

EFFECTS OF CONSERVATION MANAGEMENT PRACTICES ON COTTON YIELD AND SOIL QUALITY**C. D. R. White****Texas A&M Agrilife Research
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Semiarid environments of the Texas High Plains decrease soil organic carbon and soil residue building resulting in difficult conditions for soil microbes. Current conservation practices such as conservation tillage, crop rotation, and cover cropping have not been quickly adopted in the area. In order to increase soil health and the soil's physical, chemical, and biological properties, these practices must be implemented. The field is located at the Agricultural Complex for Advanced Research and Extension Systems (Ag-CARES) in Lamesa, TX. The Ag-CARES location has been in no-till for 18 years and the current study evaluates the influence of cover cropping and crop rotation on cotton yield and soil microbial functions. Specifically we evaluated the following systems: 1) continuous cotton-winter fallow; 2) cotton with rye cover; and 3) cotton with mixed cover, including hairy vetch, winter pea, radish, rye. Soil sampled from the field was used in an incubation study to determine microbial activity. Lint yields were lower in the NTR than the CT and NTM in 2016; this could be caused by N immobilization in the rye. The biomass of the rye in the no-till system was higher than the biomass of the mixed species cover in both 2015 and 2016. Microbial CO₂ respiration was greater in the no-till systems compared to the conventional. Carbon mineralization was greater in the no-till mixed cover compared to the no-till rye. This may be due to increased microbial diversity and more rapid decomposition for the mixed compared to the rye. Carbon mineralization generally levels off on day 21 for both no-till systems. Utilizing this information can potentially increase carbon sequestration on the semiarid Texas High Plains through cover cropping and cropping systems. In conclusion, lint yield has not been consistently improved due to conservation management practices when compared with a conventional production system. However, conservation management practices have increased carbon cycling when compared to conventional tillage, potentially improving soil quality.