

# **ASSESSMENT OF MICROALGAE AMENDMENTS ON SOIL NUTRIENT DYNAMICS AND COTTON PRODUCTIVITY UNDER LIMITED IRRIGATION IN TEXAS HIGH PLAINS**

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## **ABSTRACT**

Texas High Plains (THP) is a major cotton producing region of Texas. However, declining soil fertility and increasing risk of crop yield penalties associated with extreme weather patterns and low organic input have raised concern in sustainability of farmlands in this region. Micro-algae amendment is relatively new and emerging farm practice in crop production which is getting attention due to its ability to stimulate soil health and enhance crop productivity. There are no prior records on microalgae influence on soil nutrient availability and cotton productivity, especially in THP. The main objective of this study is to evaluate the impact of native microalgae amendment in soil nutrient availability and cotton productivity under deficit irrigation in THP. A field study was conducted during cotton growing season of 2025 at Texas A&M AgriLife Research Halfway center in a randomized complete block design with two irrigation levels: high and low rate and three algae treatments no algae-control (A1), high rate of algae (A2), and low rate of algae (A3) which were randomized with four replications. Results indicate that microalgae ameliorated water stress in cotton by retaining more water in soil and enhanced growth and physiology under water limitation. We speculate that, with microalgae amendment, soil will be enriched with essential nutrients contributing to soil fertility and overall soil health.