Life Sci. Int. J.

GINNING OUTTURN AND FIBER CHARACTERISTICS AS AFFECTED BY DIFFERENT PICKING DATES

Munaiza Baloch[1], Noor-un-Nisa Memon[2], S.N. Mari[1] and Z.A. Soomro[1]

[1]Department of Plant Breeding and Genetics, Sindh Agriculture University, Tandojam, Pakistan
[2]Department of Horticulture, Sindh Agriculture University, Tandojam, Pakistan
Corresponding Author's Email: munaizabaloch@yahoo.com

ABSTRACT
Effect of four picking dates (from 1st October to 16th November with 15 days interval) on ginning outturn and fiber characteristics was studied on five cotton cultivars in an study conducted during 2001-2002 at Cotton Section, Agriculture Research Institute, Tandojam. Results revealed that ginning outturn was less in early pickings, then gained its momentum and reached at maximum in 1st November picking, after which it again declined. The staple length was high during early pickings and then it declined to some extent with the progress of picking season. Maturity ratio, fineness and fibre strength had maximum values during first picking date (1st October), afterwards showed sharp decline with each successive picking. The lowest values were recorded during the last picking date (16th November).

KEYWORDS: Cotton (*Gossypium hirsutum*), picking dates, ginning outturn, fiber characteristics

INTRODUCTION

Cotton is the backbone of Pakistan's economy playing crucial role for country's uplift. High ginning outturn of cotton cultivars definitely plays important role for higher lint production in the country and the ginner takes the benefit. Similarly, keeping fiber characteristics to the desirable level also provide benefit to the textile industry. The picking dates definitely have the effects on fiber characteristics and their know how is must for picking the particular cultivars during the right time so that the desired level of the parameters may not negatively be disturbed. Therefore present studies were conducted on five cultivars of cotton to establish weathering effect on ginning outturn and fiber characters under Multan conditions to provide valuable suggestion to breeders, researchers, ginners and spinners to put their efforts on right path.

Salam *et al.* (1998) studied the effect of picking dates on seed index, seed maturity and seed germination and concluded that there was significant decrease in seed index and seed germination with the progress of picking season. The seed maturity showed significant increasing trend as picking season progressed, however, they were of the opinion that the varietal differences for seed index were non significant, whereas, for seed immaturity and seed germination were non significant.

Salam *et al.* (1993) demonstrated that staple length was slightly less in 15th October picking and reached its maximum in 1st November picking after which it constantly declined till 15th December picking. The micronaire value, fiber strength and fiber maturity had maximum values in 15th October picking and showed sharp decline with each successive picking and were the lowest in 15th December picking. The uniformity ratio was also highest in the 15th October picking and showed declining trend with the progress of picking season.

Salam *et al.* (1993) conducted studies on fortnightly pickings and reported that ginning outturn was lowest in picking done on 15th October and increased with each picking till it reached its maximum value in picking done on 1st December and then declined there after. The seed index had maximum value in 15th October picking and then showed sharp decline with the progress of picking season. The lint index did not show much variation in first three pickings done from 15th October to 15th November but declined in last two pickings.

Choudhry *et al.* (1987) studied the effect of picking intervals on fiber characters of cotton and reported that ginning outturn increased in 42 days and 56 days in B-557 and MNH-93 respectively after which it decreased in the last picking (70 days). Fiber length and strength also decreased with the delay in pickings. Uniformity ratio and fiber elongation were not affected significantly by weather conditions or by withholding the open bolls on the plant for longer period. Finer staple was observed in the early as well as late pickings.

Anonymous (1985) reported a distinct decrease in micronaire as harvesting dates moved from September, 21 to end of November. Since the boll formation on cotton plant continues for about 50-60 days under the influence of different climatic and agronomic conditions, therefore the fiber quality of bolls set on different days is likely to differ. Ahmad and Channa (1984) reported that the ginning outturn increased progressively

in picking done up to 23rd November after which there was slight decline. Khan (1981) studied the effect of picking dates on different fibre characters and observed that the fibre strength was higher in first picking and progressively decreased in the late pickings.
The present studies were conducted to explore the effect of picking dates on ginning outturn and fiber characteristics under the climatic conditions of Tandojam, Sindh, Pakistan.

MATERIALS AND METHODS
The studies were conducted on five commercial varieties (CIM-240, Karishma, FH-634, CIM-443 and Niab-78 at Cotton Section, Agriculture Research Institute, Tandojam. The experiment was planted during June 2000-2001 in randomized block design replicated twice having plot size of 30' x 10'. The crop was grown under normal inputs and was properly protected from insect pests according to the requirement of the crop. Ten consecutive plants of each variety from each replication were picked at fortnightly intervals from 1st October to 16th November. The seed cotton was ginned on small 10-saw ginning machine to work out ginning out turn. Following fibre characters were studied on at least two samples from each repeat.

Staple length
Fibre length was directly determined from the fibrograph of the samples ginned for ginning out turn.

Uniformity ratio
It was worked out from an estimate of upper half-mean length and mean length following the formula;
U.R. %=50% S.L. /2.5 S.L. × 100

Fibre Strength
Strength was determined on pressely strength tester as Fibre strength= Breaking loads in lbs × 10.81/Sample weight in milligram.

Fibre Fineness
Determined on Fineness meter

Maturity ratio
Determined on fineness maturity tester

RESULTS AND DISCUSSIONS
Analysis of variance data regarding five characters studied are depicted in Table-1. The data regarding effect of picking dates on various characters are given in Table-2. Mean performance of different varieties on different picking dates in respect of different varieties for five characters studied are given in Table-3. The results are discussed under separate headings:

Ginning Outturn (GOT)
The data presented in Table-3 revealed that GOT increased from 33.07% to 35.47% when readily opened bolls were allowed to stand on the plants for 31 days. Slight decrease was observed in this character when further delay in picking was done. Ahmad and Channa (1984) also reported similar results by concluding that the ginning outturn increased progressively when picking was done up to 23rd November after which slight decrease was observed. Choudhry *et al.* (1987) also opined that ginning outturn increased during 42 days and 56 days of picking after which it decreased when the picking was done after 70 days. Salam *et al.* (1993) reported that ginning outturn was lowest in picking done earlier and then increased with each picking till it reached its maximum value. The data presented in Table-2 showed that GOT was maximum in the third picking done on 1st November except Niab-78 in which it was maximum on 16th October. It was further revealed that when picking was done on 1st November GOT was high and then it declined with progressive picking. The statistical analysis in Table-1 showed that difference among picking dates was highly significant. The interaction of varieties x picking dates and the differences among the varieties for this character were also significant.

Staple length
Staple length was also affected by the picking dates. In all varieties the deterioration trend in fibre length is very clear from Table-2. If we allow the seed cotton at the mercy of weathering or to stand for longer period, it drastically declines in late pickings. On the basis of average of all varieties, staple length was 27.05 mm in 1st October picking, it reached its maximum (27.68 mm) in 16th November picking and declined thereafter reaching the minimum (26.51 mm) in 16th November picking. The results are in conformity with the findings of Choudhry *et al.* (1987) who reported that fiber length and strength also decreased with the delay in pickings. Salam *et al.* (1993) also reported similar results that staple length

was slightly less in 15th October picking and reached its maximum in 1st November picking after which it constantly declined till 15th December picking. The statistical analysis showed highly significant differences among varieties as well as picking dates. The interaction of varieties x picking dates was also highly significant.

Fibre strength

The data presented in Table-2 showed that the fibre strength was highest in all varieties in 1st October picking (104.25) and then it showed decrease with each picking till it became weakest in the last picking (98.81) which was done on 16th November. On an average basis, fiber strength was recorded on higher side on 1st October picking and then it declined with progressive pickings. These results are in conformity with those of Choudhry *et al.* (1987) who reported that fiber strength decreased with the delay in pickings. Salam *et al.* (1993) demonstrated that fiber strength had maximum values in 15th October picking and showed sharp decline with each successive picking and were the lowest in 15th December picking. Khan (1981) also observed that the fibre strength was higher in first picking and progressively decreased in the late pickings. The differences among the varieties, picking dates and the interaction of varieties and picking dates were highly significant.

Fibre fineness

Table-1 shows that in all varieties, the differences among the varieties, picking dates and interaction of picking dates x varieties are highly significant. The data presented in Table-2 revealed that the micronaire value was highest in 1st October picking (5.048) in all the varieties. It gradually decreased with each picking and reached the minimum in 16th November picking (4.613).

Maturity ratio

The data presented in Table-2 suggested that the fibre maturity was maximum in the first picking done on 1st October and minimum in last picking done on 16th November. On an average of all the varieties, the fibre maturity was (0.974) in 1st October picking and was the lowest (0.923) in 16th November picking. The statistical analysis showed that the difference among picking dates and varieties were highly significant. The interaction of varieties x picking dates was also significant.

CONCLUSION

The results showed that there was sharp decline in the values of fibre maturity, micronaire and fibre strength. In fact these characters are very much inter-related. The mature fibres have highest micronaire value and strength, whereas, the immature fibres have less micronaire value and low strength. There is more deposition of cellulose on the fibre during longer days in the early-formed bolls. Therefore earlier pickings have mature fibre, higher micronaire value and higher strength, whereas in late-formed bolls the fibre maturity decreases and resultantly micronaire value and fibre strength also decreases. The fibre length did not show that much decline with the progress of picking season as fibre maturity, micronaire value and fibre strength because might being influenced by environmental conditions. The uniformity ratio was least affected with the progress of picking season. Early pickings have lower ginning out turn as compared with late pickings.

Table-1: Analysis of variance (F values) for different fiber characters

Source of variation	D.F	Ginning outturn	Staple length	Fibre strength	Fineness	Maturity ratio
Replication	1	3.05 $^{N.S}$	3.30$^{N.S}$	0.77 $^{N.S}$	0.77$^{N.S}$	0.01 $^{N.S}$
Varieties	4	56.68**	50.18**	66.40**	21.41**	17.93**
Error I	4					
Picking dates	3	24.04**	27.24**	61.40**	46.63**	7.97**
Varieties x Picking dates	12	9.71**	4.45**	9.20**	9.76**	2.73*
Error II	15					
CV%		1.85	2.48	1.08	1.96	0.95

N.S **=** Non significant ***** = Significant ****** = Highly significant

Table-2: Effect of picking dates on fibre characters of five commercial varieties

Characters	Picking dates				C.D. %	
	1/10	16/10	1/11	16/11	1%	5%
Ginning outturn	33.07^{C}	34.43^{A}	35.47^{B}	34.31^{A}	0.84	0.60
Staple length	27.05^{A}	27.68^{B}	26.98^{A}	26.51^{C}	0.38	0.28
Fibre strength	104.25^{A}	101.37^{B}	99.77^{C}	98.81^{D}	1.27	0.92
Maturity ratio	0.97^{A}	0.95^{AC}	0.95^{AC}	0.92^{B}	0.03	0.02
Fineness	5.05^{C}	4.73^{B}	4.63^{A}	4.62^{A}	0.12	0.09

Table-3: Mean values in respect of picking dates for different varieties

Characters	Picking Dates	Varieties				
		CIM-240	Karishma	FH-634	CIM-443	Niab-78
Ginning outturn	**1/10**	30.90	36.80	30.80	34.95	31.90
	16/10	33.90	33.80	33.70	36.35	34.40
	1/11	36.50	37.00	35.10	35.60	33.15
	16/11	34.55	35.60	34.05	34.55	32.80
	AVERAGE	**33.96**	**35.80**	**33.41**	**35.36**	**33.06**
Staple length	**1/10**	28.35	26.70	26.20	27.20	26.80
	16/10	28.50	27.40	27.55	27.30	27.65
	1/11	27.65	25.95	26.80	26.95	27.55
	16/11	27.00	26.80	26.35	26.20	26.20
	AVERAGE	**27.88**	**26.71**	**26.73**	**26.91**	**27.05**
Fibre strength	**1/10**	106.05	111.05	102.60	97.60	103.95
	16/10	102.65	108.00	98.85	97.25	100.10
	1/11	99.45	103.80	97.30	95.35	102.95
	16/11	97.50	109.90	95.05	93.90	97.90
	AVERAGE	**101.41**	**108.19**	**98.45**	**96.03**	**101.23**
Fineness	**1/10**	5.20	5.02	5.04	4.90	5.09
	16/10	4.47	4.91	4.63	4.83	4.82
	1/11	4.23	4.81	4.48	4.74	4.88
	16/11	4.50	4.92	4.10	4.92	4.65
	AVERAGE	**4.60**	**4.92**	**4.56**	**4.85**	**4.86**
Maturity ratio	**1/10**	0.94	1.01	0.99	0.96	0.98
	16/10	0.90	1.04	0.92	0.93	0.97
	1/11	0.90	1.00	0.94	0.97	0.96
	16/11	0.92	0.96	0.87	0.96	0.91
	AVERAGE	0.92	1.00	0.93	0.96	0.96

REFERENCES

Ahmad, M. and M.H. Channa, 1984. Effect of different pickings on seed and lint characters in *G. hirsutum* L. The Pak. Cottons. 28(4): 301-313.

Anonymous, 1985. The effect of harvesting dates on cotton fibre quality. Texas Tech. Univ., Lubbock, Texas, U. S. A. 13 (8).

Choudhry, M. R., A. Salam and M. A. Tariq, 1987. Effect of picking intervals on some fiber characters of cotton. The Pakistan Cottons, Vol. 31 (1): 47-54.

Khan, Z. (1981). Cotton quality in relation to the dates of picking. The Pak. Cottons. 25(3); 181-190.

Salam, A., M. Arshad and M. Afzal, 1993. Effect of picking dates on ginning outturn, seed and lint indices of four commercial cotton varieties of *G. hirsutum L*. The Pakistan Cottons, Vol. 37 (2): 75-79.

Salam, A., M. Arshad and M. Afzal, 1993. Effect of picking dates on fiber characters of different commercial cotton varieties of *G. hirsutum L*. The Pakistan Cottons, Vol. 37 (2): 67-74.

Salam, A., M. Arshad and R. Ali, 1998. Effect of picking dates on seed index, seed immaturity and seed germination of three commercial cotton varieties of *G. hirsutum L*. The Pakistan Cottons, Vol. 42 (1&2): 30-37.