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The Effect of Different Sowing Dates on the Yield of Newly Developed Strain under Climatic Conditions of Ghotki, Sindh

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Abstract: Newly developed strain GH-3 was tried against commercial variety Shaheen in sowing date trial over a period of three years to assess the optimum sowing time of the strain under Ghotki conditions. Accordingly 15th May was recorded as optimum sowing time for this area as maximum yield of 1979 kg ha⁻¹ was obtained followed by 1st May and 1st June sowings that produced 1516 and 1491 kg ha⁻¹ seedcotton yield respectively. The lowest yield (1160 kg ha⁻¹) was obtained when the crop was sown on 15th June followed by 1278 kg ha⁻¹ when sowing was done on 15th April. Strain GH-3 out-yielded commercial variety Shaheen irrespective of seasons and sowing dates.

Key words: Cotton, sowing dates, seasonal effects, varietal response

Introduction

There are so many factors which affect the per acre yield of cotton. Among these are varieties, seed rate, time of sowing, spacing, manuring, day length, temperature, water management, water logging, salinity and plant protection efforts for the control of insect pests. Sowing time plays an important role to realize maximum seedcotton yield in country like Pakistan, where the climatic conditions differ from province to province and within province. Yield of cotton can be sufficiently increased if we know the optimum time for sowing in particular zone. It has been observed that cotton sown earlier or later than its optimum time shows a rapid decline in its yield. Even a delay of week in the sowing may result in a marked decrease in its yield. In still later sowings the fall in yield may be more rapid. However the yield potential of any variety can only be realized if it is sown at its optimum time. This study was under taken to assess the optimum sowing time of newly developed strain at CRS, Ghotki. Khan *et al.* (1980) reported that 15th April to 1st May was the best period for cotton sown under Sargodha conditions. This statement also holds good for Faisalabad conditions as reported by Khan *et al.* (1981). Channa and Baluch (1981), while studying on the optimum time of sowing, concluded that crop sown from 15th May to 1st June gave highest yields as compared to early or late sown cotton crop under Sakrand conditions. Karim *et al.* (1983) obtained the highest per hectare yield when the sowing was done on 16th May. Singh and Brar (1983) and Brar *et al.* (1990) observed reduction in seedcotton yield when the crop was sown late. Khan *et al.* (1988) observed that sowing of cotton in the month of May yielded well than early sowing of April and late sowing of June under Sakrand conditions.

Qayyum *et al.* (1990), indicated that crop sown on 15th April progressively increased in seedcotton yield mainly due to increase in fruiting branches, productive bolls and yield per plant. Khan and Gill (1982), reported that early sown cotton gave significantly higher yield than the late sown crop. Sultan *et al.* (1980) observed that early sown crop increased plant height, number of bolls, single plant yield and total seedcotton yield. Khan and Khan (1992) reported that crop sown between 20th April and 5th May gave highest yield under climatic conditions of D.I. Khan.

Materials and Methods

The experiment was conducted on the experimental field of

Cotton Research Station, Ghotki for consecutive three years i.e., 1992, 1993 and 1994. Newly developed strain GH-3 was tested against commercial variety Shaheen for five sowing dates viz. 15th April, 1st May, 15th May, 1st June and 15th June. The treatments were replicated four times in a split plot design with sowing dates as main plots and varieties as subplots. All other cultural practices and plant protection measures were undertaken as per recommendations. Seedcotton yield was recorded on net plot basis and then calculated on per hectare basis.

Results and Discussion

The experimental data regarding seedcotton yield showing the effect of i) season ii) sowing period iii) variety iv) seasonal effect on sowing date v) seasonal effect on variety and vi) sowing date on variety are given in Table 1, 2 and 3. The average yield data for all the three years are given in Table 4.

Seasonal Effect: The yield data of new strain GH-3 and commercial variety Shaheen for three years (1992, 1993 and 1994) are given in Table 1 which reveal that seasonal effect played an important role on the yield potential of both the varieties during different years. Season 1992 gave maximum yield of 1695 kg ha whereas the lowest yield of 1240 kg ha⁻¹ was realized during 1994 season.

Sowing date effect: Yield data from five sowing dates for all the three years are given in Table 2 which indicate that the higher yield of 1979 kg ha⁻¹ was obtained from the crop sown on 15th May followed by 1516 kg ha⁻¹ and 1491 kg ha⁻¹ from 1st May and 1st June sown crop respectively. The lowest yield of 1160 kg ha⁻¹ was obtained from 15th June sown crop followed by 1278 kg ha⁻¹ from 15th April sown crop. It is evident from the results that optimum sowing time under Ghotki conditions is 15th May, which may start from 1st May and can be extended up to 1st June. It is also clear from the results of Table 2 that very early (15th April) and very late (15th June) sown crop is not advisable for upper Sindh specially the surrounding areas of Ghotki district.

Variety performance: The data regarding seedcotton yield obtained from newly developed strain GH-3 and commercial variety Shaheen is presented in Table 3. Accordingly on an average of three years, new strain GH-3 out-yielded commercial variety Shaheen by producing 1521 kg ha⁻¹

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Table 1: Seedcotton yield (kg ha⁻¹) of two varieties in different years

Variety	1992	1993	1994	Average
GH-3	1803 a	1489 a	1 270 a	1521 a
Shaheen	1587 b	1311 b	1209 b	1369 b
Average	1695	1400	1240	

Note: Means followed by similar letters do not differ significantly from each other according to DMR test

Table 2: Seedcotton yield (kg ha⁻¹) obtained from different sowing dates

Sowing date	1992	1993	1994	Average
15th April	1562 d	1254 d	1016 e	1278 d
1st May	1654 c	1497 b	1396 b	1516 b
15th May	2127 a	1686 a	1524 a	1779 a
1st June	1923 b	1377 c	1171 c	1491 c
15th June	1209 e	1186 e	1087 d	1160 e
Average	1695	1400	1240	

Note: Means followed by similar letters do not differ significantly from each other according to DMR test

Table 3: Seedcotton yield (kg ha⁻¹) for two varieties in different sowing dates

Variety	15 th	1 st	15 th	1 st	15 th	Average
	April	May	May	June	June	
GH-3	1355 a	1576 a	1840 a	1603 a	1229 a	1521 a
Shaheen	1200 b	1456 b	1718 b	1378 b	1093 b	1369 b
Average	1278	1516	1779	1491	1160	

Note: Means followed by similar letters do not differ significantly from each other according to DMR test

Table 4: Yield (kg ha⁻¹) performance of two varieties in the sowing date trial

Sowing date	Variety	1992	1993	1994	Average
15th April	GH-3	1664	1359	1040	1355
	Shaheen	1460	1148	992	1200
1st May	GH-3	1725	1567	1435	1576
	Shaheen	1582	1427	1357	1456
15th May	GH-3	2173	1793	1554	1840
	Shaheen	2080	1578	1494	1718
1st June	GH-3	2141	1449	1219	1603
	Shaheen	1704	1305	1123	1378
15th June	GH-3	1309	1277	1100	1229
	Shaheen	1108	1094	1075	1093
Average		1695	1400	1240	

highest yield of 1695 kg ha⁻¹ was obtained during 1992 and the lowest yield of 1240 kg ha⁻¹ during 1994 season. Table 2 reveal that the highest yield of seedcotton 1779 kg ha⁻¹ was obtained from 16th May sown crop. It is therefore concluded that the optimum date of sowing under Ghotki

condition is 15th May irrespective of seasons (years of experimentation). However, results also suggest that the sowing can be started from 1st May and extended up to 1st June in the surroundings of Ghotki district, seed cotton yield as compared to 1389 kg ha⁻¹ of Shaheen.

Seasonal effect on variety performance: The data of Table 1 indicate that the yield potential of both the varieties was definitely influenced by the season. The variety GH-3 gave highest yield of 1803 kg ha⁻¹ during 1992 but lowest (1270 kg ha⁻¹) in 1994 season. The commercial variety Shaheen showed the same trend as of GH-3 and yielded highest (1587 kg ha⁻¹) during 1992 and lowest (1209 kg ha⁻¹) in 1994 season, The new strain was statistically significant during all the years, hence was recorded as superior variety as compared to commercial variety Shaheen in its yield potential irrespective of the season on the basis of average performance for all the three years of experimentation.

Seasonal effect on sowing dates: The data presented in Table 2 reveal that the highest yield of seed cotton 1779 kg ha⁻¹ was obtained from 15th may sown crop followed by (1516 kg ha⁻¹) from 1st May sown crop. Season 1992 was the best season in which highest yield was given by the 15th May sown crop followed by 1993 season in which again 15th May sown crop gave highest yield of 1686 kg ha⁻¹.

Sowing date effect on varietal performance: The data presented in Table 3 reveal that new strain GH-3 significantly out-yielded commercial variety Shaheen with different sowing times. Both the varieties showed upward trend from 15th April to 1st June, maximum yielding date being 15th May. The yield of both the varieties sharply declined when the sowing was done on 15th June. The strain GH-3 gave maximum yield of 1840 kg ha⁻¹ when sown on 15th May; the same case was with commercial variety Shaheen that yielded highest (1718 kg ha⁻¹) on the same date i.e., 15th May. Thus the optimum sowing date of 15th May can safely be recommended in Ghotki district.

Seasonal effect on variety in different sowing dates: The data presented in Table 5 indicate that the seasons along with sowing dates definitely affected the yield performance of two varieties GH-3 and Shaheen. The variety GH-3 gave highest

Table 5: Meteorological data for 1992, 1993 and 1994 years recorded at Cotton Research Station, Ghotki, Sindh

Month	Mean Temperature ° 1992				Mean Temperature ° 1993				Mean Temperature 1994			
	Max.	Min.	R.H. (%)	Rain fall (mm)	Max.	Min.	R.H. (%)	Rain fall (mm)	Max.	Min.	R.H. (%)	Rain fall (mm)
January	23.1	3.1	65	55	23.9	3.6	73.5	2	26.1	2.6	54.4	-
February	26.0	5.3	73.9	11	30.8	6.6	65.3	4	28.4	6.6	57.0	1
March	30.6	8.4	68.7	1	31.9	10.4	66.4	5	35.7	11.8	58.1	10
April	36.7	14.1	66.2	2	40.0	17.6	55.4	-	39.7	15.1	45.8	-
May	42.3	20.3	55.9	1	46.2	23.7	55.2	-	45.2	22.5	42.0	7
June	46.7	25.6	59.5	-	45.6	26.3	70.5	-	45.0	26.5	49.3	15
July	41.6	25.6	72.4	120	43.2	26.7	61.8	21	39.5	26.3	69.5	287
August	38.4	25.0	77.1	40	42.3	25.0	68.6	-	39.0	25.4	68.1	155
September	37.8	23.0	72.0	-	41.6	23.2	67.3	-	39.0	23.0	68.6	145
October	36.2	16.8	73.1	-	37.5	14.0	60.8	-	37.9	15.8	68.9	-
November	31.9	8.7	78.9	-	33.7	10.7	57.9	-	33.7	12.0	64.8	-
December	26.2	4.9	81.3	-	28.4	4.4	60.7	-	23.3	5.6	67.9	31

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yield of 2173 kg ha⁻¹ during 1992 season when sown on 15th May followed by 2141 kg ha⁻¹ in the same season sown on 1st June. The same trend was recorded for Shaheen variety also. The season 1994 gave lowest yield. Nevertheless, the trend of performance of strain GH-3 remained the same as during 1992 but the variety Shaheen gave maximum yield of 1494 kg ha⁻¹ in 15th May sown crop followed by 1357 kg ha⁻¹ in 1st May sown crop instead of 1st June sown crop as during 1992 season.

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