EVALUATION OF COTTON GERMPLASM DEVELOPED IN THE PAST CENTURY S.N. Casteel, R.C. Nuti, R.P. Viator, R. Wells, and K.L. Edmisten Department of Crop Science North Carolina State University Raleigh, NC

Abstract

USDA NASS has shown a plateau in lint yield of recent years, while micronaire has been steadily increasing to dangerous levels since the early 1990s. Staple has steadily increased since the 1970s to an apparent peak in the early 1990s then subsequent decline to the present. This study was conducted to quantify the characteristics of cotton released in the past century specifically: yield, boll distribution, and fiber quality. Fifty-six varieties were obtained to represent the past century of cotton germplasm, of which 14 were compared for this study. The 2002 and 2003 studies were conducted in Clayton, NC, where plots arranged in a RCBD with four replications. All plots were machine-harvested and fiber quality was obtained via high volume instrument analysis. Varieties were divided into the following release groups: 1900-20s, 1940-60s, 1970-80s, 1990s, 2000-1, and elite. Statistical analysis was conducted using the general linear model in SAS version 8e and means separations were reported using Fisher's Protected LSD at α =0.05. All data combined over years except for yield. In 2002, lint yield of the 1900-20s were the poorest at 415 lb A⁻¹, the 2000-1 group yielded the best at 1218 lb A⁻¹, and the remaining release groupings ranged in the middle from 682 to 878 lb A⁻¹ (P<0.0001). Again in 2003, the 1900-20s group yielded the poorest at 854 lb A^{-1} , whereas the release from 1970s to elite showed no differences ranging from 1239 to 1511 lb A^{-1} (P=0.0013). Percent lint of seedcotton has been increasing strongly since the beginning of the century ($R^2 = 0.94$). In the past century, total bolls plant⁻¹ have risen until today and mean boll weight have been the inverse ($R^2 = 0.81$, $R^2 = 0.58$ respectively). Percent boll distribution has remained consistent with 54-62% set on nodes 6-10 and with 30-37% set on nodes 11-15 since the 1970s until today. Future lines have seemed to shift to 74% and 20% at nodes 6-10 and 11-15 respectively. Regression curve of micronaire increased until 2000-1 followed by an improvement to lower micronaire in the elite ($R^2 = 0.96$). Staple followed a similar regression, but the latter decrease was into shorter lengths ($R^2 = 0.55$). Strength and uniformity leveled off into acceptable ranges in the 1960s and the 1970s respectively. In conclusion, yield has been increasing at a considerably slower pace with concurrent increases in ginout. Fiber quality has seen dramatic improvements in the past century, but staple and micronaire must be improved. Fortunately, elite lines show promise for improved micronaire.