TRADEOFFS BETWEEN LINT YIELD AND EARLINESS OF MATURITY IN TENNESSEE C. Owen Gwathmey University of Tennessee Jackson, TN

<u>Abstract</u>

Relationships between lint yield and earliness of maturity have not been adequately described for short-season cotton production regions. The cotton growing season in Tennessee is limited by heat-unit accumulation, averaging 130 days and 2200 degree-days (DD60s) from planting to defoliation, with large year-to-year variation. The main objective of this research was to determine relationships between yield and earliness in a set of crop management experiments conducted over a 16-year period in Tennessee. Treatments in the various multi-year experiments included plant growth regulators (PGRs), row spacing, defoliation timing, seeding rate, nitrogen fertilization, and irrigation. Treatments significantly influenced yield and earliness in all experiments. In a 3-year PGR experiment, yields were significantly correlated with earliness in only one year response of a late-maturing cultivar to mepiquat PGR treatment, as lint yields were reduced by 26 lb/acre for each day of delayed maturity in absence of PGR. In a defoliation timing experiment, lint yield increased in only one of three years by 10 lb/ac/day as defoliation was delayed from 1900 to 2100 DD60s after planting, but there was no significant correlation in the other two years of the study. In a 3-year seeding rate study, lint yields decreased and maturity was delayed at plant population densities below 20,000 plants/acre. Without irrigation, yield was significantly correlated with earliness in only one of three years, with a loss of 25 lb/ac/day of later maturity. Under irrigation, yield was significantly correlated with earliness in two of three years, with losses of 20 to 24 lb/ac/day of later maturity due to low plant density. In a nitrogen response study, yield was significantly correlated with earliness in three of four years. Lint yield responses ranged from +28 to +204 lb/ac/day of later maturity due to additional N. The largest gain occurred in a year averaging 2046 DD60s from planting to open boll, and the smallest gain occurred in a year averaging 2265 DD60s. In a 4-year irrigation response study, yields were significantly increased in 3 years, and maturity was delayed every year by supplemental irrigation. However, yields were significantly correlated with yield in only one year in which irrigation increased yield 65 lb/ac/day of delayed maturity. In summary, lint yields were significantly correlated with earliness in nine of 20 site-years of cotton management factors included in this study. Results suggest that crop management practices can cause yield and earliness to vary together in a short-season environment, but the correlation can be either positive or negative. Yield gains from later maturity require adequate season length, and gains in earliness of maturity do not necessarily entail loss of yield. In a short-season environment, earliness management practices provide direct and indirect economic benefits to be weighed against lint yield response.

Acknowledgments

The underlying research was supported in part by Cotton Incorporated, by the Tennessee Cotton State Support Committee, and by University of Tennessee AgResearch. Special thanks are extended to Arysta LifeSciences.