COTTON GENETIC GAIN AND SUSTAINABILITY

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Abstract

Sustainability of cotton is critical to future profitability and competitiveness in the marketplace against MMF. In the US, cotton has made steady progress in land use efficiency (LUE expressed as acres to produce a lb of lint) yet is under appreciated as a key driver of sustainability for the next 30 years. US cotton has seen a 4X increase in LUE since the 1930's attributed to better pest control, mechanization, fertility management, irrigation technologies and efficiencies and genetic improvement. For the next 30 years, two factors will contribute more and more to LUE: genetic gain and variety turnover or refresh rate. Genetic gain in breeding programs will accelerate with adoption of new technologies, such as genomic selection, HTP, data science, predictive analytics and genome editing. The rate of adoption of new varieties will accelerate dramatically which will impact refresh rate. This is due to more precise product placement, data science, improved seed production & processing technologies, and supply chain management driven by data science. Modeling of these rates of change lead to dramatic improvements in LUE especially when integrated with new production and management technologies. From genetics alone LUE approaches 0.0009 ac required to produce lb of lint by 2050.