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EFFECT OF DIFFERENT PLANTING DATES ON THE GROWTH AND YIELD OF COTTON (*G. HIRSUTUM* L.) CULTIVARS

A. Hameed Ansari, Ali M. Khushk*, S.M. Qayyum and A. Majeed Ansari
Sindh Agriculture University, Tando Jam

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A field experiment to assess the effect of different planting dates on the growth and yield of Cotton (*G. hirsutum* L.) Cultivars was conducted at (A.R.I.), Tando Jam during summer 1986. Four planting dates (1st April, 15th April, 1st May and 15th May) and six cultivars i.e., Qalandri, TH-1100, TH-1174, TH-199/80, TH-3/83 and Rehmani were studied. Early planted (1st or 15th April) cotton recorded significantly higher seed cotton yield 2.30 and 2.62 m.t/ha, than the cotton planted on 1st and 15th May.

The newly evolved cultivar gave significantly higher seed cotton yield of 2.59 m.t/ha as compared to Rehmani, TH-1100 and TH-1174 cultivars.

Key words: Planting dates, Cultivars, Yield, Yield characters.

INTRODUCTION

Cotton is an important cash crop of Pakistan, grown on more than 2.498 million hectares during 1986-87. Unfortunately, average yield in our country is much lower as compared to other growing countries in the world. In addition to the evaluation of high yielding varieties, agronomic practices play an important role in the development of cotton crop [1]. Yadee [2] reported that the early sown crop gave the high seeding stand, plant height and seed cotton yield as compared to later sown crop. Sindh *et. al.* [3], Chuhan and Suryanaryana [4], Shekhawat and Chundawat [5], Bridge *et. al.* [6], Mithaiwala and Memon [7], reported that delay in sowing beyond 15th May significantly reduced in seed cotton yield. Khan *et. al.* [8] and Ullah *et. al.* [9] observed that crop sown in early April, gave the significantly higher seed cotton yield than sown in end of May. Muhammad and Hanif [10] stated that, plant height, number of bolls and seed cotton yield decreased with delay in sowing. Khan and Ali [11], reported that plant height, number of monopodial and sympodial branches exhibited a mark decline with delay in sowing. However *et. al.* [12] reported that cotton sown either in mid April or mid May gave similar performance in respect of plant height, number of bolls and seed cotton yield. Present investigation was conducted to assess the effect of different planting dates on the growth and yield of newly developed cultivars under the agroecological conditions of Tando Jam.

MATERIALS AND METHODS

Field experiment was conducted at Agronomy experimental field (A.R.I.) Tando Jam during summer 1986. The treatments consisted of four planting dates (1st April, 15th April, 1st May and 15th May) and six cultivars Qalandri, Rehmani, TH-1100, TH-1174, TH-199/80 and TH-3/83.

The experiment was laid out in split plot design with sowing dates in main plots and cultivars in sub plots, having four replications. The net plot size was 7 x 5m. The crop was sown in rows 75 cm apart with drill using seed rate of 35 kg/ha. The seedlings were thinned keeping plant to plant distance of 25 cm.

The normal fertilizer dose of 84 kg N and 50 kg P_2O_5/ha was applied prior to sowing in the form of urea and single super phosphate. all other cultural operations were given according to the recommended schedule. The meterological data recorded during the crop season is given in Table 1.

Table 1. Average meteorological observations recorded daily from April 1986 to September 1986.

Months	Air temperature °C Maximum	Minimum	Relative humidity %	Sunshine hours	Rainfall (mm)
April	38.53	20.43	72.59	10.29	–
May	41.71	24.07	77.35	10.95	–
June	40.56	27.92	88.14	4.28	–
July	37.11	27.09	86.61	6.31	–
August	31.58	24.58	86.49	7.77	10.45
September	36.01	23.81	86.67	11.09	–

A maturity 5 plants/plot were tagged for recording the observations, on plant height, number of monopodial and sympodial branches/plant, number of productive bolls/plant, seed cotton yield/plant and specify how yield/ha was recorded. All the data were subjected to statistical analysis using the analysis of variance procedure and means were separated by L.S.D. (least significant difference) test, following Gomez and Gomez [13].

*Agricultural Economic Research Unit, PARC, Tando Jam.

RESULTS AND DISCUSSION

Seed cotton yield. Seed cotton yield was significantly (P = 0.05) affected by planting dates (Table 2). The highest seed cotton yields (2.30 and 2.62 m.t/ha) was obtained in early planted (1st or 15th April) cotton, which were significantly better than 1st and 15th May plantings (Table 3). Similar results have been reported by Yadee [2], Singh *et. al.* [13], Chuhan and Suryanaryana [4], Shekhawat and Chundawat [5], Bridge *et. al.* [6], Mithaiwala and Memon [7], Muhammad and Hanif [12]. They reported that delay in sowing cotton significantly suppressed the yield. Khan *et. al.* [10], Ullah *et. al.* observed that crop sown in early April gave significantly higher seed cotton yield. A considerable reduction in seed cotton yield was noted as sowing was delayed after 15th April. It might be due to the reduced vegetative growth, early termination of crop growth period caused by the adverse effect resulting from the rise in air temperature early in the reproductive phase.

The cultivars also differ significantly (P = 0.01) to seed cotton yield. The newly developed cultivar TH-3/83 gave significantly maximum seed cotton yield (2.59 m.t/ha) followed by Qalandri, and TH-199/80, giving (2.31 and 2.30 m.t/ha) respectively, which were significantly at par with TH-1174 (1.64 m.t/ha) Table 3. This attributed to the genetical make up of the material.

Table 2. Mean squares corresponding to various sources of variation for seed cotton yield and its components of cotton cultivars as influenced by planting dates.

Source of variation	D.F.	Mean square					
		Plant height	Monopodial branches/ plant	Sympodial brranches/ plant	Productive bolls/ plant	Seed cotton yield/ plant	Seed cotton yield/ ha
Replication	3	208.65NS	2.00NS	143.40NS	17.27NS	172.23NS	0.24NS
Planting dates (P)	3	495.39NS	8.20**	905.66**	584.19**	10579.57**	3.05*
Main plot error	9	354.40	0.90	75.76	64.66	1487.41	0.48
Cultivars (C)	5	1556.83**	0.56NS	17.82NS	41.70**	846.25NS	1.62**
PxC	15	592.89**	0.47NS	27.11NS	17.54NS	700.37*	0.19NS
Sub Plot error	60	184.11	0.72	25.61	11.56	374.67	0.20
Total	95	–	–	–	–	–	–

* Significant at P = 0.05; ** Significant at P = 0.01; NS Non-significant.

Table 3. Mean seed cotton yield/ha (M.T.) of cotton cultivars as affected by different planting dates.

(A)	*Planting dates*	*Yield/ha (M.T.)*
	1st April	2.30 a
	15th April	2.62 a
	1st May	1.95 b
	15th May	1.84 b
	S.E. ±	0.20
	C.D. at P = 0.05	0.45
(B)	*Cultivars*	
	Qalandri	2.31 ab
	TH-1100	2.07 bc
	TH-1174	1.64d
	TH-199/80	2.30 abc
	TH-3/83	2.59 a
	Rehmani	2.16 bc
	S.E. ±	0.16
	C.D. at P = 0.05	0.32
	CD at P = 0.01	0.43

Means followed by the same letters do not differ significantly at 5 per cent probability level.

Yield attributes. It is apparent (Table 2) that plant height differ significantly (P = 0.01). Cultivar Rehmani produced taller plant (181.81 cm), followed by TH-199/80 and TH-3/83 caused 166.88 and 162.00 cm respectively. However, the maximum plant height (149.32 cm) was observed in cultivar TH-1174 (Table 4). This may be due to change in parental material.

Table 2 depicted that number of monopodial branches were change significantly (P = 0.01) due to different planting dates. Delay in planting (1st or 15th May) increase in number of monopodial branches (3.17 and 2.75)/plant, over early 1st April, did lower number of branches (1.90)/plant. (Table 4). Similarly sympodial branches were also significantly different (P = 0.01) due to different planting dates, later sown crop (1st or 15th May) produced maximum number of sympodial branches (26.64 and 25.38)/plant respectively. Whereas early planted (1st or 15th April) recorded lesser number of sympodial branches (14.27 and 16.24) (Table 4). These results are not in agreement with the findings of Khan and Ali [8] who reported that number of monopodial and sympodial branches decreased with delay in sowing.

Table 4. Mean yield components of cotton cultivars as affected by different planting dates.

Treatments	Plant height (cm)	Monopodial branches/plant	Sympodial branches/ plant	Productive bolls/plant	Seed cotton yield/plant plant (gm)
(A) *Planting dates*					
1st April	160.19	1.90 c	14.27 b	19.17 a	87.01 a
15th April	166.51	2.10 bc	16.24 b	19.97 a	98.44 a
1st May	164.11	3.17 a	26.64 a	10.18 b	56.49 b
15th May	156.16	2.75 ab	25.38 a	10.18 b	58.01 b
S.E ±	5.43	0.27	2.51	2.32	0.20
CD at P = 0.05	-	0.61	5.67	5.24	0.45
CD at P = 0.01	-	0.88	8.16	7.54	0.65
(b) *Cultivars*					
Qalandri	155.95 cd	2.33	20.84	16.26 ab	81.72
TH-1100	154.51 cd	2.23	19.06	14.16 b	73.75
TH-1174	149.32 d	2.76	22.17	12.50 c	64.48
TH-199/80	166.88 b	2.57	20.70	15.60 ab	74.85
TH-3/83	162.00 bc	2.44	20.87	17.94 a	84.45
Rehmani	181.81 a	2.56	20.51	13.74 b	70.80
S.E. ±	4.80	0.30	1.79	1.20	1.58
CD at P = 0.05	9.60	-	-	2.40	-
CD at P = 0.01	12.77	-	-	3.19	-

Means followed by the same letters do not differ significantly at 5 percent probability level.

Number of productive bolls/plant varied significantly (P = 0.01) due to different planting dates (Table 2). Crop planted on 1st or 15th April progressively increased in number of productive bolls (19.17 and 19.97)/plant, over later planted 1st or 15th May giving lesser number of productive bolls (10.18)/plant (Table 4). The results are in accordance with the results obtained by Muhammad and Hanif [12] who reported that number of bolls decreased with delay in sowing.

Cultivars also differ significantly (P = 0.01). TH-3/83 produced maximum number of productive bolls 17.94/ plant, followed by Qalandari and TH-199/80 giving 16.26 and 15.60/plant respectively, whereas cultivar TH-1174 recorded lesser number of productive bolls 12.50/plant (Table 4). It might be due to genetical make up of the material.

Seed cotton yield/plant was change significantly (P = 0.05) due to different planting dates (Table 2). The maximum seed cotton yields (87.01 and 98.44 gm)/plant were obtained under 1st or 15th April planted crop. However delay in planting after 15th April significantly depressed in the seed cotton yield (56.49 or 58.01 gm)/plant (Table 4). The high yields in early sown crop was mainly due to higher number of productive bolls/plant. Similar results have been reported by Yadee [2], Khan *et. al.* [10], Ullah *et. al.* [11]. They reported that early planted crop gave higher seed cotton yield.

It is observed from the present investigation that cotton sown either 1st April or 15th April at 15 days interval, produced significantly better seed cotton yield as compared to 1st May or 15th May planted cotton, this increment in yield mainly due to higher productive bolls and seed cotton yield/plant. However each successive delay in planting beyond 15th April progressively depressed in the yield. Cultivars were also differ significantly, newly developed)TH-3/ 83). Cultivars gave maximum yield than all the rest cultivars. It is suggested that for obtaining better seed cotton yield, the cultivar TH-3/83 should be grown on 1st or 15th April, under Agro-ecological conditions of Tando Jam.

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