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Effect of Different Sowing Dates on Cotton (*Gossypium hirsutum* L.) Cultivars

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Abstract: An experiment was conducted to assess the effect of sowing date on two cotton varieties MNH552 and MNH554 grown on 1st April, 15th April, 1st May, 15th May, 1st June, 15th June, 1st July and 15th July during 1998 and 1999 under Multan conditions. 15th May and 1st June sown cotton displayed significantly maximum seed cotton yield of 2998 and 2883 kg ha⁻¹ in 1998 and 4027 and 3894 kg ha⁻¹ respectively in 1999 as compared to 595 and 253 kg ha⁻¹ (1998) and 1269 and 223 kg ha⁻¹ (1999) from crop sown on 1st and 15th July respectively. The increase in both sowing dates in seed cotton yield was associated with boll weight and bolls per plant. On average of two years data 15th May produced highest seed cotton yield of 3513 kg ha⁻¹, whereas the lowest figure was 238 kg ha⁻¹ (15th July). Comparing varietal performance MNH552 (2310 kg ha⁻¹) yielded higher as compared to MNH554 (2288 kg ha⁻¹). However two cultivars declined the yield in late planting.

Key words: Cotton varieties, different sowing dates, boll weight, bolls per plant, seed cotton yield

Introduction

Cotton is the most important textile fiber crop and is second most important oil seed crop in the world (Chary and Leffler, 1984) and is also one of the most important crops of Pakistan, which accounts for 60% of total foreign exchange earnings through export of lint and value added cotton products (Anonymous, 1999-2000). The seed cotton production per unit area is affected by the following factors:

Genotypes, plant population, time of sowing, soil status, environmental conditions (temperature, rainfall, humidity) and insect infestation (Afzal and Ali, 1983). Sowing time plays an important role to realize maximum seed cotton yield in country like Pakistan where the climatic conditions differ from province to province and with in province. Yield of cotton can be sufficiently increased if we know the optimum time for sowing in particular zone. It has observed that cotton sown earlier or later than its optimum time shows a rapid decline in its yield (Soomro, *et al.*, 2000). It was also concluded that even a delay of week in sowing may result in a marked decreased in yield. Khan (1982), Qayyum *et al.* (1990), Ansari *et al.* (1991), Tunio *et al.* (1992), Abdel-Malak *et al.* (1996) and Arain *et al.* (2001) reported that early sown cotton (15th April to 15th May) gave significantly higher plant height, number of sympodial branches, number of bolls formed, seed cotton weight per plant and seed cotton yield per hectare Channa and Baloch (1981), Khan (1981), Ansari *et al.* (1989) and Soomro *et al.* (2000) observed that 15th May an optimum sown crop gave increased number of bolls per plant, boll weight and seed cotton yield per

hectare and further observed a remarkable decline in the yield of late sown crop.

Keeping this in view, the present study was undertaken to assess the optimum sowing time of two cotton varieties at Cotton Research Station, Multan.

Materials and Methods

Field experiment was conducted at Cotton Research Station, Multan for two consecutive cotton seasons (1998 and 1999). Two cotton varieties i.e., MNH552 and MNH554 were tested in eight sowing dates 1st April, 15th April, 1st May, 15th May, 1st June, 15th June, 1st July and 15th July during 1998 and 1999. The experiment was carried out in split plot design having three replications on a plot size of 18.2 m². The sowing dates were kept as main plots and the varieties as sub-plots. All other cultural practices and plant protection measures were given as per recommendations. Seed cotton yield was recorded on net plot basis and then calculated on per hectare basis. Bolls per plant and boll weight in grams were taken as the average of 10 plants. The data were subjected to analysis of variance and to discriminate the superiority of treatment means, Duncans multiple range test was applied, following Gomez and Gomez (1984) procedures.

Results and Discussion

Season plays an important role in cotton production. The meteorological data given in table indicated that the Relative humidity percentage was higher during July, August and September in 1998 as compared to 1999. The

rainfall pattern was also different during 1998 and 1999. The fruit shedding was more in 1998 as compared to 1999. Season 1999 given maximum yield of 2687 kg ha⁻¹ as compared to 1911 kg ha⁻¹ in 1998.

The results (Table 1) revealed that sowing dates differed significantly for boll weight and bolls per plant in 1998 and 1999. Regarding boll weight the crop sown on Ist. May, 15th May, Ist. June and 15th June 1998 produced higher boll weight(g) (3.10, 3.07, 3.13, 3.10) as compared to Ist. April, 15th April, Ist. July and 15th July (2.73, 2.280, 2.83, 2.43) sown crop. In 1999 the sowing dates Ist. May, 15th May, Ist. June and 15th June gave significantly higher boll weight as compared to other sowing dates. On the average of two years data the crop sown on 15th May gave the maximum boll weight (3.17 g) whereas the lowest boll weight 2.40 g was recorded in late sown crop (15th July). The optimum boll weight was obtained from Ist. My to 15th June sown crop. It may be due to favourable temperature during the fruiting period Khan *et al.* (1981) and Ansari *et al.* (1989).

The data regarding bolls per plant (Table 1) exhibit significantly maximum bolls per plant 33.6 and 33.3 on 15th May and Ist June in 1998 and 41.4 and 39.5 bolls per plant in same sowing dates in 1999. The same trend was observed in mean data of 1998 and 1999. It is clear from the data that maximum bolls per plant were set from Ist May to Ist. June sown crop. The bolls per plant were significantly decreased in late sown crop. Similar results were also reported by Khan (1982), Qayyum *et al.* (1990), Ansari *et al.* (1991) and Tunio *et al.* (1992). Among the varieties the differences were non-significant regarding bolls weight and bolls per plant (Table 1). However MNH554 gave better boll weight and MNH552 more bolls per plant.

The sowing dates differ significantly for seed cotton yield in 1998 and 1999 (Table 2). The varieties showed non-significant difference during both years (Table 2). Among sowing dates in 1998 15th May sown crop gave significantly maximum seed cotton yield of 2998 kg ha⁻¹ as compared to Ist. April, 15th June, Ist. July and 15th July sown crop (2123, 1428, 595 and 253 kg ha⁻¹). The significantly higher yield of 4027, 3894, 3583 and 3512 kg ha⁻¹ was obtained in sowing dates 15th May, Ist June, Ist. May and 15th April respectively, whereas the lowest yield was recorded in 15th June, Ist. July and 15th July sown crop (2145, 1269 and 223 kg ha⁻¹) in 1999. The same trend was also obtained from the mean data of 1998 and 1999. These results are supported by Khan *et al.* (1981), Qayyum *et al.* (1990), Ansari *et al.* (1991) and Arain *et al.* (2001). On an average of two years MNH552 out yielded MNH554 by producing 2310 kg ha⁻¹ seed cotton as compared to 2288 kg ha⁻¹ of MNH554 (Table 2).

MNH552 and MNH554 produced increased seed cotton yield of 3514 and 3511 kg ha⁻¹ respectively when sown on 15th May (Table 3), whereas the lowest yield of 235 and 241 kg ha⁻¹ was recorded in MNH552 and MNH554 respectively (15th July sowing) (Table 3). Research conducted earlier by Khan (1982), Ansari *et al.* (1991), Soomro *et al.* (2000) and Arain *et al.* (2001) also suggested that early and medium sown (15th April to Ist

Table 1: Boll weight (g) and Bolls per plant of two varieties on different sowing dates (1998 & 1999)

Sowing date	Boll weight (g)			Bolls per plant		
	1998	1999	Means	1998	1999	Means
Ist. April	2.73d	2.67c	2.70	25.2c	28.6c	26.9
15th April	2.80cd	2.83c	2.82	29.8b	33.7b	31.8
Ist. May	3.10ab	3.10ab	3.10	30.4b	33.9b	32.2
15th May	3.07abc	3.27a	3.17	33.6a	41.4a	37.5
Ist. June	3.13a	3.07b	3.10	33.3a	39.5a	36.4
15th June	3.10ab	3.13ab	3.12	19.5d	23.7d	21.6
Ist. July	2.83bd	2.80c	2.82	11.7c	19.4e	15.6
15th July	2.43e	2.37d	2.40	5.7f	5.7f	5.7
Varieties						
MNH552	2.79	2.78	2.78	24.2	28.3	26.3
MNH554	3.01	3.03	3.02	23.1	28.0	25.6
		ns			ns	

Table 2: Seed cotton yield (kg ha⁻¹) of two cotton varieties and different sowing dates during 1998 and 1999

Sowing date	1998	1999	Means
Ist. April	2123d	2843b	2483
15th April	2399cd	3512a	2956
Ist. May	2608bc	3583a	3096
15th May	2998a	4027a	3513
Ist. June	2883ab	3894a	3389
15th June	1428e	2145c	1787
Ist. July	595f	1269d	932
15th July	253g	223e	238
Varieties			
MNH552	1978	2642	2310
MNH554	1843	2732	2288
Means	1911	2687	

Means followed by different letters differ significantly at 5% level

Table 3: Yield performance of two cotton varieties in sowing date trial (1998 and 1999)

Sowing date	Variety	1998	1999	Means
Ist. April	MNH552	2239	2617	2428
	MNH554	2007	3068	2538
15th April	MNH552	2541	3547	3044
	MNH554	2256	3477	2867
Ist. May	MNH552	2665	3576	3122
	MNH554	2551	3590	3071
15th May	MNH552	3009	4018	3514
	MNH554	2986	4036	3511
Ist. June	MNH552	2878	3997	3438
	MNH554	2888	3791	3340
15th June	MNH552	1526	2154	1840
	MNH554	1330	2135	1733
Ist. July	MNH552	670	1058	1199
	MNH554	519	1480	1000
15th July	MNH552	299	170	235
	MNH554	206	276	241
Means		1911	2687	

June) cotton displayed significantly higher number of bolls formed, seed cotton yield per plant and seed cotton yield per hectare.

The data presented (Table 3) indicate that the season alongwith sowing dates definitely affected the yield performance of two varieties. The variety MNH554 gave highest seed cotton yield of 4036 kg ha⁻¹ during 1999 season when sown on 15th May followed by 3791 kg ha⁻¹ in the same season sown on 1st June. The same trend was recorded for MNH552, which gave highest yield during same season and same sowing time. The season 1998 gave lowest yield. However, the trend of performance of both the varieties remained the same as during 1999. The increase in seed cotton yield was probably associated with more bolls per plant and boll weight. The reduction in seed cotton yield due to delayed planting was obvious in two varieties. It can be concluded from present study that for getting better seed cotton yield the optimum sowing time under Multan condition is 15th May which may start from 1st May and can be extended upto 1st June.

References

- Abdel Malak, K.K.I., E.A. Makram, M.M. Razaz, 1996. Effect of hill spacing and nitrogen levels in relation to planting dates on growth and yield of Giza-83 Cotton cultivar. *Asswt J. Agri. Sci.*, 27: 155-168. Cotton Research Institute, Agri. Res. Center, Egypt.
- Afzal, M. and M. Ali, 1983., Cotton plant in Pakistan. II Edition, Govt. Printing Press Lahore.
- Anonymous, 1999. Annual Progress Report of Central Cotton Research Institute, Multan 1999-2000 pp: 1-256.
- Ansari, A.H., A.M. Khushk, S.M. Qayyum and A.M. Ansari, 1989. Effect of different planting dates on the growth and yield of cotton (*Gossypium hirsutum* L.). *Pak. J. Sci. and Ind Res.*, 32: 474-477.
- Ansari, A.H., S.M. Qayyum, M.I. Sohut, M.M.A Baig and M.K.M. Rajput, 1991, Influence of seeding dates on the yield and its components and their interaction in Cotton (*Gossypium hirsutum* L.) genotypes. *Sarhad J. Agric.*, 7: 11-19.
- Arain, M.H., S. Arain, M.J. Baloch, G.H. Kalwar and A.A. Memon, 2001. Performance of newly developed cotton strains under different sowing dates. *Pak. J. Biol. Sci., Supplementary Issue No.1*, 1-2.
- Channa, M.H. and A.H. Balouch, 1981. Effect of sowing dates on yield of seed cotton under Sakrand conditions. *The Pak. Cottons*, 25: 125-128.
- Chary, J.P. and H.R. Leffler, 1984. Seed In. Kohel R.J. cd. C.F. Lewis (ends) Cotton USA. Modison, Wisconsin, pp: 511-569.
- Gomez K.A and A.A. Gomez, 1984, Statistical procedure for Agricultural Research (2nd Edition) Johnwilly and Sons. New York.
- Khan W.S., Z.A. Raja and A.Aziz, 1981. Studies of seed cotton yield for different sowing dates and spacings as affected by different years. *The Pak. Cottons*. 25: 81-84.
- Khan, W.S. and A.R. Gill, 1982. How different times affect the cotton yield in Jhang district. *The Pak. Cottons*, 26: 73-87.
- Qayyum. S.M., A.H. Ansari, N.A. Choudhry and M.M.A. Baig, 1990. Seed cotton yield, its components and their interrelation response of six upland cotton cultivars with regard to sowing dates. *The Pak. Cottons* 34: 59-73.
- Soomro. A.R., M.H. Channa, A.A. Channa, G.H. Kalwar, G.N. Dayo and A.H. Memon, 2000. The effect of different sowing dates on the yield of newly developed strain under climatic conditions of Ghotki, Sindh. *The Pakistan Cottons*, 44: 25-31.
- Tunio, K.L., A.H. Ansari, S. M. Qayyum, M.N. Kalwar and W.A. Khan, 1992. Effect of different sowing dates on the yield components of cotton (*Gossypium hirsutum* L.) cultivars. *Pak. J. Agril. Eng. Vet. Sci.*, 8: 24-27.