

EFFECT OF THREE SOWING DATES ON DIFFERENT CHARACTERISTICS OF FOUR EGYPTIAN COTTON VARIETIES

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ABSTRACT

This investigation was carried out at the Agricultural Experiment and Research Station, Faculty of Agriculture, Cairo University during 2001 and 2002 seasons to study the effect of three sowing dates (25 March, 10 April and 25 April) on four Egyptian cotton cultivars (Giza 70, Giza 80, Giza 83 and Giza 89).

The results obtained could be summarized as follows:

- Plant height decreased as sowing date delayed. Giza 70 gave the tallest plants.
- Sowing on 25 March and Giza 83 variety gave the best values of position 1st sympodial, branches/plant, No. of sympodial branches/plant, seed index, lint percentage and seed cotton yield/feddan .
- Delayed sowing date (25 April) and Giza 83 gave the lowest values for number of days from sowing to 1st bloom and 1st open boll. While Giza 70 gave the highest boll weight with delayed sowing date.
- Early sowing date (25 March) with Giza 83 and Giza 89 varieties gave the highest values of fiber length at 2.5 % span length, fiber strength, fiber stiffness, fiber toughness and yarn strength.

INTRODUCTION

Cotton is the most important fiber crop in the world as well as in Egypt. Cotton (*Gossypium barbadense* L.) export is a main source of foreign currency for our country. Egypt is one of the main suppliers of long and extra-long staple cotton which is more suitable to the manufacture of high quality fabrics. Raising cotton productivity and quality is an urgent national goal to meet the consistent demands from this crop. This can be achieved through planting the selected cultivars with optimizing the cultural practices.

Sowing date is considered the most important factor among the different factors which influence growth and yield of cotton. Early sowing had a favorable effect on yield of seed cotton compared with late sowing. Also sowing date may have marked effects on growth and development of cotton plant, and therefore may differentiate between the Egyptian cotton varieties.

Many workers studied the effect of sowing date on cotton plant such as El-Akkad *et al.*, (1980); Yousef (1980); El-Hattab *et al.* (1981); Hussein *et al.*, (1983); El-Hariry (1986); Shafshak *et al.*, (1987); El-Shahawy *et al.*; (1994); Ali and El-Sayed (2001) and Gadalla (2002). They found that yield and its components increased in early planting. Abou El-Nour *et al.*, (2000) as well as Abd El-Hadi and Yassen (2000) found similar results on No. of fruiting branches/plant, No. of open bolls/plant, boll weight, lint % and seed index . Regarding the growth of cotton plant, Yassen (1986) and Abdel-Rahman (1989) mentioned that number of fruiting branches, No. of open bolls/plant, boll weight, lint percentage and seed index gradually decreased from early to

late sowing . Concerning the fiber quality, El-Hattab *et al.*, (1981); Shafshak *et al.*; (1987) and El-Sheik and Abd El-Rahman (1989) reported that fiber fineness and fiber strength increased in early cotton sowing. However, Eweida *et al.*; (1988) reported that fiber fineness and fiber strength were not affected by sowing dates. The main objective of this investigation was to study the effect of sowing date on growth, yield, yield components and technological properties of four Egyptian cotton varieties.

MATERIALS AND METHODS

This investigation was carried out at the Agricultural Experimental and Research Station, Faculty of Agriculture, Cairo University during 2001 and 2002 seasons to study the effect of sowing date (25 March, 10 April and 25 April) on four Egyptian cotton varieties(Giza 70, Giza 80, Giza 83 and Giza 89). The statistical design was split plot design with four replications where, sowing dates in the main plots and cultivars in the sub plots. All the other treatments were done according to recommendations. Ten plants were taken at random from each plot to measure growth characters and some yield components. While seed cotton yield/faddan was calculated from the two inner ridge of each plot.

Plot area was 14.4 m² and constitute 6 ridges. Each ridges was 4 meters long and 60 cm were left between ridges. Hill spacing was 20 cm and two plants were left per hill after thinning.

Studied characters:

A- growth characters:

- 1) Final plant height (cm).
- 2) Number of sympodial branches/plant .
- 3) Earliness.
 - 1- Position of 1st sympodial node.
 - 2- No. of days from sowing to 1st bloom and 1st open boll

B- Yield and yield components:

- 1- No. of open bolls/plant
- 2- Seed cotton yield in kintars/fed. (one kintar = 157.5 kg).
- 3- Boll weight (gm).
- 4- Seed index (gm).
- 5- Lint percentage =
$$\frac{\text{weight of lint cotton (gm)}}{\text{weight of seed cotton yield}} \times 100$$

C- Fiber properties:

- 1- Fiber length, at 2.5% span length (mm).
- 2- Micronaire value.
- 3- Fiber strength (g/tex.).

4- Fiber elongation percentage.

$$5\text{- Fiber stiffness} = \frac{\text{fiber strength}}{\text{fiber elongation}} \times 100$$

$$6\text{- Fiber toughness} = \frac{\text{fiber strength} \times \text{fiber elongation}}{2}$$

7- Fiber maturity ratio

8- Fiber fineness (millitex)

Micronaire value, fiber fineness and fiber maturity ratio were determined using Micromate instrument according to ASTM: D3818-(1996) while, HVI instrument system was used to determine fiber length at 2.5% span length. Fiber strength and fiber elongation were determined according to ASTM D 4605 (1986).

D- Yarn strength:

Yarn strength is the product of (lea strength x yarn count) at 60's carded and 3.6 twist multiplier using Good Brand pendulum type tester.

All fiber tests were performed at the laboratories of the Cotton Research Institute, Agricultural Research Center, under constant conditions of temperature ($70 \pm 2^{\circ} \text{f}$) and relative humidity ($65 \% \pm 2 \%$) Statistical analysis was done according to Snedecor and Cochran (1982).

RESULTS AND DISCUSSION

1) Plant height:

Data in Tables (1) and (2) indicated that sowing date had a significant effect on plant height. March 25 gave the highest values (165.1 cm and 160.7 cm in the two seasons). These results may be due to that early sowing on March fits cotton plants to full season in order to obtain complete thermal unit requirement for good growth. These results are in agreement with the result obtained by El-Shahawy *et al.* (1994) but contradict Ali and El-Sayed (2001). Varieties had a significant effect on plant height. Giza 70 gave the highest value of plant height (169.5 cm and 167.6 cm in the first and second seasons respectively). These results explained that, Egyptian cotton cultivars are influenced more or less by environmental conditions. This result agrees with Mohamed (1993).

The interaction between sowing date and cultivars was insignificant in both seasons .

2- Number of sympodial branches/plant

The results in Tables (1) and (2) indicated that sowing date had a significant effect on No. of sympodial branches/plant in both seasons. Delayed sowing date decreased No. of sympodial branches/plant (17.1, 15.9 and 11.5 in the first season of study and 16.4, 15.3 and 11 in the second season). This result is in agreement with those obtained by El-Shahawy *et al.*, (1994) and Ali and El-Sayed (2001). Varieties had a significant effect in the second seasons only. Giza 89 and Giza 83 gave the highest values of No. of sympodial branches/plant in the second season. The interaction was significant in the second season.

Table (1): Main effect of varieties and sowing dates of cotton on some growth characters in the two growing seasons.

| Main effect | Plant height (cm) | | Number of sympodial branches/plant | | Position of 1 st sympodial node | | Number of days from sowing data to | | | | |
|-------------------------|-------------------|-------|------------------------------------|------|--|------|------------------------------------|------|---------------------------|-------|--|
| | 2001 | 2002 | 2001 | 2002 | 2001 | 2002 | 1 st bloom | | 1 st open boll | | |
| | | | | | | | 2001 | 2002 | 2001 | 2002 | |
| S: Sowing dates: | | | | | | | | | | | |
| 1- 25 March | 165.1 | 160.7 | 17.1 | 16.4 | 7.0 | 7.1 | 69.9 | 74.3 | 127.1 | 144.2 | |
| 2 - 10 April | 159.3 | 157.9 | 15.9 | 15.3 | 7.1 | 7.3 | 67.3 | 70.2 | 115.6 | 131.9 | |
| 3 - 25 April | 154.1 | 147. | 11.0 | 11.0 | 7.4 | 7.7 | 60.2 | 63.8 | 103.1 | 121.3 | |
| LSD 5% | 4.1 | 3.2 | 2.3 | 1.1 | Ns | 0.1 | 1.5 | 1.5 | Ns | 3.1 | |
| V: Varieties | | | | | | | | | | | |
| 1- G 89 | 164.6 | 152.1 | 12.4 | 15.6 | 6.7 | 6.5 | 62.9 | 68.0 | 107.7 | 133.3 | |
| 2 - G 83 | 155.1 | 155.2 | 14.4 | 15.5 | 5.9 | 6.5 | 62.0 | 62.3 | 101.4 | 125.2 | |
| 3 - G 80 | 152.7 | 153.7 | 16.2 | 13.3 | 8.3 | 8.4 | 65.5 | 69.3 | 122.3 | 132.6 | |
| 4- G 70 | 165.5 | 160.9 | 15.6 | 12.6 | 7.8 | 7.6 | 72.5 | 77.0 | 126.6 | 138.8 | |
| LSD 5% | 2.1 | 3.1 | Ns | 0.96 | Ns | 0.3 | 2.1 | 1.7 | 1.6 | 3.8 | |
| The interaction | | | | | | | | | | | |
| LSD 5% SXV | Ns | Ns | Ns | 1.5 | Ns | 0.4 | 4.2 | 2.9 | Ns | 4.8 | |

3- Earliness:

1- Position of 1st sympodial node

Data in Tables (1) and (2) showed that, sowing date had a significant effect on the position of 1st sympodial node in 2002 only. Sowing on 25 March gave the lowest value of position of 1st sympodial node (7.0, 7.1). 1st sympodial node tended to be located on lower nodes on the main stem in early sowing date. This result is similar to those obtained by El- Hariry (1986). Varieties had a significant effect on position of 1st sympodial node in both seasons. Giza 83 exhibited the lowest 1st sympodial node position (5.9 and 6.5 node at 2001 and 2002). The earlier cultivars produced more dry matter due to great light interception which encouraged the production of more canopy. This result agree with Bange and Milroy (2000). Thus, it could be concluded that early sowing date is capable to produce the 1st sympodial at comparatively lower nodes than the following dates. The cotton cultivar Giza 83 proved to be more tolerant to late sowing than the other cultivars under study.

2-Number of days to 1st bloom and 1st open boll

A- 1st bloom :

Data in Tables (1) and (2) indicated that sowing date, had a significant effect on No. of days to 1st bloom .Sowing on 25 April gave the lowest value (60.2 and 63.8 in the first and second seasons) respectively . Varieties had a significant effect in both seasons. Giza 83 gave the earliest reading on No. of days to 1st bloom (62.0 and 62.3 in the first and second seasons respectively). The interaction between sowing date and varieties was significant in both seasons.

B- 1st open boll

Data in Tables (1) and (2) showed that, sowing date had a significant effect in the second season of study. Sowing on 25 April gave the earliest values for 1st open boll (103.1 and 121.3 days in the first and second seasons respectively). Varieties had significant effect on this character in both seasons. Giza 83 gave the best reading (101.4 and 125.2 days). The interaction between sowing date and cultivars was significant in 2002 only. Delayed sowing date decreased No. of days to 1st boll opening. This result agrees with that obtained by El-Hariry (1986).

Yield and yield components:

1- Number of open bolls/plant :

Data in Tables (3) and (4) indicated that, sowing date had a significant effect in both seasons .

The highest value of No. of opened bolls/plant were obtained from sowing on 25 March in both seasons. Early sowing significantly increased No. of open bolls/plant. This result is in agreement with those obtained by El-Akkad *et al.* (1980); El- Shahawy, *et al.*, (1994) and Gadallah (2002) .

Table (3) : Main effect of varieties and sowing dates of cotton on some yield and yield components in the two growing seasons.

| Main effect | Number of open bolls/plant | | Boll weight (g) | | Seed Index (g) | | Lint % | | Seed cotton yield (K/fed) | |
|-------------------------------------|----------------------------|------------|-----------------|-------------|----------------|------------|------------|------------|---------------------------|------------|
| | 2001 | 2002 | 2001 | 2002 | 2001 | 2002 | 2001 | 2002 | 2001 | 2002 |
| S:Sowing dates | | | | | | | | | | |
| 1- 25 March | 16.4 | 16.5 | 2.53 | 2.43 | 10.7 | 10.7 | 39.6 | 39.7 | 10.1 | 10.4 |
| 2 - 10 April | 16.0 | 14.8 | 2.43 | 2.30 | 10.2 | 10.5 | 38.7 | 38.4 | 9.6 | 8.7 |
| 3 - 25 April | 10.4 | 10.3 | 2.08 | 2.00 | 9.4 | 9.7 | 37.5 | 37.1 | 5.3 | 5.1 |
| LSD 5 % | 4.5 | 4.3 | 0.05 | 0.9 | Ns | 0.1 | 0.6 | 0.3 | 2.1 | 1.1 |
| V: Varieties | | | | | | | | | | |
| 1- G 89 | 13.9 | 13.0 | 2.37 | 2.13 | 9.7 | 10.3 | 37.9 | 37.9 | 7.9 | 7.7 |
| 2 - G 83 | 15.3 | 15.2 | 2.37 | 2.43 | 10.3 | 10.1 | 40.8 | 39.4 | 9.1 | 8.7 |
| 3 - G 80 | 14.6 | 14.1 | 2.33 | 2.30 | 10.1 | 10.3 | 40.5 | 41.5 | 8.5 | 8.5 |
| 4- G 70 | 13.2 | 13.1 | 2.30 | 2.17 | 10.1 | 10.9 | 35.1 | 34.8 | 7.7 | 7.5 |
| LSD 5% | Ns | 1.7 | 0.06 | 0.07 | Ns | Ns | 0.3 | 0.6 | 0.6 | 0.7 |
| The interaction LSD 5% S x V | Ns | 1.5 | 0.11 | 0.12 | 0.6 | Ns | 0.5 | 1.0 | 1.1 | 1.1 |

Varieties had a significant effect on open bolls/plant in the second season of study. Giza 83 variety gave the highest numbers in both seasons (15.3 and 15.2 bolls). The interaction between sowing dates and varieties had a significant effect in the second season only .

2- Boll weight:

Data in Tables (3) and (4) indicated that effects of sowing date, cultivars and the interaction between them were significant in both season. Early sowing (25 March) significantly increased boll weight .This may be due to the great amount of dry matter in early produced bolls which resulted from long vegetative growth period than in late sowing. This result is in agreement with those obtained by El-Shahawy *et al.*, (1994), Abdel-Malak *et al.*, (1996) and Ali and El-Sayed (2001).

3-Seed index :

Data in Tables (3) and (4) showed that sowing date significantly affected seed index in the second season. Earlier sowing date (25 March) produced the highest value of seed index (10.7 and 10.79 in both seasons respectively). This result is in agreement with those obtained by El- Shahawy *et al.*, (1994) and Ali and El-Sayed (2001).

4- Lint percentage

Data in Tables (3)and(4) indicated that the sowing date, cultivars and the interaction between them had a significant effect in both seasons. Delaying sowing date decreased lint %. The highest readings of lint percentages were recorded for sowing date 25 March. Giza 83 and Giza 80 varieties gave the highest value in the first and second seasons of study (40.8 and 41.5).

5-Seed cotton yield (K/fed.) :

Data in Tables (3) and (4) indicated that sowing date, cultivars and their interaction affected this character significantly in both seasons. Sowing on 25 March produced the highest values of seed cotton yield (10.1 & 10.4 k/fed in 2001 and 2002 respectively). This may be attributed to increasig No. of bolls and weight of bolls in early sowing date. Delayed sowing date decreased seed cotton yield/fed. This result agrees with those obtained by Yousef (1980) and Gadallah (2002). Giza 83 gave the highest value of seed cotton yield/fed. (9.1 and 8.7 k/fed in the first and second seasons) respectively.

Fiber properties

1- Fiber length at 2.5% S.L (mm) :

Data in Tables (5) and (6) evidenced that sowing date, cultivars and interaction between them had significant effects in both seasons. The highest value of 2.5% span length was recorded from sowing on 25 March (33.0 mm, 32.9 mm in the two season respectively). Giza 70 gave the highest value in both seasons (35.2 mm and 35.1 mm). El-Hariry (1986), reported that the highest 2.5 % S.L., tended to increase in middle planting date. But Hussin *et al.*, (1983) found that fiber length did not follow a definite trend of response to the different sowing dates.

2- Fiber strength g/tex :

Data in Tables (5) and (6) indicated that effects of sowing date, cultivars and the interaction were significant in both seasons. Sowing on 25 March exhibited the stronger fibers (33.64 and 35.38 g/tex in both seasons). Delayed sowing date decreased fiber strength. This result is similar to those obtained by Eweida, *et al.* (1988) and El-Sheikh, and Abd El- Rahman. (1989) but Philip *et al.*, (1998) found that as sowing date delayed fiber strength increased. Giza 70 gave the strongest fibers (36.47 and 37.15 g/tex in both seasons respectively).

3-Fiber elongation percentage:

Data in Tables (5) and (6) indicated that, the maximum value of fiber elongation (7.0 % and 6.8 %) were obtained from sowing on 25 March in both seasons. As sowing date delayed the elongation percent values decreased. This may be attributed to increase in fiber convolution number in early sowing dates. This result is harmony with those obtained by El-Sheikh and Abd El- Rahman. (1989). On the contrary Philip *et al.* (1998) found that delayed sowing date increased fiber elongation percent. Giza 83 gave the highest value of fiber elongation percent. (7.0 % in the first season).

4- Micronaire Reading :

Data in Tables (5) and (7) indicated that sowing date, cultivars and the interaction between them had significant effects on this character in both seasons. Micronaire values tended to decrease as sowing date delayed. This result agrees with those obtained by Badr *et al.*, (1993) and Gadallah (2002) but contrary with El-Hattab *et al.* (1981). Giza 70 gave the best values of Micronaire readings (3.8 and 4.0 in the first and second seasons respectively).

5- Fiber maturity ratio :

Data in Tables (5) and (7) indicated that sowing date, and cultivar effects were significant in both seasons. Sowing on 25 March produced fibers with highest maturity ratios (0.98 and 1.00) supporting Bauer *et al.* (1998) who found that delayed sowing produced less mature fibers than those of early sowing . Giza 83 cultivar recorded the highest value in both seasons (0.98 and 0.99). The interaction was significant in the first season only.

6- Fiber fineness (millitex) :

Data in Tables (5) and (7) indicated that, sowing date, varieties and the interaction between them had significant effects on fiber fineness in both seasons. Fiber fineness decreased as sowing date was delayed. Factors which lead to more photosynthesis i.e., early sown plants which needed a longer period to flowering help production of more mature fibers as compared with late sown .This result agrees with those obtained by Shafshak *et al.*, (1987) who reported that fiber fineness tended to increase in early sowing. On the contrary Badr *et al.* (1993) found that fiber fineness was not affected by sowing dates. Giza 89 gave the highest values of fiber fineness in the first season (158.8 mill.) and Giza 80 in the second season (162.6 mill.) .

7- Fiber stiffness (g/tex):

Data in Tables (8) and (9) showed that, sowing date had a significant effect on fiber stiffness in the second season only. The highest values of fiber stiffness was recorded for sowing on 25 March (498.3 and 522.5 g/tex in the first and second season respectively). Cultivars and the interaction between sowing date and cultivars was significant in both seasons. Giza 70 gave the largest values of fiber stiffness (560.0 and 583.3 g/tex in the first and second season respectively). Interaction showed the highest value was obtained from sowing on 25 March and cultivar Giza 70 (600.0 and 603.0 g/tex) .

Table (8) : Main effect of varieties and sowing dates of cotton on fiber properties in the two growing seasons.

| Main effect | Fiber stiffness (g/tex) | | Fiber toughness (g/tex) | | Yarn strength | |
|-------------------------|-------------------------|-------|-------------------------|------|---------------|--------|
| | 2001 | 2002 | 2001 | 2002 | 2001 | 2002 |
| S: Sowing dates: | | | | | | |
| 1- 25 March | 498.3 | 522.5 | 1.16 | 1.20 | 2233.6 | 2114.0 |
| 2 - 10 April | 470.0 | 520.0 | 1.12 | 1.09 | 2080.7 | 2046.7 |
| 3 - 25 April | 453.3 | 534.2 | 0.98 | 0.93 | 2000.6 | 1951.3 |
| LSD 5% | Ns | 17.3 | 0.16 | 0.14 | 54.9 | 49.6 |
| V: Varieties: | | | | | | |
| 1- G 89 | 476.7 | 533.3 | 1.08 | 1.05 | 2026.5 | 1830. |
| 2 - G 83 | 421.1 | 475.6 | 1.01 | 0.95 | 1836.0 | 1824.7 |
| 3 - G 80 | 437.8 | 510.0 | 10.6 | 1.09 | 1850.6 | 1841.6 |
| 4- G 70 | 590.0 | 583.3 | 1.20 | 1.20 | 2706.7 | 2652.7 |
| LSD 5% | 19.4 | 16.8 | 0.08 | 0.08 | 37.5 | 34.3 |
| The interaction | | | | | | |
| LSD 5% SXV | 33.5 | 14.5 | 0.14 | 0.13 | 65.0 | 59.4 |

Table (9): Effect of the interaction of varieties and sowing dates of cotton on some fiber properties in the two growing seasons.

| Treatments | Fiber stiffness (g/tex) | | | | Fiber toughness (g/tex) | | | | Yarn strength | | | |
|------------------------|-------------------------|-------|-------|-------|-------------------------|------|------|------|---------------|--------|--------|--------|
| | varieties | | | | varieties | | | | varieties | | | |
| | G89 | G83 | G80 | G70 | G89 | G83 | G80 | G70 | G89 | G83 | G80 | G70 |
| S:Sowing dates: | Season 1 | | | | | | | | | | | |
| 1- 25 March | 510.0 | 426.7 | 456.7 | 600.0 | 1.18 | 1.05 | 1.12 | 1.30 | 2309.6 | 1938.4 | 1944.2 | 2742.2 |
| 2 - 10 April | 466.7 | 430.3 | 430.3 | 553.3 | 1.12 | 1.04 | 1.07 | 1.23 | 1910.2 | 1824.7 | 1865.6 | 2722.1 |
| 3 - 25 April | 453.3 | 406.7 | 426.7 | 526.7 | 0.92 | 0.94 | 1.00 | 1.06 | 1859.7 | 1745.0 | 1742.0 | 2655.9 |
| LSD 5% | 33.5 | | | | 0.14 | | | | 65.0 | | | |
| S:Sowing dates: | Season 2 | | | | | | | | | | | |
| 1- 25 March | 510.0 | 453.2 | 523.3 | 503.3 | 1.27 | 1.03 | 1.17 | 1.32 | 1926.6 | 1926.3 | 1897.8 | 2705.3 |
| 2 - 10 April | 536.7 | 466.7 | 500.0 | 576.7 | 1.02 | 0.99 | 1.12 | 1.22 | 1845.1 | 1805.4 | 1862.7 | 2673.5 |
| 3 - 25 April | 553.3 | 506.7 | 506.7 | 570.0 | 0.85 | 0.82 | 0.98 | 1.07 | 1720.6 | 1741.0 | 1764.3 | 2579.1 |
| LSD 5% | 14.5 | | | | 0.13 | | | | 59.4 | | | |

8-Fiber toughness (g/tex) :

Data in Tables (8) and (9) showed that sowing date, cultivars and interaction between them had a significant effect on fiber toughness. Sowing on 25 March gave the highest values (1.16 and 1.20 g/tex). Giza 70 gave the

highest value (1.20 and 1.20 g/tex in the first and second season respectively). Interaction between treatments showed that the highest values were obtained from Giza 70 sown on March 25 (1.30 and 1.32 g/tex).

9-Yarn strength:

Data in Tables (8) and (9) showed that sowing dates, varieties and interaction had a significant effect on yarn strength. Highest values were obtained from sowing date of 25 March in both seasons (2233.6 and 2114.0). Giza 70 cultivar exhibited the highest values of yarn strength. (2706.7 and 2652.7 in both seasons). Bouer *et al.*, (1998) and Philip *et al.*, (1998) found that as planting date delayed yarn strength increased.

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تأثير ثلاث مواعيد زراعة علي الصفات المختلفة لأربعة أصناف من القطن المصري

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أجرى هذا البحث فى محطة التجارب والبحوث الزراعية، كلية الزراعة - جامعة القاهرة فى موسمى (٢٠٠١ و ٢٠٠٢) لدراسة تأثير مواعيد الزراعة (٢٥ مارس ، ١٠ إبريل ، ٢٥ إبريل) على صفات النمو والمحصول وبعض الصفات التكنولوجية والغزلية على بعض أصناف القطن هى جيزة ٨٩ ، جيزة ٨٣ ، جيزة ٨٠ ، جيزة ٧٠ استخدم تصميم القطع المنثقة فى أربعة مكررات حيث طبقت مواعيد الزراعة فى القطع الرئيسية والأصناف فى القطع المنثقة . وكانت أهم النتائج المتحصل عليها هي :

انخفض طول النبات كلما تأخر موعد الزراعة وكان الصنف جيزة ٧٠ أطول الأصناف .
كان موعد الزراعة (٢٥ مارس) والصنف جيزة ٨٣ أكثر تيكيرا فى إعطاء أول فرع ثمري

الزراعة فى ٢٥ مارس مع الصنف جيزة ٨٣ أعطيا أكبر عدد أفرع ثمرية ولوز متفتح واعي دليل للبذرة ، نسبة التيلة و أكبر محصول قطن زهر/فدان
أعطي التيكير فى الزراعة أكبر وزن لوزة وكذلك الصنف جيزة ٧٠ فى الموسم الثانى
أعطت الزراعة فى الموعد المبكر (٢٥ مارس) مع الصنفين جيزة ٨٩ وجيزة ٨٣ أعلى قيم للميكرونير ونسبة نضج الألياف والنعمومة بالوزن والنسبة المئوية لاستطالة الألياف بينما الزراعة فى ٢٥ مارس مع الصنف جيزة ٧٠ اعطيا أكبر قيم لطول التيلة عند نسبة توزيع ٢,٥% ومتانة وصلابة الألياف وقدرة الألياف على امتصاص الجهد ومتانة الغزل.
وتوصى الدراسة بزراعة الصنف جيزة ٨٣ فى الميعاد ٢٥ مارس للحصول على أعلى قيم للمحصول ومكوناته .

Table (2): Effect The interaction between varieties and sowing dates of cotton on some growth characters in the two growing seasons.

| Treatments | Number. of sympodial branches/ plant | | | | position 1 st sympodial node | | | | Number of days From sowing data to | | | | | | | |
|------------------------|--------------------------------------|------|------|------|---|-----|-----|-----|------------------------------------|------|------|------|----------------------|-------|-------|-------|
| | varieties | | | | varieties | | | | 1 st bloom | | | | 1 st boll | | | |
| | G89 | G83 | G 80 | G70 | G89 | G83 | G80 | G70 | G89 | G83 | G80 | G70 | G89 | G83 | G80 | G70 |
| S:Sowing dates | Season 1 | | | | | | | | | | | | | | | |
| 1– 25 March | 17.2 | 17.3 | 17.7 | 16.3 | 6.3 | 5.8 | 8.2 | 7.8 | 65.3 | 64.0 | 71.0 | 79.0 | 108.7 | 119.0 | 133.7 | 147.0 |
| 2 – 10 April | 16.8 | 16.9 | 15.4 | 14.3 | 6.6 | 5.8 | 8.2 | 7.7 | 63.7 | 64.7 | 66.3 | 74.3 | 112.7 | 99.3 | 124.3 | 126.0 |
| 3 – 25 April | 12.8 | 14.3 | 10.2 | 6.5 | 7.1 | 6.2 | 8.5 | 7.9 | 59.7 | 57.3 | 59.0 | 64.3 | 101.7 | 86.0 | 109.0 | 115.7 |
| LSD 5% | Ns | | | | Ns | | | | 4.2 | | | | Ns | | | |
| S: Sowing dates | Season 2 | | | | | | | | | | | | | | | |
| 1– 25 March | 17.3 | 17.3 | 15.7 | 15.1 | 6.1 | 6.3 | 8.1 | 7.7 | 72.7 | 66.0 | 73.7 | 84.7 | 141.7 | 135.7 | 143.3 | 156.0 |
| 2 – 10 April | 16.2 | 16.1 | 15.1 | 13.9 | 7.0 | 6.4 | 8.4 | 7.3 | 68.0 | 63.0 | 69.0 | 80.0 | 135.0 | 121.6 | 134.7 | 136.3 |
| 3 – 25 April | 13.3 | 13.0 | 9.1 | 8.1 | 7.3 | 6.8 | 8.7 | 7.8 | 63.3 | 60.3 | 65.1 | 66.3 | 123.3 | 118.3 | 119.7 | 124.0 |
| LSD 5% | 1.5 | | | | 0.4 | | | | 2.9 | | | | 4.8 | | | |

Table (4): Effect of the interaction of varieties and sowing dates of cotton in some yield and yield components in the two growing seasons.

| Treatments | Number of open bolls/plant | | | | Boll weight (g) | | | | Seed index (g) | | | | Lint % | | | | Seed cotton yield /k.fed. | | | |
|-----------------------|----------------------------|------|------|------|-----------------|------|-----|-----|----------------|------|------|------|------------|------|------|------|---------------------------|------|------|------|
| | varieties | | | | varieties | | | | varieties | | | | varieties | | | | varieties | | | |
| | G89 | G83 | G 80 | G70 | G89 | G83 | G80 | G70 | G89 | G83 | G80 | G70 | G89 | G83 | G80 | G70 | G89 | G83 | G80 | G70 |
| S:Sowing dates | Season 1 | | | | | | | | | | | | | | | | | | | |
| 1- 25 March | 15.9 | 17.4 | 15.6 | 16.5 | 2.6 | 2.5 | 2.5 | 2.5 | 10.4 | 11.0 | 10.6 | 10.7 | 38.8 | 41.4 | 42.3 | 35.8 | 9.9 | 10.5 | 9.8 | 10.0 |
| 2 - 10 April | 16.5 | 15.9 | 16.4 | 15.2 | 2.4 | 2.5 | 2.4 | 2.4 | 9.9 | 10.5 | 6.8 | 10.5 | 37.8 | 40.7 | 40.6 | 35.8 | 9.3 | 9.9 | 9.6 | 9.5 |
| 3 - 25 April | 9.3 | 12.7 | 11.7 | 7.9 | 2.1 | 2.1 | 2.1 | 2.0 | 8.8 | 9.5 | 10.0 | 9.2 | 37.0 | 40.4 | 38.7 | 33.7 | 4.5 | 6.8 | 6.1 | 3.4 |
| LSD 5% | ns | | | | 0.11 | | | | 0.6 | | | | 0.5 | | | | 1.1 | | | |
| S:Sowing dates | Season 2 | | | | | | | | | | | | | | | | | | | |
| 1- 25 March | 15.9 | 16.7 | 16.1 | 17.2 | 2.3 | 2.6 | 2.5 | 2.5 | 10.9 | 10.7 | 10.5 | 10.8 | 38.9 | 41.5 | 42.8 | 35.7 | 10.3 | 10.5 | 10.5 | 10.3 |
| 2 - 10 April | 13.1 | 16.7 | 15.5 | 14.1 | 2.1 | 2.5 | 2.3 | 2.3 | 10.2 | 10.4 | 10.4 | 10.8 | 37.8 | 39.4 | 41.4 | 34.9 | 7.8 | 9.4 | 9.6 | 8.1 |
| 3 - 25 April | 10.1 | 12.4 | 12.4 | 7.9 | 2.0 | 2.20 | 2.1 | 1.7 | 9.7 | 9.3 | 9.3 | 10.0 | 37.0 | 37.3 | 40.4 | 33.8 | 4.9 | 6.3 | 5.3 | 4.0 |
| LSD 5% | 1.5 | | | | 0.12 | | | | ns | | | | 1.0 | | | | 1.1 | | | |

Table (5): Main effect of varieties and sowing dates of cotton on fiber properties on the two growing seasons.

| Main effect | Fiber length at 2.5% S.I | | Fiber Strength (g/tex) | | Fiber elongation % | | Micronaire reading | | Fiber maturity ratio | | Fiber fineness millitex | |
|---------------------------------------|-----------------------------|------------|---------------------------|-------------|-----------------------|------------|-----------------------|-------------|-------------------------|-------------|----------------------------|------------|
| | 2001 | 2002 | 2001 | 2002 | 2001 | 2002 | 2001 | 2002 | 2001 | 2002 | 2001 | 2002 |
| S:Sowing dates: | | | | | | | | | | | | |
| 1- 25 March | 33.0 | 33.9 | 33.64 | 35.38 | 7.0 | 6.8 | 4.3 | 4.6 | 0.98 | 0.10 | 160.7 | 162.0 |
| 2 - 10 April | 32.1 | 33.8 | 32.57 | 33.31 | 6.8 | 6.4 | 4.2 | 4.3 | 0.95 | 0.69 | 154.2 | 157.0 |
| 3 - 25 April | 31.6 | 30.6 | 30.03 | 31.48 | 6.6 | 6.1 | 4.1 | 4.2 | 0.88 | 0.90 | 147.2 | 156.3 |
| LSD 5% | 1.0 | 0.4 | 0.36 | 0.39 | 0.2 | 0.4 | 0.12 | 0.12 | 0.05 | 0.04 | 1.3 | 1.4 |
| V: Varieties | | | | | | | | | | | | |
| 1- G89 | 32.1 | 31.5 | 32.16 | 33.80 | 6.8 | 6.4 | 4.5 | 4.5 | 0.96 | 0.95 | 158.8 | 160.0 |
| 2 - G 83 | 30.4 | 30.0 | 29.41 | 29.40 | 7.0 | 6.3 | 4.1 | 4.3 | 0.96 | 0.99 | 158.5 | 160.9 |
| 3 - G 80 | 31.2 | 30.5 | 30.28 | 33.21 | 6.9 | 6.7 | 4.4 | 4.5 | 0.89 | 0.90 | 155.8 | 162.6 |
| 4- G 70 | 35.2 | 35.1 | 36.47 | 37.15 | 6.5 | 6.4 | 3.8 | 4.0 | 0.94 | 0.95 | 140.0 | 142.5 |
| LSD 5% | 0.5 | 0.3 | 0.42 | 0.43 | 0.4 | 0.3 | 0.08 | 0.06 | 0.02 | 0.02 | 2.1 | 2.5 |
| The interaction LSD 5% SXV | 0.7 | 0.6 | 0.43 | 0.74 | 0.2 | 0.5 | 0.13 | 0.94 | 0.03 | Ns | 3.6 | 3.9 |

Table (6): Effect of the interaction of varieties and sowing dates of cotton on some fiber properties in the two growing seasons.

| Treatments | Fiber length | | | | Fiber strength (g/tex) | | | | Fiber elongation | | | |
|-------------------------|-----------------|------|------|------|------------------------|-------|-------|-------|------------------|-----|-----|-----|
| | varieties | | | | Varieties | | | | varieties | | | |
| | G89 | G83 | G80 | G70 | G89 | G83 | G80 | G70 | G89 | G83 | G80 | G70 |
| S: Sowing dates: | Season 1 | | | | | | | | | | | |
| 1– 25 March | 33.0 | 31.0 | 31.9 | 36.0 | 34.37 | 30.10 | 31.00 | 39.10 | 7.0 | 7.1 | 7.3 | 6.7 |
| 2 – 10 April | 32.0 | 29.9 | 31.0 | 35.4 | 33.10 | 29.73 | 30.60 | 36.13 | 6.8 | 6.9 | 6.9 | 6.5 |
| 3 – 25 April | 31.6 | 31.5 | 30.6 | 34.1 | 30.03 | 28.40 | 29.23 | 33.47 | 6.5 | 7.0 | 6.6 | 6.3 |
| LSD 5% | 0.7 | | | | 0.43 | | | | 0.2 | | | |
| S: Sowing dates: | Season 2 | | | | | | | | | | | |
| 1– 25 March | 33.1 | 30.4 | 30.4 | 31.4 | 28.57 | 30.40 | 35.27 | 39.30 | 7.1 | 6.7 | 6.8 | 6.5 |
| 2 – 10 April | 31.4 | 30.2 | 30.2 | 31.0 | 33.37 | 29.40 | 33.17 | 37.30 | 6.3 | 6.2 | 6.7 | 6.5 |
| 3 – 25 April | 30.0 | 29.2 | 29.1 | 29.1 | 31.47 | 28.40 | 31.20 | 34.87 | 5.7 | 5.8 | 6.5 | 6.1 |
| LSD 5% | 0.6 | | | | 0.74 | | | | 0.5 | | | |

Table (7): Effect of the interaction of varieties and sowing dates of cotton on some fiber properties in the two growing seasons.

| Treatments | Micronair reading | | | | Fiber maturity ratio | | | | Fiber fineness millitex | | | |
|------------------------|-------------------|-----|-----|-----|----------------------|-------|------|------|-------------------------|-------|-------|-------|
| | Varieties | | | | Varieties | | | | Varieties | | | |
| | G89 | G83 | G80 | G70 | G89 | G83 | G80 | G70 | G89 | G83 | G80 | G70 |
| S:Sowing dates: | Season 1 | | | | | | | | | | | |
| 1– 25 March | 4.7 | 4.2 | 4.4 | 4.0 | 1.02 | 1.00 | 0.93 | 0.97 | 165.8 | 163.9 | 168.8 | 144.0 |
| 2 – 10 April | 4.5 | 4.1 | 4.4 | 3.8 | 0.97 | 0.99 | 0.89 | 0.69 | 154.2 | 158.3 | 158.9 | 158.8 |
| 3 – 25 April | 4.4 | 3.8 | 4.3 | 3.7 | 0.90 | 0.88 | 0.84 | 0.90 | 151.8 | 153.3 | 148.8 | 135.0 |
| LSD 5% | 0.13 | | | | 0.03 | | | | 3.6 | | | |
| S:Sowing dates: | Season 2 | | | | | | | | | | | |
| 1– 25 March | 4.8 | 4.5 | 4.7 | 4.4 | 1.01 | 1.03 | 0.93 | 1.01 | 165.1 | 166.9 | 171.1 | 145.6 |
| 2 – 10 April | 4.5 | 4.3 | 4.6 | 3.9 | 0.96 | 10.01 | 0.91 | 0.95 | 161.0 | 160.9 | 163.9 | 142.2 |
| 3 – 25 April | 4.2 | 4.2 | 4.4 | 3.8 | 0.90 | 0.93 | 0.86 | 0.92 | 153.8 | 154.9 | 152.7 | 139.7 |
| LSD 5% | 0.94 | | | | ns | | | | 3.9 | | | |

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