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EFFECT OF DIFFERENT PLANTING PATTERNS ON THE GROWTH AND YIELD OF TWO VARIETIES OF SESAME

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A field study pertaining to the effect of different planting patterns on the growth and yield of two varieties of sesame (*Sesamum indicum* L.) was conducted during Kharif 2001. Two varieties TS-3 and Punjab-89 were sown in planting patterns of 30 cm spaced single rows, 45 cm spaced single rows, 45 cm spaced double-row strips with 15 cm space between the rows and 60 cm spaced double-row strips with 30 cm space between the rows. The results revealed that plantation of sesame 45 cm spaced double-row strips with 15 cm space between rows gave maximum yields of 845 and 865 kg ha^{-1} for TS-3 and Punjab-89, respectively and it was attributed to increase in 1000 seed weight and number of seeds $capsule^{-1}$. Out of two varieties, Punjab-89 produced more number of capsules per plant and 1000 seed weight than TS-3. The number of seeds were, however, high in cv. TS-3 than Punjab-89.

Key words: Sesamum varieties, planting patterns, yield.

INTRODUCTION

Sesame (*Sesamum indicum* L.) is an important Kharif crop of Pakistan and fits well in the existing planting sequence and pattern. Sesame is a rich source of oil and protein. There is a huge gap in its potential and average yield. Although some new varieties have been evolved yet their agronomy is to be determined to fill this gap. Among various agronomic components of the production technology proper method of planting is of primary importance, which determines the growth behaviour of the crop. Patel *et al.* (1988) grew sesame cultivars at 3 different spacings and reported that the highest seed yields of 887 and 754 kg ha^{-1} were recorded in G Till-1 Tiled and Mrug-1, respectively at a spacing of 15 cm in rows 30 cm apart, while lower seed yields were obtained at a spacing of 15 cm in rows 45 or 60 cm apart. Tomar *et al*. (1992) grew cv NP-6, TMV-3 and selection R at spacing of 30 x 30, 30 x 20, 30 x 10 cm and obtained seed yields of 0.70, 0.93 and .74 t ha^{-1}, respectively. Sharma and Kakat (1993) raised 3 sesame cultivars i.e., C7, TC25 and Vinayak in row spacings of 30, 35 or 40 x 15 cm and reported that seed yields were not affected by spacings. Tiwari *et al.* (1994) performed a field trial with 4 sesame cultivars TKG-9, TKG-21, JLSC-8 and JT-7 by sowing at spacing of 30 x 15 and 10 x 10 cm. They obtained higher seed yield of 3.0 t ha^{-1} at closer spacing than 2.05 t ha^{-1} from wider spacings. Seed yields of different cultivars were 2.53, 2.80, 2.92 and 1.86 t ha^{-1} from TKG-9, TKG-21, JLSC-8 and JT-7, respectively. Keeping in view the response of sesame to planting patterns and the varying yield potential of different varieties, the present study was conducted to determine the effect of different planting patterns on the growth and yield of two varieties of sesame.

MATERIALS AND METHODS

Investigations to determine the effect of different planting patterns on the growth and yield of two sesame varieties were conducted at the Agronomic Research Area, University of Agriculture, Faisalabad during Kharif, 2001. Quadruplicated experiment was laid out in randomized complete block design with split arrangement and the plot size was 1.8 x 4 m. The two cultivars i.e, TS-3 and Punjab-89 were sown in 4 planting patterns of 30 cm spaced single rows (30 x 15 cm), 45 cm spaced single rows (45 x 10 cm) and 45 cm spaced double-row strips with 30 cm space between 4rows (30/60cm). The crop was sown on 7th July 2001 and a basal dose of 60 kg ha^{-1} of N and P each was applied in the form of Urea and TSP at the time of seed bed preparation. Thinning was done two weeks after sowing to maintain a uniform plant distance in respective treatments for uniform plant population. Crop was harvested on 28th October 2001 and data on yield and yield components were recorded by using standard procedures. The data were analysed statistically and LSD test at 5% probability was applied to differences among treatments means (Steel and Torrie, 1984).

RESULTS AND DISCUSSION

1. Number of plants (m^{-2})

A uniform plant population was maintained in all the plots. So, varieties were not affected significantly regarding the number of plants m^{-2}. Both the varieties had statistically the same number of plants m^{-2} which varied from 21.90 to 21.93. Planting patterns were also not differ significantly from one another, and plant population ranged from 21.8 to 22.0 plants m^{-2} (table 1).

Table 1. Number of plants m^{-2} at harvest of two sesame cultivars as affected by different planting patterns

Planting patterns		TS-3	Punjab-89	Mean
P1= 30x15	(Single row)	21.80	21.80	21.80
P2= 45 x 10	(Single row)	22.00	21.90	21.95
P3= 15 / 45	(Double row strip)	21.90	22.00	21.95
P4= 30 / 60	(Double row strip)	21.90	22.00	21.96
Mean		21.90	21.93	ns

2. Number of capsules per plant

Significant differences were found between the two varieties in the number of capsules per plant (table 2). The cv Punjab-89 produced more number of capsules per plant (35.36) than TS-3 (32.48). Similar results were reported by Gill and Sandhu (1972). There were non-significant differences in the number of capsules $plant^{-1}$ on an average varied from 33.28 to 34.64. These findings are in line with those of Avila *et al.* (1992).

Table 2. Number of capsules per plant of two sesame cultivars as affected by different planting patterns

Planting patterns		TS-3	Punjab-89	Mean
P1= 30x15	(Single row)	32.63	36.65	34.64
P2= 45 x 10	(Single row)	32.37	35.39	33.28
P3= 15 / 45	(Double row strip)	32.17	35.09	33.63
P4= 30 / 60	(Double row strip)	32.77	34.3	33.53
Mean		32.48 b	35.36 a	

3. Number of seeds per capsule

Varieties were significantly affected by planting patterns for the number of seeds per capsule. The cv TS-3 produced more number of seeds per capsule (56.66) than Punjab-89 (49.21). Similar findings were reported by Sinharoy *et al.* (1990). Regarding planting patterns, significant differences were recorded. Plantation in the pattern of 45 cm spaced double-row strips produced the maximum number of seeds per capsule (54.28) but it was at par with the pattern of 45 x 10 cm (single rows) and 60 cm apart double-row strip plantation against the minimum (51.36) number of seeds per capsule in the pattern of 30 x 15 cm single rows (table 3).

4. 1000-seed weight

Thousand seed weight was significantly affected by planting patterns in both the varieties (table 4). Punjab-89 gave higher 1000-seed weight of 2.86 g than TS-3 (2.77 g). These findings are in line with those of Gill and Sandhu(1972). Similarly, differences were observed among different planting patterns. The maximum 1000-seed weight of 2.86 g was recorded in the pattern of 45 cm spaced double-row strip which was at par with 60 cm spaced double-row strip plantation but differed significantly from 30 x 15 cm (single rows) and 45 x 10 cm single row plantation (Table 5). Minimum weight of 2.77 g/1000 seeds was produced by 45 x 10 cm single row plantation but it was at par with 30 x 15 cm single row plantation (2.79 g). These results are in contrast to those of Tomar et al. (1992) which stated that 1000-seed weight was not affected by different spatial arrangements.

5. Seed yield

Seed yield was also influenced significantly by planting geometry in both the varieties. Variety Punjab-89 produced significantly higher seed yield (845.81 kg ha^{-1}) than TS-3 (829.44 kg ha^{-1}). These results are in conformity with those of Gill and Sandhu (1972).

Table 3. Number of seeds per capsule of two sesame cultivars as affected by different planting patterns

Planting patterns		TS-3	Punjab-89	Mean
P1= 30x15	(Single row)	55.27	47.84	51.36 b
P2= 45 x 10	(Single row)	56.86	48.31	53.08 a
P3= 15 / 45	(Double row strip)	56.98	49.57	54.28 a
P4= 30 / 60	(Double row strip)	56.01	49.11	53.02 a
Mean		56.66 a	49.21 b	

Table 4. 1000-seed weight (g) of two sesame cultivars as affected by different planting patterns

Planting patterns		TS-3	Punjab-89	Mean
P1= 30x15	(Single row)	2.74	2.83	2.79 b
P2= 45 x 10	(Single row)	2.72	2.82	2.77 b
P3= 15 / 45	(Double row strip)	2.82	2.90	2.86 a
P4= 30 / 60	(Double row strip)	2.80	2.89	2.84 a
Mean		2.77 b	2.86 a	

Table 5. Seed yield (kg ha^{-1}) of the sesame cultivars as affected by different planting patterns

Planting patterns		TS-3	Punjab-89	Mean
P1= 30x15	(Single row)	820.00 c	827.30 d	823.60 D
P2= 45 x 10	(Single row)	828.00 b	851.00 b	839.50 B
P3= 15 / 45	(Double row strip)	845.00 a	865.00 a	855.00 A
P4= 30 / 60	(Double row strip)	824.80 bc	840.00 c	832.40 C
Mean		829.44 B	845.81 A	

Similarly, plantation patterns and interaction between varieties and patterns of plantation were also found to be significant. Both the cultivars produced significantly higher seed yield under 45 spaced double-row strip than all other treatment combinations. The minimum seed yield (820 kg ha^{-1}) was recorded in plots seeded with variety TS-3 in pattern of 30 x 15 cm in single rows, which was at par with the plots seeded with either Punjab-89 or TS-3 in the patterns of 60 cm spaced double-row strips producing 824.80 and 840.00 kg ha^{-1}, respectively (Table 5). These results are in conformity with those of Patel *et al.* (1988) and Tiwari and *et al.* (1994).

CONCLUSION

On the basis of above mentioned results it can be concluded and recommended that Punjab-89 should preferably be sown at the planting pattern of 45 cm spaced double row strips with 15 cm space between row to get good yield under agro-ecological conditions of Faisalabad.

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