DEMONSTRATION AND EVALUATION OF COTTON MODULE TRACEABILITY AND ON-MACHINE WEIGHING CAPABILITIES

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Abstract

Cotton growers have the potential to collect an immense amount of harvest data with little to no effort depending on their current harvest machinery and cotton gin. Having access to localized, on-farm generated, information would not only allow growers to make future management decisions based on actual data from their operation, but it would also allow for on-farm trials (variety, nutrient, varying management systems, etc.) to be easily evaluated. The incorporation of Radio Frequency Identification (RFID) tags into the module wrap on modulating cotton pickers provides the first step in being able to easily and accurately track modules from the field through the cotton gin. By having this data traceable through harvest ID files generated by the cotton picker, the ability for farmers to make management decisions based on end-of-year harvest operations and outcomes based on each farm, field, and module location can be possible. With newer John Deere modulating cotton pickers having the ability to weigh modules on the machine, always collecting accurate yield data could become reality. With many new concepts and technologies, confirmation that the John Deere on-board weighing system provides accurate module weights is needed. Since several cotton producers are shifting to harvesting with a modulating John Deere picker, the opportunity to collect on-farm data to make management decisions exists. Demonstrating these capabilities and value of this harvest data to growers is necessary for the increased adoption of these technologies.

An experiment was conducted in 2020 at the Cameron Cotton and Seed Company Cotton Gin in Cameron, SC and at Bickley Farms in Elloree, SC to evaluate and demonstrate module traceability. An Impinj Speedway R420 RFID reader and three antennas were installed at the module feeder at the cotton gin. This allowed round cotton modules to be scanned as they are being fed into the gin, capturing feed order, productivity, and recording any data encoded on the RFID tags. A TSL 1128 Bluetooth UHF RFID handheld reader coupled with RFID Cotton Module Scan Software was also used to manually scan 42 modules in an 80-acre field. Each module was manually scanned at its exact location of where it was ejected from the cotton picker to assign GPS coordinates with each module. Upon getting all fiber quality back from the cotton gin, data will be meshed with module location to formulate a fiber quality map of the 80-acre field, thus demonstrating the traceability of knowing where the cotton came from and its quality. Furthermore, three CP690 cotton pickers with on-machine weighing capabilities were tested against a flat scale that was previously certified by the SC Department of Agriculture for accuracy. At each picker, 5 round modules were weighed on the picker and then re-weighed on a flat scale. Weighing errors were 1.74, 4.22, and 19.94%, for the three pickers, respectively. The picker with 19.94% error did not appear to be holding the module on the handler at the right height when in the field. This was noticed due to modules falling off of the picker if the operator was not careful when turning around. We hypothesize that this issue is causing a higher error in actual module weights from the on-machine scale. Overall, with exposure and adoption of technology from growers and ginners, we predict that module traceability will become widespread across the state and region to promote efficiency and assist cotton growers with decision making in the future.