



**Is it possible to check
micro-ginning performance
for a better fiber quality preservation
using reference seed-cotton materials?**



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Outline

- **Introduction and objective**
- **Material and methods**
- **Results and discussion**
- **Conclusion and perspectives**



Introduction and objective

Simple micro-gin = reference device for characterizing the performance of industrial gin plants for fiber quality preservation

- Simple micro-gin = assumed constant performance over time
- While ageing + deterioration + setting changes may exist

=> Need for a “reference” / “ground” to assess/monitor micro-gin performance: creation of Seed-Cotton Reference materials (SCRef) with known characteristics?

- Deviations to preset results would alert on altered ginning conditions of the micro-gin
- Later, deviations between industrial vs micro-gins would alert on any malfunction or drift in practices, settings, or degradations in industrial gins

Introduction and objective

The purpose of this research is to answer these questions

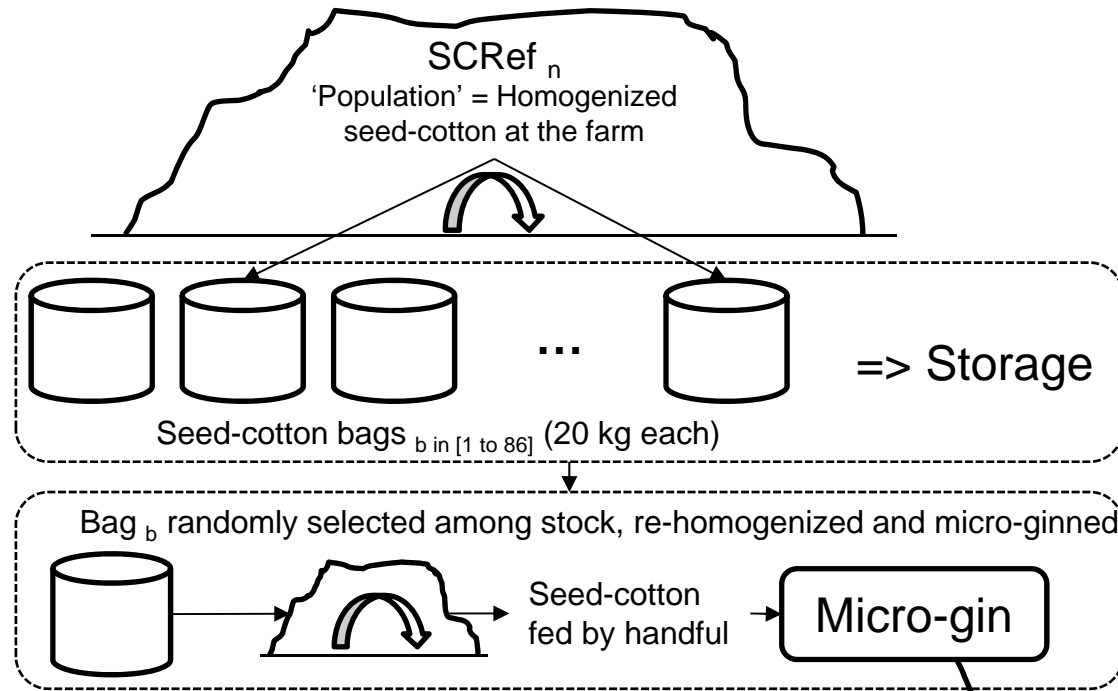
- Is that possible to set target reference characteristics on homogenized seed-cotton reference materials (based on SITC characterization)?
- Is that possible to set confidence intervals around these reference characteristics?
- Is that possible to check / trace / maintain the micro-ginning performance along time using these seed-cotton reference materials?

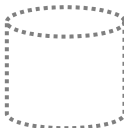
Material and methods

Creation of two seed-cotton reference materials SCRef1 and SCRef2

- One region in the country, one farm, one field, one variety
- Hand picked seed-cotton
- >1720 kg each (86 bags x 20 kg each)

Material and methods



 Seed-cotton bags from other experiments to be ginned alternatively to get fiber samples (not considered here)

- Fiber flow
- Fiber sample 10
 - Fiber sample 9
 - Fiber sample 8
 - Fiber sample 7
 - Fiber sample 6
 - Fiber sample 5
 - Fiber sample 4
 - Fiber sample 3
 - Fiber sample 2
 - Fiber sample 1

+ Fiber samples from other experiment



Laboratory using Standardized Instrument for Testing Cotton (SITC)

Material and methods

Two sets / periods of micro-ginning including seed-cotton reference materials (SCRef#) controls

- H1:
 - many bags from one experiment (results not shown here)
 - including 3 bags of SCRef1 and 3 bags of SCRef2
- H2:
 - many bags from one experiment (results not shown here)
 - including 8 bags of SCRef1 and 8 bags of SCRef2



Testing

- **Two replicates of testing in a randomized bloc design**
 - SCRef# fiber samples
 - UHVICC used as controls
 - Samples from experiments (not shown here)
- **Nb of measurements / replicate / sample**
 - one measurement of micronaire (IM, index)
 - two measurements of
 - Upper Half Mean Length (UHML, mm)
 - Uniformity Index (UI, %)
 - Strength (Str, cN/tex)
 - Reflectance (Rd, %)
 - Yellowness (+b, no unit)



Results and discussion

Results on UHVICC controls

- no drift and no deviation to their established reference values for any of the measured characteristics
- no critical difference between the two replicates of measurements

Results and discussion

- H1: first set/period of micro-ginning**

Material	Criteria/unit	IM index	UHML mm	UI %	Str cN/tex	Rd %	+b
SCRef1	Mean	4.44	28.64	81.9	28.49	74.48	10.55
	Standard deviation	0.08	0.93	1.73	1.60	1.19	0.34
SCRef2	Mean	3.97	28.53	81.7	28.95	75.92	11.86
	Standard deviation	0.09	0.84	1.40	1.16	0.91	0.47

- H2: second set/period of micro-ginning**

Material	Criteria/unit	IM index	UHML mm	UI %	Str cN/tex	Rd %	+b
SCRef1	Mean	4.55	28.61	81.7	28.36	75.00	11.00
	Standard deviation	0.09	0.72	1.19	1.39	1.01	0.29
SCRef2	Mean	4.06	28.61	81.7	29.54	75.17	12.55
	Standard deviation	0.09	0.74	1.10	1.28	1.04	0.40

Results and discussion

H1+H2 = reference values for future micro-ginning sets

Material	Criteria/unit	IM index	UHML mm	UI %	Str cN/tex	Rd %	+b
SCRef1	Mean	4.52	28.62	81.75	28.40	74.86	10.87
	Standard deviation	0.09	0.78	1.36	1.45	1.08	0.37
SCRef2	Mean	4.04	28.59	81.71	29.38	75.38	12.37
	Standard deviation	0.10	0.77	1.19	1.27	1.06	0.52

Variation components

SCRef creation	CSITC-RT
Seed-cotton heterogeneity	-
Seed-cotton sampling effect	-
Ginning practices	-
Ginning conditions	-
Fiber sampling effect	Fiber sampling effect
Testing practices	Testing practices
Testing conditions	Testing conditions

Conclusion and perspectives

- **Seed-cotton reference materials (SCRef), well homogenized and available in large quantities, can be set with known mean and variability levels**
- **First trial shows that SCRef may be used to monitor the performance of micro-gin**
- **In future, any large deviation of observed fiber test results to reference values could be considered as suspicious**
- **Beyond, taking the micro-gin as reference, the industrial gin plants will also be monitored for a better preservation of cotton fiber characteristics**

Limits of the study

- **Micro-gin: ‘simple’ technology; few ageing parts only**
- **Seed cotton storage, ambient condition during storage**
 - => Potential effect on seed cotton and fiber characteristics
 - => To be taken care of in future experiments
- **Attention to be given to the time delay between**
 - The ginning operation
 - The interpretation of fiber test results



**Many thanks from
all the ginning
and testing team**

