Maximizing Fiber Quality in Cotton

- The U.S. cotton industry is known for producing some of the highest quality cotton in the world.
- Variety selection is the most critical component for the production of high quality cotton.
- To maintain the high standard of quality and to avoid discounts, certain management practices can be implemented throughout the growing season to help maximize fiber quality.

Variety Selection and In-Season Management

The most critical component for producing high quality cotton is variety selection. The genetic makeup of a variety can play a large role in fiber quality. When selecting a variety, producers should look at all fiber quality characteristics to help make a decision for their fields.

Every year, Deltapine® introduces new cotton varieties in an effort to enhance not only cotton yield potential, but also fiber quality. Examples of fiber quality improvements of recent Deltapine varieties for the Southeast region are provided in Table 1.

Once a variety is planted, the crop must be maintained throughout the growing season. Crops under less stress will produce higher quality fiber. Fiber quality is built throughout the entire growing season, and certain factors can be controlled by the producer. Production practices that may improve cotton quality include varietal selection, soil fertility, harvest aid application, pest control, and moisture (if irrigated).

<table>
<thead>
<tr>
<th>Variety</th>
<th>% Gin Turnout</th>
<th>Micronaire</th>
<th>Staple (32nd)</th>
<th>Strength (g/tex)</th>
<th>Length Uniformity (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>DP 555 BG/RR</td>
<td>41.2</td>
<td>4.5</td>
<td>35.4</td>
<td>29.0</td>
<td>81.7</td>
</tr>
<tr>
<td>DP 1050 B2RF</td>
<td>40.6</td>
<td>4.5</td>
<td>37.4</td>
<td>29.5</td>
<td>83.0</td>
</tr>
<tr>
<td>DP 1137 B2RF</td>
<td>40.8</td>
<td>4.6</td>
<td>36.6</td>
<td>29.4</td>
<td>83.0</td>
</tr>
<tr>
<td>DP 1252 B2RF</td>
<td>41.4</td>
<td>4.6</td>
<td>36.9</td>
<td>29.6</td>
<td>83.1</td>
</tr>
<tr>
<td>DP 1555 B2RF</td>
<td>41.4</td>
<td>4.3</td>
<td>37.9</td>
<td>32.2</td>
<td>82.8</td>
</tr>
<tr>
<td>DP 1646 B2XF</td>
<td>40.2</td>
<td>4.6</td>
<td>39.0</td>
<td>29.8</td>
<td>83.5</td>
</tr>
</tbody>
</table>

Data extracted from Deltapine Southeast Product Guides: 2009 through 2016.

Development of Fiber Quality Characteristics

Length—To help maximize fiber length, proper management and ideal growing conditions must be available during the elongation phase of fiber development. Fiber elongation takes place in the first 16 to 25 days of boll development.1 During this time, high temperatures, water stress, and potassium deficiency can result in shorter fibers. Fiber length can also be affected by the ginning process. If cotton moisture is low during ginning, fiber length can be compromised due to breakage. The ideal ginning moisture range is 6 to 8%.2 When lint moisture is below 5%, each percentage lower is equivalent to 1/100 of an inch reduction in length.

Strength—Fiber strength is primarily determined by the variety; however, the environment can have a small effect on strength. Certain cultural practices can increase or decrease the lint strength. Severe potassium deficiency can decrease lint strength and extreme weather conditions may cause physical or microbial damage to fiber, resulting in reduced strength.

Micronaire—Fiber with micronaire values that are too high or too low can affect cotton quality by limiting how the fiber can be used within the textile industry. Fibers with low micronaire are typically caused by inadequate carbohydrates. Cotton fibers with low micronaire are immature and can easily form neps during the ginning process.3 High micronaire is a result of excessive carbohydrates during development. Fibers with high micronaire are more coarse, which limits their textile use. While varietal differences contribute to micronaire level, environment is a strong factor in determining micronaire.

In certain situations, management decisions may help producers avoid too low or too high micronaire fiber. Early termination of fiber development during the growing season can result in immature fiber with low micronaire, making it important to select varieties with appropriate maturities and to avoid applying plant growth regulators too early. Similar to strength, a potassium deficiency can cause low micronaire since deficient plants will still set bolls normally, but supply an insufficient amount of carbohydrates, resulting in reduced micronaire. Excessive irrigation, fertilizer, and high plant populations can also contribute to a low micronaire value. High micronaire can occur when extremely warm weather conditions cause severe boll shed. When only a few bolls are retained on the plant, high amounts of carbohydrates are available, which causes high micronaire. Moderate weather conditions may cause too much boll production and retention, limiting the carbohydrates available for each boll, also resulting in lower micronaire.
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Maintaining Fiber Quality During and After Harvest

Once cotton is harvested, it is stored in either round bale modules or the traditional modules made in rectangular module builders placed on the edge of fields until transported to a ginning facility. To maintain fiber quality during storage, cotton must be properly defoliated prior to harvest. Vegetative material or green trash left in the cotton module can result in excess moisture content, high trash count, and stained cotton lint.

The timing of harvest aid applications and harvest can affect cotton quality. Delaying harvest aid applications can increase the potential for poor late-season weather, which may affect cotton quality.

To help protect cotton during storage, rectangular modules should be covered with a high-quality tarp. Tarps should be checked for any tears or pin holes before use. Round modules are wrapped with plastic that covers the circumference of the bale and a few inches on the ends. Any excess moisture in the cotton can cause condensation, so modules should be monitored. When elevated moisture levels occur, temperatures increase within the module compromising lint grade and seed viability. Extreme cases can result in spontaneous combustion. Cotton module or bale temperature should be monitored for the first 5 to 7 days. Ideally, cotton harvested at correct moisture levels should only increase 10° to 15° F in the first 5 to 7 days of module storage, then level off or decrease in temperature. A 15° to 20° F temperature increase during the first 5 to 7 days indicates a high moisture problem and the module should be ginned as soon as possible. After the initial daily temperature check, modules should continue to be checked every 3 to 4 days. If a module reaches a temperature of 120° F at any time during storage, the cotton should be ginned immediately.

A study was conducted in 2009 to determine if the three different cotton module types, traditional large modules, half-sized modules, and round modules cause any problems in ginning or fiber quality. Data was collected at seven gins located in four states in the Cotton Belt region. While cotton degradation was observed when cotton modules were placed too close together than recommended by the manufacturer, the ginning and fiber quality observations between the three module types were too small to conclude that any of the differences were based on the module type and not other factors.

Sources


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For additional agronomic information, please contact your local seed representative. Individual results may vary, and performance may vary from location to location and from year to year. Individual results may vary, and performance may vary from location to location and from year to year. This result may not be an indicator of results you may obtain as local growing, soil and weather conditions may vary. Growers should evaluate data from multiple locations and years whenever possible. Always read and follow grain marketing and all other stewardship practices and pesticide label directions. Deltapine® is a registered trademark of Monsanto Company. All other trademarks are the property of their respective owners. ©2016 Monsanto Company. 02242016CRB 130724013713