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Response of selected sesame varieties to different weed management practices

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ABSTRACT

An experiment was conducted at the Agronomy Field Laboratory, Bangladesh Agricultural University during February to May 2019 to study the effect of weed management practices on the yield of different sesame varieties. The experiment comprised two factors; factor A: sesame varieties *viz*. Binatil-2, BARI Til-3 and BARI Til-4; factor B: weed management practices *viz*. no weeding, one hand weeding at 15 days after sowing (DAS), two hand weeding at 15 and 30 DAS, three hand weeding at 15, 30 and 45 DAS, and post-emergence herbicide application at 10 days after emergence (DAE). Weed parameters and most of the yield contributing characters and yield were significantly influenced by sesame varieties and weed management practices. Among the varieties, the highest seed yield (1.01 t ha^{-1}) was recorded in BARI Til-4, whereas for weed management practice, the highest seed yield (1.26 t ha^{-1}) was obtained in three hand weeding. The highest seed yield (1.54 t ha^{-1}) was found in BARI Til-4 with three hand weeding which was statistically similar to two hand weeding with the same variety (1.48 t ha^{-1}). Therefore, BARI Til-4 with two hand weeding at 15, and 30 DAS might be taken in consideration for obtaining higher seed yield in sesame.

Keywords: Weed management, sesame, hand weeding, herbicide, yield

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1 Introduction

Sesame (*Sesamum indicum* L.) is one of the important and ancient edible oil seed crop cultivated in Bangladesh. It is widely used in different countries of the world because of its high oil, antioxidant, nutritional and protein contents (Kamal-Eldin et al., 1992; Morris, 2002; Pal et al., 2010). As an excellent vegetable oil source, sesame seeds contain the highest amounts of oil (35-63%) among oil crops (Kim et al., 2006). Sesame has been cultivated in an area of 9.3 thousand acres and the production was 3.4 thousand metric tons in 2016-2017 in Bangladesh (BBS, 2017). The average yield of sesame in Bangladesh is 0.91 t ha^{-1} which seems to be low compared to other sesame growing countries (FAO, 2019). This low yield is partly due to growing low yielding varieties and lack of using appropriate agronomic practices such as balanced fertilizer, sowing method and time, plant density, weed management and so on (Miah et al., 2016). So, to get the maximum possible benefits from sesame cultivation, it is essential to develop appropriate agronomic package for yield maximization. Among the various cultural practices, suitable cultivar and weed management methods might play an important role for yield maximization.

Sesame yield losses are mainly due to delayed or insufficient weed control. Weeds can negatively influence sesame yield as weed emerge simultaneously and grow vigorously with sesame. So, weeds compete for nutrients, space and solar radiation with sesame during early stage of crop establishment which causes 50-70% reduction in seed yield (Grichar et al., 2001a,b). Several growth stages of sesame such as emergence, flowering and capsule setting are very vulnerable to weed competition. For proper growth and higher yield, a critical weed free period of up to 50 days after sowing is needed (Langham et al., 2008). Therefore, to avoid yield loss, weed management should be done in such a time so that minimum weed infestation occurs in sesame (Duary and Hazra, 2013). The conventional method of weed control is much effective but knowledge about appropriate stage of weeding along with lack of labor availability at those stages makes hand weeding non effective. Therefore, use of herbicide could be more feasible and efficient to check early weed competition. But hand weeding is still preferable where labor availability is not a problem. Raikwar and Srivastva (2013) reported that the yield of sesame can be increased by 21 to 53% with the adoption of improved technologies such as high yielding variety, recommended dose of fertilizer, proper weed management and plant protection measures. Keeping this in view, an attempt was made to study varietal response of sesame to weed management, and identify suitable variety and weed management practice for maximizing sesame yield.

2 Materials and Methods

2.1 Experimental site

The study was conducted at the Agronomy Field Laboratory, Bangladesh Agricultural University located at 24°43′8.3″N, 90°25′41.2″E at an elevation of 18 m from the sea level. The experimental field belongs to the non-calcareous dark grey floodplain soil under the Agro-ecological Zone of Old Brahmaputra Floodplain (AEZ-9) of Bangladesh (UNDP/FAO, 1988). The field was a medium high land with flat and well drained condition having silty loam texture with the pH value of the soil ranged from 5.9-6.5 and organic carbon (%), total N content (%) of the soil were 0.93 and 0.13, respectively. The experimental site is characterized by high temperature, high humidity and heavy rainfall with occasional gusty winds during April-September (Kharif season) and scanty rainfall associated with moderately low temperature during October-March (Rabi season).

2.2 Experimental treatments and design

The experiment included two factors; factor A: Three (3) sesame varieties *viz.* Binatil-2, BARI Til-3 and BARI Til-4; factor B: Five (5) weed management practices *viz.* no weeding (W1), one hand weeding (W2) at 15 days after sowing (DAS), two hand weeding (W3) at 15 and 30 DAS, three hand weeding (W4) at 15, 30 and 45 DAS, and post emergence herbicide Limi super 9EC (active ingredient-Fenoxaprop-p-ethyl 9 EC) (9.3% w/w) application @ 650 mL ha^{-1} at 10 days after emergence (DAE) (W5). The experiment was laid out in a randomized complete block design (RCBD) with three replications.

2.3 Crop husbandry

The main field was prepared by power tiller with ploughing and cross ploughing followed by laddering. After laying out, the land was fertilized with urea, triple super phosphate, MoP @ 60, 70 and 30 kg ha^{-1}, respectively (FRG, 2012). The entire amounts of TSP, MoP and half dose of urea were applied at the time of final land preparation and rest half dose of urea was applied at 25 DAS. Seeds were sown at the rate of 7.5 kg ha^{-1} by continuous line sowing in furrows maintaining 30 cm distance between two adjacent furrows on 15 February 2019 and the furrows were covered with soils soon after seeding. At 10 DAS, the seedlings were emerged fully and thinning was done to maintain plant to plant distance of 10 cm. Weed was removed according to the treatment specification. Irrigation, drainage and other intercultural operations were done when it was necessary. Crops were harvested on 17 May 2019 at 91 DAS, when 80% capsules attained maturity.

2.4 Sampling and measurements

To collect data on weed parameters, weed samples were collected from three spots of each plot at 20 DAS, 40 DAS and at harvest using a 0.25 m × 0.25 m quadrate as described by Cruz et al. (1986). The weeds within the quadrate were counted and converted to number m^{-2}. For dry weight of weed, the weeds within the quadrate were collected and roots were cleaned with water. Then the weeds were oven dried for 72 h at a temperature of 80 °C and after weighing results were converted to g m^{-2}. At harvest, five plants excluding border plants per plot were selected randomly for recording yield contributing data. An area of central 1 m × 1 m was selected from each plot to record the yields of seed and stover. The harvested crop of each unit area was separately bundled, properly tagged and then brought to the threshing floor. After drying, seeds were separated from the plants then sun dried at 12.5% moisture level and cleaned. The stover was also sun dried properly. Finally, the yields of seed and stover $plot^{-1}$ were recorded and converted to t ha^{-1}.

2.5 Data analysis

The collected data were compiled, tabulated and subjected to statistical analysis using computer package program MSTAT-C. After that mean differences were adjudged by Duncan's Multiple Range Test (DMRT) (Gomez and Gomez, 1984).

3 Results and Discussion

3.1 Weed growth

3.1.1 Varietal difference

Variety of sesame has significant influence on weed density and weed dry weight at 20 DAS, 40 DAS and at harvest (Fig. 1(a) and Fig. 1(b)). At 20 and 40 DAS, the highest number of weeds m^{-2} (22.27 and 78.93, respectively) was obtained in BARI Til-3 and at harvest the highest number of weeds m^{-2} (122.40) was found in Binatil-2. But at 20, 40 DAS and at harvest, the lowest number of weeds m^{-2} (19.87, 70.47 and 110.30, respectively) was obtained in BARI Til-4. On the other hand, the maximum weed dry weight (8.11 g m^{-2}) was obtained in BARI Til-4 which was statistically similar with BARI Til-3 and the minimum dry weight of weeds (7.35 g m^{-2}) was obtained in Binatil-2 at 20 DAS. Then at 40 DAS, the maximum dry weight of weeds (27.58 g m^{-2}) was obtained in BARI Til-3 and the lowest (22.95 g m^{-2}) was obtained from BARI Til-4. Finally, at harvest, the highest weed dry weight (163.20 g m^{-2}) was obtained in BARI Til-4 and the lowest one (128.70 g m^{-2}) was obtained in BARI Til-3. The results is in close agreement with the findings of Sarker (1979), Rahman et al. (2017) where they found that the variety of rice has significant influence on the component and number of weed practices.

3.1.2 Effect of weed management

Weed management has significant effect on weed density and weed dry weight at 20 and 40 DAS and at harvest (Fig. 2(a) and Fig. 2(b)). At 20 and 40 DAS and at harvest the highest number of weeds m^{-2} (32.0, 144.3 and 257.11, respectively) was obtained in no weeding. At 20 DAS, the lowest number of weeds m^{-2} (13.33) was obtained in one hand weeding at 15 DAS. At 40 DAS and at harvest, the lowest number (34.0 and 37.33, respectively) of weeds was obtained in three hand weeding at 15, 30 and 45 DAS. It was observed that more weeding resulted in lower weed density on the plots. On the other hand, the maximum weed dry weight (11.86 g m^{-2}, 45.44 g m^{-2} and 217.40 g m^{-2}) was obtained in no weeding at 20, 40 DAS and at harvest, respectively. At 20, 40 DAS and at harvest the minimum weed dry weight (6.07 g m^{-2}, 16.24 g m^{-2} and 112.80 g m^{-2}) was obtained in three hand weeding at 15, 30 and 45 DAS. It might be due to the fact that repeated weeding reduces the number of weeds on the plots because it controls the dominant weed from the beginning of the crop growth and at the same time it shows the broad-spectrum control of weeds. Naik et al. (2019) observed the similar result in case of weed weight. The results is in conformity with the results of Acker et al. (1993), Mahajan et al. (2009); who observed that weed management method greatly affect the growth of weed.

3.1.3 Interaction effect

The interaction effect of variety and weed management on weed density and weed dry weight was significant at 20, 40 DAS and at harvest (Table 1). At 20 and 40 DAS, the highest number of weeds m^{-2} (39.00 and 161.70) and the highest weed dry weight (13.07 g m^{-2} and 58.59 g m^{-2}) were obtained in BARI Til-3 × no weeding. At 20 DAS, the lowest number of weeds m^{-2} (13.33) was obtained from BARI Til-3 × one hand weeding and the lowest dry weight of weeds (5.87 g m^{-2}) was obtained in BARI Til-3 × post emergence herbicide which was statistically similar to Binatil-2 × three hand weeding at 15, 30 and 45 DAS. Then, at 40 DAS, the lowest number of weeds (29.67) was found in BARI Til-3 × three hand weeding at 15, 30 and 45 DAS and the minimum dry weight of weeds (15.13 g m^{-2}) was obtained in Binatil-2 × three hand weeding at 15, 30 and 45 DAS. Finally, at harvest the highest number of weed m^{-2} (291.00) was obtained in Binatil-2 × no weeding and the maximum weed dry weight (263.30 g m^{-2}) was obtained from BARI Til-4 × no weeding. The lowest number of weeds (32.67) and weed dry weight (101.90 g m^{-2}) was obtained from BARI Til-3 × three hand weeding at 15, 30 and 45 DAS. Our results is at par with the observation of Smith et al. (2009). Whereas Duary and Hazra (2013) and Hassan et al. (2019) found non-significant effect of interaction variety of crop and weed management technique.

3.2 Yield and yield characters

3.2.1 Varietal difference

Plant height, number of capsules plant^{-1}, number of seeds capsule^{-1}, 1000-seed weight, seed yield, stover yield and harvest index was significantly influenced by variety (Table 2). The highest plant height (107.20 cm) was obtained in BARI Til-4 and the lowest plant height (96.95 cm) was obtained in Binatil-2. The highest number of capsules plant^{-1} (57.87) was produced in BARI Til-4 and the lowest number of capsules plant^{-1} (39.87) was recorded in Binatil-2. The highest number of seeds capsule^{-1} (78.00) was produced in BARI Til-4 and the lowest number of seeds capsule^{-1} (64.40) was recorded in Binatil-2 which was statistically identical to BARI Til-3. The highest 1000-seed weight (3.14 g) was found in BARI Til-4 where the lowest was found in Binatil-2 (2.86 g) which was statistically similar with BARI Til-3. It might be due to 1000-seed weight is a varietal character and it varies from variety to variety. Subrahmaniyan et al. (1999) found difference in 1000-seed weight with different sesame varieties. The highest seed yield (1.01 t ha^{-1}) was recorded in BARI Til-4 while the lowest seed (0.73 t ha^{-1}) was found in Binatil-2. This might be due to the fact that BARI Til-4 produced the highest number of capsules plant^{-1}, seeds capsule^{-1} and

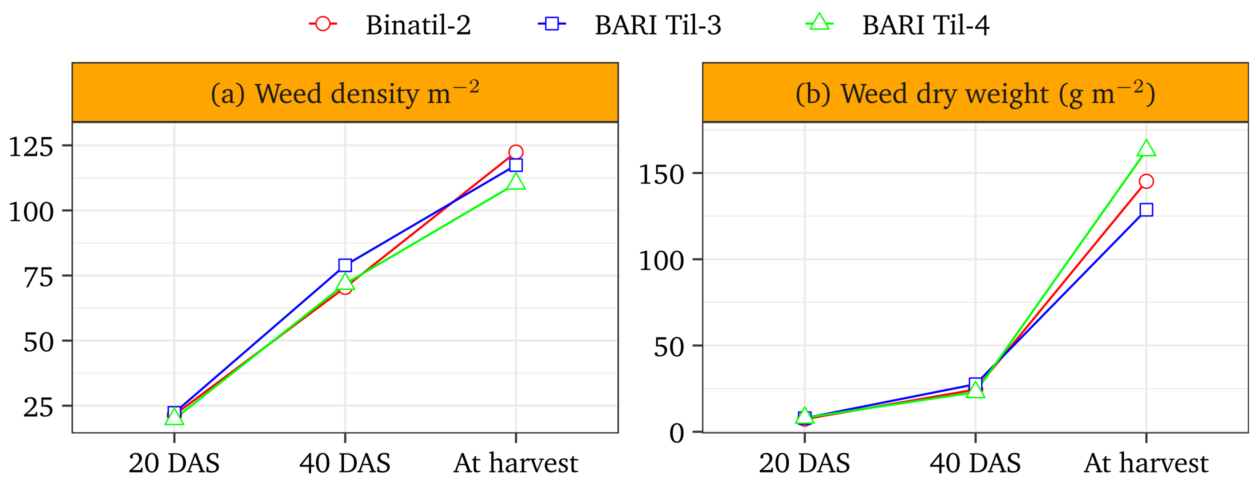

Figure 1. (a) Weed density and (b) weed dry weight at different days after sowing (DAS) in sesame

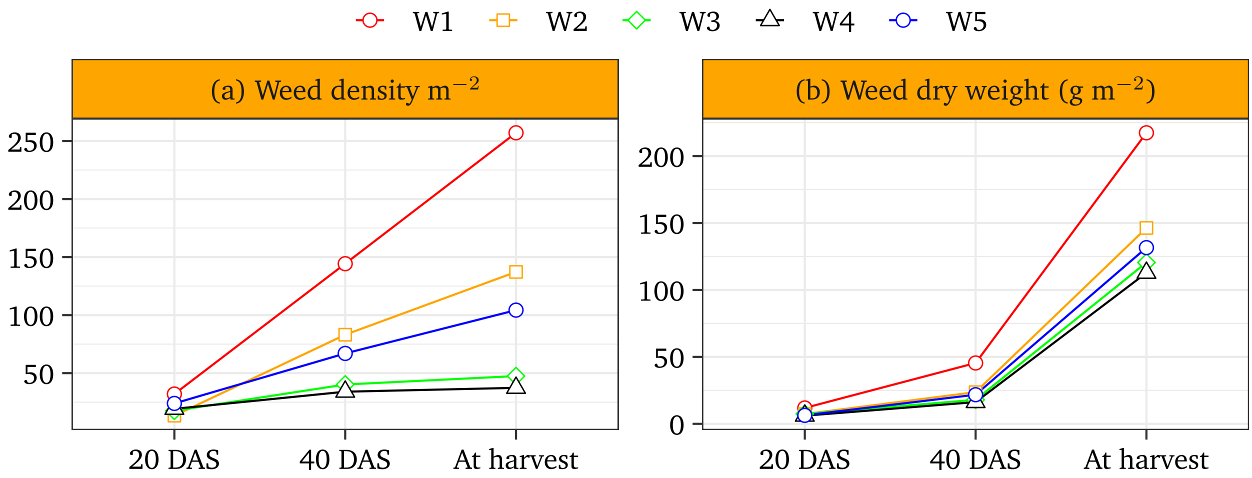

Figure 2. (a) Weed density and (b) weed dry weight at different days after sowing (DAS) as influenced by weed management practices. W1 = No weeding, W2 = One hand-weeding at 15 days after sowing (DAS), W3 = Two hand-weeding at 15 and 30 DAS, W4 = Three hand-weeding at 15, 30 and 45 DAS, W5 = Post-emergence herbicide application at 10 days after emergence (DAE)

Table 1. Interaction effects of variety and weed management practices on weed density and dry weight of weed at different days after sowing (DAS) of sesame

Interaction	Number of weeds m^{-2}			Dry weight of weed (g m^{-2})		
(V × W)	20 DAS	40 DAS	At harvest	20 DAS	40 DAS	At harvest
V1 × W1	30.67b †	116.30c	291.00a	10.92b	45.66b	207.20b
V1 × W2	13.33i	91.33d	142.70e	6.54efgh	23.82de	142.40e
V1 × W3	23.00e	42.67f	45.44i	7.12def	16.09ijk	123.10fghi
V1 × W4	17.67g	33.67gh	37.00ij	5.96h	15.13k	111.30hij
V1 × W5	22.67e	68.33e	95.67h	6.23fgh	21.76efg	142.20e
V2 × W1	39.00a	161.70a	247.70b	13.07a	58.59a	181.80c
V2 × W2	9.67j	94.00d	156.00d	7.11def	25.01d	137.20ef
V2 × W3	15.00h	41.00f	48.33i	7.35cde	18.43hi	107.30ij
V2 × W4	19.67f	29.67h	32.67j	6.23fgh	15.57jk	101.90j
V2 × W5	28.00c	68.33e	102.30gh	5.87h	20.32fgh	115.30ghij
V3 × W1	26.33d	155.00b	232.70c	11.59b	32.06c	263.30a
V3 × W2	17.00g	64.00e	113.00fg	8.23c	22.19ef	159.20d
V3 × W3	14.67hi	37.00fg	48.67i	7.76cd	19.32gh	131.30efg
V3 × W4	20.33f	38.67fg	42.33ij	6.03gh	18.03hij	125.20fgh
V3 × W5	21.00f	64.33e	115.00f	6.94defg	23.16de	137.20ef
SE	0.538	2.15	3.98	0.297	0.835	5.3
Sig. level	0.01	0.01	0.01	0.01	0.01	0.01
CV (%)	4.39	5.06	5.91	6.6	5.78	6.3

† In a column figures having common letter(s) do not differ significantly as per DMRT;
V =variety, W = weed management; SE = standard error; V1 = Binatil-2, V2 = BARI Til-3, V3 = BARI Til-4, W1 = No weeding, W2 = One hand weeding at 15 DAS, W3 = Two hand weeding at 15 and 30 DAS, W4 = Three hand weeding at 15, 30 and 45 DAS, W5 = Post emergence herbicide Limi super 9EC application at 10 days after emergence (DAE); CV = Coefficient of Variation

Table 2. Effect of variety on yield contributing characters and yield of sesame

Variety	Plant height (cm)	Capsules plant^{-1}	Seeds capsule^{-1}	WTS (g)	Seed yield (t ha^{-1})	Stover yield (t ha^{-1})	Harvest index (%)
Binatil-2	96.95c †	39.87c	64.40b	2.86b	0.73c	4.79b	12.72b
BARI Til-3	102.60b	46.20b	65.60b	2.92b	0.86b	5.74a	12.89b
BARI Til-4	107.20a	57.87a	78.00a	3.14a	1.01a	5.76a	14.23a
SE	0.899	0.507	0.854	0.058	0.018	0.063	0.26
Sig. level	0.01	0.01	0.01	0.01	0.01	0.01	0.01
CV (%)	3.4	4.09	4.77	7.6	8.44	4.49	7.58

† In a column figures having common letter(s) do not differ significantly as per DMRT; SE = standard error; CV = Coefficient of Variation

Table 3. Effect of weed management practices on yield contributing characters and yield of sesame

Weed manag.	Plant height (cm)	Capsules plant^{-1}	Seeds capsule^{-1}	WTS (g)	Seed yield (t ha^{-1})	Stover yield (t ha^{-1})	Harvest index (%)
W1	87.75d†	33.33e	56.00e	2.49d	3.96e	0.440e	9.94d
W2	96.53c	46.55d	63.33d	2.72c	5.18d	0.636d	10.96c
W3	107.40b	53.89b	77.33b	3.18b	6.12b	1.13b	15.53a
W4	114.60a	56.67a	80.67a	3.44a	6.40a	1.26a	16.37a
W5	105.00b	49.44c	69.33c	3.04b	5.49c	0.870c	13.63b
SE	1.16	0.654	1.1	0.075	0.082	0.024	0.335
Sig. level	0.01	0.01	0.01	0.01	0.01	0.01	0.01
CV (%)	3.4	4.09	4.77	7.6	4.49	8.44	7.58

† In a column figures having common letter(s) do not differ significantly as per DMRT; SE = standard error; W1 = No weeding, W2 = One hand weeding at 15 DAS, W3 = Two hand weeding at 15 and 30 DAS, W4 = Three hand weeding at 15, 30 and 45 DAS, W5 = Post emergence herbicide Limi super 9EC application at 10 days after emergence (DAE); CV = Coefficient of Variation

Table 4. Interaction effects of variety and weed management practices on yield contributing characters and yield of sesame

Interaction (V × W)	Plant height (cm)	Capsules plant^{-1}	Seeds capsule^{-1}	WTS (g)	Seed yield (t ha^{-1})	Stover yield (t ha^{-1})	Harvest index (%)
V1 × W1	83.67i †	27	56.00gh	2.46	0.41g	3.80g	9.59e
V1 × W2	94.58fg	39.33	62.00efg	2.63	0.58ef	4.74f	10.90e
V1 × W3	101.30de	43.67	68.00cde	3.02	0.91c	5.16def	15.03bcd
V1 × W4	106.70c	48	72.00cd	3.22	0.98c	5.28de	15.66b
V1 × W5	98.50ef	41.33	64.00ef	2.98	0.76d	4.97ef	13.25d
V2 × W1	88.33hi	29.67	58.00fgh	2.48	0.44g	3.96g	9.99e
V2 × W2	96.67ef	43.33	62.00efg	2.56	0.70de	5.51cd	11.33e
V2 × W3	105.50cd	54.33	68.00de	3.16	1.02c	6.38b	13.77cd
V2 × W4	115.40b	56	74.00bc	3.4	1.26b	6.95a	15.35bc
V2 × W5	107.30c	47.67	66.00de	3.05	0.91c	5.94c	13.28d
V3 × W1	91.24gh	43.33	54.00h	2.53	0.47fg	4.13g	10.23e
V3 × W2	98.33ef	57	66.00de	3	0.63e	5.30de	10.65e
V3 × W3	115.40b	63.67	96.00a	3.36	1.48a	6.84a	17.79a
V3 × W4	121.70a	66	96.00a	3.72	1.54a	6.97a	18.09a
V3 × W5	109.30c	59.33	78.00b	3.1	0.94c	5.58cd	14.37bcd
SE	1.62	1.13	1.91	0.13	0.041	0.141	0.58
Sig. level	0.05	NS	0.01	NS	0.01	0.01	0.01
CV (%)	2.75	4.09	4.77	7.6	8.44	4.49	7.58

† In a column figures having common letter(s) do not differ significantly as per DMRT;
V =variety, W = weed management; SE = standard error; V1 = Binatil-2, V2 = BARI Til-3, V3 = BARI Til-4, W1 = No weeding, W2 = One hand weeding at 15 DAS, W3 = Two hand weeding at 15 and 30 DAS, W4 = Three hand weeding at 15, 30 and 45 DAS, W5 = Post emergence herbicide Limi super 9EC application at 10 days after emergence (DAE); CV = Coefficient of Variation

the highest 1000-seed weight which ultimately contributed to the highest seed yield. The highest stover yield (5.76 t ha^{-1}) was recorded in BARI Til-4 which was statistically similar to BARI Til-3 and the lowest stover yield (4.79 t ha^{-1}) was found in Binatil-2. The height value of harvest index (14.23%) was recorded in BARI Til-4 and the lowest (12.74%) was achieved in Binatil-2 which was statistically similar to BARI Til-3. Similar results were reported by Hoque et al. (2007) and Hoque et al. (2008) where they observed that yield contributing characters and yield varied among different sesame cultivars.

3.2.2 Effect of weed management

Plant height, number of capsules $plant^{-1}$, number of seeds $capsule^{-1}$, 1000-seed weight, seed yield, stover yield and harvest index was significantly influenced by weed management (Table 3). The highest plant height (114.60 cm) was recorded in three hand weeding at 15, 30 and 45 DAS and the lowest (87.75 cm) was recorded in no weeding. Three hand weeding at 15, 30 and 45 DAS produced the highest number of capsules $plant^{-1}$ and seeds $capsule^{-1}$ (56.67 and 80.67, respectively) and the lowest number (33.33 and 56.0, respectively) were found in no weeding. It might be due to more weeding frequency creates the availability of more space, air, water, light which resulted in the production of more capsules $plant^{-1}$ and more seeds $capsule^{-1}$. Bhadauria et al. (2012) reported that prolonged weed free condition increased number of capsules $plant^{-1}$ and seeds $capsule^{-1}$.

The highest 1000-seed weight (3.44 g) was recorded in three hand weeding at 15, 30 and 45 DAS whereas the lowest 1000-seed weight was found in no weeding (2.49 g). The maximum seed weight was found with increased number of weeding which might be due to the proper growth and development of seeds in the absence of weeds. The highest seed and stover yield (1.26 tha^{-1} and 6.40 t ha^{-1}) were recorded in three hand weeding at 15, 30 and 45 DAS, while the lowest seed and stover yield (0.44 t ha^{-1} and 3.96 t ha^{-1}, respectively) were found in no weeding condition. More weeding increased the yield of sesame seed because the weed free ideal rhizosphere environment might have provided higher nutrient uptake which resulted in the greater source accumulation and efficient translocation of photosynthates into the sink as indicated by higher yield attributes. The highest harvest index (16.37%) was recorded in hand weeding for three times at 15, 30 and 45 DAS and the lowest (9.94%) harvest index was recorded in no weeding. These results are in compliance with the report of Kumar et al. (2012), Sultana et al. (2013). Khan et al. (2009) also reported that weed management practices affect the yield contributing characters of sesame.

3.2.3 Interaction effect

Interaction between variety and weed management had significant influence over different parameters except capsules $plant^{-1}$ and 1000-seed weight (Table 4). The tallest plant (121.70 cm) was observed in BARI Til-4 × three hand weeding at 15, 30 and 45 DAS and the shortest plant height (83.67 cm) was obtained in Binatil-2 × no weeding. Frequent weeding might provide better growth or height due to less weed competition. The highest number of seeds $capsule^{-1}$ (96.00) was observed in BARI Til-4 × three hand weeding at 15, 30 and 45 DAS and BARI Til-4 × two hand weeding at 15 and 30 DAS. On the other hand, the lowest number of seeds $capsule^{-1}$ (54.00) was obtained in BARI Til-4 × no weeding.

The highest seed yield (1.54 t ha^{-1}) was observed in the treatment combination of BARI Til-4 × three hand weeding at 15, 30 and 45 DAS which was statistically similar to BARI Til-4 × two hand weeding at 15 and 30 DAS. This might be due to in prolonged weed free condition crop produced higher number of capsules $plant^{-1}$, seeds $capsule^{-1}$ and 1000-seed weight that leads to higher seed yield. The lowest seed yield (0.41 t ha^{-1}) was obtained in Binatil-2 × no weeding which was statistically similar to BARI Til-3 × no weeding. This might due to in no weeding condition sesame plant suffered from more weed density in the early growth stages. The highest stover yield (6.97 t ha^{-1}) was observed in BARI Til-4 × three hand weeding at 15, 30 and 45 DAS which was statistically similar to BARI Til-4 × two hand weeding at 15 and 30 DAS. This might be due to prolonged weed free period leads to better vegetative growth thus increased stover yield whereas the lowest stover yield (3.80 t ha^{-1}) was obtained in Binatil-2 × no weeding treatment. The highest harvest index (18.09%) was observed in the treatment BARI til-4 × three hand weeding at 15, 30 and 45 DAS which was statistically similar with BARI Til-4 × two hand weeding at 15 and 30 DAS. On the other hand, the lowest harvest index (9.59%) was obtained in Binatil-2 × no weeding.

4 Conclusions

It is clear that variety of sesame and weed management practices have significant influences on the growth and development of weed, yield contributing characters and yield of sesame. In weedy conditions, none of the studied sesame varieties could produce optimum yield. BARI Til-4 with three hand weeding produced the highest seed yield which is similar to the two hand weeding of the same variety. Therefore, it might be concluded that BARI Til-4 with two hand weeding at 15 and 30 DAS could be a better treatment for reducing crop weed competition of sesame plant which gave higher yield of sesame.

Conflict of Interest

The authors declare that there is no conflict of interests regarding the publication of this paper.

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