

THE IMPACT OF FIBER MATURITY ON ESTIMATING THE NUMBER OF COTTON (GOSSYPIMUM HIRSUTUM L.) FIBERS PER SEED SURFACE AREA**Addissu Ayele****Eric Hequet****Texas Tech University****Lubbock, TX****Brendan Kelly****Texas A&M AgriLife Research & Extension Center****Lubbock, TX****Abstract**

The number of fibers per seed surface area (fiber density) is a selection criterion used to improve cotton fiber quality and yield simultaneously in cotton breeding programs. However, the parameters utilized to estimate fiber density are calculated from fiber quality attributes that are sensitive to environmental variations, especially fiber maturity. Fiber maturity is one of the most important fiber properties that influences other fiber properties such as individual fiber strength and length. In order to investigate the impact of within-plant fiber maturity on the estimates of fiber density, field experiments were conducted at Lubbock, Texas during the 2012, 2013 and 2014 growing seasons. A set of twelve upland cotton cultivars popular in the Texas High Plains were grown in a randomized complete block design with three field replications. Bolls were box picked at harvest to provide samples from each cultivar representing a range of fiber maturity. Fuzzy seeds obtained after roller ginning were acid-delinted, scanned on a flatbed scanner, and the WinSeedle Pro software was used to estimate the seed surface area (SSA). The number of fibers per seed was estimated using the fiber quality parameters provided by AFIS (Advanced Fiber Information System), the lint weight, and the number of seeds in the sample. The number of fibers per seed surface area was obtained by dividing the number of fibers per seed by the estimated SSA. In this study, cultivars with relatively less stable fiber maturity across the fruiting branches of the cotton plant tend to have more variable number of fibers per seed surface area estimates, suggesting that the calculation of the number of fibers per seed surface area may be biased. It is likely that the source of bias is fiber maturity (immature fibers are weak and tend to break during mechanical processing). Therefore, fiber maturity should be considered when screening lines based on estimated fiber density because low fiber maturity can lead to unreliable estimates of fiber density.