Texas A&M AgriLife Research

WATER AND SOIL WATER RESOURCES MANAGEMENT PROGRAM

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RESEARCH

DEVELOPMENT OF IRRIGATION GUIDELINES FOR MANAGING LIMITED WATER SUPPLIES

Figure 1. Research on crop water management using remote sensors

Our research team is currently involved in the third year of a funded project through a USDA-NRCS Conservation Innovation grant (**Fig. 1**) titled "Irrigation Management Practices for Water Conservation Using Weather Based Information." The main purpose of this project is to develop agronomic and irrigation strategies to plan and manage irrigation of small-acreage producers. The specific objectives of the project are as follows:

1. Establish irrigation management demonstration trials in which the amount of water applied will be measured and the amounts to apply will be estimated using information from automatic weather stations, which will be provided via the Internet to farmers.
2. Demonstrate the use of irrigation scheduling and small reservoirs in conjunction with drip irrigation to adjust the schedule determined via weather stations for small-acreage producers who are using multi-crops.
3. Organize field days and workshops in partnership with irrigation districts, NRCS, and grower organizations.
4. Develop English and Spanish publications oriented to farmers and irrigation operators on how to manage soil and water resources.

DISSEMINATION AND FATE OF FOODBORNE PATHOGENS AND INDICATORS ON PRODUCE POST-IRRIGATION WITH SURFACE WATER: AN INTERVENTION TRIAL

Figure 2. Experiments on water treatment for contaminated water

Figure 3. Comparing the effect of irrigation methods and management on food safety

Our research team is currently involved in a funded project through USDA-NIFA (**Figs. 2 and 3**) titled "Dissemination and Fate of Foodborne Pathogens and Indicators on Produce Post-Irrigation with Surface Water: An Intervention Trial." The long-term goal is to identify key risk factors for produce contamination so that improved control strategies can be developed, evaluated for cost-effectiveness, and implemented through science-based policy, education, and extension.

The first objective of the study consists of conducting intervention trials to test the effectiveness of irrigation water treatments in reducing produce contamination at harvest. Three water treatments (a no-treatment control, UV-radiation treatment, and a novel SA-fertilizer treatment) are being compared in a split-plot intervention trial, conducted over two growing seasons in parallel for spinach and cantaloupes. Our hypothesis is that the UV-radiation and SA-fertilizer treatments of irrigation water reduce the prevalence/level of indicators and pathogens on spinach and cantaloupes at harvest. The second objective of the study is to determine irrigation-induced dissemination and fate of indicators and pathogens on produce at harvest. The third objective is to develop good agricultural practices (GAPs) for management of irrigation.

RESEARCH WITH INDUSTRY GROUPS: SHELL OIL TRIALS

Our research team is currently involved in a funded project with Shell Oil Company to assess sweet sorghum yield, growth, and conversion efficiency. Five sweet sorghum genotypes are being evaluated at the Weslaco Center. Three irrigation regimens will be imposed on the test plots (**Fig. 4**). Factors of interest for this study are timing and rate of irrigation, with an aim of reducing total irrigation cost. In addition to the irrigation study, our research group is conducting sensor technology research on this plot.

Figure 4. Experiments with water-limited supplies for biomass production using unmanned aerial vehicles

EXTENDING CURRENT CAPABILITIES AND EXPERTISE

Our research team seeks to expand our current capabilities and expertise and seek interdisciplinary and multi-institutional collaborations that can encourage the development of innovative and groundbreaking strategies in investigating novel, complex, and convoluted areas. Please feel free to contact us for future partnerships.

SENSOR TECHNOLOGY RESEARCH

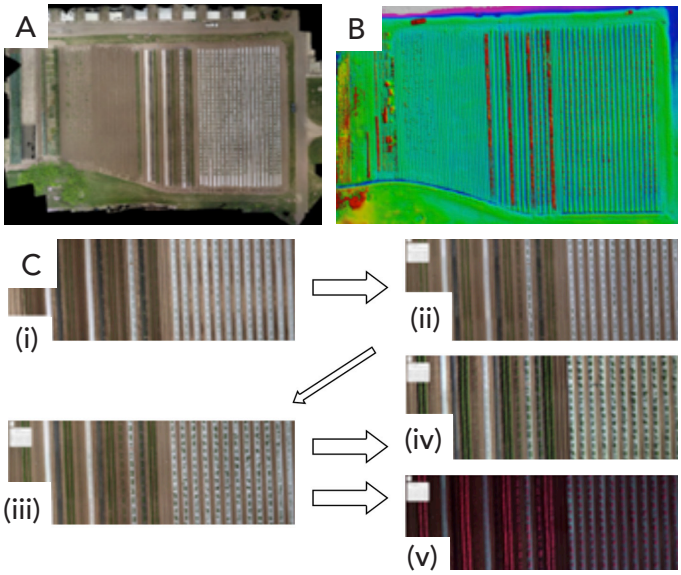

Figure 5. Analysis and interpretation of images obtained with unmanned aerial vehicles

Our research team is currently involved in a funded project titled "Development and Evaluation of Integrated Insect Vector Disease Management Strategies to Improve Vegetable Production in South Texas." The research consists of developing high-throughput phenotyping methods to accelerate introgression of insect-vector and pathogen-resistance traits into solanaceous crops. Two rotocraft platforms have been developed for this study, an eight-motor and a four-motor platform. Seamless orthomosaic images and 3D point cloud data for Digital Surface Model (DSM) were created (**Fig. 5**). Images are collected from the fields to monitor crop development over time with a four-motor rotocraft (**Fig. 6**).

Figure 6. Four-motor rotocraft platform

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