# COTTONSCOPE MATURITY and FINENESS UPDATE:

## *CSITC, COTTON STANDARDS, NEW TECHNIQUES*

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## ***COTTONSCOPE PROGRAM, ACKNOWLEDGEMENTS***

***SRRC:*** **Jeannine Moraitis**

***COTTONSCOPE LLC***

***COTTON INCORPORATED***

# COTTONSCOPE UPDATE

•CSITC/ICA EVALUATIONS

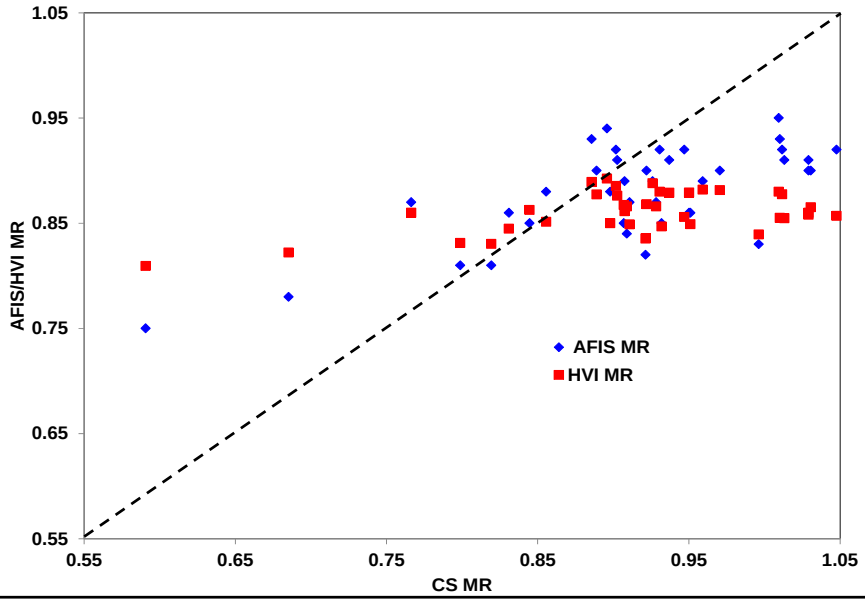
# CSITC-ICA EVALUATIONS

- Previous evaluations had shown AFIS MR and fineness to not be as responsive to MR changes as the Cottonscope.
- 39 samples (15-CSITC, 6-ICA)
- INSTRUMENTS/MEASUREMENTS
  - HVI micronaire and MR
  - AFIS MR and fineness
  - COTTONSCOPE MR and fineness

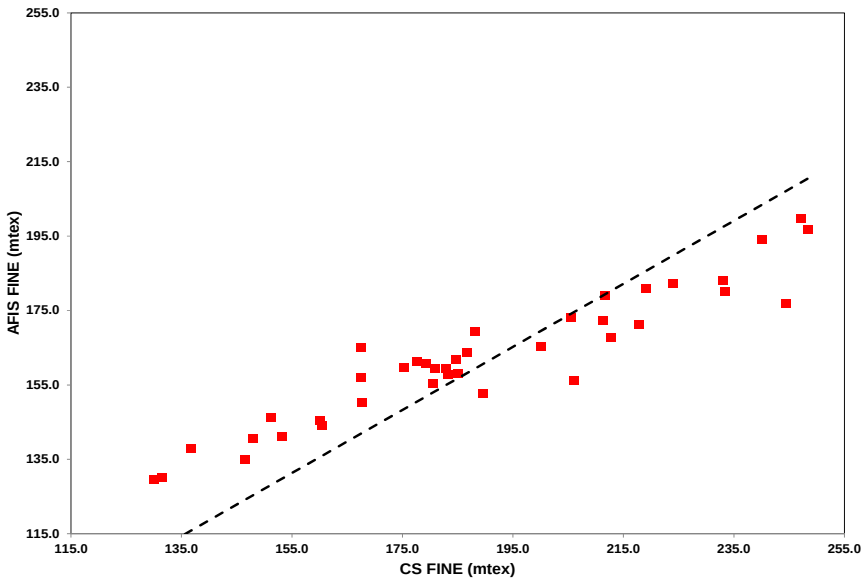
# CSITC-ICA, MR COMPARISONS

| PARAMETER | MATURITY RATIO, MR | | |
|---|---|---|---|
| | HVI™ | COTTONSCOPE | AFIS |
| AVERAGE | 0.86 | 0.91 | 0.88 |
| SD | 0.02 | 0.09 | 0.04 |
| %CV | 2.3 | 9.9 | 4.5 |
| SLOPE | 0.10 | NA | 0.33 |

# CSITC-ICA, MR COMPARISONS



# CSITC-ICA, FINENESS COMPARISONS




# CSITC-ICA, MICRONAIRE "COMPARISONS"

| PARAMETER | CALCULATED MICRONAIRE | | |
|---|---|---|---|
| | HVI™ | COTTONSCOPE | AFIS |
| AVERAGE | 4.26 | 4.30 | 4.30 |
| SD | 0.77 | 0.79 | 0.44 |
| $R^2$ | NA | 0.91 | 0.89 |
| SDD | NA | 0.24 | 0.41 |
| SLOPE | NA | 0.91 | 0.54 |
| % > ±0.30 | NA | 15.4% | 30.8% |

## NEW COTTON STANDARDS

•CSITC/ICA EVALUATIONS

•COTTON STANDARDS
- •9 cottons (AMS)
  - MR Range: 0.59-0.99
  - Fineness Range (mtex): 130.1-246.7
  - Ribbon Width Range: 14.34-16.50
- •Multi-site comparisons underway

## NEW TECHNIQUES/IMPACTS

•CSITC/ICA EVALUATIONS

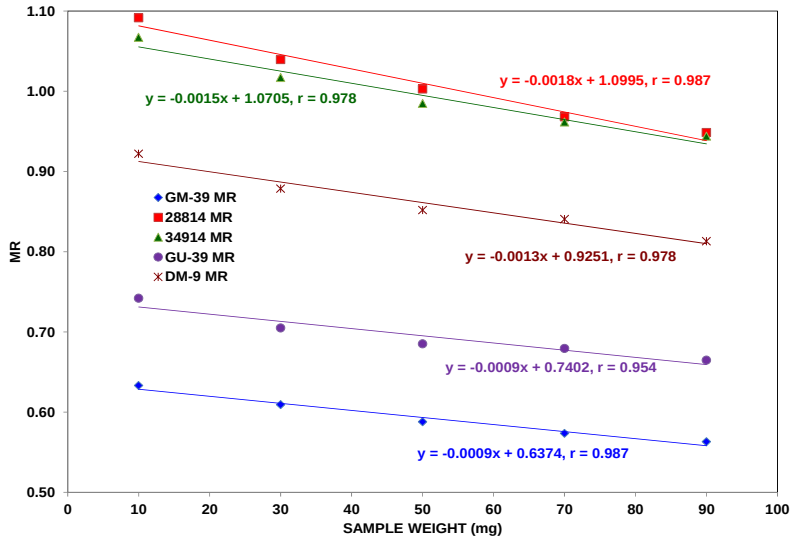
•COTTON STANDARDS

•NEW TECHNIQUES/IMPACTS
- •FIBER WEIGHT (10 to 90 mg; Joint with CSIRO)
- •ENVIRONMENTAL CONDITIONS (Joint with CSIRO)
  (Weight Precision, Temperature/RH, Dry vs. Wet Conditioning)

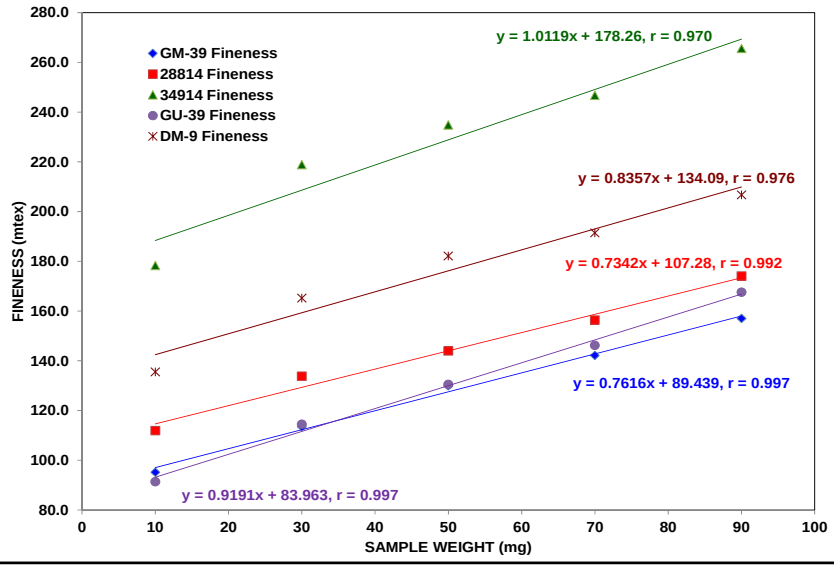
# INSTRUMENTAL and OPERATIONAL IMPACTS (with CSIRO)

- **ENVIRONMENTAL IMPACTS (Temperature/RH)**
  - Temperature/RH and Dry vs. Wet Conditioning
  - Fineness only, primarily due to temperature/RH
  - Removed by re-calibration at conditions samples measured
- **WEIGHING PRECISION IMPACTS (3 vs. 4-Decimal)**
  - 4-decimal place weighings reduce fineness variability
- **SAMPLE WEIGHT IMPACTS (10 – 90 mg; 50 mg Standard)**
  - Impact MR, Fineness, and Ribbon Width
  - Primarily Fineness
  - Removed by re-calibration for specific sample weights
- **FIBER COUNT IMPACTS (5,000-20,000 Fibers; 20,000 Std)**
  - Can decrease down to 10,000 fibers with minor impact

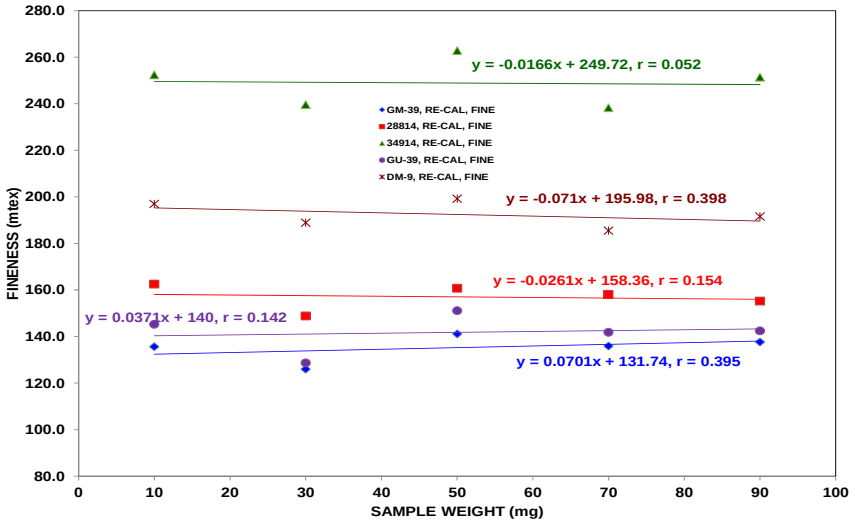
# DIFFERENT FIBER WEIGHTS, MR IMPACT



# DIFFERENT FIBER WEIGHTS, FINENESS IMPACT




# DIFFERENT FIBER WEIGHTS, FINENESS IMPACT/RE-CALIBRATE



# MR DISTRIBUTION COMPARISONS

- CSITC/ICA EVALUATIONS
- COTTON STANDARDS
- NEW TECHNIQUES/IMPACTS
  - FIBER WEIGHT (10 to 90 mg; Joint with CSIRO)
  - ENVIRONMENTAL CONDITIONS
    (Weight Precision, Temperature/RH, Dry vs. Wet Conditioning)
  - MATURITY DISTRIBUTIONS

# MR DISTRIBUTION COMPARISONS

## OBJECTIVES

- Compare the average MR and Fineness results from the Cottonscope and AFIS instruments using samples from a constant base (e.g., blend samples)
- Compare the MR distributions from the Cottonscope and AFIS instruments using samples from a constant base (e.g., blend samples)

## INSTRUMENTS

- Cottonscope
- AFIS

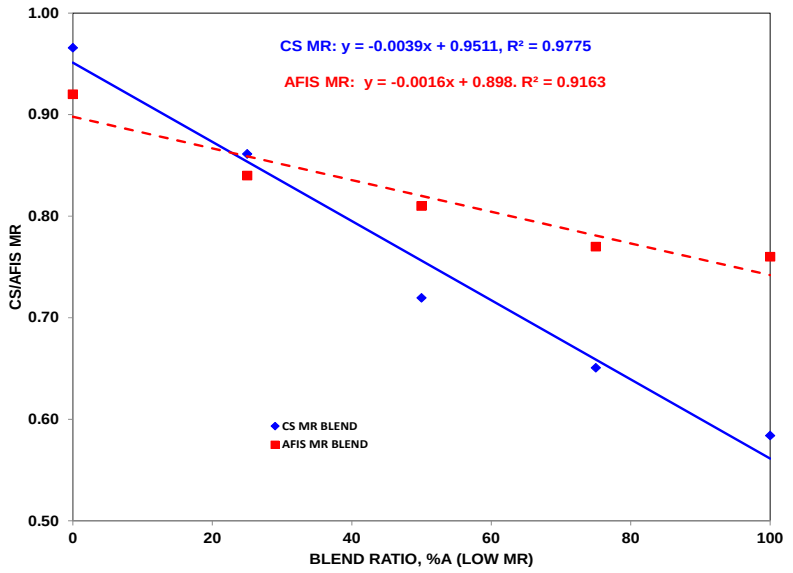
## SAMPLES

- 100% A (Low MR)
- 0% A or 100% B (High MR)
- 75% A/25% B
- 50% A/50% B
- 25% A/75% B

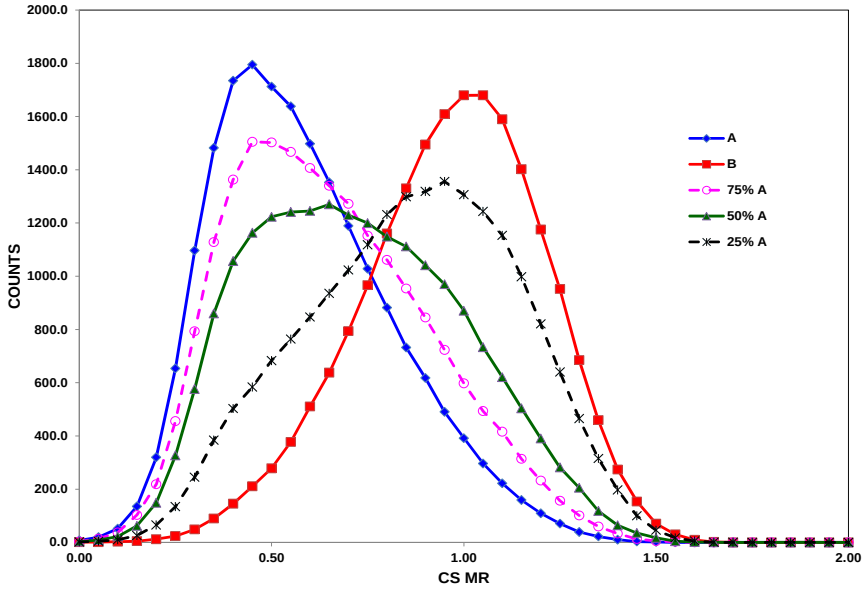
# AVERAGE MR AND FINENESS, PURE/BLEND SAMPLES

| SAMPLE | % COMPONENTS | | MR | | FINENESS (mtex) | |
|---|---|---|---|---|---|---|
| | A | B | CS | AFIS | CS | AFIS |
| 1 | 100 | 0 | 0.58 | 0.76 | 138.2 | 129.3 |
| 2 | 75 | 25 | 0.65 | 0.77 | 149.7 | 132.7 |
| 3 | 50 | 50 | 0.72 | 0.81 | 177.4 | 144.0 |
| 4 | 25 | 75 | 0.86 | 0.84 | 213.3 | 155.3 |
| 5 | 0 | 100 | 0.97 | 0.92 | 256.5 | 180.7 |
| $R^2$ (linear) | | | 0.98 | 0.92 | 0.96 | 0.91 |
| $R^2$ (quad) | | | 0.99 | 0.99 | 0.99 | 0.99 |
| RANGE | | | 0.39 | 0.16 | 118.3 | 51.4 |

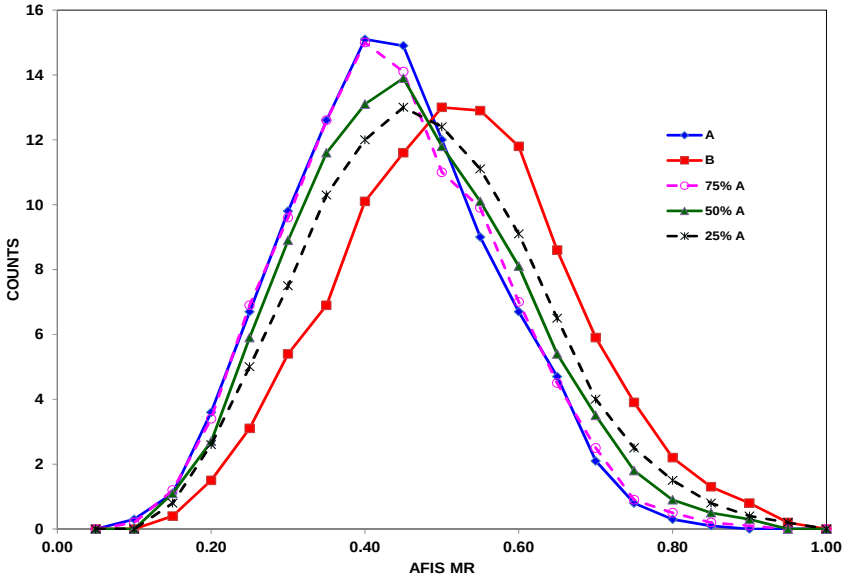
# AVERAGE MR, PURE/BLEND SAMPLES



## COTTONSCOPE MR DISTRIBUTION, PURE/BLEND SAMPLES




## AFIS MR DISTRIBUTION, PURE/BLEND SAMPLES



# SUMMARY

•COTTONSCOPE--Rapid, precise, and accurate measurement
- ➢Measurements—2 runs/rep, 3 reps per sample (n=6); ~6-8 minutes/sample

•Good trend agreement between HVI, AFIS, and Cottonscope MR and Fineness
- ➢Cottonscope much more responsive to MR and Fineness changes

•Best calculated micronaire agreement to HVI micronaire with the Cottonscope
- ➢AFIS less responsive (lower slope) to changes in micronaire
- ➢*AFIS adjustments to match Image Analysis for MR by Uster*

•New Cottonscope cotton standards (9) developed and nearing completion

•Instrumental and operational impacts determined (with CSIRO).
- ➢Sample weight, weight precision, temperature/RH, dry vs. wet conditioning.
- ➢Fineness most impacted
- ➢Impacts removed with re-calibration at specified condition(s).

•Techniques with different Fiber Weights developed.
- •10 – 90 mg
- •Large changes in fiber weight impacts MR, fineness, ribbon width (primarily fineness)
- •Impacts removed with re-calibration at specified fiber weight.

# SUMMARY (2)

•For blended samples, good AFIS-Cottonscope trend agreement for MR-fineness
- ➢ AFIS less responsive to changes in MR and fineness (~50% slope for MR)

•Cottonscope MR distributions for blend samples were more representative of expected peak height and width changes with blend ratio changes.
- ➢ Re-run when AFIS-Image analysis MR adjustments in place