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Effect of sulphur on the seed yield and oil content of sesame (*Sesamum indicum* L.)

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Abstract

Sulphur is a component of plant amino acids, proteins, vitamins, and enzyme structures which influence the productivity of oil seed and total oil content. The experiment was conducted to find out the effect of sulphur on the seed yield and oil content of sesame in Bangladesh. The experiment comprised three varieties of sesame *viz*. Binatil-2, Binatil-3 and BARI Til-4 and six levels of sulphur (S) *viz*. 0, 10, 20, 30, 40 and 50 kg S ha^{-1}. The experiment was laid out in a randomized complete block design with three replications. Dry matter production, crop characters, yield components, seed yield and oil content were significantly influenced by variety, level of sulphur and their interaction. The highest dry matter production plant^{-1} at 50 DAS (17.56 g), plant height (101.3 cm), number of branches plant^{-1} (3.66), number of pods plant^{-1} (41.56), number of seeds pod^{-1} (58.83), seed yield (747.2 kg ha^{-1}), stover yield (2243.0 kg ha^{-1}) and oil content (40.03%) were obtained in BARI Til-4 while the corresponding lowest values of all parameters were recorded in Binatil-2. In case of sulphur application, the highest dry matter production plant^{-1} at 50 DAS (20.81 g), plant height (109.7 cm), number of branches plant^{-1} (3.87), number of pods plant^{-1} (46.13), number of seeds pod^{-1} (56.67), seed yield (800.0 kg ha^{-1}), stover yield (2787 kg ha^{-1}) and oil content (43.97%) were obtained when crop was fertilized with 30 kg S ha^{-1} while the lowest seed yield (502.2 kg ha^{-1}), stover yield (1550.0 kg ha^{-1}) and oil content (32.80%) were obtained in control (0 kg S ha^{-1}). BARI Til-4 fertilized with 30 kg S ha^{-1} produced the highest dry matter plant^{-1} at 50 DAS (24.80 g), number of pods plant^{-1} (51.13), seeds pod^{-1} (62.0) and seed yield (1011.0 kg ha^{-1}). The highest oil content (43.97%) was also recorded in BARI Til-4 fertilized with 30 kg S ha^{-1}, which was as good as that of BARI Til-4 fertilized with 40 kg S ha^{-1}. Therefore, BARI Til-4 fertilized with 30 kg S ha^{-1} can be considered as a promising practice in respect of seed yield and oil content of sesame in Bangladesh.

Introduction

Sesame (*Sesamum indicum* L.) is one of the most ancient oil seed crops of the family Pedaliaceae. Its major production areas are the tropics and the subtropics of Asia, East and Central America. Sesame is cultivated all over Bangladesh but major growing districts are Pabna, Khulna, Faridpur, Rajshahi, Dhaka, Jessore and Mymensingh. Due to high competition among different high valued crops over the years, the acreage and production of sesame have severely decreased in recent years. The area under sesame cultivation was 3454 ha and a total production of 2970 metric tons was recorded in Bangladesh (BBS, 2015). Sesame is a versatile crop giving high quality edible oil. The oilseeds are very important because of its capability of synthesis of sulphur containing amino acids, vitamins, and constituent in human dietary system next to carbohydrates, protein and fats (Mohsana, 2009). Sesame has the highest oil content of 42-50% along with 25% protein compare to other oilseed crops.The sesame oil contains 16-18% carbohydrate and 42% essential linoleic acid (Miah *et al.,* 2015), and the high grades of sesame oil are used for cooking, margarine manufacturing and in pharmaceutical industries (El Naim *et al*., 2012). Its oilcake is a noble feed for poultry, fish, cattle, goat and sheep (Khan *et al.,* 2009).

Sesame is a short duration photoinsensitive crop with wider adaptability. It can be cultivated both in *Kharif*-I (mid-February to mid-April) and *Kharif*-II (mid-August to mid-September) seasons. In Bangladesh, yield of sesame per unit area is very low (0.92 t ha^{-1}) (BBS, 2017) compared to other sesame producing countries of the world. The main reasons for poor yield are lack of suitable varieties and improper management practices. Variety plays an important role on the yield and quality of sesame. Seed yield variations due to varietal potentiality have already been reported (Mohsana, 2009; Raja *et al*., 2007). Akinoso *et al.* (2010) noticed that the brown seeded strain contains higher oil than black seed. In addition, best quality edible oil and as well as medicinal oil can be extracted from sesame that can be preserve for a long period of time.

Sulphur is an essential element for plant growth particularly for oilseed crops which play an important role in plant metabolism system, crucial for the synthesis of essential oil that plays a key role in formation of chlorophyll in plant leaf (Ajai *et al.,* 2000), increase cold

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and drought resistance ability in plant (Patel and Shelke, 1995). It also increases oil content and pungency in oil (Khan *et al.*, 2016). Oil crops are sulphur (S) loving and S plays a vital role in the plant metabolism thus increasing a number of organic compounds, oil storages, particularly oil glands and vitamin B_1 (Shelke *et al.,* 2014). Sulphur is a constituent of three essential amino acids commonly found in plants, namely cysteine and methionine, which are essential components of proteins. It can be called as master nutrient for oil seed production. Application of 40 kg S (20 kg basal + 20 kg at 20 days after sowing (DAS)) along with NPK significantly increased yield of sesame (Kundu *et al.*, 2010). Nagwani *et al.* (2001) and Sarkar and Banik (2002) reported that yield of sesame increased up to application of 30 kg S ha^{-1} and 50 kg S ha^{-1}, respectively. Sulphur application increased seed yield as well as oil quality of sesame (Tiwari and Gupta, 2006). Hence, the present study was undertaken to study the effect of sulphur on the growth, yield and oil content of three sesame varieties.

Materials and Methods

The experiment was conducted at the Agronomy Field Laboratory, Bangladesh Agricultural University, Mymensingh during March to June 2016. The experimental site was located at 24.7°N latitude and 90.50°E longitude with an altitude of 18 m above the mean sea level. The research field belongs to the agro-ecological zone of the Old Brahmaputra Floodplain (AEZ-9). The soil of the research field belongs to the Sonatola series of non-calcareous dark grey floodplain soil. The experiment comprised three popular sesame varieties *viz.* Binatil-2 (V_1), Binatil-3 (V_2) and BARI Til-4 (V_3) and six sulphur (S) levels *viz.* 0 (S_0), 10 (S_{10}), 20 (S_{20}), 30 (S_{30}), 40 (S_{40}) and 50 (S_{50}) kg S ha^{-1}. The experiment was laid out in a randomized complete block design with three replications. The experimental unit was divided into 3 blocks with 18 unit plots of size 5.0 m × 2.0 m in each block. The land was prepared by ploughing and cross ploughing with country plough followed by laddering. The corner of the land was spaded and visible large clods were broken into small pieces. Weeds and stubble were removed from the field. The layout of the experiment was done in accordance with the design adopted. The crop was fertilized with 120 kg urea ha^{-1}, 140 kg triple super phosphate (TSP) ha^{-1}, 70 kg muriate of potash (MoP) ha^{-1}, 2.5 kg zinc-oxide (ZnO) ha^{-1}. Gypsum was used as source of S as per treatment specification. The whole amount of TSP, MOP, ZnO, 50% of urea and required amount of gypsum were applied at final land preparation. The remaining urea was applied at 25 days after seed germination. Seeds of sesame (6 kg ha^{-1}) were sown in 25 cm apart rows on 10 March 2016 in 2-3 cm deep furrows made by hand rake. After establishment, the crop was thinned by keeping only healthy seedling at 5 cm distance in each row. Two hand weeding were done at 20 and 45 days after sowing (DAS). The crop was infested with hopper *(Heliothis armigera)* at the reproductive stage, which was successfully controlled by spraying insecticide Limida 17.8% SL at the rate of 3.375 ml 10 L^{-1} of water.

To measure dry matter production $plant^{-1}$, five plants were randomly uprooted at 50 DAS (excluding border rows and central 1 m × 1 m harvest area), and oven dried until constant weight was reached. At harvest, five sample plants $plot^{-1}$ were collected (excluding boarder row and central 1 m^2) to record data on yield components. Central 1 m^2 area in each plot was harvested, threshed and seeds and stover were sun dried and weighed to record the yield in kg ha^{-1}. The oil content was estimated by Soxhlet apparatus method following the procedure of Singh *et al.* (1960). The collected data were analyzed statistically using "Analysis of Variance" with MSTATC computer programm and the difference among treatment means were adjudged by Duncan's Multiple Range Test (DMRT) (Gomez and Gomez, 1984).

Results and Discussion

Effect of variety

Variety exerted a positive effect on dry matter production, yield components, seed yield and oil content of sesame (Table 1). BARI Til-4 produced the highest dry matter (17.56 g) followed by Binatil-3 (12.93 g) and the lowest dry matter was produced in Binatil-2 (10.53 g). The tallest plant (101.3 cm) was found in BARI Til-4 which was at par with Binatil-3 (99.34 cm) and the shortest one (94.63 cm) was recorded in Binatil-2. BARI Til-4 produced the highest number of branches $plant^{-1}$ (3.6), number of pods $plant^{-1}$ (41.56) and number of seeds pod^{-1} (58.83) followed by Binatil-3 and their corresponding lowest values of all characters was found in Binatil-2. The highest 1000-seed weight (2.94 g) was found in Binatil-2 and the lowest one (2.61 g) was recorded in BARI Til-4 which was at par with Binatil-3 (Table 1). BARI Til-4 produced the highest seed yield (747.20 kg ha^{-1}) followed by Binatil-3 and Binatil-2. The highest number of branches $plant^{-1}$, pods $plant^{-1}$ and seeds pod^{-1} contributed to the highest seed yield in BARI Til-4 compared to other varieties. Akinoso *et al.* (2010) reported that variety played an important role on the seed yield of sesame. The highest stover yield (2243.00 kg ha^{-1}) was recorded in the variety BARI Til-4 followed by Binatil-3 and the lowest one was recorded in Binatil-2. The highest harvest index (25.48%) was obtained in BARI Til-4 which was at par with Binatil-2 (24.66%) and the lowest harvest index was found in Binatil-3 (22.95%). Oil content was also significantly influenced by variety. The highest oil content was obtained in BARI Til-4 (40.03%) followed by Binatil-3 (38.82%) and the lowest one (37.45%) was recorded in Binatil-2 (Table 1).

Table 1. Effect of variety on dry matter production, crop characters, yield components, seed yield and oil content of sesame

Variety	Dry matter production plant^{-1} at 50 DAS (g)	Plant height at harvest (cm)	No. of branches plant^{-1}	No. of pods plant^{-1}	No. of seeds pod^{-1}	1000- seed weight (g)	Seed yield (kg ha^{-1})	Stover yield (kg ha^{-1})	Harvest index (%)	Oil content (%)
Binatil-2	10.53c	94.63b	3.37b	34.56c	44.50c	2.94a	548.3c	1716.00c	24.66a	37.45c
Binatil-3	12.93b	99.34a	3.41b	39.48b	53.83b	2.70b	591.2b	1950.00b	22.95b	38.82b
BARI Til-4	17.56a	101.3a	3.66a	41.56a	58.83a	2.61b	747.2a	2243.00a	25.48a	40.03a
$S\bar{x}$	0.192	0.719	0.055	0.485	0.470	0.038	14.18	35.00	0.288	0.213
Level of significance	**	**	**	**	**	**	**	**	**	**
CV (%)	5.97	3.10	6.73	5.35	3.81	5.58	9.56	7.54	5.03	2.33

In a column, figures with same letter or without letter do not differ significantly whereas figures with dissimilar letter (s) differ significantly (as per DMRT).
** = Significant at 1% level of probability

Effect of sulphur level

Dry matter production, plant height, number of branches plant^{-1} and number of seeds pod^{-1} were significantly influenced by S levels (Table 2). Results revealed that all the above mentioned characters were increased up to 30 kg S ha^{-1}and thereafter declined. The highest dry matter production plant^{-1} (20.81 g) was obtained from 30 kg S ha^{-1} followed by (16.31 g) 40 kg S ha^{-1} and the lowest one (8.748 g) from 0 kg S ha^{-1}. Sharma and Gupta (2003) also reported increased dry matter accumulation in sesame with application of S at 40 kg ha^{-1}. The tallest plant (109.7 cm) was found in 30 kg S ha^{-1} followed by 40 kg S ha^{-1}, which was as good as 50 kg S ha^{-1} and the lowest one was recorded in 0 kg S ha^{-1} (Table 2). Obaidul (2012) reported that plant height was significantly affected by different S levels. The highest number of branches plant^{-1} (3.86) was obtained in 30 kg S ha^{-1} which was at par with 40 kg S ha^{-1} and the lowest one (2.93) in control treatment (0 kg S ha^{-1}). The highest number of pods plant^{-1} (46.13) was recorded in 30 kg S ha^{-1} which was at par with 40 kg S ha^{-1} and the lowest one (31.38) was recorded in control treatment (0 kg S ha^{-1}). These results are in agreement with the findings of Sharma *et al.* (2003) who reported that increasing S rate increased the number of pods plant^{-1}. The maximum number of seeds pod^{-1} (56.67) was produced when the crop was fertilized with 30 kg S ha^{-1} which was as good as 20 kg S ha^{-1} (55.67) and the lowest one (46.33) was produced with controls. Sulphur nutrient might have stimulated metabolic energy of the plant, which enhanced the seeds pod^{-1} with increasing S fertilization. Shelke *et al.* (2014) observed that increasing S rate resulted in a significant increase in the seeds pod^{-1}. Numerically, the highest thousand seed weight (2.84 g) was found in 40 kg S ha^{-1} followed by 50 kg S ha^{-1} and the lowest one was recorded in (0 kg S ha^{-1}) control. The highest harvest index (25.83%) was obtained from 20 kg S ha^{-1} which was statistically identical to the harvest index of 40 kg S ha^{-1} and the lowest one (22.52%) was recorded in 30 kg S ha^{-1} (Table 2). Significant difference was found among the S levels in respect of seed yield. Seed yield ranged from 502.20 to 800.00 kg ha^{-1}. The highest seed yield (800.00 kg ha^{-1}) was obtained in 30 kg S ha^{-1} followed by 40 kg S ha^{-1} and the lowest one (502.20 kg ha^{-1}) was produced in control (0 kg S ha^{-1}). Seed yield increased due to increased level of S, which caused improvement of yield components. Allam (2002) reported that in a field trial, S fertilizer has increased yield from 20% to 42% in sesame. The highest stover yield (2787.00 kg ha^{-1}) was obtained in 30 kg S ha^{-1} and the lowest one (1550.00 kg ha^{-1}) was found in without S fertilization (0 kg S ha^{-1}), which was at par with 10 kg S ha^{-1}. Oil content ranged from 32.80% to 43.97%. The highest oil content (43.97%) was obtained in 30 kg S ha^{-1}, which was followed by 40 kg S ha^{-1} and the lowest oil content (32.80%) was obtained in control treatment (Table 2). Similar results were reported by Choudhary *et al.* (2016) who stated that application of 30 kg S ha^{-1} was significantly superior to 10 and 20 kg S ha^{-1}. The increase in oil content might be due to higher oil synthesis due to increased dose of S.

Table 2. Effect of levels sulphur on dry matter production, crop characters, yield components, seed yield and oil content of sesame

Level of sulphur (kg S ha^{-1})	Dry matter production plant^{-1} at 50 DAS (g)	Plant height at harvest (cm)	No. of branches plant^{-1}	No. of pods plant^{-1}	No. of seeds pod^{-1}	1000-seed weight (g)	Seed yield (kg ha^{-1})	Stover yield (kg ha^{-1})	Harvest index (%)	Oil content (%)
0	8.748f	90.42d	2.934d	31.38f	46.33d	2.69	502.2d	1550.00d	24.42b	32.80f
10	10.71e	93.47c	3.337c	34.07e	50.00c	2.70	531.3d	1666.00d	24.41b	35.17e
20	11.67d	95.58c	3.380c	37.07d	51.33c	2.69	647.8bc	1822.00c	25.83a	37.83d
30	20.81a	109.7a	3.867a	46.13a	56.67a	2.76	800.0a	2787.00a	22.52c	43.97a
40	16.31b	101.7b	3.733ab	42.56b	55.67ab	2.84	698.7b	2088.00b	25.13ab	42.87b
50	13.81 c	99.78b	3.622b	39.98c	54.33b	2.83	593.6c	1905.00 c	23.86b	39.97c
$S\bar{x}$	0.272	1.02	0.078	0.686	0.665	0.038	20.05	49.49	0.408	0.301
Level of significance	**	**	**	**	**	NS	**	**	**	**
CV (%)	5.97	3.10	6.73	5.35	3.81	5.58	9.56	7.54	5.03	2.33

In a column, figures with same letter or without letter do not differ significantly whereas figures with dissimilar letter (s) differ significantly (as per DMRT.
** = Significant at 1% level of probability. NS = Not significant.

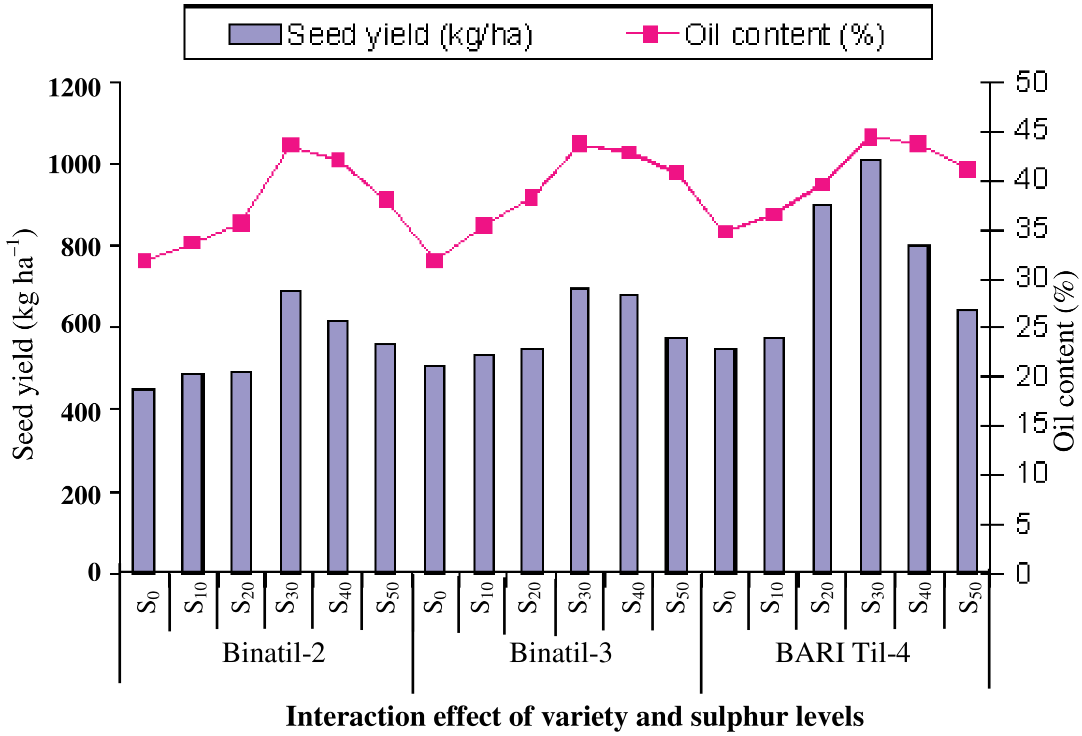

Fig. 1. Interaction effect between variety and levels of sulphur on seed yield and oil content of sesame

Interaction effect of variety and sulphur level

Interaction effect of variety and S level was significantly influenced dry matter production, number of seeds pod^{-1} and 1000-seed weight (Table 3). The highest dry matter production plant^{-1} (24.80 g) was produced in BARI Til-4 fertilized with 30 kg S ha^{-1} and the lowest one (7.28 g) was produced in Binatil-2 with 0 kg S ha^{-1}. BARI Til-4 fertilized with 40 kg S ha^{-1} and 50 kg S ha^{-1}and Binatil-3 fertilized with 30 kg S ha^{-1} produced statistically identical seed yields and occupied the second position (Table 3). The interaction of variety and S level did not significantly affect plant height and number of branches plant^{-1}. Plant height ranged from 113.7 cm to 86.87 cm. However, numerically the tallest plant (113.7 cm) was obtained in BARI Til-4 fertilized with 30 kg S ha^{-1} and the shortest one (86.87 cm) was recorded in Binatil-2 under control treatment (0 kg S ha^{-1}). Numerically the highest number of branches plant^{-1} (4.0) was produced in BARI Til-4 fertilized with 30 kg S ha^{-1} and 40 kg S ha^{-1}, and the lowest one (2.73) was produced in Binatil-2 under control treatment. BARI Til-4 fertilized with 30 kg S ha^{-1} resulted maximum number of pods plant^{-1} (51.13) which was at par with BARI Til-4 fertilized with 40 kg S ha^{-1} and Binatil-3 fertilized with 30 kg S ha^{-1}. Number of seeds pod^{-1} (62.00) was the highest in BARI Til-4 fertilized with 30 kg S ha^{-1} which was at par with combined effect of BARI Til-4 fertilized with 40, 20 and 10 kg S ha^{-1}. The lowest number of pods plant^{-1} (28.07) and seeds pod^{-1} (39.00) were produced in Binatil-2 with control. The highest 1000-seed weight (3.28 g) was produced in Binatil-2 fertilized with 50 kg S ha^{-1} which was as good as Binatil-2 fertilized with 30 kg S ha^{-1} (2.94 g) and the lowest one (2.53 g) was obtained in BARI Til-4 fertilized with 50 kg S ha^{-1}. The highest seed yield (1011.00 kg ha^{-1}) was obtained in BARI Til-4 fertilized with 30 kg S ha^{-1} which was followed by BARI Til-4 fertilized with 20 kg S ha^{-1} while the lowest seed yield (449.30 kg ha^{-1}) was obtained in Binatil-2 under control treatment (Table 3). The highest stover yield was found in BARI Til-4 (3751.00 kg ha^{-1}) fertilized with 30 kg S ha^{-1}. Stover yield of Binatil-3 and Binatil-2 were statistically identical when fertilized with 30 kg S ha^{-1}. The lowest stover yield was recorded in Binatil-2 under control treatment (0 kg S ha^{-1}). Significant influence on harvest index was found in the interaction effect of variety and S level. The highest harvest index (31.42%) was obtained in BARI Til-4 fertilized with 20 kg S ha-1, which was followed by Binatil-2 fertilized with 40 kg S ha-1 while the lowest harvest index (21.21%) was obtained in BARI Til-4 fertilized with 30 kg S ha^{-1}. The highest oil content was found in BARI Til-4 (44.50%) fertilized with 30 kg S ha^{-1}, which was as good as BARI Til-4 fertilized with 40 kg S ha^{-1}. The oil content of Binatil-3 and Binatil-2 were statistically identical when fertilized with 30 kg S ha^{-1}, while the lowest oil content was obtained in Binatil-2 under control treatment (no S fertilization) (Fig. 1).

Table 3. Effect of interaction between variety and levels of sulphur on crop characters, yield contributing characters and harvest index of sesame

Interaction (Variety × Level of sulphur)	Dry matter production plant^{-1} at 50 DAS (g)	Plant height (cm)	No. of branches plant^{-1}	No. of pods plant^{-1}	No. of seeds pod^{-1}	1000- seed weight (g)	Seed yield (kg ha^{-1})	Stover yield (kg ha^{-1})	Harvest index (%)	Oil content (%)
$V_1 \times S_0$	7.28i	86.87	2.73	28.07h	39.00h	2.86bcd	449.30 i	1470.00g	23.38defghi	31.80k
$V_1 \times S_{10}$	8.05hi	88.80	3.27	32.13g	40.00h	2.89bcd	486.00 hi	1493.00g	24.56cdef	33.60j
$V_1 \times S_{20}$	8.22ghi	90.20	3.27	34.80defg	41.00h	2.88bcd	490.00 hi	1553.00g	23.99defg	35.70hi
$V_1 \times S_{30}$	17.46c	102.6	3.80	38.00cde	50.00fg	2.94ab	691.30d	2218.00bc	23.76defgh	43.60a
$V_1 \times S_{40}$	11.27e	100.0	3.60	37.33cdef	49.00g	2.79bcd	614.70defg	1894.00de	27.19b	42.00bc
$V_1 \times S_{50}$	10.92ef	99.33	3.53	37.00 def	48.00g	3.28a	558.70fghi	1667.00efg	25.10bcde	38.00fg
$V_2 \times S_0$	9.47fgh	88.93	2.80	32.40g	49.00g	2.65bcd	510.00ghi	1575.00g	24.46cdefg	31.80k
$V_2 \times S_{10}$	9.57fg	95.07	3.27	34.40efg	51.00fg	2.67bcd	529.30ghi	1655.00efg	24.24defg	35.40hi
$V_2 \times S_{20}$	10.25ef	97.20	3.40	37.93cde	53.00ef	2.65bcd	550.70fghi	1942.00cd	22.09ghi	38.20ef
$V_2 \times S_{30}$	20.18b	112.8	3.80	49.27a	58.00bcd	2.68bcd	698.00d	2392.00b	22.59fghi	43.80a
$V_2 \times S_{40}$	17.01c	102.3	3.60	41.87b	57.00cd	2.90bc	682.00de	2175.00bc	21.52hi	42.90ab
$V_2 \times S_{50}$	11.11e	99.73	3.60	41.00bc	55.00de	2.67bcd	577.3efgh	1961.00cd	22.75efghi	40.80cd
$V_3 \times S_0$	9.49fgh	95.47	3.27	33.67fg	51.00fg	2.57cd	547.30fghi	1605.00fg	25.43bcd	34.80ij
$V_3 \times S_{10}$	14.50d	96.53	3.47	35.67defg	59.00abc	2.55cd	578.70efgh	1852.00def	24.42cdefg	36.50gh
$V_3 \times S_{20}$	16.55c	99.33	3.47	38.47bcd	60.00abc	2.55cd	902.70b	1971.00cd	31.42a	39.60de
$V_3 \times S_{30}$	24.80a	113.7	4.00	51.13a	62.00a	2.68bcd	1011.00a	3751.00a	21.21i	44.50a
$V_3 \times S_{40}$	20.64b	102.7	4.00	48.47a	61.00ab	2.78bcd	799.30c	2195.00bc	26.69bc	43.70a
$V_3 \times S_{50}$	19.40b	100.3	3.73	41.93b	60.00abc	2.53d	644.70 def	2086.00cd	23.73defgh	41.10cd
$S\bar{x}$	0.47	1.76	0.135	1.19	1.15	0.054	34.73	85.73	0.707	0.522
Level of significance	**	NS	NS	**	**	*	**	**	**	*
CV (%)	5.97	3.10	6.73	5.35	3.81	5.58	9.56	7.54	5.03	2.33

In a column, figures with same letter or without letter do not differ significantly whereas figures with dissimilar letter (s) differ significantly (as per DMRT).

** = Significant at 1% level of probability, * = Significant at 5% level of probability, NS = Not significant V_1 = Binatil-2; V_2 = Binatil-3; V_3 = BARI Til-4 S_0 = 0 kg S, S_{10} = 10 kg S, S_{20} = 20 kg S, S_{30} = 30 kg S, S_{40} = 40 kg S, S_{50} = 50 kg S.

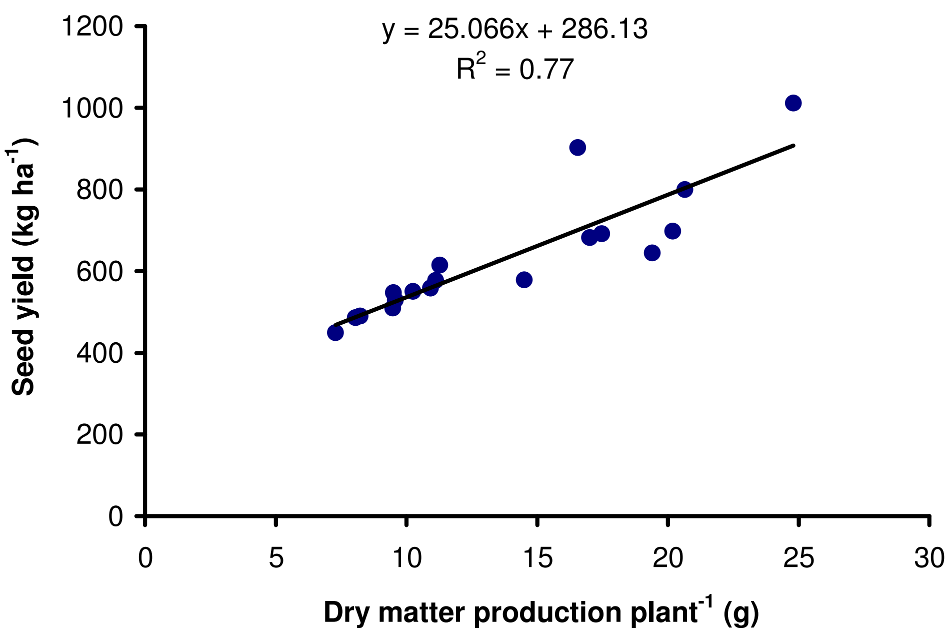

Fig. 2. Functional relationship between total dry matter production at 50 DAS and seed yield of sesame

Functional relationship between total dry matter production at 50 DAS and seed yield of sesame

Total dry matter production is an important parameter for the determination of seed yield of sesame (Akter *et al*., 2016). Partitioning of dry matter in sink organs, *i.e.* seeds are responsible for the seed yield of sesame. The relationship of total dry matter production at 50 DAS and seed yield of sesame was determined by using the interaction data between variety and level of S application. Experimental results revealed that seed yield showed significantly positive correlation with total dry matter production at 50 DAS (Fig. 2). The functional relationship was significant at $p \leq 0.01$. The functional relationship can be determined by the regression equation Y = 25.066x + 286.13 (R^2 = 0.77). It was revealed that 77% of the variation in yield could be explained from the variation in total dry matter production at 50 DAS. This means an increase in total dry matter production will result in the corresponding increase in the seed yield of sesame. This indicates that total dry matter production might be a critical characteristic feature for seed yield performance of sesame.

Conclusion

Under the perspective of present experimentation, all the varieties of sesame included in the study exhibited an increasing trend in seed yield and oil content with increased level of S from 0 kg to 30 kg ha^{-1}. BARI Til-4 produced the highest seed yield and oil content (%) when fertilized with 30 kg S ha^{-1} followed by Binatil-3 and Binatil-2. Still the latter two varieties may express their promising performance in other location specific differential environmental conditions. In this study BARI Til-4 fertilized with 30 kg S ha^{-1} appears as a promising practice in respect of seed yield and oil content of sesame in Bangladesh. Therefore, sesame growers can be select BARI Til-4 along with 30 kg S ha^{-1} for maximizing yield and oil content.

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