COTTON YIELD COMPONENTS INDICES: 1. SEED-SCORE

Fred Bourland
University of Arkansas – NEREC
Keiser, AR
Don Jones
Ed Barnes
Cotton Incorporated
Cary, NC

Abstract

Improving yield is the primary objective of most if not all cotton breeding programs. Yields may be improved by increasing the volume of selection/testing, improving testing precision, employing advanced statistical tools, and/or by utilizing yield components. The simplest component model for lint yield in cotton is number of seed per area (SPA) times the weight of lint per seed (lint index (LI)/100). Since more plant energy is required to produce seed than fiber, lint yields produced with relative preference of LI over SPA are preferred. A measure of seed index (weight of 100 seed, SI) is required to calculate both SPA and LI, as well as fibers per seed (FPS), seed surface area (SSA) and fiber density (Fden). Moderate seed index has long been considered to be optimum in cotton. Seed-Score (S-Score) is the first of possibly three yield component indices that may be useful for selecting and/or describing cotton lines. S-Score employs SI, LI, and lint percent (L%, optional) data. Both small and large seed size tends to be associated with high seed coat fragmentation and with low seed and seedling vigor. The logic of S-Score is patterned after the logic of Q-score with SI handled like micronaire in Q-score (penalties for both high and low values); and with LI and L% handled like fiber length in Q-score (no penalty for high values). Data for SI, LI and L% were determined from seed sampled from all locations of the Arkansas Cotton Variety Tests from 1999 through 2020 – total of 6,639 observations. The means and standard deviations of these factors were used to set upper and lower bounds when calculating S-Score. An APP for S-Score has been written, and will soon be made available after its use is validated.