

COTTON INCORPORATED

STICKY COTTON MEASUREMENTS

PRESENTED TO THE ENGINEERED FIBER SELECTION SYSTEMS

CONFERENCE

GREENVILLE, SC

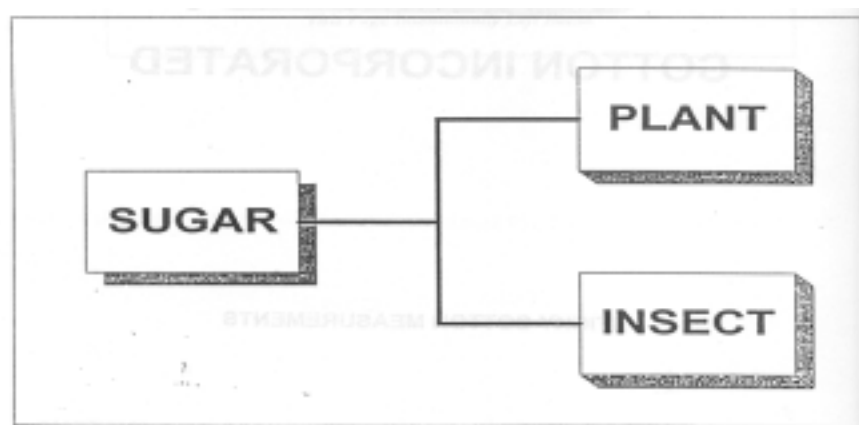
MICHAEL D. WATSON

FIBER QUALITY RESEARCH

STICKY COTTON MEASUREMENTS

Causes of Sticky Cotton

While cotton sugar content and fiber stickiness have often been regarded as synonymous, our research indicates that these two fiber properties should be viewed as independent. There are several sugars, from different sources, that can be found on cotton fiber. These sugars can be grouped into the two categories shown in the diagram below:



The properties of each sugar grouping are summarized below:

Plant sugar

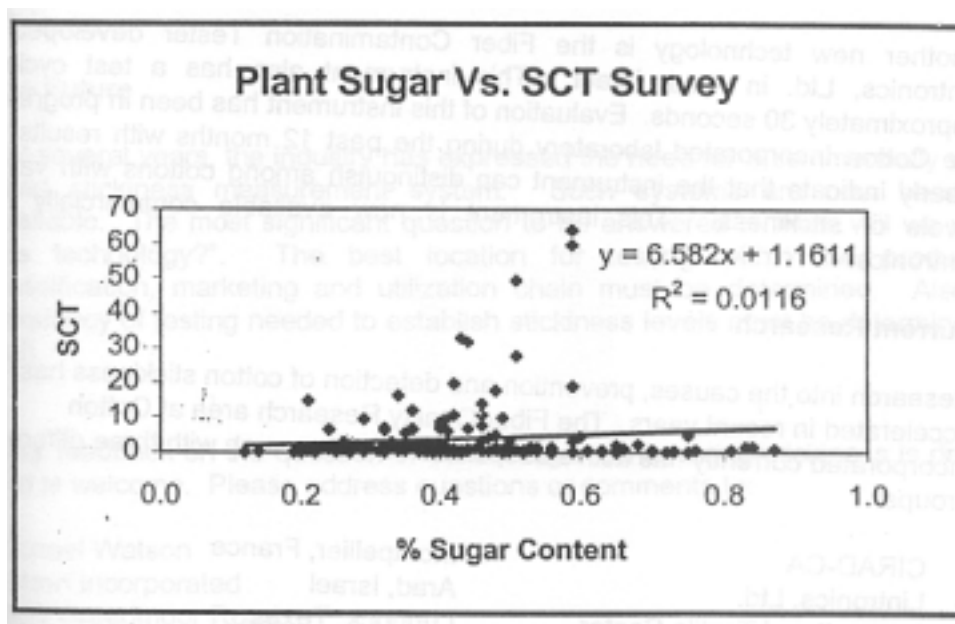
- Present in all cotton fiber with a minimum of approximately 0.20%
- Glucose is transported to developing fibers until boll opening
- Tends to be higher in less mature, lower micronaire fiber
- Mainly glucose
- Uniform distribution on fiber
- Building block for cellulose and source of energy for plant metabolism
- Typically causes a "chronic" problem in spinning due to buildup on equipment

Insect Sugar

- Deposited on fiber by aphids or whiteflies
- Distribution is very non-uniform
- The principle aphid sugar is melezitose
- The principle whitefly sugar is trehalulose
- These sugars can best be detected by HPLC
- Normally tested for by physical stickiness methods
- Tend to cause immediate spinning problems such as torn webs and lapping

Correlation of Sugar Contest and Stickiness

The figure below illustrates the poor correlation between cotton sugar contest measured by titration (mainly plant sugar) and stickiness measured by the Sticky Cotton Thermodetector (mainly point stickiness caused by insects).



The poor correlation between plant sugar content and point stickiness requires that actual stickiness measurements be used if point stickiness caused by insect sugars is present.

Detection of Sticky Cotton

The accepted current technology for evaluation of cotton stickiness is the Sticky Cotton Thermodetector (SCT) developed by CIARD. This device utilizes heat and pressure to generate sticking points on an aluminum foil in contact with a cotton sample. Testing generally takes about four minutes per sample.

Newer technologies for stickiness testing are now being developed. The High Speed Stickiness Detector (H2SD) by CIARD is currently in the prototype stage. This instrument can test a sample in approximately 30 seconds in full automatic mode. Evaluation of this instrument has been in progress in the Cotton Incorporated laboratory during the past 18 months. Significant progress has been made on the operation of the

- ITMF Honeydew Working group
- Cotton Aphid Working Group
- Cotton Aphid Working Group
- European Common fund Project

The most important stickiness prevention development that has occurred recently is the approval of two insect Growth Regulators (IGR's) for usage in Arizona under a Section 18 provision by the Environmental Protection Agency. These products have been extremely effective in controlling whitefly populations during the first season of usage (1996). The main question to be answered is that of the longevity of the efficacy of IGR's. A strategy for limiting usage to one treatment per year per product is aimed at holding the build-up of insect resistance to a minimum.

The Future

For several years, the industry has expressed the need for a commercially viable rapid stickiness measurement system. Such systems are now becoming available. The most significant question to be answered is "How will we utilize this technology?" The best location for testing within the production classification, marketing and utilization chain must be determined. Also the frequency of testing needed to establish stickiness levels must be determined as well.

Your feedback on the question of cotton sugar content and stickiness is needed and is welcome. Please address questions or comments to:

Michael Watson

Cotton Incorporated

4505 Creedmoor Road

Raleigh, NC 27612 USA

Phone: 919-510-6115

Fax: 919-881-9874

E-mail: Cottonfq@ix.netcom.com