

<http://www.pjbs.org>

**PJBS**

ISSN 1028-8880

**Pakistan  
Journal of Biological Sciences**

**ANSI***net*

Asian Network for Scientific Information  
308 Lasani Town, Sargodha Road, Faisalabad - Pakistan

## Yield Response of Four Cotton Cultivars under Varying Plant Spacings at CCRI, Sakrand Sindh

A.R. Soomro, A.W. Soomro, A.M. Memon, M.H. Arain and A.A. Memon  
 Central Cotton Research Institute, Sakrand Sindh, Pakistan

**Abstract:** A field experiment was designed to assess the yield performance of four genotypes under five plant spacings (15, 22, 30, 37 and 45 cm) during 1997 and 1998 years at CCRI, Sakrand Sindh. On an average, highest seed cotton yield of 2121 kg ha<sup>-1</sup> was obtained when the plant-to-plant distance was maintained at 22 centimeters followed by plant spacing of 15 centimeters where seed cotton yield of 2055 kg ha<sup>-1</sup> was harvested. The lowest yield of 1720 kg ha<sup>-1</sup> was produced from plant to plant distance of 45 centimeters. The highest yielding variety was CRIS-134 that produced 2067 kg ha<sup>-1</sup> followed by CRIS-9 with 1944 kg ha<sup>-1</sup> seed cotton yield.

**Key words:** Cotton, plant spacing, seed cotton yield and varietal response

### Introduction

The potential of any variety can only be realized if it is sown at the proper spacings and optimum time. Spacings between rows and plants count a lot for proper growth, better aeration and better control of pests.

Researchers are of different opinion, some have recommended wider spacing, some have advocated for narrow spacing and some say that there is no any impact of plant spacing on yield of cotton. Bridge *et al.* (1973) and Hearn and Hughes (1975) concluded that the yield differences due to spacing were statistically non-significant. El-Hattab *et al.* (1976) obtained increased seed cotton yield with increased plant spacing from 20-30 cm. Zabab and Hafiz (1979) demonstrated that for obtaining handsome seed cotton yield cotton should be planted at 15 cm. Sinha (1974) favored wider spacing, while Brar and Singh (1978) and Virk *et al.* (1984) recommended closer spacing for obtaining higher yields. Hake *et al.* (1991) concluded that plant spacings directly influence soil moisture extraction, light interception, humidity and wind movement. These factors, in turn, influence plant height, branch development, fruit location and size, crop maturity and, narrow spacing increase light interception and plant efficiency. They recommended plant spacing 10-15 cm between plant to plant. Present studies were under taken to assess the performance of advance strains developed by CCRI, Sakrand under varying plant spacings.

### Materials and Methods

An experiment was conducted to assess seed cotton yield response of three advance strains (CRIS-19, CRIS-82 and CRIS-134) and one commercial variety CRIS-9 developed by CCRI, Sakrand under five plant spacings (15, 22, 30, 37 and 45 cm) during 1997 and 1998 crop seasons. The sowing of the experiment was done in split plot design replicated four times. The plant spacings were kept as main plots while varieties were kept as sub-plots. All the required agronomical practices such as hoeing, weeding earthing-up etc were carried out when needed. Crop was protected thrice during both the years against sucking as well as bollworm complex. The seed cotton was harvested plot-wise and finally calculated as kilograms per hectare basis. Duncan's Multiple Range Test was applied to bring out the differences between the treatments.

### Results and Discussion

During 1997, highest yield (2237 kg ha<sup>-1</sup>) was obtained when the distance between the plants was maintained at 22 cm followed by 15 cm where the yield of 2187 kg ha<sup>-1</sup> was achieved. However, yield difference was non significant and was of same order according to DMR test. Significantly highest yielding variety was CRIS-134 that produced 2117 kg ha<sup>-1</sup> seed cotton followed by CRIS-82 (2027 kg ha<sup>-1</sup>).

During 1998, almost same trend of yield performance in respect of plant spacings was observed as 22 cm plant

Table 1: Performance (seed cotton yield kg ha<sup>-1</sup>) of strains under varying plant spacings during 1997 cotton season at CCRI, Sakrand

Spacings	CRIS-9	CRIS-19	CRIS-82	CRIS-134	Average
15 cm	2184	2183	2186	2197	2187 a
22 cm	2226	2235	2243	2245	2237 a
30 cm	1830	1722	1938	2107	1899 bc
37 cm	2045	1938	2099	1991	2018 b
45 cm	1561	1830	1668	2045	1776 c
Average	1969 b	1982 b	2027 ab	2117 a	-

Means followed by similar letters are not significantly different at 5% level

Table 2: Performance (seed cotton yield kg ha<sup>-1</sup>) of strains under varying plant spacings during 1998 cotton season at CCRI, Sakrand

Spacings	CRIS-9	CRIS-19	CRIS-82	CRIS-134	Average
15 cm	2297	1618	1608	2066	1897 ab
22 cm	2060	1825	1835	2297	2004 a
30 cm	2016	1722	1491	2066	1824 ab
37 cm	1724	1952	1608	1835	1780 bc
45 cm	1490	1608	1835	1723	1664 c
Average	1917 ab	1745 bc	1676 c	1997 a	-

Means followed by similar letters are not significantly different at 5% level

**Soomro *et al.*: Yield response of cotton under varying plant spacings**

Table 3: Average performance seed cotton yield kg ha<sup>-1</sup> of strains under varying plant spacings at CCRI, Sakrand

Spacings	CRIS-9	CRIS-19	CRIS-82	CRIS-134	Average
15 cm	2241	1901	1897	2182	2055 a
22 cm	2143	2030	2039	2271	2121a
30 cm	1923	1722	1715	2087	1862 b
37 cm	1885	1945	1854	1913	1899 b
45 cm	1526	1719	1752	1884	1720 c
Average	1944 b	1863 c	1851 c	2067 a	

Means followed by similar letters are not significantly different at 5% level

spacing recorded highest yield of 2004 kg ha<sup>-1</sup> followed by 15 cm spacing (1897 kg ha<sup>-1</sup>). However, statistically the two spacings were of the same order. This year also highest yielding variety was CRIS-134 with 1997 kg ha<sup>-1</sup> yield followed by CRIS-9 (1917 kg ha<sup>-1</sup>).

When the data of two years were averaged (Table 1, 2, 3), 22 cm plant spacing remained on top with 2121 kg ha<sup>-1</sup> seed cotton yield followed by 15 cm spacing (2055 kg ha<sup>-1</sup>). However, statistically both spacings were of same order according to DMR test. As regards the varietal performance, on an average, CRIS-134 remained on top by producing 2067 kg ha<sup>-1</sup> seed cotton yield and was statistically high yielding variety as compared to other varieties. Second best was CRIS-9 with 1944 kg ha<sup>-1</sup> seed cotton.

The findings are in conformity with the results of Brar and Singh (1978), Zabab and Hafiz (1979), Virk *et al.* (1984) and Hake *et al.* (1991) as all of them have recommended narrow spacings. However, the results to some extent contradict the results demonstrated by Sinha (1974) who favored wider spacings. The results of this study demonstrated that 15 and 22 cm plant spacings gave highest yield while wider spacing of 30, 37 and 45 cm gave low yield. Therefore the growers are advised to make the thinning in their crop Well before first irrigation and leave plant to plant distance of 15 cm up to 22 cm for getting higher yields and maintaining required/recommended plant population in the field.

**References**

- Brar, A.S. and T.H. Singh, 1978. Effect of varying plant population levels on growth and yield characters of cotton. *Indian J. Agron.*, 23: 213-218.
- Bridge, R.R., W.R. Meredith Jr. and J.S. Chism, 1973. Plant method, plant population influence on cotton performance. *Mafes Res. Highlights*, 36: 123-129.
- El-Hattab, H.S., M.H. Alshaer, A.A. Abo-El-Zabab and A.M. Samra, 1976. Response of two Egyptian cotton cultivars to plant population density. *Agric. Res. Rev.*, 54: 1-14.
- Hake, K., T. Burch, L. Harvey, T. Kerby and J. Supak, 1991. Plant population. News letter of the Cotton Physiology Education Program. National Cotton Council, America, Vol. 2, No. 4.
- Hearn, A.B. and N.J. Hughes, 1975. Narrow row cotton in the Ord Valley, Western Australia. *Cotton Grow. Rev.*, 52: 285-292.
- Sinha, M.N., 1974. Studies on spacing with cotton at two nitrogen levels. *Indian J. Agron.*, 19: 53-59.
- Virk, J.S., D. Singh, R. Singh and H.P. Tripathi, 1984. Effect of planting patterns inter and intra rows spacing on growth and yield of cotton. *Cotton Dev.*, 14: 7-12.
- Zabab, I.A.A. and A. Hafiz, 1979. Cotton growing in Egypt. *Pak. Cottons*, 23: 305-309.