



## EFFECT OF DELAYED PICKING ON FIBRE QUALITIES OF COTTON

\*A. A. BANDESHA, M. ASLAM and M. B. CHAUDHARY

Nuclear Institute for Agriculture and Biology, Faisalabad, Pakistan

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The present studies were conducted in the Fibre Testing Laboratory of NIAB Faisalabad with three cotton varieties (NIAB-78, SLS-1 and CIM-240) in triplicated trials conducted for two years. Two hundred opened bolls of these varieties were tagged on 15 October and the samples were picked after every fortnight upto 15 February for fibre analysis. The results showed that fibre strength was significantly reduced due to delayed picking. The staple length was also reduced but the results were non-significant. The Micronaire value was least affected by the weathering of seed cotton in the field. Although the results on fibre maturity were non-significant, there was slight improvement due to delayed picking.

**Keywords:** Fibre technology, Delayed picking, Fibre qualities, Weathering effect, Cotton, Pakistan

### 1. Introduction

Cotton fibre exhibits pronounced variations in its physical characteristics. It is a common experience of plant breeders that the best fibre quality characters can rarely, if ever, be combined with yield. That is why, no single ideal variety of cotton has been evolved which can fulfill all the requirements of textile industry as well as cotton growers. Due to its variable nature, the cotton fibre varies much with the environmental conditions prevailing in the cotton growing areas of Pakistan. There is no alternate crop, hence, cotton is grown on almost the whole area and becomes ready for picking at one time. Mechanical pickers are not available therefore, cotton is hand picked. The cotton growers face much problem when lady pickers are not available and picking of seed cotton is delayed in some cases upto Feb./ March. In this way, cotton lint is exposed to environment for a longer time. Considering this situation, the present experiment was conducted to study the weathering effect on fibre properties of cotton lint irrespective of the variety, by exposing it to field environment for different time lengths. Some research work has been reported on this topic. Buxton [2] reported that the upper half mean length of cotton plant was reduced significantly by 10 week weathering period. The weathering reduced the staple length and fibre strength by about 0.8 percent per week. Raingard [7] reported that the staple length, Micronaire and fibre strength was

decreased from first to third pick. Delayed picking generally lowered the grade and reduced length and strength of fibre. According to the studies of Basinski et al [3] fibre length was consistently and markedly affected by weather, being reduced on average by 0.7 percent per week of exposure ; the uniformity and extensibility were also adversely affected. Micronaire value was not affected but the loss of fibre strength increased with the length of exposure. Quensenberry and Kohel [6] stated that the varieties differed significantly in all characters studied except number of seed per boll. They also reported that the environment significantly influenced the rate of elongation, fibre dry weight, fibre length and fineness. Salam et al [10] reported that the fibre strength decreased with the delayed picking. Willium [11] reported that the fibre strength was temperature sensitive and decreased upto 7 percent when exposed to low temperature.

### 2. Materials and Methods

The experiment was conducted during 1993-94 and repeated during 1994-95 to confirm the results, at NIAB Experimental Farm. Three cotton varieties namely, SIS-1, CIM-240 and NIAB-78, were used. The varieties were sown in three replicates. Two hundred newly opened bolls of these varieties from three replications were tagged on 15 October. The samples of seed cotton collected from each variety and each replicate on this date were treated as control. Sample collection

\* Corresponding author : niab@fsd.paknet.com.pk

of seed cotton was continued from the tagged bolls every 15 days upto 15 February. Samples of seed cotton from two consecutive pickings were bulked to increase time span (one month) for increasing the delaying effect of picking on fibre quality of cotton. After ginning, the samples were analyzed for staple length, fibre strength, fineness and maturity in fibre testing laboratory at NIAB Faisalabad according to the standard methods [1]. The individual fibre strength index was calculated by the following formula [8].

$$\text{Individual Fibre Strength Index} = \frac{\text{Fineness} \times 0.464 \times \text{P.I.}}{1000}$$

Where, P.I. is Pressley Index, 0.464 is a constant.

Finally, the mean values of two years data (1993-94 and 1994-95) were calculated for statistical analysis to see the average effect of delaying on quality traits. This average data were analysed by analyses of variance Steel and Torrie [9] and the mean values were compared by the Duncan's Multiple Range (DMR), Test Steel and Torrie [9].

### 3. Results and Discussion

The mean values of staple length, fibre strength, individual fibre strength index, fibre fineness and fibre maturity as influenced by varieties and dates of sampling are shown in Tables 1 and 2, respectively.

#### 3.1. Staple length

The data on staple length (Table 1 and 2) showed non-significant differences among dates, but significant differences were found among varieties. Cotton variety SLS-1 gave the highest staple length of 27.634 mm followed by NIAB-78 with mean value of 26.930 mm, whereas CIM-240 gave the lowest staple length of 26.777mm. Although differences among the dates of picking were non-significant, the data showed slight deteriorating effect on staple length due to weathering, and the effect increased with the length of weathering period. The results were confirmed by the findings of other workers [3-5] who reported that the staple length was strictly a genetic character and weathering had an adverse effect on it.

Table 1. Mean values of fibre characteristics as a function of cotton varieties.

Varieties	Staple Length (mm)	Fibre Strength (000/psi)	Individual Fibre Strength Index (lbs/0.464in)	Fineness ( $\mu\text{g/in}$ )	Maturity Index (%)
NIAB-78	26.930 a	89.880 b	0.0180 b	4.703 c	80.800 b
CIM-240	26.777 b	86.307 c	0.0190 a	5.191 a	82.320 a
SLS-1	27.634 a	94.520 a	0.0200 a	4.869 b	81.013 b

Table-2. Mean values of fibre characteristics as a function dates of picking.

Dates of Picking	Staple Length (mm)	Fibre Strength (000) psi	Individual Fibre Strength (lbs/0.464in)	Finenes ( $\mu\text{g/in}$ )	Maturity Index (%)
15 OCT.	27.389a	92.144a	0.0190b	4.896a	81.233a
15 NOV.	27.300a	92.178a	0.0200a	4.966a	81.311a
15 DEC.	27.050a	89.711b	0.0190b	4.921a	81.200a
15 JAN.	26.916a	89.144b	0.0190b	4.889a	81.489a
15 FEB.	26.911a	88.000b	0.0190b	4.933a	81.656a

### 3.2 *Fibre bundle strength and individual fibre strength index*

The data (Tables 1 and 2) indicated significant differences among the varieties and the dates of picking on individual fibre strength index as well as bundle fibre strength. Cotton variety SLS-1 proved to be the strongest with mean value of 94.52, followed by variety NIAB-78 with mean value of 89.88, whereas variety CIM-240 was the lowest in fibre bundle strength with mean value 86.31. In case of individual fibre strength index, SLS-1, CIM-240 and NIAB-78 had the mean values 0.0200, 0.0190 and 0.0180 respectively. The mean values of dates of picking in case of fibre bundle strength as well as individual fibre strength index showed quite similar trend in reduction of strength with the length of weathering period. The data indicated the most adverse and deteriorating effect of seed cotton exposure in the field on fibre strength. The findings are supported by other workers [4,2,6,7, 10 and 11] who reported very serious reducing effect of weathering on strength of cotton fibre.

### 3.3 *Fibre fineness*

Tables 1 and 2 revealed that the mean values of varieties were significantly different whereas those of dates were non-significant. The variety NIAB-78 with mean micronaire value of 4.703 proved to be the most desirable followed by the variety SLS-1 with mean micronaire value of 4.869. The variety CIM-240 with mean micronaire value of 5.191 proved to be the most coarse cotton variety. The present studies are confirmed by the results of [3 and 6].

### 3.4 *Maturity index*

The data on maturity index (Tables 1 and 2) showed that the differences among varieties were significant, while those among the dates of picking were non-significant. The cotton variety CIM-240 with mean fibre maturity value of 82.320 produced the most mature fibres, followed by the variety SLS-1 (81.013), and NIAB-78 (80.800) whose fibre

maturity values were non-significant among themselves. The data showed that differences among the dates of picking were non-significant, but the maturity of fibre tended to improve with the length of weathering period in the field. The present results are supported by the findings of [6].

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