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COTTON GROWTH PARAMETERS AND PRODUCTION OF GIZA 75 COTTON VARIETY AS AFFECTED BY SOWING DATE AND NITROGEN LEVELS

Abuldahab, A. A.; Sohair, E.D. Elayan and Samia, E. S. Ali
Agron. Dept., Fac. of Agric. Cairo University.

ABSTRACT

Both nitrogen supply and planting date affect plant development, yield and other characteristics of cotton. To obtain this type of information the response of Giza 75 cotton variety to N fertilization (0, 20, 40, 60, and 80 N unit / fed.) and planting dates (15thMarch, 1stApril, 15th April and 1st May) were studied at the Agric. Exp. and Res. Cent. Fac. Agric. Cairo Univ. during 1995 and 1996 seasons. The main findings of this study can be summarized as follows: sowing date and nitrogen level had significant effects on plant height in different growth stages in the two seasons. Generally delaying sowing date led to significant decrease in plant height Like-wise increasing nitrogen levels resulted in increasing plant height. Sowing date had insignificant effects on LAI at the three growth stages studied (8-leaves, first flower and first open boll). However, increasing nitrogen fertilization more than 40 N unit/fed. induced significant increase in LAI. Delaying sowing date, led to significant decrease in the total dry matter (TDM). Increasing the applied nitrogen level, increased significantly the average (TDM). In general there was a gradual increase in DM partition in terms of recovered roots, leaves and stems with late planting . However , late planting induced significant reduction in DM. partition in terms of the fruiting parts of its (buds, flowers and bolls) and in estimates of earliness criteria (1stflower and 1st open boll) . Cotton yields and only one yield component variable viz.: number of bolls per plant and earliness index expressed significant variation in the favour of the earlier sowing dates viz.: 15th March and 1st April , with no significant differences between those two dates in most instances . All yield components except number of bolls per plant and standability at harvest were not significantly affected by variation in levels of N fertilizations used. Averaged over the levels of the other factor, both successively latter planting dates and nitrogen levels exhibited insignificant variations in all fiber properties, indicating that these traits are highly inherited traits and low effected with variability in the environment.

INTRODUCTION

Both nitrogen supply and planting dates affect plant development, yield and other characteristics of cotton. For a number of reasons, Egyptian cotton (*Gossypium barbadense* L.) might not always be planted at the most optimum time. General trends for Egyptian cotton indicate that early planting (full season tests) yielded significantly more than the late- planting ones (Abd El-Rahman, 1989; El-Okkia *et al*. 1989; Yousef, 1980; and Abo El-Zahab, 1994), The earlier plantings provide more time for the plants to produce more mature bolls. Data showed that all cotton varieties have a general tendency of growing taller and more vegetatively, however, they yield less with delayed planting (Abo El-Zahab, 1994 and Abo El-Zahab *et al*., 1996). Although extensive tests have been conducted to determine the effect of fertilizer applications on cotton lint yield, less attention has been given to their

influence on fiber characteristics. Yield, plant characteristics and boll properties were influenced by N application, while for fiber properties results reported are inconsistentst. Nitrogen fertilization exerted a pronounced increment in seed cotton yield (Basinski *et al*. 1971, Srfsook *et al*. 1973, El-Hattab *et al*., 1975, El-Shaer *et al*., 1979). Curvelinear relationship was reported between cotton lint yield and nitrogen (Hamilton *et al.*, 1956, Searsbrook *et al*. 1961, Clark 1964). However, no definite response of cotton yield to rates of nitrogen either alone or in combination with other elements was reported. (Jones *et al*. 1956). Nelson and Ware (1932), Gipson *et al*. (1960), Mackenzie and Schaik (1963) and Murray et al. (1965) stated that N fertilizer had no effect on fiber properties. Crowther (1934) and Godoy (1950) reported an increase in lint length from nitrogen fertilizer treatment. On the other hand Gulati (1951) reported reductions in both length and strength from nitrogen applications.

MATERIALS AND METHODS

Supra-optimal growth in cotton is a consequence of delaying sowing date and excess of nitrogen applications. Therefore, the present study was initiated to study the effect of these two factors on growth attributes , yield and lint properties in Egyptian cotton variety Giza 75.

Two factor experiment (sowing dates and nitrogen fertilizer levels) were arranged in a split-plot arrangement in complete block design with 4 replicates was conducted at the Agricultural Experiment and Research Center Faculty of Agriculture, Cairo University in the two Summer Seasons of 1995 and 1996. Sowing dates were allocated to the main plot, while sub-plots included fertilizer levels. The sub plot size was 3.0 x 7.0 m (1/200 feddan) including 5 rows 0.60 aport and 7 m in length, sowing dates were ; 15th March (Early), 1st April (Mid.), 15th April (Mid.), and 1st May (Late) in the two seasons. Nitrogen levels were, zero, 20, 40, 60 and 80 kg N per feddan in the form of urea (46% N). Beside a basic of 150 kg. calcium super phosphate (15.50% P_2O_5) and 50 kg. Potassium sulphate (48% K_2O) per feddan for all treatment were added. All cultural practices, i.e. hoeing, irrigation, insect control were carried out in the same way as in ordinary cotton fields. Thinning took place after 4 weeks from sowing, where two plants per 20 cm.- hill were left and 20 cm. between hill. Picking took place on 1st October and 15th October in both seasons.

Characters studied:
Growth attributes:

Ten plants (5 successive guarded hills) from the two inner rows of each sub plot denoted for growth analyses were taken at three growth stages 8-leaf, first flower and first open boll. Plant samples were carefully uprooted and separated into recovered roots, leaves, stems, buds, blooms and bolls. The different plant and fractions were dried for 48 hours at 105^{o} c.

The following traits were evaluated:

1- Plant height : from cotyledonary nodes to the top of the plant.
2- Leaf area index (LAI): was expressed as the ratio of total leaf area (cm^2) per plant to the area of the land (cm^2) covered by the plant (Watson, 1958).
3- Total dry weight : (T.D.W.) in grams per plant.
4- Dry weight partitioning as percentages in terms of recovered roots, leaves, stems, blooms and opened bolls.

Yield and yield components:

1- Boll weight, as average weight in grams of 50 random bolls from each plot.
2- Number of open bolls / plant (mean of number of bolls at ten plants taken at random).
3- Seed cotton yield per plant (mean of seeds in grams of ten random plants).
4- Seed cotton yield per feddan (K.) based on the bulk yield of each plot.
5- Lint percentage : percentage of the weight of lint of seed cotton.
6- Standability expressed as final number of plants at the end of the season.
7- Earliness percentage yield of 1st pick / total yield X 100.
8- Lint index ; weight of lint in grams born on 100 seeds.
9- Seed index; weight of 100 sound seeds.

Lint properties:

For measuring lint properties a composite lint sample from lint yield of ten plants / plot was used. Tests were conducted under controlled conditions (i.e. 70 $^oF \pm 2$ and 65% R.H $\pm$ 2). Fiber length was measured as 50% and 2.5% span length (SL) and uniformity ratio (50% SL / 2.5% SL) X100 on a digital fibrograph. Fiber strength expressed as pressely index, was measured. Fiber fitness was expressed in micronaire units.

RESULTS AND DISCUSSION

Growth and development:

Plant height:

Data in (Table 1) indicated that sowing dates and nitrogen levels had significant effects on plant height in different growth stages in the two seasons. Generally delaying sowing dates led to significant decrease in plant height. Like-wise increasing nitrogen levels resulted in increasing plant height. In this respect a series of field experiments was carried out at Arizona State, USA to evaluate the effects of planting date on the lint yield of several cotton varieties (Kittock *et al*.,1987; Kittock *et al*., 1988 and Silvertooth *et al*., 1988). Data showed that all cotton varieties have a general tendency of growing taller and more vegetatively, but yield less with delayed planting. It is generally known that in late plantings, early-maturing cultivars will perform better than late-maturing cultivars.

Table (1): Plant height cm (H), Leaf area index (LAI) and total dry weight (g) /plant (TDW) at certain development al growth stages as influenced by sowing dates and fertilizer levels in 1995 and 1996 seasons.

Factors	8 Leaves			1st flower			1st open boll		
	H(cm)	LAI	TDW	H(cm)	LAI	TDW	H(cm)	LAI	TDW
Sowing dates								1995	Season
15th March	38.38b	0.43	4.00b	76.76bc	3.39	32.57b	104.24b	6.77	128.18b
1st April	40.58a	0.44	5.01a	80.25a	3.49	34.61a	108.25a	6.64	133.23a
15th April	37.25c	0.41	3.42bc	76.94b	3.29	31.01c	100.17c	6.73	120.82c
1st May	36.42d	0.40	2.98c	75.67c	3.35	30.22c	97.81c	6.56	117.33d
L S D	1.07	n.s	0.82	1.15	n.s	1.01	3.14	n.s	2.45
Fertilizer levels (N unit/ fed)									
0	32.56 e	0.35c	3.10c	70.84e	2.75c	26.98e	92.41d	4.4a2b	105.16cd
20	34.26d	0.38bc	3.32c	72.69d	2.92c	28.65d	94.55cd	4.83b	112.45d
40	36.89c	0.41bc	3.72bc	76.64c	3.15c	31.16c	98.81c	7.77a	119.51c
60	40.88b	0.46b	4.19b	80.79b	3.69b	33.76b	109.88b	8.05a	135.43b
80	46.19a	0.51a	4.92a	86.07a	4.24a	39.96a	117.36a	8.31a	151.91a
LSD	0.67	0.08	0.62	1.14	0.50	0.79	6.18	1.02	4.86a
Sowing dates								**1996**	**Season**
15th March	33.55b	0.40	4.01b	73.19b	3.46	32.46b	106.36b	6.73	144.60b
1st April	35.70a	0.41	5.03a	75.00a	3.60	34.61a	110.93a	6.82	151.00a
15th April	32.57c	0.39	3.42c	71.34c	3.41	31.02c	104.56b	6.91	141.30bc
1st May	31.63d	0.38	2.98d	70.46c	3.35	30.22d	103.44b	6.95	137.74c
L S D	0.82	n.s	0.03	1.08	n.s	0.008	2.91	n.s	3.76
Fertilizer levels (N unit/ fed)									
0	27.69e	0.32b	2.63d	65.18e	2.86b	26.06e	93.33d	4.62	112.48e
20	29.50d	0.35b	3.56e	67.34d	3.02b	29.11d	95.54cd	4.79	121.44d
40	32.27c	0.38b	3.96c	71.17c	3.25b	31.59c	100.51c	7.95	137.21c
60	36.03b	0.44a	4.33b	76.42b	3.79ab	34.30b	117.35b	8.03	168.70b
80	41.34a	0.49a	4.81a	82.38a	4.38a	39.32a	124.88a	8.42	178.43a
LSD	1.75	0.10	0.03	2.13	1.02	0.007	6.62	n.s	5.46

Means designated by the same letter in the same column are not significantly different at 0.05 level.

Leaf area index (LAI):

Data presented in (Table 1) clearly indicated that sowing dates had insignificant effects on LAI in the three growth stages studied (8 leaves, first flower and first open boll). However, increasing nitrogen fertilization to more than 40 N unit / fed. induced significant increase in LAI.

Total dry weight / plant (TDW) :

The average of TDW / plant increased continuously as the plant age proceeded (Table 1). Delaying sowing date, led to significant decrease in the TDW. However, increasing the applied nitrogen level, increased significantly the average TDW. In this context, increasing N rates (from 0 to 140 kg / ha , Sato et al., 1984; from 0 up to 69 N / feddan, Ebaid *et al*., 1987; and from 60 to 90 kg N/fed. for Giza 75 cultivar, Yassen *et al*. ; 1990) induced an increase in plant height, leaf area index, dry matter accumulation and in turn this was reflected in high fruiting load.

Dry matter (Dm.) partitioning :

Dry matter Partition in terms of recovered roots , buds , leaves , stems, flowers and bolls, the first open boll stage revealed that sowing date had a significant effect on DM. Partitioning in all parts of the plant in both seasons except for recovered roots and stems in 1995 season. Nitrogen levels had a significant effect on DM. Partition in both seasons (Table 2).In general there is a gradual increase in DM. partitioning in terms of recovered roots, leaves , stems with late planting.

Table (2): Dry matter partitioning % as influenced by sowing dates and fertilizer levels at first open boll stage in 1995 and 1996 seasons.

Factors	Recovered roots	Buds	Leaves	Stems	Flowers	Bolls
Sowing dates			**1995**			
15th March	23.35	0.61b	26.45c	35.40	0.75 ab	13.45a
1st April	23.84	0.70a	26.05bc	35.38	0.82a	13.21a
15th April	23.26	0.58b	26.63bc	35.95	0.70 bc	12.88a
1st May	22.93	0.55b	27.51a	36.69	0.65 c	11.86b
LSD	n.s	0.06	0.78	n.s	0.07	0.58
Fertilizer levels (N unit/ fed)						
0	22.05c	0.74 a	25.70c	34.84b	0.89a	15.97a
20	22.22c	0.76 a	25.74bc	34.60b	084a	15.94a
40	23.15 bc	0.64 a	26.73abc	35.71b	0.78a	12.99b
60	24.10ab	0.46 b	27.23ab	37.08a	0.64b	10.50c
80	25.22a	0.44b	27.91a	37.05a	0.53b	9.03d
LSD	1.26	0.11	1.54	1.94	0.11	1.32
Sowing dates			**1996**			
15th March	22.01 d	0.70ab	26.40d	36.18b	0.74a	13.56a
1st April	22.91 a	0.73a	27.29a	37.55a	0.74a	10.77c
15th April	22.35 c	0.64 bc	26.63b	36.91a	0.73ab	12.74b
1st May	22.46 b	0.58c	26.43c	37.06a	0.65b	12.84 b
LSD	0.008	0.06	0.02	0.69	0.08	0.62
Fertilizer levels (N unit/ fed)						
0	21.57 e	0.80a	25.33e	36.04c	0.88a	15.21a
20	21.84 d	0.78a	25.52d	36.15c	0.86a	14.87b
40	22.24 c	0.73a	26.47c	36.16c	0.82a	13.10c
60	22.92b	0.57b	27.65b	37.69b	0.61b	10.56d
80	23.41a	0.44c	28.47a	38.59a	0.44c	8.66e
LSD	0.007	0.13	0.02	0.61	0.13	1.23

Means designated by the same letter in the same column are not significantly different at 0.05 Level.

However, late planting induced significant reduction in DM. partition in terms of the fruiting parts (buds, flowers and bolls) with pronouncedly effects for planting after 15th April. Increasing N fertilization than 40 N unit /fed. induced significant increase in dry matter of recovered roots , leaves and stems, however ,the reverse was correct for the fruiting parts , where significant reduction was observed for DM . partition in forms buds , flowers and bolls .

Days from sowing to date of first flower and first open boll may be taken as criteria for earliness in cotton . Godoy and Palomo (1999) in their analysis of earliness in Upland cotton listed 12 morphological and phenological variables among them date of first flower and date of first open boll .

Data presented in (Table 3) revealed significant effects for planting date in number of days from sowing up to certein phenological growth stages viz.- date of first flower and date of first open boll .There was significant gradual reduction in these earliness criterias with delaying planting date in both seasons, where date of first flower was earlier by about 4-9 days , and date of first open boll was earlier with about 8-9 days for plant sown in 1st May compared to those sown in 15th March.

Table (3): Number of days from sowing date up to certain developmental stages as influenced by sowing dates and fertilizer levels in 1995 and 1996 seasons.

Factors	Days from sowing up to			
	1st flower	1st open boll	1st flower	1st open boll
Sowing dates	1995 Season		1996 Season	
15th March	87.41a	137.38a	81.74a	135.05a
1st April	83.08b	132.86b	82.27a	132.25b
15th April	81.24bc	130.69b	79.41b	128.74c
1st May	79.58c	128.23c	77.90c	126.24d
LSD	2.34	2.40	1.35	2.37
Fertilizer levels (N unit/ fed)				
0	81.11	130.42	79.03	128.30
20	82.45	131.93	80.65	130.10
40	82.99	132.54	81.41	130.90
60	83.64	133.28	82.10	131.75
80	83.96	133.29	82.23	131.75
LSD	n.s	n.s	n.s	n.s

Means designated by the same letter in the same column are not significantly different at 0.05 level.

Yields and its components

Cotton yields (seed cotton and lint cotton yields),yield contributing variables viz.: seed cotton yield /fed ., seed cotton yield/plant , no. of bolls /plant ,boll weight (g) , lint %, lint index (g), seed index (g) ,earliness index and standability at harvest are presented in (Table 4).

Cotton yields and only one of its yield component variable viz.: number of bolls per plant and earliness index expressed significant variation in the favour of the earlier sowing dates viz.: 15th March and 1st April , with no significant differences between those two dates in most instances. However, there was evidently significant reduction in cotton productivity and its main yield component, i.e. number of bolls /plant for sowing after 15th April, with the lowest yield for plants sown at the first May. However, all the yield

contributing variables except number of bolls/plant, and number of plants at harvest per unit area had nothing to do with variation in sowing date.

It is evident from data presented in (Table 4) that all yield components except number of bolls per plant and standability at harvest were not significantly affected by variation in levels of N fertilizations from zero level up to 80 N unit /fed. However , for bolls per plant high doses of N fertilization (60 and 80 unit /fed.) induced significantly more bolls /plant .This was reflected in more yield production per unit area but with no significant differences between 60 and 80 N unit /fed ., indicating that more N fertilization than 60 N unit/fed. under the conditions of the experiment is not required for yield maximization . This trend was quite true for the effect of planting dates and N fertilization in both seasons.

In this connection, general trends in lint yield indicate an advantage in yield potential from full-season type varieties, particularly when they are planted early .Full season varieties , however diminish rather quickly with regard to yield potential when planting is delayed in comparison to varieties that are considered mid-or shorter- season varieties . Lint yield reduction of Upland , Pima and Egyptian cotton after the optimum planting date was apparently due to reduced growing season .(Bilbro and Ray,1973, kittock and Taylor ,1985 and Abo El-Zahab, *et al*.,1996). Several studies have associated higher lint yields of both Upland (Aguillard *et al*., 1980; Galanopoulou et al., 1980; and kittock and Taylor 1985) and Egyptian cottons (El-kalla *et at*.,1994; Abd El Gawad *et al*.,1986; El Hariry,1986; Shahin ,1986 Abo El - Zahab *et al*. ,1996 and other) with early planting .

In a recent study of the differential response of Egyptian cotton cultivar to the stress of late production system, Abo El-Zahab *et al*, (1996) reported that planting dates significantly affected cotton yields, with decreasing mean yield potentials of genotypes with each successive delay in planting dates. They added that the unchangeable expression of lint percentage and boll weight under late planting stress conditions suggest that these two traits are relatively constant for a genotype and much emphasis must be directed to them when improving for adaptation for late planting date.

The result of this study is evidenced with the notation raised by Abo El Zahab *et al.* (1996) for releasing short-season cotton genotype and to provide a plan for reliable integrated production management (IPM) system for delayed planting cotton in order to maximize economic yield and give greater flexibility in cropping pattern. For Egyptian cotton, this IPM as given by Abo El–Zahab (1994) numerated several factors among them the availability of ample water and nitrogen through peak bloom to avoid stress, and adjusting N level to yield potential. Nitrogen application rates up to 45 N units /fed . splitted three times and side dressed at the 1st ,2nd and 3rd irrigation is recommended.

Table (5): Means of fiber properties as influenced by sowing data and fertilizer levels in 1995 and 1996 seasons.

Factors	Fiber length(mm)		UR%	Micronaire Reading	Pressty index
	2.5 %	50 %			
Sowing dates	**1995 season**				
15th March	1.26	0.58	48.59	4.04	35.45 a
1st April	1.27	0.61	48.75	4.25	35.48 a
15th April	1.27	0.57	48.21	3.91	34.10 ab
1st May	1.22	0.55	48.09	375	33.32 b
LSD	n.s	n.s	n.s	n.s	1.77
Fertilizer levels					
(N unit/ fed)	1.23	0.55	46.89	3.58	32.91
0	1.24	0.56	47.40	3.89	33.79
20	1.25	0.58	48.26	4.03	34.85
40	1.26	0.59	49.09	4.20	35.60
60	1.26	0.60	50.42	4.31	36.21
80					
LSD	n.s	n.s	n.s	n.s	n.s
Sowing dates	**1996 Season**				
15th March	1.28	0.60	49.35	4.57	34.02
1st April	1.26	0.61	49.78	4.47	34.12
15th April	1.25	0.62	48.12	4.58	33.43
1st May	1.25	0.62	50.86	4.11	32.80
LSD	n.s	n.s	n.s	n.s	n.s
Fertilizer levels					
(N unit/ fed)	1.22	0.58	47.21	3.96	32.17
0	1.25	0.60	48.46	4.24	37.67
20	1.27	0.61	49.81	4.42	33.62
40	1.28	0.62	51.20	4.72	34.34
60	1.28	0.62	50.98	4.83	35.16
80					
LSD	n.s	n.s	n.s	n.s	n.s

Means designated by the same letter in the same column are not significantly different at 0.05 level.

Fiber properties :-

Means of fiber properties as influenced by sowing dates and N fertilization are presented in (Table 5) Except for pressely index in 1995 season sowing date, averaged over fertilizer levels , successively latter planting date exhibited insignificant variations in fiber properties in both years of experimentation . However , for fiber strength expressed as pressely index in 1995 season , the latest planting dates 1st May induced significant reductions in fiber strength . Our results with respect to fiber length, uniformity ratio, strength and micronaire units were in accord with those reported by Bilbro and Ray (1973).

Table (5) shows the fiber properties averaged over planting dates. It is obvious that inherent genetically consistutions of those traits are far more

important in producing fiber characteristics than is the level of N fertilization. N had no effect on any of fiber properties . Our data are in line with those reported by Bilbro and Ray (1973), Murray *et al*. (1965), Mackenzie and Schick (1963) and Nelson and Ware (1932) In this context, Murray et al reported that apparently, the cotton plant requires a certain level of nutrients to produced a given amount of seed , which controls lint yield. Once sufficient soil nutrients are available to allow a seed to develop, the properties of its cellulose seed hair are determined by factors other than the levels of nitrogen , phosphorus, and potassium.

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ثوابت النمو والانتاجية لصنف القطن جيزة ٧٥ وتأثرها بمواعيد الزراعة ومستويات التسميد الازوتي.

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عبدالله عبدالغفار ابو الدهب، سهير عليان دسوقي عليان، ساميةالبدري سيد علي
قسم المحاصيل –كلية الزراعة – جامعة القاهرة.

تتباين تقديرات النمو والانتاجية في القطن تبعا لميعاد الزراعة ومستويات التسميد الازوتي. ولتقدير استجابة صنف القطن جيزة ٧٥ لخمسة مستويات من التسميد الازوتي (صفر، ٢٠، ٤٠، ٦٠، ٨٠ وحدة أزوت للفدان) واربعة مواعيد زراعة (١٥ مارس، أول إبريل، ١٥ إبريل، أول مايو) تمت دراسة هذه العوامل في تجربة عاملية في موسمين ١٩٩٥ ،١٩٩٦ في محطة التجارب والبحوث الزراعية بكلية الزراعة- جامعة القاهرة ويمكن تلخيص اهم النتائج كما يلي:
تأثر طول النبات في مراحل النمو المختلفة بميعاد الزراعة ومستوي التسميد الازوتي حيث ادى تاخير ميعاد الزراعة إلي نقص في طول النبات كما أن زيادة مستويات التسميد الازوتي ادت إلي زيادة طول النبات. لم يكن لميعاد الزراعة تأثير معنوي علي دليل مساحة الورقه المقدرة عند ثلاث مراحل من النمو (مرحلة٨ أوراق، تاريخ أول زهرة، تاريخ أول لوزة) وادت زيادة التسميد الازوتى لأكثر من ٤٠ وحدة أزوت للفدان إلي زيادة معنوية في دليل مساحة الورقة، أما بالنسبة لتجميع المادة الجافة فقد انخفض معنويا بتأخير ميعاد الزراعة، بينما حدثت زيادة معنوية له بزيادة مستويات التسميد الأزوتى، كما لوحظ تأثر توزيع المادة الجافة بين أجزاء النبات المختلفة بميعاد الزراعة، حيث ادي تاخير ميعاد الزراعة إلى زيادة تركيز المادة الجافة في الجذور والاوراق والسيقان مع نقصها المعنوي في الاجزاء الثمرية (البراعم، الأزهار، الثمار) .كما انعكس تأثير ميعاد الزراعة المتاخر علي النقص فى تقديرات مقايس التبكير فى صوره عدد الأيام من الزراعة حتى تفتح أول زهرة وأول لوزة. وتشير النتائج إلى أن مواعيد الزراعة المبكرة (١٥ مارس، أول ابريل) تؤدى إلى الحصول على إنتاجية مرتفعة سواء بالنسبة لإنتاج محصول القطن الزهر أو الشعر ومكون هام من مكوناتة وهو عدد اللوز على النبات، كما تؤدى إلى زيادة معنوية فى دليل التبكير مقدرة كمحصول الجنية الأولى علي مجموع الجنيات. ومن الجدير بالذكر أن جميع مكونات المحصول المدروسة ما عدا عدد اللوز علي النبات بالاضافة إلى عدد النباتات عند الحصاد لم تتأثر معنويا بتباين مستويات التسميد الازوتى.

Table (4): Cotton yields and its components, earliness index and standability at harvest as influenced by sowing dates and fertilizer levels in 1995 and 1996 seasons .

Factors	Seed cotton yield (k) fed.	Seed cotton yield (g)plant	No bolls/ plant	Boll weight/ plant (g)	Lint %	Lint index(g)	Seed index (g)	Earliness index %	Stand ability (thousand plants)
Sowing dates				**1995**	**Season**				
15th March	5.16 ab	30.61 b	14.04 a	2.16	34.88	5.44	9.40	60.35 a	58.07
1st April	5.48 a	32.79 a	14.35 a	2.27	35.37	5.44	9.64	58.41 b	59.10
15th April	4.42 b	25.46 c	12.24 a	2.06	35.00	5.68	9.17	55.93 c	58.53
1st May	3.55 c	15.03 d	7.50 b	1.99	34.77	5.40	9.05	53.94 b	57.39
LSD	0.75	1.38	3.09	n.s	n.s	n.s	n.s	1.38	n.s
Fertilizer levels (N unit/ fed)									
0	3.14 c	16.12 d	8.07 c	1.98	32.97 c	4.99	8.79	62.31 a	56.43
20	3.85 bc	20.69 c	9.92 bc	2.07	35.30 abc	5.59	9.18	60.67 ab	57.21
40	4.97 bc	28.12 b	12.77 ab	2.18	36.05 ab	5.65	9.73	58.01 b	58.71
60	6.04 a	34.90 a	15.13 a	2.29	36.60 a	5.87	9.55	54.55 c	59.98
80	5.27 ab	30.05 b	14.29 a	2.08	34.12 bc	5.31	9.34	50.25 d	59.04
LSD	1.48	2.72	4.18	n.s	2.46	n.s	n.s	2.72	n.s
Sowing dates				**1996**	**Season**				
15th March	5.54 ab	28.91 b	12.98 ab	2.28	35.27	5.51	9.90	63.11	58.31
1st April	5.81 a	32.98 a	13.69 a	2.39	34.15	5.47	10.09	61.08	58.67
15th April	4.75 b	25.19 a	11.45 c	2.38	35.06	5.26	10.13	58.89	57.20
1st May	3.91c	18.01 c	8.42 d	2.13	34.46	5.20	9.73	56.98	55.91
LSD	0.80	1.73	0.91		n.s	n.s	n.s	1.75	n.s
Fertilizer levels (N unit/ fed)									
0	3.55 c	17.18 d	8.14 c	2.10	33.75	4.74	8.93	65.02 a	54.94
20	4.22 bc	21.53 c	9.75 c	2.20	35.30	5.26	9.69	63.53 ab	56.62
40	5.38 ab	27.62 b	12.35 b	2.30	35.97	5.58	10.12	60.95 bc	57.96
60	6.40 a	35.91 a	15.37 a	2.44	36.38	5.73	10.69	57.86 c	59.11
80	5.46 ab	30.36 b	14.32 a	2.18	34.00	5.51	10.53	52.74 d	59.20
LSD	1.71	3.41	1.96	n.s	n.s	n.s	n.s	3.49	n.s

Means designated by the same letter in the same column are not significantly different at 0.05 level.