

## Effect of Number of Irrigations on High Yielding Strain, CRIS-19 Developed at CCRI, Sakrand

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**Abstract:** A field experiment was conducted to assess the effect of four irrigation regimes ( $I_1=6$ ,  $I_2=7$ ,  $I_3=8$  and  $I_4=9$  including one irrigation as soaking dose) on a high yielding strain, CRIS-19 during 1997 and 1998 crop seasons at CCRI, Sakrand Sindh. On an average, highest seedcotton yield of  $1944 \text{ kg ha}^{-1}$  was obtained when the crop received 8 irrigations followed by 9 and 6 irrigations where seedcotton yield of 1887 and  $1808 \text{ kg ha}^{-1}$  was obtained respectively. The lowest yield of  $1763 \text{ kg ha}^{-1}$  was produced when 6 irrigations were applied.

**Key words:** Cotton, post-plant irrigations, seedcotton yield and varietal response

### Introduction

The genetic yield potential of today's cotton plant is at least 5 and probably close to 10 times the average yields we attain each year. The primary cause of potential yield reductions is an unfavorable physical environment, including radiation, temperature and water supply. Water stress from lack of water is rarely a problem in seedling emergence and stand establishment, but water stress from excess water is a greater problem to stand establishment and seedling survival. Cotton crop is very sensitive to the environmental conditions and is grown in the wide range of ecological zones. It does well when appropriate agronomic practices are adopted. It has been observed that majority of cotton growers irrigate their crop indiscriminately without keeping in view the need and planting time of the crop.

Depending on climate and length of growing season, cotton crop transpires about 2570 to 3085 m<sup>3</sup> (25 to 30 acre inches) of water per acre during the season. In the early vegetative period, crop water requirements are low or some 10 percent of total. They are high (50 to 60 percent of total) during flowering and yield formation phase. Later in the growing period, the requirements decline because of leaf shedding, salinity and cooler season. The peak water use occurs during the months of August and September hence water stress should be avoided during this period (Khan and Malik, 1996). Nazirov and Satipov (1979) compared water regimes 1-3-1 (one irrigation at the early bud formation stage, three irrigations during early flowering to boll formation period and one irrigation during maturation), 0-3-1 and 2-3-1. The highest seedcotton yield of 4.33-4.76 t ha<sup>-1</sup> was obtained with the regime of 0-3-1 against 3.7 t ha<sup>-1</sup> with irrigation regime of 1-3-1.

Nadi (1975) in Sudan investigated the effects of three irrigations on growth, yield and quality of cotton and found that light irrigation at 75 mm per irrigation every 10 days are economically better than traditionally accepted practice of irrigation every 14 days or 20 days. Mustafa and Siddiqui (1978) reported that optimum interval of 1<sup>st</sup> irrigation after sowing was 42 days with two soaking doses and 28 days with one soaking dose.

Godoy *et al.* (1994) indicated that the highest values in lint yield were found when initial irrigation was applied 60 or 70 days after planting and then irrigated after each 28 days. Khan and Malik (1996) viewed that first post planting irrigation may be applied at 50 to 60 percent depletion of

available moisture. Further depletion of available water may restrict vegetative growth but when followed by ample supply of water, vegetative growth will be somewhat excessive, which may cause late flowering and reduced yield.

The seedcotton yield of CIM-240 variety was compared in three post-planting irrigation regimes (5, 6 and 8 irrigations) at CCRI, Multan. Accordingly 8 post-planting irrigations gave 404 and 100 Kg more seedcotton than 5 and 6 post planting irrigations respectively (Anonymous, 1993). Almost similar results were obtained when the experiment was repeated during next year.

These studies therefore, were conducted to determine the effect of number of irrigations on a new high yielding variety CRIS-19.

### Materials and Methods

An experiment was conducted to assess seedcotton yield response of advance strain CRIS-19 against four irrigation regimes during 1997 and 1998 crop seasons. The sowing of the experiment was done in randomized complete block design replicated four times. All the required agronomical practices such as hoeing, weeding earthing-up etc were carried out as and when needed basis. Crop was protected thrice during 1992 and twice during 1993 against sucking as well as bollworm complex. The seedcotton 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 Discussions

The seedcotton yield data of CRIS-19 for the year 1992 under varying irrigation regimes are depicted in Table 1 whereas for the year 1993 in Table 2 and average data of two years are given in Table 3. During 1997, when the crop received 8, 7, 9, and 6 irrigations the yield was obtained 1803, 1781, 1780 and  $1666 \text{ kg ha}^{-1}$  respectively (Table 1). During 1998 when the crop received 8, 9, 6 and 7 irrigations, the yield was obtained 2085, 1994, 1949 and 1745 respectively (Table 2). When the data of two years were averaged (Table 3), significantly 8 irrigations gave highest seedcotton yield of  $1944 \text{ kg ha}^{-1}$  as compared to 9 and 6 irrigations (1887 and  $1808 \text{ kg ha}^{-1}$ ). However, statistically both these irrigations were of same order according to DMR test.

Our results are in accordance with the results obtained at CCRI, Multan where the highest yield was obtained when the

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**Table 1: Effect of number of irrigations on CRIS-19 during 1997 at CCRI, Sakrand**

Irrigation treatments	Seedcotton yield (kg ha <sup>-1</sup> )
I <sub>1</sub> = Six irrigations including one soaking dose	1666 b
I <sub>2</sub> = Seven irrigations including one soaking dose	1781 a
I <sub>3</sub> = Eight irrigations including one soaking dose	1803 a
I <sub>4</sub> = Nine irrigations including one soaking dose	1780 a

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

**Table 2: Effect of number of irrigations on CRIS-19 during 1998 at CCRI, Sakrand**

Irrigation treatments	Seedcotton yield (kg ha <sup>-1</sup> )
I <sub>1</sub> = Six irrigations including one soaking dose	1949 ab
I <sub>2</sub> = Seven irrigations including one soaking dose	1745 b
I <sub>3</sub> = Eight irrigations including one soaking dose	2085 a
I <sub>4</sub> = Nine irrigations including one soaking dose	1994 ab

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

**Table 3: Effect of number of irrigations on CRIS-19 (Average of 1997 & 1998) at CCRI, Sakrand**

Irrigation treatments	Seedcotton yield (kg ha <sup>-1</sup> )
I <sub>1</sub> = Six irrigations including one soaking dose	1808 ab
I <sub>2</sub> = Seven irrigations including one soaking dose	1763 b
I <sub>3</sub> = Eight irrigations including one soaking dose	1944 a
I <sub>4</sub> = Nine irrigations including one soaking dose	1887 ab

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

crop was irrigated 8 times after planting (Anonymous, 1993) but contradicted the results of Nazirov and Satipov (1979) who got highest yield with 4 and 5 irrigation regimes. This may be due to high under ground water table of the area where both scientists conducted the study; therefore the crop needed less number of irrigations.

Therefore, keeping in mind the results of this study, the growers of this area are advised to irrigate their crop with 8 irrigations including soaking dose before sowing for getting high yields from their crop.

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