MMA 4.1 : Quality Evaluation of Cotton Fibre

Principal Investigator : G. F. S. Hussain, CIRCOT, Mumbai

Target & Achievement

Target/ Activity	Achievement (2004-2005)
• Evaluation of fibre traits of samples related to MM 1.1, 1.2, 1.3, 1.5, 2.1, 2.2, 2.3, 3.1 and Miscellaneous • Categorization of samples according to CIRCOT norms • Standardization of techniques to measure the pesticide residues in the cotton lint samples	• Fibre attributes of totally 3662 samples were tested and screened for fibre quality. • 301 samples were found to satisfy CIRCOT fibre quality norms. 80 out of 301 samples were most promising varieties. The fibre data were sent to the respective PI/CCPI • Promising varieties, possessing good fibre properties under this project: KWAN-62, SP-16, NHH-02, RS-2013-1, T-3, MOS2, G. Cot 11XAH-32-3-F2 • The technique to measure the pesticide residues in the cotton lint has been standardized.

Progress of Work :

Fibre Quality Details :

The following tables describe the results of the season :

CIRCOT NORMS FOR FIBRE PROPERTIES

Range of 2.5% Span Length (mm)	Minimum Tenacity (g/t)	Range of Micronaire
22-23	20	4.5-5.0
24-25	21	4.0-4.5
25-26	23	4.0-4.5
26-27	24	3.8-4.5
28-29	25	3.8-4.5
29-31	26	3.8-4.5
31-33	28	3.8-4.2
33-34	29	3.7-4.0
35-36	31	3.6-3.8
36-38	32	3.5-3.8

SAMPLE PARTICULARS

Sr. No.	Trial	No. of Samples	No. of Promising Strains	No. of Most Promising Strains
1	**1.1**Development of diploid cotton cultivars with high fibre quality.	353	5	1
2	**1.2** Development of tetraploid cotton cultivars with high fibre quality and resistance to drought and biotic stresses.	1057	62	21
3	**1.3** Genetic diversity through introgression of useful genes.	674	57	9
4	**1.5** Maintenance breeding, seed production and marker based purity evaluation.	522	58	13
5	**2.1** Integrated nutrient management for high quality fibre and yield.	257	48	19
6	**2.2** Integrated water management systems for quality fibre production.	9	-	-
7	**2.3** Bioinoculants for sustainable and cost effective production of high quality fibre.	150	21	5
8	**3.1** Integrated pest management (IPM) at village level for cost effective quality production.	39	1	-
9	**Miscellaneous**	601	49	12
	Total	3662	301	80

MM 1.1

Location	No. of Samples	Promising Strains	Most Promising Strains
Sriganganagar	133	RS-2013	-
Parbhani	38	KWAN-62, AKA-8, AH-38, PA-603	KWAN-62
Sirsa	85	-	-
Sirsa	76	-	-
Hisar	21	-	-
TOTAL	**353**	**5**	**1**

Remarks : The samples from Sriganganagar and Sirsa show high micronaire values. Samples from Sirsa show low strength.

MM 1.2

Location	No. of Samples	Promising Strains	Most Promising Strains
Sriganganagar	221	**LC-**6, 8, 10, 13, 15, 17, 23, RCTA-III-10, Trial V-17, **Trial VII-** 17, 23, 28, 29, 61	**LC-**6, 8, 10, 15, 17, RCTA-III-10, **Trial VII-** 29, 61
New Delhi	34	H 1236, CCH 226, **P 56-1** R2, R3, P 56-2 R3, **P 56-4** R1, R2, R3, **P 56-6** R1,R2, C4-9-2-1-1 R2, C4-9-2-1-2 R2, **P 95-27-2-P1** R2, R3	P 56-1 R3, P 56-4 R3, **P 56-6** R1,R2,
New Delhi	54	P 8-6-5-1-1, P 31-9-2-4, P 386, P 31-9-2-4, P 95 33-47-1-2, P 95-3-6-P2, P 95-27-P2	-
New Delhi	43	P 72-9-37 P2, P 8-6-68-29 P4, P 8-6-3-1-P2, P 74-5-4-3-1-1-P1, P 57-P2, C4-9-1-1-P3	P 8-6-3-1-P2, P 57-P2
New Delhi	33	-	-
Nagpur	227	-	-
Surat	80	-	-
Coimbatore	25	-	-
Sirsa	21	SP- 16	SP- 16
Faridkot	144	P61, P93, P99	-
Sirsa	153	3119, 3015, 3093, 3021, 3051, 3120, 3070, H1242, SRT.TOM277, BN OKRA, CSH3158, **CMB**-3, 4, 7, 9, 11	3119, 3051, BN OKRA, CSH3158
Hisar	22	H1242	H1242, H1236
Total	**1057**	**62**	**21**

Remarks : The quality assessment indicates 62 samples are satisfying the quality norms. Among above locations, samples from New Delhi performed better. Samples from Nagpur show low micronaire as well as low strength values. Samples from Surat and Coimbatore did not meet quality norms.

MM 1.3

Location	No. of Samples	Promising Strains	Most Promising Strains
Sriganganagar	148	Trial-II- BM XTCH-1648, VHMXTCH-1652, VHFXTCH-1653, VHFXIH-35, Trial-III- IS-376/4/1-9XRS-875, Trial-IV-AKH-0301, Trial-V- TCH-1652, **Trial-VI- SPS-**6, 8, 28, 43	**Trial-II-** BM XTCH-1648, VHMXTCH-1652, VHFXTCH-1653, **Trial-VI-** SPS-43
New Delhi	221	TCH 1652, **Abhadita X Rai-**P6, P9, Abhadita X TCH-1 P9, Abhadita X Surat-9 P7, Abhadita X TCH-2 P1, Abhadita XSurat-2 P5, NHH-02, GISV-206, G.COT 16 X GISV 61 F4, 321-2-P1 X AKH 2053 P4, BF X TCH- 1653, VHM X TCH- 1652, 1648, 1653, VHF X IH-35, LH 900 X IH-35, RS-2013 X TCH-1652, RS-2013 X Rai 11-3, Adhadita X Surat-2 P4, (GISV-197 X GISV-61) RS 875 P4	NHH-02, BF X TCH-1653, RS-2013 X TCH-1652, Adhadita X Surat-2 P4, (GISV-197 X GISV-61) RS 875 P4
Surat	148	-	-
Sirsa	157	**LHT-1-** 2,8, 9, 10, 19, 23, 24, 26, 28, **LHT-3-** 1, 3, 6, 12, 13, 17, **LHT-4-** 2,4, 5, 19, 21, **LVT-2-** 1, 7, **Int. Lines-** 4, 18, Seg.Material- 38	-
Total	**674**	**57**	**9**

Remarks : Samples from Surat show low strength and high micronaire values. Sriganganagar samples show high mic values

MM 1.5

Location	No. of Samples	Promising Strains	Most Promising Strains
Sriganganagar	126	**RS-2013**-1,2, 3, 4, 6-11, 13-17, **Trial-IV-** 1, 2, 3, 5, 6	**RS-**2013-1, 2, 3, 11, 14,15, Trial-IV- 5
Khandwa	77	**A-** 3, 7, 9, 12-15, 19, 38, 43, 77	**A-** 7, 12, 19, 77
New Delhi	184	**P-** 7, 13, 19, 21, 32, 37, 42, 46, 73, 81, 89, 90, 105, 123, 127, 131, 132, 137, 159, 162, 164, 167	P- 37, 89
Coimbatore	24	-	-
Sirsa	59	**PIL43FP-**1, 4	-
Sirsa	52	**F.No.59/04-**2, 3, 8	-
Total	**522**	**58**	**13**

Remarks : Samples from Sriganganagar (Trials I, III, V) register high micronaire values.

MM 2.1

Location	No. of Samples	Promising Strains	Most Promising Strains
Sriganganagar	44	**Agro-** 8,12,20,23	-
Bhopal	24	-	-
Banswara/ Udaipur	72	-	-
Surat	68	-	-
Hisar	49	T1- T3, T5-T38, T41-T45, T48-49	T3, T5, T7, T11-T13, T15-T21, T23, T27, T32-T35
Total	**257**	**48**	**19**

Remarks : Samples from Bhopal and Banswara do not meet quality norms because the parameters of strength and micronaire do not match. Samples from Bhopal register low strength and micronaire values. Samples from Surat, on the other hand, show high micronaire values**.**

MM 2.2

Location	No. of Samples	Promising Strains	Most Promising Strains
Sriganganagar	9	-	-
Total	**9**	**-**	**-**

Remarks : 9 samples were tested among which none of the samples satisfied the quality norms.

MM 2.3

Location	No. of Samples	Promising Strains	Most Promising Strains
Khandwa	100	MOS2, MOS3, M1SO, **FLD- 2-**5, 8, 10,12, 18, 19, 25, 7, 39, 54, 58, 59, 64, 65, 68	**FLD-** 2, 5, 12, 18, 27
Hisar	50	-	-
Total	**150**	**21**	**5**

MM 3.1

Location	No. of Samples	Promising Strains	Most Promising Strains
Udaipur	**2**	-	-
Sriganganagar	**33**	Loc.22 ML American Roja,	-
Akola	**4**	-	-
Total	**39**	**1**	**-**

Remarks : Quality parameters of samples form Udaipur and Nagpur do not match while samples from Srignaganagar show high micronaire values.

Miscellaneous

Location	No. of Samples	Promising Strains	Most Promising Strains
Sriganganagar (MM 5.1)	25	1, 3, 4, 5, 14, 21	21
Sriganganagar (TMC 2)	20	**Agro-** 1, 4, 8,	Agro- 1
Khandwa (MM 1.4)	68	2, 3, 9-11, 13, 19, 53, 58	3,13, 53
Rahuri	4	-	-
Surat (MM 1)	74	G.Cot. 11 X AH-32-3-F2, LRA X IGM-42 F2, TCH-1696, Abadhita X TCH-1 F2, IS-376/4/2/9 X RS.875 F2, IS-376/4/2/9 X RS.2013 F2, IS-376/4/2/9 X RS.875 F2, (G.cot 10 X GISV-61) X RS. 875 F2, Sarvottam X KWA-7-F2, Rai-4, Rai-3	G.Cot. 11 X AH-32-3-F2, TCH-1696, Sarvottam X KWA-7-F2, Rai-4, Rai-3
Surat (MM 3)	28	(RI)- GISV-2, 61, G.cot. 16 (C)	-
Sirsa (MM 1.4)	8	-	-
Sirsa (MM 04)	234	14, 15, 42, 43, 44, 81, 103, 113	43
Faridkot (MM 1.4)	54	32 (5982), 31 (5997)	32 (5982)
Sirsa	68	**Seg.-** 3, 4, 7, 8, 15, Germplasm hirsutum-2, Advance Culture hirsutum-1	-
Hisar	18	-	-
Total	**601**	**49**	**12**

Remarks : Samples from Sirsa and Faridkot show high micronaire values.

Quality Data of Most Promising Strains

Sr. No.	Entry No.	TMC-MMI	Location	2.5% SL	UR %	Mic value	Strength g/tex	Elong %
1	KWA-N-6-2	1.1	Parbhani	27.0	53	4.6	25.6	6.1
2	LC-6	1.2	Sriganganagar	22.5	54	4.8	22.9	5.8
3	LC-8	1.2	Sriganganagar	22.9	54	4.9	21.9	5.5
4	LC-10	1.2	Sriganganagar	23.3	49	4.6	21.5	5.3
5	LC-15	1.2	Sriganganagar	23.3	55	5.0	22.8	5.4
6	LC-17	1.2	Sriganganagar	22.6	55	4.5	27.1	5.7
7	RCTA-III-10	1.2	Sriganganagar	29.9	56	4.4	27.4	4.9
8	Trial VII 29	1.2	Sriganganagar	23.4	50	4.7	22.6	5.8
9	Trial VII 61	1.2	Sriganganagar	25.2	54	4	23.7	5.1
10	P 56-1 R3	1.2	New Delhi	27.4	54	4.1	26.2	4.6

Sr. No.	Entry No.	TMC-MMI	Location	2.5% SL	UR %	Mic value	Strength g/tex	Elong %
11	P 56-4 R3	1.2	New Delhi	27.8	54	4.1	28.5	4.9
12	P 56-6 R1	1.2	New Delhi	26.4	55	4.5	26.1	4.9
13	P 56-6 R2	1.2	New Delhi	27.6	56	4.5	26.2	4.8
14	P 8-6-3-1-P2	1.2	New Delhi	26.6	53	4.5	25.3	4.9
15	P 57-P2	1.2	New Delhi	25.9	54	4.4	24.2	5.1
16	SP 16	1.2	Sirsa	27.2	40	4.3	24.7	6.4
17	3119	1.2	Sirsa	29.9	47	3.5	27.0	6.7
18	3015	1.2	Sirsa	23.7	52	4.8	20.5	6.1
19	BN OKRA	1.2	Sirsa	23.8	52	4.9	21.3	6.4
20	CSH3158	1.2	Sirsa	23.8	49	4.2	21.1	6.1
21	H1242	1.2	Hisar	25.8	54	4.2	22.4	6.4
22	H1236	1.2	Hisar	26.8	46	4.2	22.2	6.3
23	BM XTCH-1648	1.3	Sriganganagar	30.8	49	4.5	26.3	6.5
24	VHMXTCH-1652	1.3	Sriganganagar	26.9	53	4.4	24.2	6.4
25	VHFXTCH-1653	1.3	Sriganganagar	28.9	54	4.5	27.2	6.5
26	SPS-43	1.3	Sriganganagar	31.9	53	4.1	29.1	6.1
27	NHH-02	1.3	New Delhi	24.9	52	4.4	22.8	4.7
28	BF X TCH- 1653	1.3	New Delhi	27.9	51	4.0	26.4	5.5
29	RS-2013 X TCH-1652	1.3	New Delhi	25.9	52	4.6	24.3	5.7
30	Adhadita x Surat-2 P4	1.3	New Delhi	23.8	51	4.6	21.9	5.2
31	(GISV-197 X GISV-61)RS 875 P4	1.3	New Delhi	25.3	52	4.0	25.2	5.5
32	RS-2013-1	1.5	Sriganganagar	24.9	53	4.5	23.2	5.6
33	RS-2013-2	1.5	Sriganganagar	24.3	51	4.8	23.7	5.8
34	RS-2013-3	1.5	Sriganganagar	25.4	53	4.4	24.2	6.2
35	RS-2013-11	1.5	Sriganganagar	24.9	52	4.6	23.5	6.1
36	RS-2013-14	1.5	Sriganganagar	24.9	50	4.1	23.0	6.6
37	RS-2013-15	1.5	Sriganganagar	23.7	54	4.5	22.5	6.4
38	Treatment-5	1.5	Sriganganagar	24.7	51	4.3	23.5	6.3
39	A-7	1.5	Khandwa	24.0	52	4.7	23.0	5.1
40	A-12	1.5	Khandwa	24.4	49	3.8	22.0	4.9
41	A-19	1.5	Khandwa	23.8	51	4.3	21.0	4.9
42	A-77	1.5	Khandwa	22.5	51	4.3	21.2	4.4

Sr. No.	Entry No.	TMC-MMI	Location	2.5% SL	UR %	Mic value	Strength g/tex	Elong %
43	P-37	1.5	New Delhi	25.6	51	4.8	24.0	4.3
44	P-89	1.5	New Delhi	29.2	52	3.5	27.2	4.9
45	T3	2.1	Hisar	24.5	52	4.5	22.0	6.4
46	T5	2.1	Hisar	24.5	50	4.4	22.4	6.5
47	T7	2.1	Hisar	23.4	49	4.4	21.5	6.3
48	T11	2.1	Hisar	23.6	48	4.6	21.7	6.4
49	T12	2.1	Hisar	23.3	46	4.7	21.1	6.4
50	T13	2.1	Hisar	24.6	48	4.4	23.3	6.6
51	T15	2.1	Hisar	24.7	46	4.6	22.3	6.5
52	T16	2.1	Hisar	24.0	47	4.7	22.8	6.5
53	T17	2.1	Hisar	24.1	46	4.5	22.1	6.4
54	T18	2.1	Hisar	23.9	48	4.6	22.4	6.5
55	T19	2.1	Hisar	23.6	47	4.9	21.1	6.3
56	T20	2.1	Hisar	24.3	49	4.7	22.1	6.5
57	T21	2.1	Hisar	24.5	47	4.4	23.0	6.5
58	T23	2.1	Hisar	24.8	47	4.4	23.4	6.4
59	T27	2.1	Hisar	23.2	52	4.6	21.3	6.4
60	T32	2.1	Hisar	23.8	48	4.5	21.2	6.3
61	T33	2.1	Hisar	24.4	48	4.5	22.1	6.4
62	T34	2.1	Hisar	24.8	51	4.7	22.7	6.5
63	T35	2.1	Hisar	24.5	49	4.5	22.0	6.4
64	FLD 2	2.3	Khandwa	24.9	49	4.6	23.3	6.2
65	FLD 5	2.3	Khandwa	25.1	49	4.6	23.2	6.3
66	FLD 12	2.3	Khandwa	24.8	51	4.8	23.1	6.1
67	FLD 18	2.3	Khandwa	24.9	49	4.5	23.0	6.2
68	FLD 27	2.3	Khandwa	23.4	50	5.2	21.0	6.1
69	21	5.1	Sriganganagar	22.9	51	4.3	21.5	6.2
70	Agro- 1	2	Sriganganagar	24.7	53	4.5	22.9	6.3
71	3	1.4	Khandwa	24.3	52	4.3	22.6	5.9
72	13	1.4	Khandwa	23.8	51	4.3	21.4	5.8
73	53	1.4	Khandwa	23.9	49	4.0	24.0	6.5

Sr. No.	Entry No.	TMC-MMI	Location	2.5% SL	UR %	Mic value	Strength g/tex	Elong %
74	G.Cot.11XAH-32-3-F2	1	Surat	25.9	50	4.2	26.0	6.3
75	TCH-1696	1	Surat	26.0	51	4.6	24.9	6.2
76	SarvottamxKWA-7-F2	1	Surat	25.1	51	4.7	24.7	6.0
77	Rai-4	1	Surat	24.3	53	4.6	22.7	9.0
78	Rai-3	1	Surat	25.9	54	4.2	24.8	7.3
79	43	O4	Sirsa	24.4	51	4.6	23.3	6.3
80	32 (5982)	1.4	Faridkot	23.8	51	4.8	21.1	6.4

Standardisation of pesticide extraction and cleaning up protocol :

Cotton is a long duration crop and a number of pesticides are applied during its growth cycle. As the photo stability of pesticides differ widely, the advice of cotton Entomologist, CRS, Nanded was sought. As per his advice only the following pesticides were identified for residue analysis.

1. Dimethoate
2. Monocrotophos

The above pesticides belong to organophosphates group. A number of extraction procedures were tried to obtain maximum recovery of the above pesticides. Several cleaning-up methods were also examined. The following methodology was adopted for extraction and cleaning up operations. The method is based on the AOAC Standard 970.52.

3g of cotton fibre was extracted with Acetontrile and celite with the material to liquor ratio of 1:2 and 1:0.1 respectively for 15 minutes. The extract filtered through Buchner funnel. The filtrate was shaken with petroleum ether, NaCl solution and water in a separating funnel for 5 minutes. The aqueous layer was discarded and the solvent layer was washed with water twice. The washed and separated solvent layer was cleaned up by passing through a column of anhydrous Sodium Sulphate followed with clean up in florisil column. The cleaned extract is concentrated to 5 ml. This extract can be injected in Gas Chromatograph and can be analysed with NPD/ECD/MS detectors.