

THE EFFECT OF PICKING DATE OF PARENT SEED ON SOME ECONOMIC CHARACTERS OF THE COTTON PLANT

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Introduction. The variation in the characters of cotton bolls picked at different parts of the season is a phenomenon familiar to cotton breeders. A gradual and pronounced decline in the values of these characters with the advance of the season is also a common experience. It often happens that seed material obtained from a portion of the picking period is used to raise the subsequent year's crop. A knowledge, therefore, of the influence of these parental variations on the characters of the progeny will be useful, particularly in breeding work on Cotton. Some aspects of this study are presented in this paper.

Characters Investigated. Observations on the following characters of cotton bolls are included in the present study:

- (1) Ovules (per lock).
- (2) Seeds „ „
- (3) Fertility index (% of ovules maturing to seeds).
- (4) Seed cotton weight, per seed (in m. gms.)
- (5) Seed weight, per seed „ „
- (6) Lint weight, per seed „ „
- (7) Ginning percentage.
- (8) Lint length per seed (in m. ms.)

Material and Methods. Culture 54, a pure line of *G. indicum*, was grown at the Agricultural Research Station, Nandyal, Kurnool District during the seasons 1929—30 and 1930—31 for purposes of the present study. During the first year of the experiment, 150 plants in one row of the seed multiplication plot of No. 54 Cotton were marked out for purposes of 'selfing' the flowers. Picking of bolls was done at intervals of three days. The culture was 'selfed' during all generations to ensure genetic purity. Healthy material from three-locked bolls (this category being the most common in the selection) of each harvest was examined for the boll characters. All available locks of each picking date were examined in determining the average number of ovules and seeds per lock. For *Kapas*, seed and lint weights, one hundred representative seeds from each group were taken or as many as were available, if less than 100. For the study of lint length, six third position seeds from random locks were used (Ramanatha Ayyar and Jagannatha Rao, 1930) the method of fibre length determination being the one adopted by Hilson (1923). In order to study the effect of these variations on the characters of the progeny, the seeds from alternate lots of material picked at three-day intervals were sown during the

year 1930-31 and the flowers protected from foreign pollen. The seed-cotton obtained from the progeny of each lot was examined for the same set of eight characters.

Results. The appended charts show the variations in the parental characters during the year 1929-30.

The characters, Kapas, seed and lint weights exhibit a gradual fall from the beginning of the season to the end, the respective percentages of decrease being 38, 41 and 41. These observations are mostly in agreement with those of several other workers on cotton. Zaitzev and Gusteva (1928) working on short-stapled Upland cotton observe "that seed-cotton undergoes considerable changes dependent on the age of the cotton plant and that characters such as the weights of seed-cotton, seed and lint per seed decrease with the age". Patel and Mann (1928) working on *Broach deshi* cottons observe: "Generally, there seems to be a marked tendency for both the characters (seed and lint weights) to decrease in the later developed parts of the plant and in the younger parts of branches". Venkatraman (1930) concludes from a study of an *Uppam* (*G. herbaceum*) culture that there is a general tendency for the characters, seed and lint weights, to decline towards the later formed bolls. The present writer (1931) has shown a similar decline in the characters, kapas, seed and lint weights, in the case of *Karunganni* cotton (*G. indicum* of Tinnevely). A perusal of the chart shows that the decline in the case of ginning percentage is not very pronounced. In the investigations of Zaitzev and Gusteva (1928), out-turn of lint decreases with the age of the plant.

As regards lint length also, a fall (11%) is seen to occur in the cotton under study. This is in agreement with Venkatraman's (1930) finding and opposed to that of Zaitzev and Gusteva (1928).

The data pertaining to ovules and seeds per lock do not show a decline from the beginning of the flowering phase towards later stages, but a rise accompanied by a decline in value is seen. Venkatraman (1930) finds no effect on these characters with differences in the flowering period.

In Table 1 are presented the parental and the progeny averages pertaining to the several lots of seed sown during 1930-31 and Table 2 shows the parental and the progeny general means and standard deviations for each character.

As opposed to the wide variability of the parent, it is seen that the progeny characters vary only to a limited extent. Although the parental values chosen for sowing varied from 80-54, 55-37 and 26-17 m. gms. per seed in the case of *Kapas*, seed and lint weights respectively and 7.0-6.2 and 6.8-5.8 ovules and seeds per lock, the variation in the case of the progeny characters is seen to be very low. The corresponding ranges are 72-69, 52-49 and 22-20 m. gms. per seed and 6.5-6.1 ovules and 6.1-5.8 seeds per lock, respectively.

These figures together with the general means and standard deviations cited in Table 2 clearly show that the progeny averages of the characters regress towards the means of the respective parental characters irrespective of the character of the seeds sown. The seasonal influence has modified the means to a slight extent in the case of some characters such as ovules and seeds per lock and seed and lint weights. The seasonal and environmental factors affect the values of any character of the progeny of a pure line in a plus or minus direction, though during any given season some characters are affected in a positive and some in a negative direction while some are not influenced at all.

Conclusion: For purposes of the study of economic characters in breeding work on cotton, it often happens that only a portion of the plant produce usually at the time of heavy picking is gathered for the study of characters and for the subsequent sowings. The result that the picking date of parent seed has no effect on the progeny plant is in the welcome direction and this knowledge can be made use of in purification studies.

Summary. An experiment conducted at the Nandyal Agricultural Research Station during the two seasons 1929—30 and 1930—31 to see the effect of picking date of parent seed on some economic characters of the progeny plants in a pure line of *indicum* Cotton has shown that:

(1) the boll characters like *Kapas*, seed and lint weights distinctly decrease in value as the season advances, while lint length and ginning percentage show only a slight falling off;

(2) in the case of ovules and seeds per lock, the decline is preceded by a rise;

(3) the high or low parental value occurring as a seasonal variation has no influence on the progeny average, and

(4) except as modified by the seasonal and environmental influences surrounding the progeny, the average of the off-spring tends to regress to the mean value of the parent.

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Table 1.
Parental & Progeny Averages.

Parental picking date	Ovules per lock		Seed per lock		Fertility index per cent.		Seed-cotton weight per seed, m. gm.		Seed weight per seed, m. gm.		Lint weight per seed, m. gm.		Ginning percentage.		Lint length, m. m.	
	Parent	Progeny	Parent	Progeny	Parent	Progeny	Parent	Progeny	Parent	Progeny	Parent	Progeny	Parent	Progeny	Parent	Progeny
1930																
23/1	6.7	6.3	6.3	5.9	94	94	80	71	55	50	25	21	31	30	26	25
29/1	7.0	6.5	6.8	6.1	97	94	77	71	51	50	26	21	34	30	26	25
4/2	6.4	6.2	6.3	6.0	98	97	79	72	55	50	24	22	30	31	26	25
10/2	6.2	6.1	6.0	5.8	97	95	74	69	53	49	21	20	28	29	25	25
16/2	6.7	6.1	6.4	5.8	96	95	70	70	48	49	22	21	31	30	25	25
22/2	6.6	6.1	6.4	5.9	97	97	69	72	48	51	21	21	31	29	25	25
28.2	6.6	6.1	6.1	5.8	92	95	66	72	45	50	21	22	32	31	21	25
6.3	6.7	6.1	6.3	5.9	94	97	57	72	39	52	18	20	32	28	24	25
12.3	6.3	6.3	5.8	5.9	92	94	54	71	37	50	17	21	31	30	24	25

Table 2.
Parental & Progeny general means & standard deviations.

Character	Parent. 1929—30.			Progeny. 1930—31.		
	Average	Standard deviation	Coeff. of variability	Average	Standard deviation	Coeff. of variability
Ovules per lock	6.50	± .29	4.4	6.24	±0.15	2.4
Seeds per lock	6.20	± .33	5.4	5.91	±0.14	2.4
Fertility index	95.50	±2.55	2.7	95.50	±1.73	1.9
Seed-Cotton weight	70.26	±9.52	13.6	71.06	±0.90	1.3
Seed weight	48.74	±7.09	14.5	49.94	±0.90	1.8
Lint weight	21.69	±3.03	14.0	21.06	±0.90	4.3
Ginning per cent.	30.81	±1.69	5.5	29.78	±1.00	3.3
Lint length	25.26	±0.90	3.6	25.00	Nil	Nil

VARIATION IN PARENTAL CHARACTERS.

(1929-30)

