

# Cotton Yield as Influenced by Different Sowing Dates Under the Climatic Conditions of Vehari–Pakistan

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## ABSTRACT

Influence of different sowing dates commencing from 1<sup>st</sup> May to 30<sup>th</sup> June with 15 days interval, on seed cotton yield of CIM-446, CIM-473 and FH-901 was studied at Adaptive Research Farm under the conditions prevailing in Vehari district during 2000-01 and 2001-02. The differences in yield of seed cotton recorded each year were highly significant. The two years average results revealed that highest seed cotton yield of 2039 kg ha<sup>-1</sup> were obtained on 15<sup>th</sup> May sowing followed by 1847 and 1669 kg ha<sup>-1</sup> sown on 1<sup>st</sup> May and 30<sup>th</sup> May, respectively. It is suggested that for getting better seed cotton yield, cotton may be planted in the month of May and the sowing done in the month of June resulted in low yield. The variety CIM-446 out yielded the other varieties by producing 1536 and 1720 kg seed cotton per hectare during 2000-01 and 2001-02, respectively.

**Key Words:** *Gossypium hirsutum*; Sowing date; Cultivars; Yield; Vehari; Pakistan

## INTRODUCTION

Cotton is the most important cash crop and plays a vital role in the economy of Pakistan. Unfortunately its per hectare yield is very low as compared to other cotton growing countries of the world. It is partly due to the unawareness of various agronomic practices, of which optimum time of sowing is believed to be one of the most important factors responsible for yield performance. The cotton plant unlike rice and wheat possesses narrow range of ecological adaptability and is very much influenced by the climatic conditions and sowing seasons. Khan *et al.* (1980) and Khan *et al.* (1981) observed the effect of various sowing periods on the yield of seed cotton in Faisalabad and Sargodha districts that cotton sown in the period from 15<sup>th</sup> to 30<sup>th</sup> April gave the highest per acre yield than the late sowing. Channa and Baluch (1981), Khan *et al.* (1988) and Soomro *et al.* (1996) while studying on the optimum time of sowing concluded that crop sown from 5<sup>th</sup> to 20<sup>th</sup> May gave highest yield as compared to early or late sown under Sakrand conditions. Khan *et al.* (1981) observed that seed cotton yield of different varieties is influenced by the seasonal variation. They concluded that best planting period of cotton is the second fortnight of May under the conditions prevailing in Dera Ghazi Khan. Karim *et al.* (1983) obtained the highest per hectare yield when sowing was done on 16<sup>th</sup> May under Bahawalnagar conditions. Saroya *et al.* (1984) while determining the optimum sowing period of cotton under Sahiwal conditions concluded that sowing done during the month of May produced better yield than the plantings done in the month of June. Exactly the same time of planting cotton for Bahawalpur district was also reported by Cheema *et al.* (1988) to obtain maximum yield. Qayyum *et al.* (1990), Rajput *et al.* (1993) and

Qayyum *et al.* (1996) expressed their views that medium and early sown cotton displayed significantly maximum seed cotton yield than late sowing under Tandojam climatic conditions. They further concluded that some varieties produced significantly higher seed cotton yield as compared to others tested in the experiment. The recommended sowing period of cotton for central Sindh area is the first fortnight of May (Soomro *et al.*, 2001). Khan and Khan (1992) from 2-year experiment on four cotton cultivars reported that 20<sup>th</sup> April to 5<sup>th</sup> May gave better cotton yield than late sown crop and the varieties DNH-1 and B-557 showed greater yield potential than other varieties under soil and climatic conditions of D.I. Khan in NWFP.

Keeping these contradictory reports and lack of information for this area in view it was considered imperative to conduct such studies to have some information for the guidance of cotton growers. So, an experiment to ascertain the optimum planting period of three cotton cultivars was conducted consecutively for two years with a view to see the practical utility to the farmers of this area for getting optimum yield of seed cotton.

## MATERIALS AND METHODS

Field experiment was conducted for two years during 2000-01 and 2001-02 to determine the influence of sowing dates viz. D1 (1<sup>st</sup> May), D2 (15<sup>th</sup> May), D3 (30<sup>th</sup> May), D4 (15<sup>th</sup> June) and D5 (30<sup>th</sup> June) on the yield of three cotton cultivars CIM-446, CIM-473 and FH-901 at Adaptive Research Farm, Vehari. The crop was sown well in time according to the schedule. The seeds of all the varieties were drilled @ 25 kg ha<sup>-1</sup> in three replicated split plot design in each year keeping sowing dates as main plots and varieties as sub plots in net plot size of 7 x 10 meters. The distance

between rows and plant to plant was 75 x 25 cm. Plant population was almost the same in all the treatments during both the years of study. A basal fertilizer recommended dose of 170-60 NP kg ha<sup>-1</sup> was applied in the form of Urea and SSP, the full dose of P and 1/3 N was applied at the time of sowing, whereas the remaining 2/3 N was split into two equal parts and top dressed at the time of first irrigation and flowering. All the required cultural operations regarding irrigation, weeding and plant protection measures were adopted uniformly in all the plots throughout the growing periods. Meteorological observations were recorded on maximum and minimum air temperature (°C) and rainfall (mm) from sowing to final picking. The data in respect of seed cotton yield were collected and subjected to analysis of variance to discriminate the superiority of treatment means by Duncan's new multiple range test following Steel and Torrie (1984).

**RESULTS AND DISCUSSION**

The data regarding seed cotton yield of three cotton cultivars for 2000-01 and 2001-02 alongwith average of two years have been presented in Table I. The yield results alongwith statistical analysis showed that the difference due to sowing dates as well as varieties were highly significant. It is evident from the yield data for individual seasons and the average of both the years that sowing done on 15<sup>th</sup> May gave the highest seed cotton yield as against the lowest in the sowing done on 30<sup>th</sup> June. From the pooled results it was observed that 15<sup>th</sup> May sowing gave the highest yield of 2039 kg ha<sup>-1</sup> followed by 1<sup>st</sup> May, 30<sup>th</sup> May and 15<sup>th</sup> June sowings with 1847, 1669 and 1208 kg ha<sup>-1</sup>, respectively, while 30<sup>th</sup> June sowing gave the lowest yield of 1044 kg ha<sup>-1</sup>. On both the sides of 15<sup>th</sup> May sowing there was a progressive decrease in yield of seed cotton suggesting that 15<sup>th</sup> May sowing was the best over early and late sowings. The individual seasons as well as summarized data indicated the highest response to 15<sup>th</sup> May sowing and 1<sup>st</sup> and 30<sup>th</sup>

May proved to be the second and third best treatments. From the results of this study it might be concluded that optimum sowing time for CIM-446, CIM-473 and FH-901 cotton cultivars under the climatic conditions of Vehari ranged within the whole month of May and there after the plantings in the month of June reduced yield progressively with the delay in planting season. The results are quite in harmony with the findings of Karim *et al.* (1983) who obtained the highest per hectare yield of seed cotton with planting on 16<sup>th</sup> May under Bahawalnagar conditions. The findings of Saroya *et al.* (1984) and Cheema *et al.* (1988) are also in good agreement with the conclusions of this study, who recommended the sowing of cotton during the month of May for Sahiwal and Bahawalpur districts, respectively. Moreover, the findings of Channa and Baluch (1981), Khan *et al.* (1981), Khan *et al.* (1988) and Soomro *et al.* (1996) also support the present investigations under the conditions prevailing in Sakrand and D.G. Khan areas.

Fig. 1 showing the yield of three cultivars CIM-446, CIM-473 and FH-901 for different sowing dates for the years 2000-01, 2001-02 and average of both the years exhibited better yield results for 15<sup>th</sup> May, 1<sup>st</sup> May and 30<sup>th</sup> May and there after the 15<sup>th</sup> and 30<sup>th</sup> June planting reduced yield progressively with the delay in planting season.

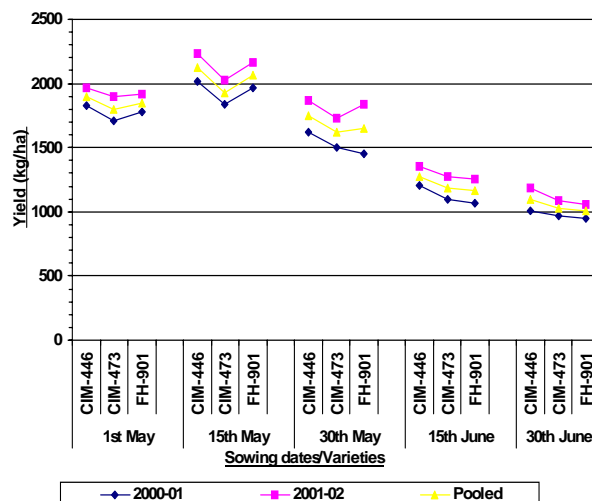
Varieties also had significant differences among them for seed cotton yield during both the years of study. CIM-446 gave higher two years mean seed cotton yield of 1628 kg ha<sup>-1</sup>, followed by FH-901 giving 1545 kg ha<sup>-1</sup> where as the minimum seed cotton yield of 1512 kg ha<sup>-1</sup> was observed in CIM-473. It might be due to genetical make up of the cultivars. The findings are in accordance with those of Khan *et al.* (1981), Qayyum *et al.* (1990), Khan and Khan (1992), Rajput *et al.* (1993) and Qayyum *et al.* (1996) who

**Table I. Seed cotton yield (kg/ha) of three cultivars as influenced by different sowing dates during 2000-01 and 2001-02**

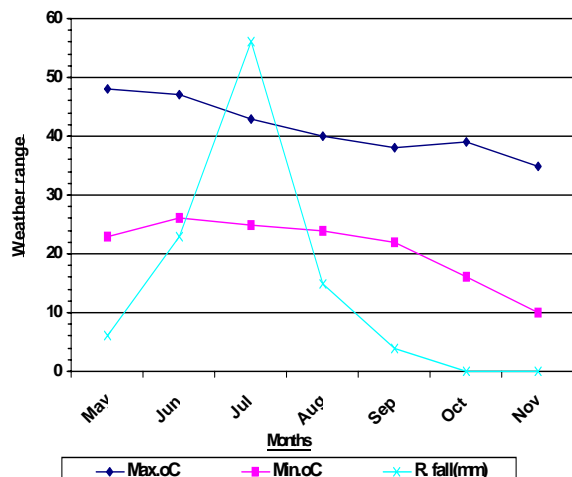
Sowing dates	Years		
	2000-01	2001-02	Average
1st May	1772 b	1923 b	1847 b
15th May	1939 a	2138 a	2039 a
30th May	1524 c	1814 c	1669 c
15th June	1124 d	1292 d	1208 d
30th June	979 e	1110 e	1044 e
LSD (<0.05)	24.70	27.56	17.01
<i>Varieties</i>			
CIM-446	1536 A	1720 A	1628 A
CIM-473	1423 C	1600 C	1512 C
FH-901	1444 B	1646 B	1545 B
LSD (<0.05)	10.18	8.07	6.09

Values followed by similar letters do not differ significantly at 5 percent probability level

**Fig. 1. Cotton yield of three varieties as influenced by different sowing dates**



**Fig. 2. Average monthly weather data from May to November Government Seed Farm, Vehari in 2000 and 2001**



had already reported variation for yield in different varieties.

The percentage increase of CIM-446 over FH-901 and CIM-473 was 5.37 and 7.67%, respectively. Highest yield was obtained when the crop was sown on 15<sup>th</sup> May, showing the increase of 10.40, 22.17, 68.79 and 95.31% over the sowings of 1<sup>st</sup> May, 30<sup>th</sup> May, 15<sup>th</sup> June and 30<sup>th</sup> June, respectively.

The interaction of sowing dates and cultivars was also found highly significant indicating that all the varieties recorded highest seed cotton yields with the sowing done on 15<sup>th</sup> May followed by 1<sup>st</sup> and 30<sup>th</sup> May sowings.

Fig. 2 illustrates that two years average minimum temperature decreased after the month of September which did not favor proper boll maturation of seed cotton but promoted the pest population in late sowing treatments.

## REFERENCES

Channa, M.H. and A.H. Baluch, 1981. Effect of sowing dates on yield of seed cotton under Sakrand conditions. *The Pakistan Cottons*, 25: 125-8

Cheema, M.S., M. Afzal and M.S. Ahmad, 1988. Effect of sowing date on seed cotton yield (*Gossypium hirsutum* L.) under Bahawalpur conditions. *J. Agri. Res.*, 26: 177-9

Karim, A., M.A. Saeed, A. Tariq and Z.R. Shakir, 1983. Effect of different sowing dates on the yield of seed cotton (*Gossypium hirsutum* L.) under Bahawalnagar conditions. *The Pakistan Cottons*, 27: 105-9

Khan, K. and S. Khan, 1992. The effects of dates of planting on the yield of promising cotton cultivars under climatic conditions of D.I. Khan. *The Pakistan Cottons*, 36: 29-33

Khan, M.A., A.W. Soomro and A. S. Arain, 1988. Effect of sowing dates on the yield components of some cotton genotypes. *The Pakistan Cottons*, 32: 22-30

Khan, M.D., M.J. Mirza and R. Hafeezullah, 1981. Impact of sowing dates on the yield of cotton (*Gossypium hirsutum* L.) under Dera Ghazi Khan conditions. *J. Agri. Res.*, 19: 103-7

Khan, W.S., M. Hanif and Z. Ahmad, 1980. Studies on the sowing date, quantum of irrigation and levels of fertilizers on the yield of American cotton in Sargodha. *The Pakistan Cottons*, 24: 75-85

Khan, W.S., Z.A. Raja, and A. Aziz, 1981. Studies on seed cotton yield for different sowing dates and spacings as affected by different years. *The Pakistan Cottons*, 25: 81-4

Qayyum, S.M., A.H. Ansari, N.A. Chaudhary and M.M.A. Baig, 1990. Seed cotton yield its components and their interrelation response of six upland cotton cultivars with regard of sowing dates. *The Pakistan Cottons*, 34: 59-73

Qayyum, S.M., A.S.A. Arain and A.H. Ansari, 1996. Response of some cotton genotypes to early, medium and late sowing times. *The Pakistan Cottons*, 40: 4-11

Rajput, M.K.K., A.H. Ansari, A.G. Magsi, S.A. Rao and A.K. Akbani, 1993. Growth and yield response of cotton varieties to different sowing dates. *Pakistan J. Agric. Engg. Vet. Sci.*, 9: 74-8

Saroya, R.A., M. Saeed and M. Sharif, 1984. Studies regarding determination of optimum sowing period of B-557 cotton variety under Sahiwal conditions. *J. Agri. Res.*, 22: 209-13

Soomro, A.R., R. Anjum, A.W. Soomro, A.M. Memmon and S. Bano, 2001. Optimum sowing time for new commercial cotton variety, Marvi. (CRIS-5A). *The Pakistan Cottons*, 45: 25-8

Soomro, A.R., W.A. Siddiqui, M.H. Arain, A.W. Soomro and G.H. Nachani, 1996. Performance of *Gossypium hirsutum* strains under different sowing dates and plant spacings. *The Pakistan Cottons*, 40: 48-52

Steel, R.G.D. and J.H. Torrie, 1984. *Principals and Procedures of Statistics: A Biometrical Approach*. p: 177-88. McGraw Hill International Book Company, Tokyo

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