Performance of Medium Staple Cotton Selections in Hambantota

P. YOGARATNAM

Cotton Experiment Station, Hambantota, Ceylon

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INTRODUCTION

THE progress of cotton breeding work at the Cotton Experiment Station, Hambantota up to the year 1956 has been reviewed by Ariyanayagam and Wijewantha (1). The strain selected in Ceylon from the variety BP79 introduced from Uganda was recommended for cultivation in Ceylon in 1944. The Wellawatta Spinning and Weaving Mills was satisfied with the variety BP79 in respect of its spinning 30s counts and its staple length of 39/32 inches, but this cotton was considered to be neppy. Thereafter selection work in the upland medium staple varieties, viz :—5143 Cambodia, 5143C × 5143 and CO4 commenced in Maha 1949-50 and in 1956 a strain S6-O6 selected from Cambodia was chosen for cultivation throughout Ceylon under the name HC—101. Extensive tests have proved the new strain superior to BP79. It has a ginning percentage of 33.8 per cent. and effective fibre length of 42/32 inches. Moreover it produced the strongest yarns, spinning 40s and 50s counts and had the best yarn appearance in respect of neppiness. A hybridization programme was also commenced in Maha 1952-53 to evolve superior strains having high seed cotton yielding ability, staple length between $1\frac{1}{8}$—$1\frac{1}{4}$ inch, ginning percentage over 30 per cent, lint index over 0.17, lint free nep, better spinning quality and high oil content of seed. The crosses effected were between groups of unrelated varieties introduced from different countries. The groups were Mwanzas 561 and local from Tanganiyka, CO2, CO3 and CO4 varieties from India, Domain Sakel from Sudan, 5143 Cambodia and Cambodia × 5143 from South Africa and BP79 and BP52 varieties from Uganda. Major replicated trials with the selections which have emerged from the breeding work initiated by these workers have been the subject of study for over four seasons and the present analysis as reported in this note is an attempt to isolate the more promising selections for further study.

MATERIALS AND METHODS

The cotton selections were sown in trials conducted under uniform cultural conditions of which the main features were as follows:

(*a*) Sowing on land fallow for Yala season.

(*b*) Fertilizer applications at sowing of 5 tons cattle manure, 1 cwt. of Super Phosphate, ¼ cwt. of Muriate of Potash and ½ cwt. of Ammanium Sulphate per acre. Another ½ cwt. of Ammonium Sulphate was given as top dressing at flowering time.

(*c*) Dependent on rainfall, from sowing to harvesting.

(*d*) Frequent application of insecticides to maintain as high a degree of insect control as possible.

HC—101 was the standard of comparison in all trials.

The trials were in the form of randomized block with four replications. The characteristics on which these selections were assessed were as follows:—

(1) Seed cotton yield.

(2) Ginning percentage.

(3) Lint index.

(4) Halo length measurement.

(5) Percentage neps.

(6) Bacterial blight resistance assessed on a plot basis during the boll period.

RESULTS AND DISCUSSION

In order to link the results of the various trials and to unify the data all measurements are expressed relative to the standard HC—101. Quantative observations are given as a plus or minus percentage deviation from the corresponding value for HC—101.

In reporting the results (Tables 1—5) selections derived from the crosses are grouped as (1) BP79 × Mwanzas 561 and local. (2) BP79 × CO varieties. (3) 5143 and 5143C × 5143 with other varieties. (4) Selections from diverse crosses. (5) 5143C × 5143 crosses and other selections. A single mean figure for each characteristic of each selection is only given.

Two selections BP79 × M—561—78 and GP79 × M—561—86 from the crosses BP79 with ML and M—561 (Table 1) were high yielding with a lower ginning percentage, lint index and average halo length than HC—101. The selection BP79 × M—561—78 had lower neps percentage than all other selections tested in the trial. All were susceptible to bacterial blight.

Some of the selections from BP79 × CO varieties (Table 2) were high yielding but had lower ginning percentages, lint index, halo length measurements and showed less bacterial blight resistance than HC—101.

All the selections derived from crosses 5143C, 5143C x 5143 with other varieties (Table 3) were low yielding except selection 5143C x BP52—5/4. These selections had low economic characteristics and less bacterial blight resistance than HC—101.

Four selections, viz :—ML × DS—6/2, CO3 × M—561—½ CO2 × M—561—13/3 derived from diverse crosses (Table 4) showed higher yields but they all had low economic characteristics except ML x DS—6/2 which had a higher lint index than HC—101.

All selections derived from 5143C x 5143 crosses and other varieties (Table 5) showed lower yields than the standard with low economic charcteristics and showed less resistance to bacterial blight compared with HC—101.

In these trials none of the selections has measured up to the standard HC—101 in all respects. However a few selections notably BP79 × M—561—78 and BP79 × M—561—86 from crosses BP79 with Mwanza varieties ; BP79 × CO3—561, BP79 × CO4—80 from BP79 × CO varieties ; 5143C × BP52—5/4 from crosses 5143C and 5143C × 5143 with other varieties ; and selections ML DS 6/2, CO3 × M—561—1/2, CO2 × M—561—13/3 and DS × M—561—3/3 from diverse crosses showed higher yields than HC—101 even though they had fallen short of HC—101 in certain economic characters. The present analysis is an attempt to isolate the high yielding selections for further breeding and selection while eliminating the rest.

SUMMARY

The performance of medium staple cotton selections from the crosses BP79 × Mwansas, BP79 × CO varieties, 5143 C and 5143C × 5143 with other varieties, 5143 × 5143 crosses and other varieties and selections from diverse crosses is reported.

The promising selections were from the crosses BP79 with Mwanzas and CO varieties, 5143C and 5143C cross 5143 with other varieties and from diverse crosses. A large number of these selections had lower ginning percentages, lint index, halo length measurements, high neps percentage compared with the standard HC—101. All sections were less resistant to bacterial blight than HC—101.

The high yielding selections have been isolated for further breeding and selection while eliminating the rest of the selections.

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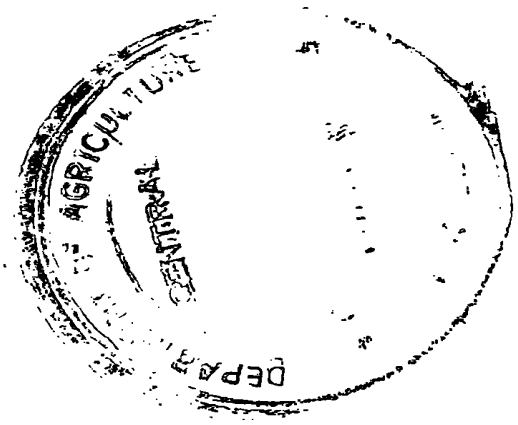

PERFORMANCE OF COTTON SELECTIONS OF BP79 WITH MWANZA LOCAL AND MWANZA 561 CROSSES RELATIVE TO HC—101

TABLE 1.—Values expressed either as Percentage Deviations from HC—101, taken as 100, or as plus (+), Zero (0), or Negative (—) Deviations from HC—101

Selections	*Yield of Seed Cotton*	*Ginning Percentage*	*Lint Index*	*Average Halo Length*	*Neps Percentage*	*Bacterial Blight Percentage*
1. BP79×M—561—78	+17	—11	—13	—3	—10	—
2. BP79×ML—12	—8	—2	—16	—1	+9	—
3. BP79×ML—72	—4	—2	—11	—5	—3	—
4. BP79×ML—8	—13	—5	—6	0	+2	—
5. BP79×ML—86	+6	—8	—4	—1	+3	—
6. BP79×M—561—59	+1	—7	3	—1	+12	—
7. BP79×M—561—88	+1	—9	—7	—1	+8	—
8. BP79×M—561—1	—6	—3	—11	—1	—8	—

PERFORMANCE OF COTTON SELECTIONS DERIVED FROM CROSSES OF BP 79×CO : VARIETIES RELATIVE TO HC—101

TABLE 2—Values expressed either as percentage deviations from HC—101, taken as 100, or as plus (+), Zero (0), or negative (—) Deviations from HC—101

Selections	*Yield of Seed Cotton*	*Ginning Percentage*	*Lint Index*	*Avergage Halo Length*	*Neps Percentage*	*Bacterial Blight Percentage*
1. BP79×CO2—01	—8	—1	—2	—7	+41	—
2. BP79×CO2—55	—6	—14	—15	—9	+7	—
3. BP79×CO3—56	+5	—1	—3	—9	+53	—
4. BP79×CO3—75	—4	—14	—6	—9	+4	—
5. BP79×CO3—50	+1	—11	—6	—10	+26	—
6. BP79×CO3—38	—18	—5	—10	—9	+97	—
7. BP79×CO4—72	—17	—5	—11	—7	+35	—
8. BP79×CO4—83	—3	—2	—3	—8	+80	—
9. BP79×CO4—47	0	—2	—2	—8	+72	—
10. BP79×CO4—80	+5	—11	—11	—6	+38	—
11. BP79×CO4—15	—5	—19	—2	—2	+42	—

PERFORMANCE OF COTTON SELECTIONS DERIVED FROM THE CROSSES 5143C AND 5143C × 5143 WITH OTHER VARIETIES RELATIVE TO HC - 101.

TABLE 3—Values expressed either as percentage deviations from HC-101 taken as 100, or as plus (+), Zero (o), or negative (—) deviations from HC — 101.

Selections	*Yield of Seed Cotton*	*Ginning percentage*	*Lint index*	*Average halo length*	*Neps percentage*	*Bacterial blight resistance*
1. 5143C×ML — 16/2	—5	—1	—2	—1	—3	—
2. 5143C×BP52 — 5/4	+7	—1	0	—5	—14	0
3. 5143C×M — 561 — 16/3	—3	—6	—3	0	+20	—
4. 5143C×5143×DS— 2/3	—7	—3	+3	—1	+21	—
5. 5143C×5143×ML — 11/4	—1	0	+6	—2	+33	—
6. 5143C×5143×M — 561 — 8/4	0	—5	—2	—1	+2	—
7. 5143C×5143×BP52 — 17/2	—1	—5	—11	0	+26	—

PERFORMANCE OF COTTON SELECTIONS DERIVED FROM DIVERSE CROSSES RELATIVE TO HC—101

TABLE 4.—Values expressed either as percentage deviations from HC—101 taken as 100, or as plus (+), Zero (0), or negative (—) deviations from HC—101

Selections	*Yield of Seed Cotton*	*Ginning percentage*	*Lint index*	*Average halo length*	*Neps percentage*	*Bacterial blight resistance*
1. SG×M — 561— 23/3	—2	—1	—0	—2	+28	—
2. ML×DS — 6/2	+8	—10	+8	—10	—3	—
3. CO3×M — 561 — 1/2	+8	—3	—2	—9	—7	0
4. CO2×M — 561 — 5/1	+1	0	0	—16	+15	—
5. CO2×M — 561 — 13/3	+5	—1	0	—11	+5	—
6. CO2×M — 561 — 31/3	—30	—6	—1	—2	—13	—
7. DS×M — 561 — 3/3	+11	—5	—6	—8	—1	—

PERFORMANCE OF COTTON SELECTIONS DERIVED FROM 5143C × 5143 CROSSES AND OTHER VARIETIES RELATIVE TO HC—101

TABLE 5.—Values expressed either as percentage deviations from HC—101 taken as 100, or as plus (+), Zero (o), or negative (—) deviations from HC—101

	Selections		*Yield of Seed Cotton*	*Ginning Percentage*	*Lint Index*	*Average Halo length*	*Neps Percentage*	*Bacterial blight resistance*
1.	5143C × 5143	S — 39	—12	—1	—3	0	—2	—
2.	5143C × 5143	S — 36	—7	—3	—4	0	0	—
3.	5143C × 5143	S — 18	—31	—3	9	—1	—4	—
4.	M—561	S — 12	—9	0	—2	—1	—18	—
5.	M—561	S — 18	—20	—5	—1	3	—3	—
6.	ML	S — 31	—30	—1	5	—2	27	—
7.	CO3	S — 6	—4	2	—1	—12	7	—
8.	5143C	06	—6	—1	—5	—1	—1	—