

Proper Moisture at Harvest for Cotton Stored in Round Modules



Ed Barnes, *Cotton Incorporated*; Harrison Ashley, *National Cotton Ginners*; Bobby Hardin, *Texas A&M*; Dusty Findley, *Southeastern Cotton Ginners*; John Wanjura, *USDA-ARS*

October 2020

The new cotton harvesters from John Deere (CP690; CS690) can provide a real time estimate of seed cotton moisture content. For traditional cotton modules, seed cotton moisture content above 12% wet basis will result in loss of color grades, and higher moisture contents can risk complete loss of the cotton due to overheating (Curley et al., 1987). Current studies of both picked and stripped cotton stored in round modules indicate this threshold still applies to the new round module harvest systems (van De Sluijs and Long, 2015; Faulkner et al., 2016). There is also evidence that round modules are generally better at preventing moisture from entering seed cotton, and they will also retain moisture if the cotton is harvested too wet (Byler et al, 2009). Furthermore, round modules are much less forgiving of trying to finish a field during a rain as there is limited mixing of the cotton (see example in Figure 1). The objective of this brochure is to remind producers of the importance of harvesting cotton at proper moisture content and what the potential costs are if they do not. Determining when it is safe to harvest if a moisture meter is not available is also discussed.



Figure 1. Ring of wet cotton is evident on the outer area of a module harvested after rainfall began.

When to Harvest

Deciding when to start harvesting is sometimes complex, especially with weather forecasts uncertain beyond a few days. The main things to consider in this decision are the factors that affect lint and seed quality. Most growers will schedule harvest 10-14 days after the first application of defoliants. Daily temperatures, soil moisture, defoliant selection, and boll maturity and plant condition when defoliants are applied may shift harvest a few days earlier or later. Unless extreme conditions occur – such as forecast of a tropical system or delayed harvest late in the season – do not operate pickers when relative humidity is above 70%. Do not pick until all free moisture from dew or rain has dried from the lint. Heavy morning dews extend the time required for seed cotton to become sufficiently dry. Review of weather records during the

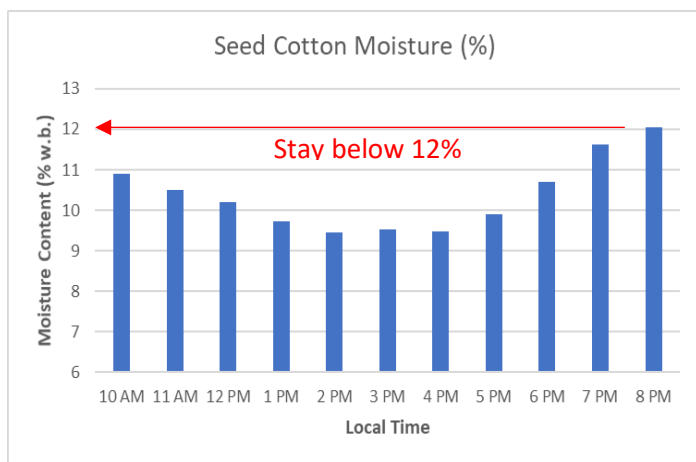


Figure 2. Average seed cotton moisture during harvest season in NC versus local time. At least 30 modules averaged per bar.

harvest times in the mid-south and southeast regions of the Cotton Belt indicates relative humidity more than 70% is likely before 10 am and after 8 pm local time. If you do have a moisture meter, do not continue harvest if seed cotton moisture is more than 12% wet basis.

One simple test of when harvest may begin is to pick several bolls by hand, ball them into a tight fist, and then release the fist. If the seed cotton springs back to or near the original volume, it is time for harvest. Also, the fiber will dry before the seed. Cotton should only be harvested if the seed audibly cracks when bitten.

Costs of Harvesting Wet Cotton

There are several negative impacts of harvesting cotton that is above 12% moisture content. The first is risk of color change during storage – primarily yellowing of the fiber. That yellowing will cause poorer color grades and decrease the loan value of the cotton. Figure 3 is the predicted change in 500-pound bale value as moisture content during storage increases from 9% to 16%. In the figure, a scenario was evaluated where the reflectance (Rd) of the cotton was held at 76 and the relationship between the change in yellowness (+b) with moisture content was predicted from Curley et al. (1987). Color grade was then estimated with a starting +b of 8.5. The other fiber quality data was assumed to be equal to the average values for the U.S. Upland cotton crop in 2019 (leaf grade 3; Mic 4.5; length 1.14 inches; strength 30.6 g/tex; length uniformity 81.2%). The predicted decrease in color grade begins to impact loan value in this scenario once moisture exceeds 13% with a loss of \$5 per bale that reaches \$45 per bale at 16% moisture content (based on the 2020 loan chart).

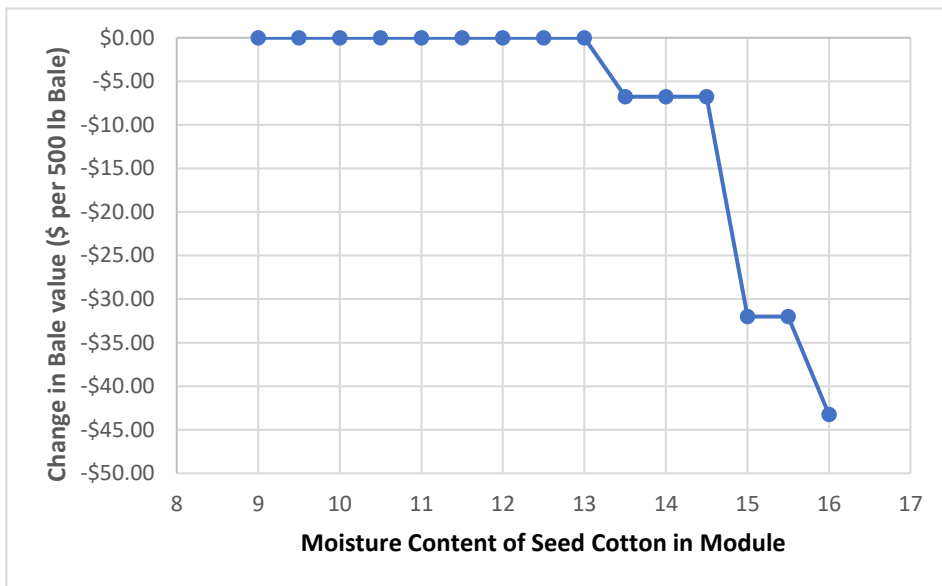


Figure 3. Predicted change in bale value as moisture content increases (see text for scenario).

High moisture content during storage also has a negative impact on seed quality. Increasing moisture content will typically decrease seed germination and increase free fatty acids, decreasing the value of the seed. In addition to

Protect the season-long investment you have made in your cotton and do not harvest when seed moisture content is above 12% or when relative humidity is >70%!

lowering the value of both the fiber and seed, high seed cotton moisture content increases the costs of ginning. More drying fuel is needed, and wet seed can drastically reduce ginning rate. In some cases, wet modules gin more than 50% slower (such as was observed during a study available from this [link](#)). Wet seed is more likely to break, resulting in increased seed coat fragments and additional fiber discounts. In worst case situations, extremely wet cotton may not be ginned at all. That is why it is important to give the seed time to dry after long periods of rainfall, or high humidity and cloudy conditions.

REFERENCES

- Byler, R.K., M.H. Willcutt, M.J. Buschermohle, W.D. Mayfield, and E.M. Barnes. 2009. The Effects of Three Module Types on Cotton Ginning and Fiber Quality. ASABE Paper No. 096826. St. Joseph, Mich.: ASABE.
- Curley, R.G., B. Roberts, T. Kerby, C. Brooks, and J. Knutson. 1987. Effect of seed cotton moisture level and storage time on the quality of lint in stored modules. In Proc. 1987 Beltwide Cotton Conference. pp. 504-505. National Cotton Council. Memphis, TN.
- Faulkner, W., J. Wanjura, J. McGinty, and K.P. Edwards. 2016. Storability of stripped cotton round modules. 2015 project report to Cotton Incorporated for projects 13-445TX and 13-531.
- Van der Sluijs, MHJ, and R.L. Long. 2016. The effect of seed cotton moisture during harvesting on – part 1 – fiber quality. Textile Research Journal 86(18):1925–1934.

- For cotton exposed to excessive rainfall see: <http://www.cotton.org/tech/quality/rainfallandseedcotton.cfm>
- More on harvest & module storage at: <https://www.cottoninc.com/cotton-production/ag-resources/harvest-systems/>