Pak. J. Biotechnol. Vol. 6 (1-2) 109-113 (2009) ISSN. 1812-1837

EVALUATION OF COTTON RELEASED/CANDIDATE VARIETIES UNDER DIFFERENT SOWING DATES AT TANDOJAM CONDITIONS

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ABSTRACT

A field study was conducted to evaluate the cotton released/candidate varieties under different sowing dates for the qualitative and quantitative characters at Nuclear Institute of Agriculture (NIA) Tando jam. Three sowing dates viz., 15th April, 15th May and 15th June and three varieties and one candidate variety were tested respectively. The result revealed that the highest mean (2983 kg ha^{-1}) seed cotton yield has got sowing date two 15th May where as lowest mean (1996 kgs/ha) seed cotton yield in sowing date 15th June. The mean values of all varieties showed more seed index (8.34g) and highest (90%) germination percentage in sowing date 15th April and 15th May. The highest GOT% (35.42) and germination percent (89%) were recorded in 15th May sown crop. It was found that the delaying sowing date significantly decreased yield and yield contributing parameters.

INTRODUCTION

Cotton (*Gossypium hirsutum* L.) is an important cash crop and a primary source of foreign exchange earnings. It accounts for 7.5% of value added in agriculture and about 1.6% to GDP of Pakistan (GOP, 2007 - 08). Cotton yield is variable and dependent on varietal potential, envi-ronment and the pest management. Among agronomic factors, sowing time is considered a key factor to harvest profitable seed cotton yield. Maximum seed cotton yield was produced when it was sown on 15th April and 1st May. Arain *et al.*, (2001) revealed that 15th May and 1st June sown cotton displayed significantly higher seed cotton yield than other sowing dates.

Delayed sowing in July resulted in poor yield performance. Like wise, Arshad *et al.,* (2007) studies sowing dates of four cotton cultivars belonging to Punjab (CIM-496, CIM-506 and NIAB-111 and SLH-284). The highest yield was produced by SLH-284 (1463kg ha^{-1}), followed by NIAB-111 (1347 kg ha^{-1}), when planted on 20th May. Effect of sowing dates (15th April, 15th May and 15th June) on total biomass content of stems, leaves and fruits of cotton genotypes Qalandri, DS-67-3A and NIAB-78 was checked. Delayed sowing increased the period from sowing to seedling emergence, 1st square, first flower, first open boll and plant survival decreased (Hosny and Shahine 1995).

MATERIALS AND METHODS

Seed of three released (Sadori, Chandi-95 Malmal and one candidate (NIA-77) varieties were planted on 15th April, 15th May and 15th June, 2008 to evaluate their performance of released/candidate cotton varieties under different sowing dates at Nuclear Institute of Agriculture Tando Jam. The seeds were sown on ridges at the distance of 75 cm and plants carried out finally thinned at 30cm in $36m^2$ plot with 4 replicates. The experimental design was RCBD (Factorial). All the agronomical and plant protection measures were managed properly.

RESULTS AND DISCUSSIONS

Meteorological data regarding to cotton growing season of 2007- 2008 were given in Table- 1. The mean minimum (21°C, 20°C) and maximum (40°C, 39°C) temperature respectively in the month of April, and May were recorded in both years 2007 and 2008. The effects of favorable temperatures were used for squaring and flowering period. From sowing to squaring and boll formation such high temperature i-e 39°C, 40°C, 40.8°C respectively in the months of April, May accelerated quick germination and healthy development of root zones which motivated the nutrient uptake from the soil which help healthy growth of cotton plant (Noor-ul-Islam 2004-05). Relative humidity percent were moderate in the month of May in both years where as high humidity percent at par recorded in both years in the months of June, July, August and September which are not feasible for seed cotton.

Ginning out turn %: Ginning out turn is the ratio between the lint weight and the seed weight. This is an important character because varieties with high ginning out turn fetch higher price in the market. The data on GOT% given in Table- 2 showed that the highest mean values of GOT% (35.42%) has got 15th May sowing date followed by mean GOT% (34.34%) in sowing dates 15th April and 15th June respectively. The results w**ere** fully supported by Oad *et al.*,(2002) who also observed that medium sowing of 10th May produced the highest GOT% (34.56%) in cotton variety Rehmani as compared to other sowing dates (10th April and 10th June). The differences among the different sowing dates and varieties were statistically significant.

$$GOT\% = \frac{\text{Lint weight}}{\text{Seed Cotton Yield}} \times 100$$

Staple length (mm): The staple length (mm) data given in Table-3 depicted that the highest mean staple length mm (29.38mm) has got sowing date 15th May followed by (27.86mm) staple length in 15th April. The inter-action of sowing dates and varieties were highly significant statistically.

Table-2: Mean values of ginning out turn percentage of varieties on different sowing dates.

Sowing Dates	Sadori	Malmal	NIA-77	Chandi-95	Mean
15th April	27.27cd	27.46cd	28.00bc	28.73ab	27.86ab
15th May	29.03a	29.32a	29.38a	28.85ab	29.14a
15th June	26.96d	26.94d	27.08cd	26.81d	26.95c

Seed index (g): Timely sowing had also shown positive effect on quality traits of cotton, such as seed index (Chandio *et al.*, 2005).The maximum 100 cotton seed weight (8.25g) produced in 10th May sown crop (Arshad *et al*., 2007). Seed index data presented in Table-4 showed that highly significant seed index found among all varieties in 15th May. The mean maximum seed index (g) (8.34g) observed in 15th may sown crop while minimum (5.5g) seed index in 15th June. The interaction of sowing dates and varieties were highly significant statistically.

Table-3: Mean values of Staple Length (mm) of varieties on different sowing dates.

Sowing Dates	Sadori	Malmal	NIA-77	Chandi-95	Mean
15th April	5.8 9bc	5.8 0bc	5.9 3bc	6.1 4b	5.9 4b
15th May	8.4 4a	8.2 5a	8.3 0a	8.3 8a	8.3 4a
15th June	5.2 5d	5.2 5d	5.5 0cd	6.0 0b	5.5 bc

Table-4: Mean values of seed index (g) of varieties on different sowing dates.

Sowing Dates	Sadori	Malmal	NIA-77	Chandi-95	Mean
15th April	34.25cd	34.35bcd	34.53bcd	34.23d	34.34ab
15th May	34.50bcd	35.70ab	35.61abc	35.97a	35.42a
15th June	34.41bcd	34.25d	34.24d	34.23d	34.28ab

Germination %: The data on germination % given in Table-5. The mean maximum germination percentage (89%) was obtained in 15th May sown crop in all varieties where as minimum germination percentage (67%) noted in 15th June sowing date. The interaction of sowing dates and varieties were highly significant statistically.

Table-5: Mean values of germination percentage of varieties on different sowing dates.

Sowing Dates	Sadori	Malmal	NIA-77	Chandi-95	Mean
15th April	70bc	71b	70bcd	71b	71b
15th May	90a	88b	91a	89ab	89.5a
15th June	66cd	68bcd	66d	68bcd	67c

Seed cotton yield (kg ha^{-1}): Seed cotton yield of different varieties affected by different sowing dates given in Table-6. It was seen that the highest mean seed cotton yield (2983 kg $^{-1}$ ha) obtained in 15th may sown crop while the minimum seed cotton yield (1996 kg $^{-1}$ ha) in sowing date 15th June. The interaction between sowing dates and varieties was highly significant. Beginning of May sown crop gave significantly higher seed cotton yield than other sowing dates (Dilbaugh *et al.*, 2003). Seed cotton yield was decreased by delaying sowing after July. They further observed that higher seed cotton yield due to early sowing was mainly attributed to higher number of open bolls and seed cotton weight per plant (Itnal *et al.*, 1993). It was found that the highest seed cotton yield was obtained from 1st May sowing date (4196 kg ha^{-1}) (Taner *et al.*, 2006).

Table-6: Mean values of seed cotton yield (kg ha^{-1}) of varieties on different sowing dates.

Sowing Dates	Sadori	Malmal	NIA-77	Chandi-95	Mean
15thApril	2153b	1973b	2242b	2242b	2153b
15thMay	2960a	2960a	3050a	2960a	2983a
15thJune	2063b	1973b	1973b	1973b	1996 c

The analysis of variance reveals that in Table-7 the parameters ginning out turn percentage, staple length(mm), seed index, germination percentage and seed cotton yield (kg ha^{-1}) were highly significant in sowing dates where as same parameters were non significant in varieties. The inter-action between varieties and sowing dates were found also non significant.

CONCLUSION

For a healthy crop growth and better seed cotton crop needs a proper sown at the field.

It is concluded that the above facts that the timely sown crop will increase the yield and yield contributing parameters than the early and late sowing.

Table-1: The minimum and maximum temperature and relative humidity % in 2007-2008.

Months	2007			2008		
	Mean		Rel.Humidity (%)	Mean		Relative Humidity (%)
	Minimum Temp: (°C)	Maximum Temp: (°C)		Minimum Temp: (°C)	Maximum Temp: (°C)	
April	21	40	58	20	39	61
May	26	40	65	25	40	61
June	26	38	73	26	38	68
July	27	36	76	26	36	74
August	25	36	79	24	34	79
September	24	37	71	24	37	72
October	22	36	74	20	37	69

Table-7: Analysis of variance (mean square) for GOT%, Staple Length (mm), Seed Index(g), Germination% and Seed cotton yield kg ha^{-1} of cotton varieties.

Source	D.F	GOT%	S. Length (mm)	S. index	Ger %	SCY kg ha-1
Replications	3	2.03230	0.8642	0.1645	50.58	0.1389
Varieties	3	0.56409ns	0.4360ns	0.2599ns	2.57ns	0.2500ns
Sowing dates	2	6.61709**	19.4937**	30.0065**	2470.22**	34.9375**
Var x Sowing	6	0.74380ns	0.7906ns	0.1928ns	1.62ns	0.1875ns
Error	33	0.89347	0.4083	0.0996	7.57	0.2753

* = Significant at 5%, ** = Significant at 1%, NS = Non significant

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