

THREE-YEAR STUDY ON COTTON PLANT HEIGHT MAPPING**Ruixiu Sui****USDA-ARS Crop Production Systems Research Unit
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Plant height can be an important indicator of plant health status and yield potential. A map of plant height could provide information and be used as a tool to site-specifically adjust farming inputs such as fertilization, irrigation, chemical application, etc. However, devices and methods are needed to effectively collect plant height data and generate the plant height map. Meanwhile, understanding of the relationship between the plant height and the inputs is required. Effect of Nitrogen (N) application rate and irrigation on the plant height was investigated at USDA-ARS Crop Production Systems Research Unit in Stoneville, MS. An experimental field (latitude: 33°26'30.86", longitude: -90°53'26.60") with 48 plots was employed for this research. Cotton was planted for three years in 2011, 2012, and 2013. Cotton plant height was mapped using an ultrasonic plant height mapping device. The device includes an ultrasonic sensor, a GPS receiver, and a data acquisition unit. The system was installed on a high-clearance tractor for field operation. As the tractor travelled across the field, plant canopy was automatically and continuously scanned, and measurement of the plant height was taken in each second along with the spatial coordinates. Plant leaf samples were collected and analyzed for leaf N content. Cotton yield and fiber quality were measured. Results showed that plant height had a positive linear correlation with both cotton yield and leaf N content. Irrigation had a significant effect on plant height. Plant height map compared favorably to visible field conditions. Plant height dataset could be useful for precision agriculture practices.