

Estimating Leaf Area and Biomass of Wheat Using UAS Multispectral Remote Sensing

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Abstract : Unmanned aerial vehicle (UAV) technology is being increasingly adopted in high-throughput plant phenotyping for applications in plant breeding and precision agriculture. Winter wheat is an important cover crop for reducing soil erosion and protecting the environment in the Southern High Plains. Efficiently quantifying plant leaf area and biomass provides critical information for producers to practice site-specific management of crop inputs, such as water and fertilizers. The objective of this study was to estimate wheat biomass and leaf area index using UAV images. This study was conducted in an irrigated field in Garza County, Texas. High-resolution images were acquired on three dates (February 18, March 25, and May 15th) using a multispectral sensor onboard a Matrice 600 UAV. On each data of image acquisition, 10 random plant samples were collected and measured for biomass and leaf area. Images were stitched using Pix4D, and ArcGIS was applied to overlay sampling locations and derive data for sampling locations.

Keywords : precision agriculture, UAV plant phenotyping, biomass, leaf area index, winter wheat, southern high plains

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