Short Notes

• Microbial Activity of Stored Cotton Bales with Ambient and Moderate Moisture Levels

Some earlier work shows that the addition of water to lint before packing could reduce fiber quality and enhance microbial activity during storage. Mr. David Chun and his colleagues, David McAlister and Dean Cobb of USDA-ARS, Cotton Quality Research Station, Clemson, SC, USA, while working with moderately moistened cotton did not observe any significant damage to cotton quality or increased microbial activities. The addition of moisture to lint before packing has two benefits for the ginner and farmer. The addition of moisture requires less force to pack bales, and farmers get higher weight. But, excessive water could lower quality. While excess moisture in cotton could spoil cotton during ginning, ginning generally results in excessively dry cotton and some moisture is needed to make up the lost moisture during drying. Mr. Chun and his colleagues added only a moderate quantity of moisture and checked for its effect on fiber quality. Bales of cotton of the same variety and from the same field were ginned under normal conditions following a sequence of module feeder, feed controller, two split-fed tower dryers, two incline cleaners, dryer behind gin stand, incline cleaner, impact cleaner, distributor, gin stand feeder, gin stand, two lint cleaners, battery condenser, Cotton Moist System and bale press. The gin drying temperature was set at 176˚C. Regular water was sprayed before baling at the lint slide using computer control. The five nozzles could be activated or deactivated individually based on the cotton feed rate of each gin feeder and the moisture level in the lint. Moisture was monitored with infrared and radio frequency technology. Four moisture treatments were evaluated in the experiment: a control with no moisture added, and 6%, 8% and 10% moisture levels. The moisture content of the control cotton was 5%. The bales were wrapped in a single layer of polypropylene sheet and bound by six plastic straps. Bales were stored for approximately one year; six months under warehouse conditions and six months under processing conditions (23.9±1.1˚C and 55±2% RH) before they were opened for sampling. Bales measured 53.3 x 139.7 x 78.7 cm and had a universal density of 448.5 kg/m^3. A 20-gram sample was used to measure dust, and a one-gram sample was analyzed for microbial populations of total bacteria, Gram-negative bacteria and total fungi. Initial, target and actual moisture content was recorded as follows:

Treatment Target Moisture (%)	Actual Moisture After Treatment (%)	Moisture at Bale Opening (%)
Control	5.0	5.7
6.0	5.4	6.0
8.0	8.0	6.8
10.0	9.5	7.2

As seen from the table above, the control and 6% treatment bales gained 0.7% and 0.6% moisture respectively in one year. The two treatments with comparatively high moisture levels i.e. 8% and 10% at the time of packing bales lost moisture by 1.2% and 2.3% respectively in one year. The data show that the weight of a bale may decrease or increase during storage depending upon the moisture level of cotton in the bale and storage conditions. In one year, the 10% moisture cotton lowered its reflectance and increased yellowness resulting in a change in color from white to light spotted and lower grade. The other two treatments and the control did not show such effects. Micronaire, short fiber index and strength did not improve in the treated bales. The added moisture did not enhance microbial activity, which was supported by the failure to observe significant fiber quality deterioration, or increased dust potential. The study, based on the color change in the 10% moisture treatment, suggests that moisture contents must not exceed 8% at the time of packing. Increasing the moisture level may bring the additional benefit of weight to farmers in some countries and ginners in others but there is a narrow limit particularly beyond 8% moisture, otherwise microbial activity and color deterioration could affect prices negatively.

For more details consult the full article ‘Microbial activity of stored cotton bales with ambient and moderate moisture levels’ by David T.W. Chun, David D. McAlister and Dean R. Cobb published in the Journal of Cotton Science, Volume 9, Issue 1, 2005 available at <http://www.cotton.org/journal/2005-09/1/upload/jcs09-024.pdf>.

• More Bt Hybrids Approved in India

The Government of India allowed commercial production of Bt cotton hybrids in March 2002. Commercial cotton hybrids are planted on almost half of the cotton area in India, and initially only three Bt hybrids were approved for commercial production. Those three hybrids were developed by a single company, Maharashtra Hybrid Seed Company (Mahyco), under license from Monsanto, the owner of Bt technology. The performance of Bt gene was successful under Indian conditions and lately three more seed companies have been permitted to commercialize their Bt hybrids. Now, the number of Bt hybrids approved

for commercial production stands at 21, seven from Mahyco, eight from Rasi Seeds, three from Ankur Seeds and three from Nuziveedu Seeds. Monsanto has sub-licensed agreements to more than 20 seed companies in India for producing Bt hybrids patented as Bollgard for Bt gene. More companies are working on other technologies. Ajeet Seeds has received approval for large scale testing of a Bt hybrid ACH-155-1 in the South. So far all hybrids have a single Bt gene. The Genetic Engineering Approval Committee, which is the final authority for approval field trials and commercial production, has allowed Mahyco to test three Bollgard II gene hybrids in the Central and South zones. However, the trial area will not exceed 0.41 hectare (one acre). Lately, the Genetic Engineering Approval Committee has started tightening conditions for large-scale trials and seed production. The two changes that have already been approved and notified are

1. First-year seed production is limited to only 0.41 hectare, compared to an earlier limit of 100 hectares. In the second year, the Committee may allow an increase to eight hectares.

2. Large-scale trials will be conducted for two years instead of one year as in the past, before any hybrid is approved for commercial production.

Effect of Moisture Content on Fiber Quality and Dust in Baled Cotton

September 2001 (At the Time of Packing Bales)				A Year Later (September 2002)						
Treatment (% Moisture)	Color Grade	Reflectance (%)	Yellowness (+)	Color Grade	Reflectance (%)	Yellowness (+)	Micronaire	Strength (cN/tex)	Short Fiber Index	Average Dust (mg/20 g lint)
Control	31	76	9.1	31	76.0	9.0	5.28	27.66	10.15	2.82
6.0	31	76	9.0	31	76.0	9.3	5.30	27.42	10.20	2.73
8.0	31	76	9.0	31	75.8	9.2	5.30	27.66	10.33	2.75
10.0	31	77	9.2	32	74.8	9.6	5.33	27.66	10.48	2.70