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THE OPTIMUM FLOWERING STAGE FOR APPLYING THE LAST IRRIGATION FOR THE COTTON CULTIVAR GIZA 76

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Abstract

Four exeriments were carried out at Sakha Agricultrural Research Station in 1992 and 93 seasons. The experimental design was complete randomized blocks with six replicates. Last irrigation treatments were at the end of 9th, 11th and 13th week of flowering for early sown cotton and at the end of 8th, 10th, and 13th week of late sown cotton. Results obtained revealed that final plant height was increased by delaying irrigation due to the increase of number of nodes per plant rather than intenode length. Number of fruiting branches, number of open bolls, boll weight, yield per plant, yield per fedan, lint percentage and seed index were increased in favour of irrigation at 11th week of flowering for early sowing, and 12th week of flowering for late sowing, while earliness was increased in favour of termination irrigation early, for both planting dates.

INTRODUCTION

In Egypt, the date of last irrigation has a great effect on the yield of seed cotton. In this respect, Brown and ware (1958) reported that late irrigation delays boll opening which may cause more infestation by boll weevil, pink boll worm or boll rot. Haagan and Vaadia (1960) indicated that moisture deficits late in the season are not harmful and may have beneficial effects by holding vegetative growth to a minimum without measurable decreases in seed or lint yield. Longnecker and Thaxton (1963) showed that serious moisture stress in late August and September have a favourable effect upon earliness and lint percentage, but it reduced yield.

On the other hand, Sawires (1976) found that last irrigation during boll maturation had little effect on final plant height and number of open bolls per plant, while it increased number of fruiting branches per plant and boll weight. Seed cotton yield and lint percentage were increased by delaying irrigation, while seed index was decreased. Farah and Abdel-Rahman (1994) showed that reducing 3-4 irrigations during the late seasons did not significantly reduce the yield of seed cotton.

Therefore, this study was conducted to determine the optimum flowering stage for applying the last irrigaion for early and late sowing of cotton.

MATERIALS AND METHODS

Four field experiments were carried out at Sakha Agricultural Research Station during 1992 and 1993 seasons, using the Egyptian cotton cultivar Giza 76; two experiments for each of early and late sowings.

The experimental design was randomized complete blocks with six replications. The plot size was 5x4 m, including 8 rows which were 60 cm apart. Hill spacings were 20 cm and leaving two plants at thinning time. To avoid lateral water movement after irrigation, deep chanals of 200 cm width were dug between plots. All other cultural practices were done as recommended, except the dates of last irrigation, which were as follows:

a. For early sown cotton in mid March it was the end of 9th, 11th and 13 th weak of first flower opening date.

b. For late sown cotton in mid April it was the end of 8th, 10th and 12th weak of first flower opening date.

Five representative hills were chosen at random from one of the six inner rows of each plot to study, the following traits; final plant height (cm), number of fruiting branches per plant number of opened and unopened bolls per plant, boll weight, seed cotton yield per plant, lint percentage and seed index .

Seed cotton yield per feddan in kentars was calculated from the yield of the six inner rows of each plot. Yield earliness was estimated as the percentage of first pick to total yield.

Statistical analysis was done according to procedure out-lined by Snedecor and Cochran (1967), while combined analysis was performed for both seasons and for each planting date as described by LeClerg et al. (1966). The mean values were compared at 0.50 level by using Duncan's Multiple Range Test.

RESULTS AND DISCUSSION

1- Growth characters

Results presented in Table.1 show that final plant height, number of fruiting branches per plant and number of nodes per plant were significantly affected by the date of last irrigaion, for both planting dates. Generally, there was a tendency of increase for the previous traits by delaying the date of last irrigation. Intermode length was significantly affected by last irrigation date treatments for late sowing only, but the differences between mean values for both planting dates were slight.

However, it is obvious that the increase of plant height by delaying last irrigation was a result of increasing the number of nodes per plant instead of increasing internode length. This might be the reason for increased number of fruiting branches per plant on the position of new formed nodes. Therefore, it could be concluded that sufficient available water at late season resulted in increased plant growth through enhancing photosynthetic process which in turn resulted in cell divison and enlargement. Similar results were obtained by Hagan and Vaadia (1960).

2- Yield components

It is obvious from Table 1 that last irrigation treatments had significant effects on yield component characters, for both planting dates. For early sowing, the highest mean values for number of open bolls per plant,boll weight and yield per plant were obtained from those irrigated at the 13th week of flowering. Therefore, the highest mean for total bolls was realized from the treatment 13th week of flowering date, but as a result of increasing number of unopened bolls, the 11th week of flowering favoured the former on in number of open bolls per plant (Brown and Ware, 1958).

For late sowing, yield component characters were increased significantly in favour of 12th week of flowering. Similar results were obtained by Sawires (1976)

with respect to boll weight and yield per plant.

However, previous results indicated that yield components per plant were increased by continual irrigation till the 13th week of flowering for early sowing and the 12th week of flowering for late sowing. This might be due to better plant rowth which realized heavy load of bolls and this resulted in the increase in yield per plant. The inference of other factors such as boll infection might alter these expectations as have seen with respect to early sowing results.

3- Seed cotton yield

The yield of seed cotton was significantly increased in favour of irrigation at 11th week of flowering for early sowing and 12th week of flowering for late sowing (Table 1). These results seemed to be reasonable where the yield per feddan was a reflection of the yield per plant. Similar results were obtained by Longnecker and Thaxton (1963) and Sawires (1976). Farah and Abdel Rahman (1994) obtained contradictory results.

4- Yield earliness

Yield earliness as percentage of first pick to total yield was increased significantly in favour of irrigation at 9th week and 8th week of flowering for early and late sowings, respectively (Table 1). This might be due to that termination the irrigation early resulted in holding vegetative growth and late formation of bolls which in turn resulted in opening most of the bolls per plant early. Similar results were obtained by Longnecker and Thaxton (1963).

5- Lint percentage and seed index

Lint percentage was significantly affecd by last irrigation teatments for early sowing, while seed index was significantly affected for late sowing only. This might be due to increase in maturity of lint and cotton seeds with more irrigation at boll maturation period. Similar results were obtained by Loughnecker and Thaxton (1963). Sawirers (1976) showed that delaying last irrigation increased lint percentage, but it decreased seed index.

Table 1 . Effect of last irrigation timing on growth, yield components and yield of Giza 76 cotton cultivar for early and late sowing.

Characters	Weeks after first flower opening					
	Early sowing			Late sowing		
	9	11	13	8	10	12
Final plant height (cm)	110.9 b	119.3 ab	127.7 a	93.8 b	99.4 ab	110.6a
No. fruiting branches/plant	12.2 b	14.6 a	13.5 ab	8.6 b	10.0 ab	11.0a
No. nodes/plant	21.1 b	22.9 a	22.8 a	18.8 c	20.2 b	21.4a
Internode length (cm)	4.6	4.7	4.7	4.6 b	4.7 b	4.9a
No. of open bolls / plant	11.0 b	13.9 a	12.8 a	9.1 b	10.5 a	11.3a
No. of unopened bolls/plant	1.6 b	1.4 b	3.2 a	1.7 a	1.4 b	0.9c
Boll weight (g)	1.8b	2.1 a	1.9 b	1.5 b	1.8 a	1.9a
Seed cotton yield/plant (g)	20.2 b	28.4 a	26.2 a	14.5 b	18.2 a	19.7a
Seed cotton yield (K./fed.	4.9 c	6.4 a	5.7 b	3.5 c	4.1 b	4.4a
First pick/total yield %	72.0 a	68.0 b	66.5 b	66.3 a	65.0 a	62.5b
Lint percentage	37.7 b	38.3 a	39.2 a	37.1	37.9	38.3
Seed index (g)	8.9	9.2	9.4	6.8 b	7.8 a	7.9a

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أنسب مرحلة إزهار لإعطاء آخر رية للقطن لصنف جيزة ٧٦

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معهد بحوث القطن . مركز البحوث الزراعية . وزارة الزراعة .

أجريت أربع تجارب زراعية بمحطة بحوث سخا الزراعية بمحافظة كفر الشيخ لدراسة أنسب مرحلة إزهار لإعطاء آخر رية للقطن لصنف جيزة ٧٦ لكل من الزراعة المبكرة والمتاخرة وذلك خلال موسمى ١٩٩٢ ، ١٩٩٣. كانت معاملات اخر رية للزراعة المبكرة فى نهاية الأسبوع التاسع والحادى عشر والثالث عشر من بداية الإزهار، بينما فى حالة الزراعة المتاخرة كانت المعاملات فى نهاية الأسبوع الثامن والاسبوع العاشر والأسبوع الثانى عشر من بداية الازهار. وكانت أهم النتائج المتحصل عليها فى هذا البحث كالاتى :

١- أدى تاخير آخر رية إلى زيادة طول النبات النهائى لزيادة عدد العقد على النبات دون زيادة تذكر فى طول السلامية .

٢- زاد كل من عدد الأفرع الثمرية وعدد اللوز المتفتح للنبات ووزن اللوزة ومحصول النبات الواحد ومحصول القطن الزهر للفدان ومعدل الحليج ومعدل البذرة عند إنتهاء الرى فى نهاية الاسبوع الحادى عشر من بداية التزهير فى حالة الزراعة المبكرة وفى نهاية الاسبوع الثانى عشر من التزهير فى حالة الزراعة المتاخرة.

٣- زاد عدد اللوز الغير متفتح عند تاخير الرى للاسبوع الثالث عشر فى حالة الزراعة المبكرة بينما كان العكس صحيحا فى حالة الزراعة المتاخرة.

٤- نتج أعلى تبكير للمحصول عند إنتهاء الرى مبكرا فى كلا الزراعتين.