Pak. j. sci. ind. red., vol. 35, no. 7-8, July-August 1992

EFFECT OF NUMBER OF PLANTS PER DIBBLE ON YIELD AND SOME ECONOMIC CHARACTERS OF TWO UPLAND COTTON CULTIVARS

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(Received; March 2, 1992)

Two cotton cultivars having different plant morphology were evaluated for seed cotton yield and some economic characters keeping 1, 2 and 3 plants per dibble at a standard plant configuration of 75x30 cms. The results showed that the cultivars do not differ significantly from each other in yield of seed cotton, boll weight ginning out turn and staple length except number of bolls per plant. In spite of difference in plant shape, CIM-85 and MNH-93 produced maximum yield of seed cotton at two plants and one plant per dibble respectively. The increase in number of plants per dibble showed statistically significant negative effect on bolls per plant, boll weight and lint percentage. However, the staple length was not affected by different number of plants per dibble. The verieties and number of plants per dibble interaction effects remained significant only for seed cotton yield.

Key words. Upland cotton, Cultivars, Plants per dibble, Fibre quality.

Introduction

Lately with the increased intensity of cropping the farmers have inadvertently changed their choice for early maturing varieties. The early maturing varieties usually have short internodal length and consequently remain short statured. Thus leaving the opportunity to increase cotton production through less bolls per plant but higher number of plants per unit area. The short stature of plant in addition to many other advantages also facilitates cultural practices which are a prerequiste for obtaining optimum yield. Although several factors ultimately determine the farmer's profitability but yield remains the primary consideration in the farmer's choice for varieties.

With the resulted change in the plant morphology higher plant population was required than the spreading and bushy varieties for obtaining equally better yield. According to Walton [1] cotton yield due to two plants per dibble was higher than one plant per dibble. Ingram [2] also reported that 2 plants per dibble gave higher yield than one plant. Moreover, Hawkins and Peacock [3] found that cotton yield from 5 plants per dibble was significantly higher than the yield from two plants per dibble. They also found that the differences among 3, 4 or 5 plants per dibble were not significant. They further reported that in case of 2 plants per hole lint percentage was the highest and bolls were larger. The longest fibre was produced by 3 plants per dibble. Brown [4] found that 2 plants per dibble and greater plant population gave considerably higher yield than those recommended. Anonymous [5] observed gradual and significant increase in yield as the number of plants per dibble increased from 2 – 5. Similarly Bridge *et al.* [6] obtained the highest yield with the higher population i.e., 5 plants per hill. They also observed that lint percentage of low population was significantly higher than that of 2 highest populations. Lowest population usually produced significantly larger bolls and seeds. They did not find any effect of plant population on fibre length. Bavale [7] also confirmed that yields are higher with two plants per hill than one plant per hill. Dzhabbarove *et al.* [8] showed that optimum stand density depend on the type of branching.

As the plant to plant distance is determined from the plant morphology similarly the plant morphology also affects the number of plants per dibble. Varieties suitable for increased population through closer spacing may not be suitable to increase number of plants per dibble. Cotton breeders at Cotton Research Institute, Multan developed a strain CIM-85 which have short sympodial branches and close fruit bearing. CIM-85 was evaluated against commercial variety NMH-93 to get the maximum yield from the new strain by adjusting number of plants per dibble.

Materials and Method

The experiment was conducted on two cotton varieties *viz*; CIM-85 and MNH-93 during 1984-85. Sowing was done on 6th June by dibbling 5-6 seeds per dibble and later thinned to one, two and three plants per dibble. The experiment was laid out in split plot design with three replications and standard plant configuration of 75 x 30 cms. Varieties were kept in main plots and number of plants per dibble in sub plots. Plots in each replication was 35' x 15' size. Standard production and plant protection practices were following throughout the growing season. The data on the following characters were recorded:

(i) Seed cotton yield (kgs/ha.); (ii) Number of bolls per plant. (iii) Boll weight (gms). (iv) Lint percentage. (v) Staple length (m.m.).

The data obtained were analysed by the analysis of variance method and L.S.D.test was applied to test the significance of difference among the varieties and number of plant per dibble.

Results and Discussion

The results (Table 1) show that the varieties do not differ significantly from each other for seed cotton yield, boll-weight, ginning out turn and staple length. However, the varieties differed significantly in respect of boll numbers per plant. It is clear that the number of plants per dibble had significant effect on seed cotton yield, boll number per plant, boll weight and ginning outturn (Table 1). The critical differences showed that all the treatment i.e., 1, 2 and 3 plants per dibble gave significantly different yield from each other. Two plants per dibble gave the highest yield i.e., 4979 kgs/ha., followed by one plant per dibble. Three plants per dibble gave the minimum yield of 4306 kgs/ha [1,2,4,7,9]. However, Hawkins and Peacock [3] and Anonymous [5] found significant increase in yield as the number of plants per hill increased from 2-5. Here the antagonistic results suggests that the genotypes studied might have different plant architecture.

Cotton yield obviously is the out come of boll weight and number of bolls per plant. The present study revealed that the number of plants per dibble have statistically significant effect on number of bolls per plant (Table 1). The bolls per plant decreased from 22.6 to 11.7 and 6.7 with 1, 2 and 3 plants per dibble respectively.

The results presented in Table 1 indicate that the number of plants per dibble also expressed significant effect on boll weight. Maximum boll weight i.e. 4.9 gms was attained in minimum number of plants per dibble which decreased significantly when the number of plants were raised to 2 and 3 per dibble. These results confirm the findings of Bridge [6] who also observed decrease in boll weight as the number of plant per dibble were increased. The number of plants per dibble also showed highly significant effect of lint percentage (Table 1). Maximum lint percentage; i.e. 35.4% was achieved in case of one plant per dibble which decreased to 32.4% with 3 plants per dibble. The results agree to those of Hawkins and Peacock [3] who observed highest lint percentage from 2 plants per dibble. However, they kept minimum two plants per dibble in their experiment. The number of plants per dibble produced non-significant effect on staple length (Table 1). Similar results have already been reported by Bridge *et al.* [6]. It is seen that CIM-85 gave the maximum yield of 5209 kg/ha in case of two plants per dibble, against 5002 kg/ha of MNH-93 having one plant per dibble (Table 1). This reflects the difference of plant morphology between CIM-85 and MNH-93. Since CIM-85 have short sympodial branches with close bearing on them, the yield increased significantly as the plants were raised from 1 – 2 per dibble. Whereas in case of MNH-93 the monopodial branches and longer sympodial branches results the negative effect on yield as the plants per dibble were increased. The interaction of number of plants per dibble versus the varieties expressed non-significant difference on boll number, boll weight, ginning out turn and staple length. Now it is concluded that the varieties with shorter sympodial branches may give higher seed cotton yield with more than one plant per dibble.

TABLE 1. EFFECT OF NUMBER OF PLANTS PER DIBBLE ON YIELD AND OTHER ATTRIBUTES IN TWO COTTON CULTIVARS.

Treatments						
Cultivar	No of plants/ dibble	Seed cotton yield (kgs/ha)	Bolls per plant	Bolls weight (gms)	Ginning out turn (%)	Staple length (mm)
CIM-85	1	4498 b	21.9 a	4.7 a	35.6 a	28.1
	2	5209 a	14.2 b	4.7 a	34.8 b	28.3
	3	4350 c	7.8 c	4.5 b	34.4 c	28.2
MNH-93	1	5002 a	23.3 a	5.0 a	35.2 a	28.0
	2	47.49 b	9.2 b	4.9 b	34.4 b	28.0
	3	4262 c	5.5 c	4.8 c	34.0 c	28.1
Average						
(CIM-85)		4685	14.6 a	4.6	34.9	28.2
(MNH-93)		4671	12.7 b	4.9	34.5	28.0
Mean effects	1	4750 b	22.6 a	4.9 a	35.4 a	28.1
for plants	2	4979 a	11.7 b	4.8 b	34.6 b	28.2
per dibble	3	4306 c	6.7 c	4.7 c	34.2 c	28.2
Critical differences:						
Cultivars		N.S.	1.44*	N.S.	N.S.	N.S
Plants/dibble		76.56*	0.75*	0.07*	0.11*	N.S
		111.39**	1.09**	0.10**	0.16**	
Interaction		108.52*	N.S	N.S	N.S	N.S
		157.52**				

Figures with the same letter do not differ at 5% level of significance; N.S. = Non-significant.* = Significant at 5% level.; ** = Significant at 1% level.

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