systems through carbon dioxide (CO₂) emissions. We compared two regenerative practices: no-till rye cover and wheat-fallow rotation with cotton, to the regional standard practice of conventionally tilled cotton with winter fallow. Our results indicate that rye cover increased CO₂ emissions compared to standard practice while the rotation did not. These decreases in CO₂ emissions, along with cotton yield benefits of the rotation, make it a promising option for future sustainable cotton production in the region.