

Structure and dataset of the micro-spinning tests performed at CIRAD linked to the ITMF-ICCTM Round-Tests on Stickiness Measuring Methods



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Background: Stickiness is the results of insect honeydew excreted by insects living in the cotton fields. Stickiness is considered as a contamination which leads to fiber spinning and processing problems which induce quality and productivity degradations. The SIP (Stickiness in Practice)¹ criterion have been designed to help harmonizing Measuring Methods through an inter-laboratory round trials RT2017-1 to RT2022-2)² carried out every six months since 2017.

Goals: Collecting and arranging a dataset to performing our goal which was to determine if combined incidences between fiber characteristics and stickiness could be used in predicting CIRAD micro-spinning productivity and yarn quality of cotton based on various fiber characteristics and stickiness levels. The reason is that the relation between stickiness results and its consequences on the spinning behavior of the cotton is most important for spinners.

Achievements: A data base (Structure in Figure 1) was created to store all results (Extract in Figure 2) making the presentation “Stickiness and fiber characteristics related to fiber processing efficiency and yarn quality” possible in the International Cotton Conference Bremen 2024³.

Figure 1: Partial structure of the storing database.

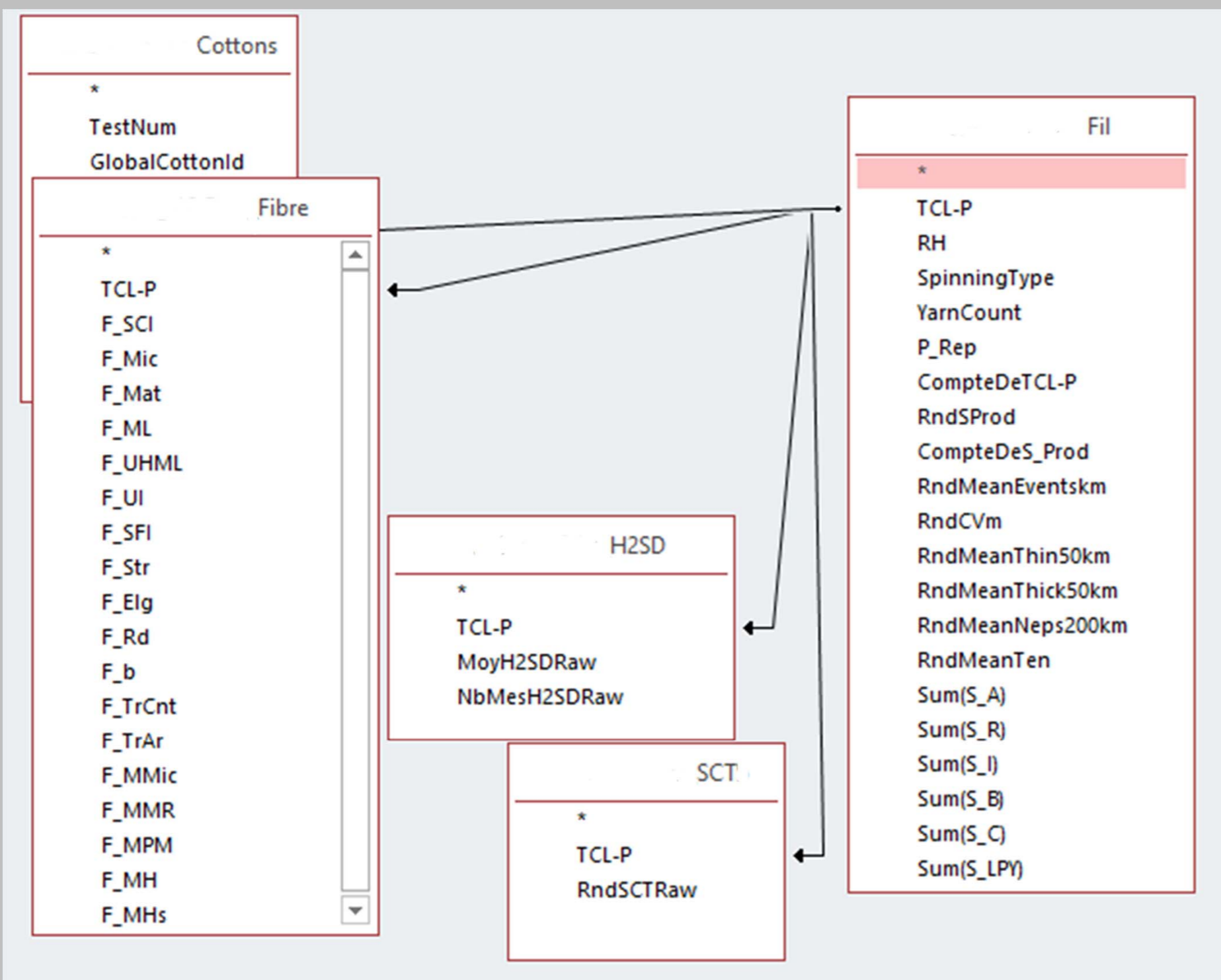


Figure 2: Partial view on the studied dataset.

F ML	F UHML	F UI	F Str	F Elg	F MMR	F MH	H2SD	YarnTenact	Sum_Events_1km
20.7	25.85	79.9	26.12	5.8	0.73	161	36.3	13.84	26
20.7	25.85	79.9	26.12	5.8	0.73	161	36.3	13.81	41
21.2	26.34	80.6	27.75	6.4	0.8	156	21.7	14.45	21
21.2	26.34	80.6	27.75	6.4	0.8	156	21.7	14.57	15
20.6	25.73	80.1	27.18	6.3	0.79	145	29.7	13.47	38
20.6	25.73	80.1	27.18	6.3	0.79	145	29.7	13.71	2
20.2	25.04	80.6	23.97	5.8	0.7	141	13	14.18	25
20.2	25.04	80.6	23.97	5.8	0.7	141	13	14.28	31
20.3	25.25	80.4	24.01	5.8	0.7	136	15	13.6	2
20.3	25.25	80.4	24.01	5.8	0.7	136	15	13.97	2
20.1	25.2	79.8	24.42	6	0.69	178	27.3	14.12	88
20.1	25.2	79.8	24.42	6	0.69	178	27.3	14	1
22.2	27.47	80.7	33.85	5.9	0.75	189	23.3	16.14	6
22.2	27.47	80.7	33.85	5.9	0.75	189	23.3	16.25	1
22.7	28.03	81	31.23	6.3	0.88	162	8.7	14.27	1
22.7	28.03	81	31.23	6.3	0.88	162	8.7	14.92	1
21.8	26.32	82.7	28.94	8.3	0.89	199	28.3	12.85	11
21.8	26.32	82.7	28.94	8.3	0.89	199	28.3	13.56	1
23.1	28.53	81	29.38	6.1	0.9	166	7	14.88	11
23.1	28.53	81	29.38	6.1	0.9	166	7	15.24	4
22.3	27	82.6	27.75	7.3	0.99	200	1.7	12.9	4
22.3	27	82.6	27.75	7.3	0.99	200	1.7	13.26	1
22.6	27.48	82.2	27.51	6.2	0.77	165	32	15.22	41
22.6	27.48	82.2	27.51	6.2	0.77	165	32	15.11	27
23.6	28.57	82.5	31.52	7	0.78	176	42.3	15.38	21
23.6	28.57	82.5	31.52	7	0.78	176	42.3	15.92	1
23.3	28.28	82.3	30.44	6.4	0.96	145	41.7	16.89	11
19.2	24.5	78.5	24.8	5.5	0.8	137	26	12.05	1
24.4	29.46	82.9	29.68	6.9	0.9	160	20.3	15.61	1
22.4	27.27	82.1	27.64	5.6	0.84	167	7.3	15.24	11
21.1	26.23	80.6	26.39	5.5	0.75	150	21.7	14.31	26
20.8	25.79	80.8	25.63	5.4	0.67	156	25	14.85	1
21.8	26.62	82	26.72	5.9	0.86	168	10	14.77	1
22	26.83	82	27.08	6.2	0.82	172	19.3	14.87	1
21.2	26.4	80.4	27.22	5.6	0.87	148	14	14.41	1

Example of metadata of this data set:
UHML (Upper Half Mean Length, mm), UI (Uniformity Index, %), Str (Strength, cN/tex), ...,
H2SD (Number of sticky points), ..., YarnStrength (Yarn strength, cN/tex), Sum_Events_1km
(Sum of spinning Event per km), ...
⁴ Link to the full public dataset: <https://doi.org/10.18167/DVN1/GBJPGM>

Incidences, consequences, discussion and conclusion:

- As specific sticky Cottons feed both the **Stickiness Reference Material** (RefMat) production on one side and the periodic Round-tests on the other side, productivity and quality data gathered during our micro-spinning experiment for producing a RS20tex yarn will serve as SIP criterion. The relationship between stickiness results and its consequences is thus known on these cottons and can serve the purpose of harmonizing Stickiness Measuring Methods results on the long run.
- Some ideas on future developments have been developed in **HarCoStic Project**⁵ presented in ITMF-ICCTM in 2018, including the way of feeding **RefMat** (See Axel Drieling, FIBRE, Germany, from now on).
- Do not forget to see the ‘Open laboratory’ in BBB, 4th floor on Friday 22nd.

More about this topic:

¹ Gourolt J.-P., Drieling A. 2021. Steps towards suitable stickiness test results for trading and processing, International Cotton Conference Bremen Lectures. Bremen Cotton Exchange, Fibre Institute Bremen. Bremen: Bremen Cotton Exchange, March 18, 2021, Diaporama 40 vues + abstract. <https://baumwollboerse.de/en/cotton-conference/lectures/> <https://agritrop.cirad.fr/600984/>

² See ITMF-ICCTM website <https://www.itmf.org/committees/international-committee-on-cotton-testing-methods> and dataset in <https://doi.org/10.18167/DVN1/FIP6HF>

³ Gourolt J.-P., Gozé E., Giner M. & Drieling A., 2024, “Stickiness and fiber characteristics related to fiber processing efficiency and yarn quality”, International Cotton Conference Bremen 2024.

⁴ <https://doi.org/10.18167/DVN1/GBJPGM>

⁵ HarCoStic project presented in ITMF-ICCTM 2018 session (Cirad-Agritrop (<https://agritrop.cirad.fr/608113/>)).