

Effects of Planting Date and Weeding Regimes on Growth and Yield of Sesame (*Sesamum indicum* L.) in Sokoto, North- Western Nigeria

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ABSTRACT: Field experiments were carried out between 2007 and 2008 rainy seasons at the Teaching and Research Dry Land Farm of the Usmanu Danfodiyo University, Sokoto, to investigate the effects of planting date (mid may, early and late June) and weeding regimes (weedy check, weeding once, weeding twice and weed free) on the growth and yield of sesame (*Sesamum indicum* L.). The experiment was laid out in a Randomised Complete Block Design (RCBD) with three replications. Results obtained indicated that planting date had significant ($P<0.05$) influence on plant height, number of branches and number of capsules per plant, seed yield kg/ha and weight of 100 seeds. Weeding regime also significantly ($P<0.05$) affected plant height, weight of capsules and number of capsules per plant.

KEYWORDS: Planting date; Sesame; Seed yield; Weeding regime.

INTRODUCTION

Sesame (*S. indicum*) is an annual crop with height ranging from 50 to 100 cm tall. It is one of the important oil crops and ranked 9th among the top thirteen oil seed crops, which make up to 90% of the world edible oil production (Kafiriti and Deckers, 2001). The production of high quality seed is prerequisite to successful sesame cultivation. Apart from being the principal method of reproduction, the seed is largely the material from which the edible oil is extracted. The world hectareage exceeds 6 million and world output stood at 2.4 million tonnes (Phillips 1997; Dudley *et al.*, 2000). In Africa, Nigeria is the second largest producer after Sudan. Sesame oil is of good quality. According to Dudley *et al.* (2000), the oil is used for cooking, baking, candy making, soaps, lubricant, body massage, hair treatment, food manufacture, industrial uses and alternative medicine (blood pressure, stress and tension). Also, Irvine (1970) reported that leaves are used in vegetable soup while seeds are consumed when fried and mixed with sugar in most African countries and stems are used in making paper, fuel wood and source of potash after burning. Sesame has the potential of producing high percent of blossoms, better pod set and pod yield with good agronomic practices (Alam *et al.*, 2007), in which proper weeding and appropriate planting date are inclusive and indispensable. Cane (1949) reported that yield in sesame is progressively reduced with delay in planting from optimum time of sowing. There

are few studies conducted as regards to optimum sowing date and weeding regime on the growth and yield of sesame. Field trials were therefore carried out to study the influence of planting date and weeding regime on the growth and yield components in sesame.

MATERIALS AND METHODS

Field trials were conducted at the Teaching and Research Dry land farm of the Usmanu Danfodiyo University, Sokoto (latitude 13° 01'N and 5,° 15'E) during the 2007 and 2008 rainy seasons. The soil of the site is sandy and characterize by low fertility and poor water holding capacity. The annual rainfall range from 500mm to 750mm and the temperature range from 17° C in December and January to a maximum of 40° C in April and May.

The treatments consisted of three planting dates (mid May, early June and late June) and four weeding regimes (weedy check, weeding once, weeding twice and weed free) arranged in all possible factorial combinations and laid out in a randomized complete block design with three replications. The land was harrowed and a blanket dose of 30kgN, 30kgP₂O₅ and 30kgK₂O per hectare (using 15:15:15 NPK) was applied after first weeding. N was split in two doses with second dose applied six weeks after planting. The plots were weeded as per treatments and appropriate pests and diseases control were carried out.

Data were collected on establishment count, plant height, weed cover score, weed dry weight, number of branches per plant, number

of capsules per plant, capsule, seed yield and weight of 100 seeds. Data on growth and yield components were analysed as described by Snedecor and Cochran (1967). Multiple comparisons of treatment means were done using Duncan's multiple Range Test (Carmer and Swanson, 1973).

RESULTS AND DISCUSSION

Establishment count

Planting date and weeding regime had no significant (P>0.05) effect on stand establishment count in both seasons (Tables 1&2). This could be as a result of proper land preparation and use of quality seeds. Use of quality seeds coupled with good land

preparation give an excellent establishment in sesame (Cane, 1949).

Plant height

Plant height was significantly (P<0.05) affected by planting date (Table 1). Mid May planting had significantly (P<0.05) produced the tallest plants than early June and late June plantings. Early June planting and late June planting were statistically at par. Mid May planting had enough time to grow vegetatively than early and late June plantings which might likely be the reason for producing tallest plants. Similar results were reported by Van-Rheenan (1973), Mulkey *et al.* (1987), Kafiriti and Deckers (2001) and Alam *et al.* (2007) on the effect of planting date on sesame plant height.

Table1. Effect of Planting Date on Growth and Yield Parameters of Sesame During 2006/2007 and 2007/2008 Rainy Seasons at Usmanu Danfodiyo University Teaching and Research Dry Land Farm, Sokoto

Parameters	Mid May	Early June	Late June	SE+	Significant
Establishment count	49.33	51.53	51.56	1.18	ns
Plant height (cm)	152.89a	148.91b	135.93b	4.43	**
No. of branches per plant	4.77a	4.69a	3.16b	0.19	**
No. of capsules per plant	81.90a	67.12a	55.44b	4.12	**
No. of seeds per capsule	50.08	47.75	48.58	0.77	ns
Weight of 100 seeds	0.39a	0.35a	0.29b	0.05	**
Seed yield (Kg/ha)	1102.66a	1057.73a	758.22b	282.32	**
Weed cover score	52.50	50.83	48.33	10.29	ns
Weed dry weight (g)	473.6	479.6	480.8	125	ns

Means in a row of treatments followed by different alphabet(s) are significantly different at 5% significant level using Duncan Multiple Range Test (DMRT). ns= not significant

Table2. Effect of Weeding Regime on Growth and Yield Parameters of Sesame During 2006/2007 And 2007/2008 Rainy Seasons at Usmanu Danfodiyo University Teaching and Research Dry Land Farm, Sokoto

Parameters	Weedy check	Weeding once	Weeding Twice	Weed free	SE+	Significance
Establishment count	49.22	51.55	49.88	53.11	1.02	ns
Plant height (cm)	129.80c	155.31a	143.47b	155.10a	3.66	**
No. of branches per plant	3.31b	3.99a	3.95a	5.58a	0.16	**
No. of capsules per plant	43.55	46.88	50.66	54.11	0.66	ns
No. of seeds per capsule	43.55	46.88	50.66	54.11	0.66	ns
Weight of 100 seeds	0.35	0.34	0.35	0.35	0.06	ns
Seed yield (Kg/ha)	784.10	995.07	992.85	1249.20	323.23	ns
Weed cover score	72.32a	36.69b	21.33b	00.00	35.39	**
Weed dry weight (g)	874.8a	466.4b	426.4b	00.00	144.4	**

Means in a row of treatments followed by different alphabet(s) are significantly different at 5% significant level using Duncan Multiple Range Test (DMRT). ns= not significant

Weeding regime also had significant effect on plant height (Table 2). Effect of weeding once and weed free were statistically the same and differed significantly from weedy check and

weeding twice. Weedy check produced significantly shortest plants than the rest of the weeding regimes mainly due to competition from weeds. This result is in conformity with that of Lagoke (1978) who reported that weeds

had detrimental effect on growth and development of crops.

Number of branches per plant

The mid May and early June plantings had produced the same number of branches but produced significantly more number of branches than late June planting (Table 1). Number of branches decreased from mid May to late June. Delay in planting decreases the number of branches per plant (Tilak *et al.*, 1971; Alam *et al.*, 2007). They maintained that the fewer number of branches in delayed planting may be as a result of environmental factors more, importantly the rainfall. Weed free treatment produced significantly ($p < 0.05$) higher number of branches per plant than weedy check and weeding once and twice (Table 2). Weedy check had the lowest number of branches per plant than the rest of the treatments and could be due to excessive competition for soil nutrients and space between the target crop and the weeds. The result is in conformity with what was reported by Deckers (2001) that in the persistent presence of weeds, number of branches per plant decreases due to competition. The effect of interaction of planting date and weeding regime shows significant difference on the number of branches per plant (Table 3). The highest number of branches per plant was obtained when sesame was planted in mid May and kept weed free while the lowest number of branches per plant was obtained at the late June planting and when the plots were not weeded.

Number of capsules per plant

Planting date had significant effect on the number of capsules per plant (Table 1). Mid May planting had significantly ($P < 0.05$) more number of capsules per plant than both early June and late June plantings which were found to be at par. Number of capsules decreased consistently with delay in planting date. This result was in line with that of Alam *et al.* (2007) who reported that delay in planting decreased the number of capsules produced. Weed free had significantly ($P < 0.05$) higher number of capsules per plant than the rest of the weeding regimes. Weeding once and weeding twice were statistically at par while weedy check had significantly ($P > 0.05$) lower number of capsules per plant. Dowson (1970) reported that most of the reduction in crop vigour and yield was as a result of weed competition with crops for

essential nutrients, water below the soil and for light and space above the soil surface.

Interaction effect of planting date and weeding regime was significant on the number of capsules per plant (Table 3). The best combination was that of mid May planting and weed-free plots. This was as a result of availability of soil moisture coupled with the absence of weeds competition which enabled the target crop to effectively utilize soil nutrients, moisture and probably light and space during both vegetative and reproductive stages. Yayock *et al.* (1988) reported that as a consequence of large scale problem posed by weeds, more than half of the cultural practices required for better crop growth and yield are devoted to the control of weeds.

Seed yield (kg/ha)

Mid May planting and early June planting were similar statistically and differed significantly ($P < 0.05$) from late June planting (Table 1). Seed yield decreased as the planting date was delayed from mid May to late June. Ashtana and Narain (1977), Rahman *et al.* (1994) and Alam *et al.* (2007) also reported that highest seed yields were obtained from the early sown Sesame compared to the late sown ones. The higher seed yield obtained from the early sown Sesame was mainly due to the production of higher number of branches and capsules per plant. Weeding regimes have no significant effect of on the seed yield of sesame.

100 seeds weight (g)

Planting date has significant effect on the weight of 100 seeds. The highest value was obtained from mid May planting which was statistically at par with what was obtained from early June planting. Alam *et al.* (2007) have also reported significant effect of planting date on the weight of 1000 seeds of sesame. Weeding regime has no significant effect on the weight of 100 seeds weight of sesame. This is in conformity with the report of Zimdahl (1985) who stated that final yield was unaffected by initial weed competition.

Weed cover score (%) and weed dry weight (Kg/ha)

Planting date had no significant effect ($P > 0.05$) on both weed cover score and weed dry weight (Tables 1&2). However, weeding regime had significant effect ($P < 0.05$) on weed cover score and weed dry weight. Weedy check was the

highest for both parameters and differed significantly from the rest of the weeding regimes. These observations are generally obvious in the sense that weedy check received no weeding throughout the period of the

experimentation and therefore likely to have more weed cover score and weed dry weight than the rest of the weeding regimes. This is in conformity with what was reported by Yayock *et al.* (1988).

Table 3: Effect of Interaction Between Planting Date and Weeding Regimes on the Growth and Yield Parameters of Sesame During 2006/2007 Rainy Season at Usmanu Danfodiyo University Dry Land Farm, Sokoto.

Planting date x Weeding regime	Number of branches per plant	Number of capsules per plant	Weed cover score (%)
P1WO	3.65f	64.48d	100.00
P1W1	4.09e	76.36c	76.66
P1W2	4.99c	83.72b	33.33
P1WF	6.35a	102.48a	0.00
P2WO	3.60f	36.63g	73.33
P2W1	4.92c	76.36c	66.66
P2W2	4.27de	70.03c	63.33
P2WF	5.99b	85.22b	0.00
P3WO	2.69h	43.95f	100.00
P3W1	2.98g	40.62f	53.33
P3W2	2.59h	54.36e	40.00
P3WF	4.39d	82.84b	0.00
SE+	0.03	8.10	

Means in a column of treatments followed by different alphabet(s) in superscript(s) are significantly different at 5% significant level using Duncan Multiple Range Test (DMRT). P1=Mid May planting, P2=Early June, P3=Late June, Wo=Weedy check, W1=Weeding once, W2=Weeding twice, W3=Weedy free.

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