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INTERNATIONAL TEXTILE CENTER • TEXAS TECH UNIVERSITY
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ERIC HEQUET IS NEW ASSISTANT DIRECTOR

We are pleased to announce that, effective November 1, 1997, Mr. Eric Hequet became the new Assistant Director of the ITC. He brings fifteen years of distinguished work with the *Centre de Cooperation Internationale en Recherche Agronomique pour le Developpement* (CIRAD), Montpellier, France. His experience progressed from direction of experiment stations in Africa, to head of CIRAD's Cotton Technology Laboratory in Montpellier, to direction of the international cotton program for CIRAD.

Eric's advanced degree is in plant genetics. A successful cotton breeding program evolved into research in diverse aspects of fiber property measurement and evaluation of impacts on textile processing performance. In recent years, he has provided international leadership on issues surrounding stickiness contamination in cotton; this focus will continue at the ITC. He will have a primary responsibility for research project development and management. He will also focus on (1) developing the ITC's total program in materials testing and evaluation, and (2) strengthening the international outreach of the ITC in research, education, and consultation.

VIDEO AVAILABLE ON COVERING NEPS

Pam Alspaugh, Communications Coordinator of the ITC, has finished production of a video on current techniques for covering neps in woven and knitted fabrics. Cotton Incorporated and the Cotton Foundation provided funding. The target audience is managers of dye houses and textile mills. Copies of the video are available from **Cotton Incorporated,** Technical Services, Dyeing and Finishing, 4505 Creedmoor Road, Raleigh, North Carolina 27612. Versions with Spanish subtitles and PAL are also available.

NEW MOHAIR PRODUCTS DEVELOPED

Working with the Mohair Council of America, using funds provided by the Texas Food and Fiber Commission, the ITC is developing new woven and knitted products using adult mohair. Also, yarn spinning and dyeing is being done for Creative Conversions, a Texas company marketing rugs and carpeting made from adult mohair. James Simonton, Textile Engineer, is managing these ITC activities. Primary responsibility for mechanical processing tasks rests with Bobby Rodriguez, technician in long-staple spinning.

EXAMINATION OF EFFECTS OF DRAFTING RATES ON YARN QUALITY

Introduction

Textile manufacturers know that higher drafting rates allow higher production rates from the spinning preparation stages of drawing (for rotor spinning) and roving (for ring spinning). However, many manufacturers fear that they must sacrifice yarn quality if they increase drafting rates. This trade-off between increased drafting rates and decreased yarn quality has been alleviated with the improved process control offered by modern textile machinery. This study demonstrates the impacts of drafting rates on yarn quality.

Procedure

Three Texas Upland cotton varieties were chosen from significant varieties grown in different parts of the state. These varieties were HS-200 (from the Texas High Plains), DPL-5409 (from the Coastal Bend), and Acala 1517-88 (from the Trans-Pecos). In selecting these cottons, an effort was made to find fiber properties that were similar among them, except that the micronaire values were spread over a significant range. The HVI test results for each of these cottons are summarized in Exhibit 1, where it is seen that all fiber properties except micronaire are similar. The HS-200 cotton is somewhat stronger and has a somewhat shorter staple length than the other two varieties. However, micronaire values go from 3.2 (for the HS-200) to 4.2 (for the DPL-5409) to 4.7 (for the Acala 1517-88).

In order to clarify the meaning of the micronaire values, the Shirley FMT tester was used to estimate the maturity and fineness of each of the cottons; these measurements are shown in the bottom two rows of Exhibit 1. Results indicate that the HS-200 cotton sample is of comparable maturity with the other two cottons, but that it is a finer fiber than the other two. Therefore, the low micronaire reading for the HS-200 cotton is due primarily to fiber fineness, rather than to immaturity.

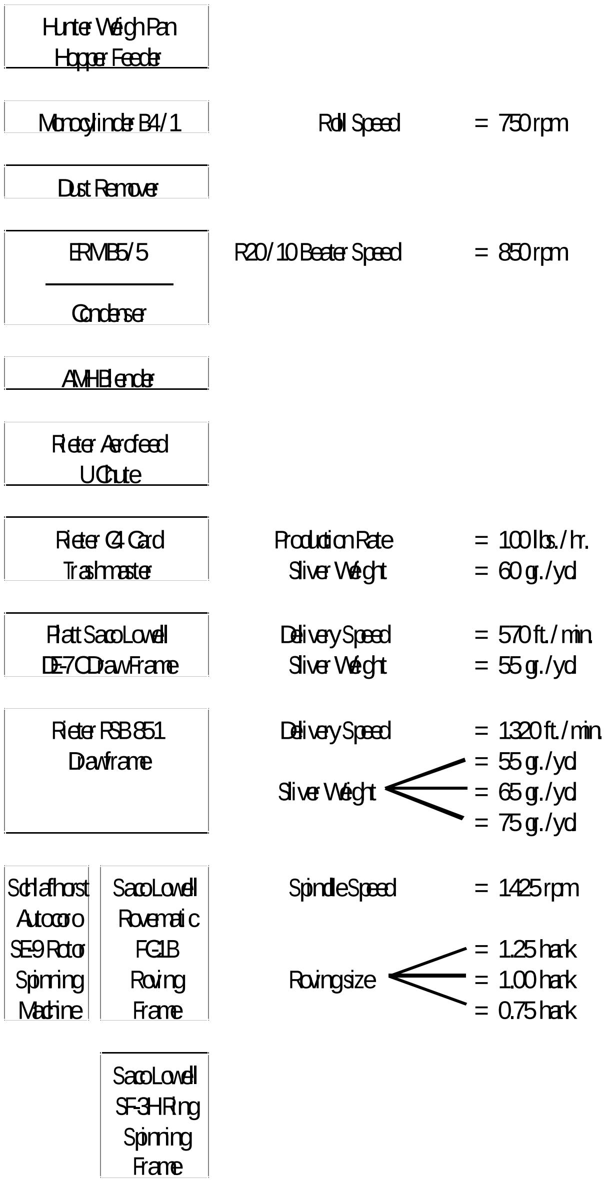
The processing of the cottons is summarized in Exhibit 2, where it may be noted that there were no variations in procedures until after the breaker drawing. Then the stock to be rotor spun was finisher drawn to three different weights per unit length; i.e., 55, 65, and 75 gr/yd. Stock from the cottons destined for ring spinning was finisher drawn to 65 gr/yd and made into three different roving lengths per pound; i.e., 1.25, 1.00, and 0.75 hanks. Slivers and rovings were tested for evenness.

Three yarn sizes (Ne 16, 22, and 30) were spun from each of the cottons on both the rotor and ring spinning systems; the spinning specifications are given in Exhibit 3. Each yarn size was spun using a low, medium, and high draft,

Exhibit 1. HVI and FMT Fiber Data

Properties	HS-200	DPL-5409	Acala 1517-88
1/8 in gauge strength (g/tex)	30.8	28.7	28.4
Elongation (%)	6.7	6.1	6.2
Length (in)	1.14	1.16	1.17
Uniformity (%)	84.7	82.7	84.2
Micronaire (µg/in)	3.2	4.2	4.7
Reflectance (Rd)	79.3	76.0	76.7
Yellowness (+b)	8.9	8.5	8.9
FMT Maturity (%)	80.6	78.8	84.1
FMT Fineness (mtex)	142	184	192

Exhibit 2. Processing Flows and Machinery Settings



as appropriate for the three different densities of the drawing slivers and rovings. All yarns were spun at a weaving twist for optimum strength. All three of the cottons processed without difficulty and no evidence of yarn problems was observed during spinning.

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Results

Evenness tests on slivers and rovings were done with the Uster 3 Tester and are summarized in Exhibit 4. All of the coefficients of variation (CV%) recorded here are acceptable; however, values for the drawing slivers and the rovings tended to improve substantially between the light and the medium weights, but changed little between the medium and heavy weights.

Critical yarn measurements are given in Exhibits 5, 6 and 7. Major conclusions from these measurements include the following:

- Yarn strength and elongation are little affected by changing from low to high draft ratios on either the rotor or ring spinning systems.
- Non-uniformity of yarns is largely unaffected by draft ratios on the rotor system, but slightly improved by medium and high draft ratios on the ring system.
- Thin places are little affected by draft ratios on the rotor system, but slightly decreased by medium and high draft ratios on the ring system.
- Thick places are little affected by draft ratios on both the rotor and ring systems.
- The nep counts are unaffected by draft ratios on the rotor system, but are clearly reduced by medium and high draft ratios on the ring system.
- Hairiness of the yarns are generally unaffected by draft ratios on either spinning system.

Conclusions

Results from this study indicate that there is no dilemma between choosing high draft ratios (to achieve higher production rates) and delivering quality yarns to the market. In the case of rotor-spun yarns, the higher draft ratios have virtually no undesirable effects on yarn quality. In the case of ring-spun yarns, the higher draft ratios actually have, on balance, a beneficial effect on yarn quality.

These conclusions hold over the fairly wide range of micronaire values covered in this study. Additional study is needed regarding significant variations in other fiber properties; e.g., length, uniformity, strength, fineness, and maturity.

William D. Cole, Manager of the Short Staple Spinning Laboratory of the ITC, supervised the spinning tests and data collection. The Texas Food and Fiber Commission provided funding for this study.

Exhibit 3: Spinning Specifications

Rotor Spinning

Machine	Schlafhorst Autocoro SE-9								
Rotor Type	T 231 D								
Rotor Speed (rpm)	100,000								
Opening Roller Type	B 174 DN								
Opening Roller Speed (rpm)	7,500								
Twist Multiplier	4.80								
Navel	4-grooved Ceramic (KN4) +1.5								
Torque Stop	TS 37								
Nominal Yarn Size (Ne)	16			22			30		
Sliver weight (gr/yd)	55	65	75	55	65	75	55	65	75
Draft Values (approximate)	106	125	144	145	172	198	198	234	270
Yarn Speed (yd/min)	132.3			123.6			105.5		

Ring Spinning

Roving Machine	Saco Lowell FG-1B								
Flyer Speed (rpm)	1,425								
Spinning Machine	Saco Lowell SF-3H								
Spindle Speed (rpm)	10,000								
Ring Diameter (in)	2								
Twist Multiplier	4.00								
Nominal Yarn Size (Ne)	16			22			30		
Roving size (hank)	1.25	1.00	0.75	1.25	1.00	0.75	1.25	1.00	0.75
Draft Values (approximate)	12.8	16.0	21.3	17.6	22.0	29.3	24.0	30.0	40.0
Front Roll Speed (yd/min)	17.4			14.8			12.7		

Exhibit 4. Evenness (CV%) of Slivers and Rovings

Cotton	Sliver Weights			Roving Sizes		
Varieties	55 gr/yd	65 gr/yd	75 gr/yd	1.25 hank	1.00 hank	0.75 hank
HS-200	4.06	3.57	3.56	8.38	6.01	6.59
DPL-5409	3.96	3.32	3.46	8.36	6.47	6.24
Acala 1517-88	3.76	3.52	3.53	8.46	7.02	6.20

Exhibit 5. Yarn Properties for HS-200

For 16 Ne Yarns:

Spinning Technique	**Rotor**			**Ring**		
Draft Ratio	**Low**	**Medium**	**High**	**Low**	**Medium**	**High**
Tenacity (g/tex)	13.66	13.70	13.56	16.41	16.40	16.36
Elongation (%)	7.35	7.61	7.57	7.58	7.56	7.49
Non-uniformity (CV%)	12.92	12.84	12.71	16.82	15.70	15.98
Thin Places/1,000 yd	1	1	1	41	17	20
Thick Places/1,000 yd	25	26	20	220	171	223
Neps/1,000 yd	4	3	3	90	86	84
Hairiness	4.18	4.09	4.24	5.74	5.67	5.67

For 22 Ne Yarns:

Spinning Technique	**Rotor**			**Ring**		
Draft Ratio	**Low**	**Medium**	**High**	**Low**	**Medium**	**High**
Tenacity (g/tex)	13.23	13.12	13.00	15.23	15.50	15.62
Elongation (%)	7.00	7.01	7.03	7.38	7.53	7.53
Non-uniformity (CV%)	13.94	13.90	14.87	18.29	17.56	17.61
Thin Places/1,000 yd	11	10	20	104	53	51
Thick Places/1,000 yd	60	60	99	471	458	482
Neps/1,000 yd	12	8	15	202	174	164
Hairiness	3.97	3.75	4.22	5.22	5.18	5.20

For 30 Ne Yarns:

Spinning Technique	**Rotor**			**Ring**		
Draft Ratio	**Low**	**Medium**	**High**	**Low**	**Medium**	**High**
Tenacity (g/tex)	12.40	12.58	12.24	14.77	15.13	14.64
Elongation (%)	6.87	6.84	6.82	6.83	7.12	6.88
Non-uniformity (CV%)	15.89	15.71	16.78	20.69	19.85	20.09
Thin Places/1,000 yd	56	45	111	273	194	200
Thick Places/1,000 yd	160	142	210	923	883	933
Neps/1,000 yd	62	60	66	673	604	543
Hairiness	3.71	3.68	3.76	4.61	4.53	4.63

Exhibit 6. Yarn Properties for DPL-5409

For 16 Ne Yarns:

Spinning Technique	Rotor			Ring		
Draft Ratio	Low	Medium	High	Low	Medium	High
Tenacity (g/tex)	12.62	12.61	12.55	14.28	14.86	14.70
Elongation (%)	6.61	6.87	6.97	6.79	6.95	6.92
Non-uniformity (CV%)	13.57	13.62	13.61	18.06	17.01	17.15
Thin Places/1,000 yd	5	5	4	100	47	52
Thick Places/1,000 yd	42	46	42	355	300	346
Neps/1,000 yd	4	4	2	91	66	65
Hairiness	4.54	4.44	4.54	5.94	5.69	5.70

For 22 Ne Yarns:

Spinning Technique	Rotor			Ring		
Draft Ratio	Low	Medium	High	Low	Medium	High
Tenacity (g/tex)	11.99	12.15	12.12	14.40	14.14	14.04
Elongation (%)	6.38	6.42	6.34	6.93	6.88	6.91
Non-uniformity (CV%)	13.66	14.82	14.85	19.78	19.01	19.08
Thin Places/1,000 yd	6	21	20	221	154	159
Thick Places/1,000 yd	48	96	91	676	665	702
Neps/1,000 yd	8	15	14	187	160	153
Hairiness	3.99	4.24	4.30	5.28	5.26	5.25

For 30 Ne Yarns:

Spinning Technique	Rotor			Ring		
Draft Ratio	Low	Medium	High	Low	Medium	High
Tenacity (g/tex)	11.48	11.40	11.26	13.38	13.51	13.22
Elongation (%)	6.24	6.22	6.14	6.25	6.31	6.15
Non-uniformity (CV%)	17.11	17.01	17.00	22.17	21.55	21.65
Thin Places/1,000 yd	133	122	124	547	435	416
Thick Places/1,000 yd	269	253	248	1,202	1,231	1,283
Neps/1,000 yd	92	93	95	633	550	534
Hairiness	3.99	4.03	4.00	4.60	4.62	4.72

Exhibit 7. Yarn Properties for Acala 1517-88

For 16 Ne Yarns:

Spinning Technique	**Rotor**			**Ring**		
Draft Ratio	**Low**	**Medium**	**High**	**Low**	**Medium**	**High**
Tenacity (g/tex)	12.84	12.90	12.71	14.96	15.12	15.00
Elongation (%)	6.52	6.60	6.80	6.73	6.90	6.83
Non-uniformity (CV%)	13.78	13.73	13.71	18.15	17.05	17.22
Thin Places/1,000 yd	6	6	6	97	47	42
Thick Places/1,000 yd	52	42	44	358	308	360
Neps/1,000 yd	5	5	4	101	86	76
Hairiness	4.42	4.42	4.46	5.78	5.63	5.64

For 22 Ne Yarns:

Spinning Technique	**Rotor**			**Ring**		
Draft Ratio	**Low**	**Medium**	**High**	**Low**	**Medium**	**High**
Tenacity (g/tex)	12.19	12.29	11.87	14.32	14.48	14.45
Elongation (%)	6.33	6.27	6.24	6.71	6.82	6.81
Non-uniformity (CV%)	14.92	14.80	14.86	19.72	18.94	18.99
Thin Places/1,000 yd	24	22	28	208	124	117
Thick Places/1,000 yd	101	97	92	666	645	685
Neps/1,000 yd	14	13	10	218	177	175
Hairiness	4.12	4.16	4.15	5.13	5.12	5.13

For 30 Ne Yarns:

Spinning Technique	**Rotor**			**Ring**		
Draft Ratio	**Low**	**Medium**	**High**	**Low**	**Medium**	**High**
Tenacity (g/tex)	11.62	11.52	11.59	13.59	13.70	13.53
Elongation (%)	6.16	6.23	6.22	6.20	6.28	6.13
Non-uniformity (CV%)	17.00	16.95	15.55	21.97	21.52	21.73
Thin Places/1,000 yd	115	119	38	497	391	395
Thick Places/1,000 yd	242	259	128	1,201	1,191	1,280
Neps/1,000 yd	70	84	57	657	605	560
Hairiness	3.94	3.94	3.74	4.56	4.52	4.58

TEXAS INTERNATIONAL COTTON SCHOOL, OCTOBER 1997

Front row: Yasemin Aydogmus, Clemson University, SC; Juanita Harris, Queensland Cotton Corp., Ltd., Australia; Mandy Howell, School Coordinator; Maria Isabel Gubaton, Primatex Fibre Corporation, The Philippines; Brenda Jackson, Ass't. Coordinator.

Second row: Mario Maher, Canadian Yarns, Ltd., Canada; Saul Reyna, Tejidos Imperial, Guatemala; Masudur Rahman, Panna Textile Mills, Ltd., Bangladesh; Crawford Tatum, The Montgomery Company, Alabama; Anant Mohod, The Maharashtra State Co-Operative "Cotton Growers" Marketing Federation, Ltd., India; Dino Karagozian, Textil Noreste S.A., Argentina.

Third Row: Michael Godfrey, Lorber Industries of Texas, Texas; Aldo Brambilla, Textile Noreste S.A., Argentina; Dante Valdez Pedroni, Tejidos Imperial, Guatemala; Renato Martinez, Duracril S.A., Guatemala; David Brooks, Nunn Cotton Company, Inc., Tennessee.
Not pictured is Shawn Wade of Plains Cotton Growers, Lubbock, Texas.