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EFFECT OF SOWING METHODS AND WEEDING REGIMES ON THE YIELD OF SESAME (*Sesamum indicum L.*)

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ABSTRACT

The experiment was conducted at the Agronomy Field Laboratory, Bangladesh Agricultural University to observe the effect of sowing methods and weeding regimes on the yield of sesame. The experiment comprised of two factors. Two methods of sowing i.e., broadcasting and line sowing (S_2), and six weeding regimes- control (T_0), weed free (T_1), one hand weeding at 15 DAS (T_2), two hand weedings at 15 and 30 DAS (T_3), three hand weedings at 15, 30 and 45 DAS (T_4) and application of Panida (Pendimethalin) herbicide (T_5) at 3 DAS. The experiment was laid out in a randomized complete block design (RCBD) with three replications. Almost all the yield characters of sesame were affected significantly due to sowing methods, weeding regime and their interaction. Result showed that the line sowing showed better performance regarding plant height (100.40 cm), number of branches (4.983) plant^{-1}, number of capsules plant^{-1} (47.82), number of seeds capsule^{-1} (69.66), 1000–seed weight (2.96 g), seed yield (956.90 kg ha^{-1}), stover yield (2167.0 kg ha^{-1}), biological yield (3123.00 kg ha^{-1}) and harvest index (31.45%) than that of broadcasting method. Also weed free treatment had the highest plant height (101.90 cm), highest number of branches (5.00) plant^{-1}, highest capsule (47.08) plant^{-1}, heaviest 1000–seed weight (3.28 g), highest number of seeds capsule^{-1} (76.22), highest seed yield (974.30 kg ha^{-1}), stover yield (2947.0 kg ha^{-1}) and biological yield (3922.0 kg ha^{-1}) as compared to other treatments while unweeded plot had least significant effect among the whole yield and yield attributes of sesame. In case of interactions, both weed free treatment and herbicidal effect with line sowing methods produced the highest plant height, number of branches and capsules plant^{-1}, seeds capsule^{-1}, seed yield, stover yield and biological yield (109.80 cm, 5.967, 56.57, 81.53, 1054.0 kg ha^{-1}, 3139.0 kg ha^{-1} and 4193.0 kg ha^{-1}, respectively) as compared to other interaction combinations. The results of the study reveal that the weed free treatment along with line sowing would be the proper technique for higher production of sesame. But line sowing along with application of Panida herbicide would be the best combination for obtaining higher yield of sesame since it is not feasible for the farmers to keep their field weed free throughout all the growing periods.

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INTRODUCTION

Sesame (*Sesamum indicum* L.) belongs to the double–cotyledon Pedaliaceae family. It is probably the most ancient oil seed used by man and its domestication lost in the mists of antiquity (Negasa, 2014). It had earned a poetic label "Queen of oilseeds" because seeds have high quality polyunsaturated stable fatty acids which offer resistance to rancidity (Sanga, 2013). It is recognized by various names like Gingely, Til, Simsim, Gergelin, Biniseed etc. (Hossain, 2012). It is locally known as "Til" in Bangladesh (Huq, 2012). As Getinet and Negusse (1997) and Negasa (2014) indicated that the crop was used as a cash crop, export commodity, raw materials for industries and as a source of employment opportunity. World production of sesame gradually increased due to an increasing demand for sesame oil worldwide (Mkamilo and Bedigian, 2007; Negasa, 2014). In 2013, about 9.4 million ha of the total world crop area are under sesame cultivation and 4.76 million tons of sesame produced in the world (FAOSTAT, 2016). In Bangladesh, about 37000 ha of land are cultivable where the production of 34000 tons with an average yields of 0.92 tons ha^{-1} (FAOSTAT, 2016). However, BBS (2019) showed that the production of this crop is 35000 metric tons from 93000 acres of land in Bangladesh. The lower yield of the crop is partly due to low yielding cultivars and partly due to the lack of appropriate agronomic practices such as fertilizer management, sowing methods and time, line spacing, weed management, etc. Among the different agronomic practices of crop production, method of planting is the most important factor. Islam et al. (2008) reported that the broadcast method is the conventional method of growing sesame in Bangladesh due to simple agronomic practice and less cost involvement. Yield performance in line sowing is satisfactory in other crops as indicated by Clarke *et al*., (1988). Information regarding method of planting in sesame is scarcely available in Bangladesh condition (Islam et al., 2008). Malik et al. (2003) also reported that the planting method was considered as an important aspect of advanced production technology which not only ensure better crop establishment but also resulted in water saving when the crop was sown on ridges or beds.

Weed management practices is one of the important factors for successful crop production in any crop especially sesame. Lack of proper weed management is one of the main constraints for poor yields of sesame. Yield losses due to crop weed competition in sesame have been estimated to be 50–75% (Mruthul et al., 2015). A critical period of weed competition in sesame is between 15 and 30 days after seedlings emergence and weeds alone reduce about 50-78% seed yield of sesame (Amare et al., 2011; Karnas et al., 2019). Bhadauria et al. (2012) also reported that the period from 15 and 30 DAS is the most critical period of weed competition in sesame and yield loss varied from 16 to 68% due to weed. Hand weeding is commonly practiced by the farmers as an effective method of weed control but incessant rain, high wages, and timely unavailability of labourers at weeding peaks are also some of constraints. Therefore, integrated weed management (manual as well as chemical) is most efficient and acceptable approach to combat with the weed control problems (Bhadauria et al., 2012). However, Islam et al. (2014) reported that the weed species generally had better nutrient use efficiency and typically dominated and weakened crop plants, which negatively affected plant morphology and eventually crop yield. Therefore, inappropriate weed control during the early growth period of sesame may cause yield reduction. Cultural practices are often effective for enhancing weed competition in crops (Khaliq et al., 2012). Overall, mechanical weed control is expensive in developing countries due to prohibitive initial investment costs and chemical methods often leads to environmental pollution (Omezzine et al., 2011); in addition, many weed species developed resistance against herbicide. Though the conventional methods of weed control viz., hand weeding, hand hoeing etc. are very much effective but due to high wages and non–availability of labourers during the critical weeding season (15–30 DAS) and incessant protracted rains, use of herbicides and their combination with cultural practices could be more time saving, economical and efficient to check early crop–weed competition (Gupta et al., 2015). Considering the above points in views, the present study was, therefore, undertaken to find out the best combination of sowing method and weed control technique in relation to better yield of sesame.

MATERIALS AND METHODS

The experiment was conducted during the period from February to May 2015 to evaluate the yield performance of sesame as influenced by sowing methods and weeding regimes at the Agronomy Field Laboratory, Bangladesh Agricultural University, Mymensingh.

Description of the experimental site

Location and soil

The experimental site was located at 24.75^0 N latitude and 90.50^0 longitude at a mean elevation of l8 m above the sea level. The area was a medium high land belonging to the Sonatola series of non–calcareous dark grey floodplain soil type under the Old Brahmaputra Floodplain (AEZ 9), (UNDP and FAO, 1988).

Climate

The climate of the experimental site was subtropical. It was characterized by high temperature, high humidity, and heavy precipitation with occasional gusty winds during *Kharif* season (April to September) and scanty rainfall associated with moderately low temperature and plenty of sunshine during *Rabi* season (October to March).

Experimental treatments and design

Two seed sowing methods and six weed management practices including no weeding and their interaction were used in the experiment. Sowing method includes broadcasting method and line sowing. Weed management practices-No weeding (T_0), weed free (T_1), one hand weeding at 15 DAS (T_2), two hand weeding at 15 and 30 DAS (T_3), three hand weeding at 15, 30 and 45 DAS (T_4), herbicide(T_5). Herbicide, Panida (Pendimethalin, 3.0 L ha^{-1}) was applied as a preemergence condition at moist soil condition. Two factors experiment was laid out in a Randomized Complete Block Design (RCBD) with three replications.

Seed collection

Healthy and vigorous seeds of sesame cv. Binatil–3 were collected from the Bangladesh Institute of Nuclear Agriculture (BINA), Mymensingh.

Land preparation and fertilizer application

The experimental land was ploughed with a tractor followed by harrowing to attain a desirable filth. The land was finally prepared with power tiller to ensure a good land preparation. Cowdung at the rate of 10 t ha^{-1} was applied during land preparation. Other fertilizers at the rate 125 kg urea ha^{-1}, 50 kg MoP ha^{-1}, 150 kg TSP ha^{-1}, 20 kg gypsum ha^{-1} and16 kg $ZnSO_4$ ha^{-1} was used for the present study. Half of urea and whole amount of all other fertilizers were incorporated into the soil as broadcast at the time of final land preparation. Rest half of urea was top dressed during flower initiation (45 DAS).

Seed sowing

In line sowing method seeds were sown @ 7.5 kg ha^{-1}, Plant to plant and row to row spacing were 6–8 cm and 25–30 cm, respectively. Three to five seeds were sown hill^{-1} in line sowing. In broadcast sowing, seeds were sown haphazardly on the same day @ 8.5 kg ha^{-1}.

Data collection

Yield and yield attributes

For collecting data on seed and stover yield attributes, ten plants from each plot excluding border plants outside the central 1 m^2 area which was kept for taking yield data, were selected randomly. The sample plants were uprooted carefully from the soil with *khurpi* so that no seeds were dropped in the soil.

Statistical analysis

The recorded data on various parameters under study were statistically analyzed according to the principles of experimental design to find out the variation resulting from experimental treatments. Analysis of variance was done following the Randomized Complete Block Design with the help of MSTAT–C package programme developed by Russel (1986). The mean of all the studied parameters were adjudged by Duncan's Multiple Range Test (DMRT) at 5% level of probability (Gomez and Gomez, 1984).

RESULTS AND DISCUSSION

Effect of sowing methods on yield and yield attributes of sesame

The plant height of sesame varied significantly due to sowing methods (Table 1) where the taller plant (100.40 cm) was found from the line sowing compared to broadcast sowing (90.47 cm) (Table 1). Number of branch number plant^{-1} also influenced significantly because of sowing methods where line sowing produced more branches plant^{-1} (4.98) than that of broadcast (3.78) method (Table 2). The findings of the present study were similar with the study of Svathi *et al*. (2005) and Islam et al. (2008). Sowing methods had significant effect on number of capsule plant^{-1}. The line sowing method produced the maximum number of capsules plant^{-1} (47.82) compared to broadcast sowing (31.74) (Table 1). Sowing methods exerted significant effect on number of seeds capsule^{-1}. Similar finding was also reported by Svathi et al. (2005). Number of seeds capsule^{-1} varied significantly from 62.00 to 69.66 where line sowing method showed the higher and broadcast sowing method produced the lower number of seeds capsule^{-1} (Table 2). The above observation of the present study was also conformity with the findings of Islam et al. (2008) who also reported that line sowing methods had more effective for the development of crop growth which influenced the yield attributes of sesame. 1000-seed weight was significantly affected by sowing method (Table 2). Line sowing recorded the highest 1000–seed weight (2.96 g) than that of broadcast sowing (2.53 g) (Table 2). The higher seed yield (956.90 kg ha^{-1}) produced in line sowing method while the plants of sesame grown under broadcast sowing recorded the lower seed yield (847.20 kg ha^{-1}) (Table 2). Similar results were also reported by Svathi *et al*. (2005) and Islam *et al*. (2008). The higher stover yield (2167.0 kg ha^{-1}) was recorded from the line sowing while broadcast sowing showed the lower stover yield (2039.0 kg ha^{-1}) (Table 2). The biological yield and harvest index were significantly affected by sowing methods. The higher biological yield (3123.0 kg ha^{-1}) was found in line sowing and the lower biological yield (2886 kg ha^{-1}) was observed in broadcast sowing (Table 2). Line sowing showed the higher harvest index (31.45%) and broadcast sowing recorded the lower (29.87%) harvest index (Table 2).

Effect of weeding regimes on yield and yield attributes of sesame

Weeding regimes had significant effect on plant height at harvest (Table 1). Among the weeding regimes, the weed free treatment produced the highest plant height (101.90 cm) followed by the application of Panida herbicide (100.60 cm). On the other hand, the lowest plant height (88.70 cm) was obtained when weeding operation was not done and it was statistically similar with the plant height in one hand weeding at 15 DAS (90.82 cm) and two hand weedings at 15 DAS and 30 DAS (92.50 cm) in this study (Table 1). Weed free treatment confirmed the highest growth of sesame crop as well as the highest plant height and production of branches plant^{-1}. The findings of the above observation were fully conformity with the findings of Take–tsaba (2011), Mahgoub et al. (2014), Islam *et al*. (2014) and Mruthul et al. (2015). Ahmed *et al*. (2009); Mathukia *et al*. (2013) and Mruthul et al. (2015) also reported that the growth of sesame crop had lowest in no weeding treatment. Weeding regimes had significant effect on the production of sesame capsules plant^{-1} (Table 1). The maximum number of capsules plant^{-1} (47.08) was recorded at weed free treatment while it was statistically differed from other weed management treatments. No weeding treatments produced the minimum number of capsules plant^{-1} (30.62) which was also statistically differed from other treatments of the study (Table 1). The number of seeds capsule^{-1} also showed significant difference among the weeding regimes where the maximum number of seeds capsule^{-1} (76.22) was found in weed free treatment and the minimum number of seeds capsule^{-1} (53.98) was recorded when weeding was not done (Table 3). Weight of 1000–grain varied significantly from 1.59 to 3.28 g because of weeding regimes where the highest and lowest weight of 1000–grains were obtained from weed free treatments and no weeding, respectively (Table 3). Panida herbicide treated plants of sesame showed second highest weight of 1000–seed (3.16 g) (Table 3). On the other hand, yield attributes of sesame *i.e.,* capsules plant^{-1}, number of seeds capsule^{-1} and 1000–seed weight were varied significantly due to weeding regimes while those were superior under weed free treatment. The observation of the present study was fully supported by the findings of Ahmed et al. (2009), Take–tsaba (2011), Islam et al. (2014), Mahgoub et al. (2014) and Mruthul *et al*. (2015). The treatments of weeding regimes showed significant variation on seed yield. Obtained result from the Table 3, it is found that the weed free treatment produced the highest (974.30 kg ha^{-1}) and no weeding (T_0) showed the lowest (776.0 kg ha^{-1}) seed yield. This result agreed with the findings of Ahmed *et al*. (2009), Islam *et al*. (2014) and Mruthul et al. (2015) who obtained highest seed yield in weed free treatment. Stover yield was significantly influenced by different weeding regimes (Table 3). From the study, it was found that all the treatments showed significant variation with each other in respect of stover yield while weed free treatment produced the highest (2947.0 kg ha^{-1}) and no weeding treatment showed the lowest (1388.0 kg ha^{-1}) stover yield (Table 3). This result agreed with the findings of Ahmed *et al*. (2009) and Islam et al. (2014). The biological yield of the present study varied significantly from 2164.0 to 3922.0 kg ha^{-1}

where the treatment weed free recorded the highest and treatment no weeding observed the lowest (2164.0 kg ha^{-1}) biological yield (Table 3). A significant variation for harvest index was found because of weeding regimes (Table 3). The highest harvest index (35.76%) was found from the weed free treatment followed (33.91%) by one hand weeding at 15 DAS while it was the lowest (24.82%) in treatment weed free. However, two hand weedings at 15 and 30 DAS, three hand weedings at 15, 30 and 45 DAS and application of Panida herbicide showed the statistically identical and second lowest harvest index (Table 3).

Effect of interaction between sowing methods and weeding regimes on yield and yield attributes of sesame

Effect of interaction of sowing methods and weeding regimes revealed significant difference on plant height with the ranges of 85.57 to 109.80 cm (Table 4). The highest plant height of sesame was in line sowing with weed free treatment followed by same method with the application of Panida herbicide (107.30 cm). Interaction of sowing method and weeding regime had significant effect on number of branches plant^{-1} (Table 4). The plants of sesame grown under line sowing with weed free treatment and line sowing with Panida herbicide applied plot produced statistically similar number of branches plant^{-1} (5.97 and 5.63, respectively) and it was statistically close (5.37) to line sowing × three hand weeding at 15, 30 and 45 DAS. It significantly varied from 28.03 to 56.57 where the maximum number of capsules plant^{-1} was recorded from the interaction of line sowing with weed free treatment and it was the minimum in interaction of broadcast sowing with no weeding (Table 4). Number of seeds capsule^{-1} significantly varied from 56.97 to 81.53 due to the interaction effect of sowing methods and weeding regimes (Table 4). The plants of weed free plot grown under line sowing produced the maximum number of seeds capsule^{-1} followed by (76.90) application of Panida herbicide treated plants of sesame grown under same sowing (Table 4). Interaction effect of sowing method and weeding regime had no significant effect on 1000–seed weight (Table 4). The plants of line sowing at weed free treatment produced the highest seed yield (1054.0 kg ha^{-1}) of sesame while same sowing methods treated by Panida herbicide showed the statistically similar highest seed yield (956.0 kg ha^{-1}). On the other hand, the plants of broadcast sowing method at no weeding treatment recorded the lowest yield (683.0 kg ha^{-1}) of sesame seed which was statistically differed from all other treatments of the study (Table 4). The weed free treatment in line sowing showed the highest yield of sesame stover (3139.0 kg ha^{-1}) followed by the weed free plant in broadcast sowing (Table 4). Effect of interaction showed significant variation for the biological yield. Among the interaction treatments, weed free treatment with line sowing gave the highest biological yield of sesame (4193.0 kg ha^{-1}) followed by same weeding regime at broadcast sowing (3651.0 kg ha^{-1}). On the other hand, both un–weeded and one hand weeding at 15 DAS treatments at line sowing were recorded to produce the statistically lowest biological yield of sesame (2354.0 and 2403.0 kg ha^{-1}, respectively) (Table 4).

Table 1. Effect of sowing method and weeding regime on plant height and number of capsules plant^{-1} at harvest

Sowing methods	**Plant height (cm)**	**Number of capsules plant^{-1}**
S_1	90.47 b	31.74 b
S_2	100.4 a	47.82 a
$\overline{Sx}$	0.720	0.426
Level of significance	**	**
CV (%)	3.20	4.55
Weeding regimes	Plant height (cm)	Number of capsules plant^{-1}
T_0	88.70 c	30.62 e
T_1	101.9 a	47.08 a
T_2	90.82 c	34.32 d
T_3	92.50 c	38.97 c
T_4	97.97 b	43.10 b
T_5	100.6 ab	44.60 b
$\overline{Sx}$	1.24	0.738
Level of significance	**	**
CV (%)	**3.20**	**4.55**

** = Significant at 1% level of probability; S_1 = Broadcasting method, and S_2 = Line sowing method

T_0 = No weeding, T_1 = Weed free, T_2 = One hand weeding at 15 DAS, T_3 = two hand weedings at 15 and 30 DAS, T_4 = three hand weedings at 15, 30 and 45 DAS and T_5 = Application of Panida herbicide.

Table 2. Effect of sowing methods on the yield and yield components of sesame

Sowing methods	Number of branches plant^{-1}	Number of seeds capsule^{-1}	Weight of 1000–seed (g)	Seed yield (kg ha^{-1})	Stover yield (kg ha^{-1})	Biological yield (kg ha^{-1})	Harvest index (%)
S_1	3.77 b	62.00 b	2.52b	847.20 b	2039.0 b	2886.0 b	29.87 b
S_2	4.98 a	69.66 a	2.96 a	956.90 a	2167.0 a	3123.0 a	31.45 a
Sx	0.08	0.48	0.03	10.44	28.43	41.97	0.28
Level of sig.	**	**	**	**	**	**	**
CV (%)	8.54	3.09	5.67	4.91	5.74	5.93	3.97

In a column figure having similar and no letter(s) do not differ significantly at 5% level whereas figures with dissimilar letter(s) differ significantly as per DMRT at same level.

**= Significant at 1% level of probability

S_1 = Broadcast sowing and S_2 = Line sowing

Table 3. Effect of weeding regimes on the yield and yield components of sesame

Weeding regime treatments	Number of branches plant^{-1}	Number of seeds capsule^{-1}	Weight of 1000–seed (g)	Seed yield (kg ha^{-1})	Stover yield (kg ha^{-1})	Biological yield (kg ha^{-1})	Harvest index (%)
T_0	3.65 d	53.98 f	1.58 e	776.0 c	1388.0 e	2164.0 e	35.76 a
T_1	5.00 a	76.22 a	3.28 a	974.3 a	2947.0 a	3922.0 a	24.82 d
T_2	3.86 cd	58.96 e	2.59 d	870.0 b	1711.0 d	2581.0 d	33.91 b
T_3	4.25 bc	64.83 d	2.82 c	901.2 b	2106.0 c	3008.0 c	29.97 c
T_4	4.68 ab	68.66 c	3.00 bc	918.2 b	2131.0 c	3049.0 c	30.12 c
T_5	4.83 a	72.34 b	3.16 ab	972.7 a	2334.0 b	3306.0 b	29.37 c
Sx	0.15	0.83	0.06	18.07	49.24	72.70	0.49
Level of sig.	**	**	**	**	**	**	**
CV (%)	8.54	3.09	5.67	4.91	5.74	5.93	3.97

In a column figure having similar and no letter(s) do not differ significantly at 5% level whereas figures with dissimilar letter(s) differ significantly as per DMRT at same level.

**= Significant at 1% level of probability

T_0 = No weeding, T_1 = Weed free, T_2 = One hand weeding at 15 DAS, T_3 = two hand weedings at 15 and 30 DAS, T_4 = three hand weedings at 15, 30 and 45 DAS and T_5 = Application of Panida herbicide.

Table 4. Effect of interaction of sowing methods and weeding regimes on the yield and yield components of sesame

Sowing methods × Weeding regime	Plant height (cm)	Number of branches plant^{-1}	Number of capsules plant^{-1}	Number of seeds capsule^{-1}	Weight of 1000–seed (g)	Seed yield (kg ha^{-1})	Stover yield (kg ha^{-1})	Biological yield (kg ha^{-1})	Harvest index (%)
S_1T_0	85.57 f	3.26 d	28.03 f	50.98 g	1.46	683.0 d	1291.0 g	1974.0 g	34.61 b
S_1T_1	94.03 cd	4.03 c	37.60 c	70.91 cd	3.01	894.7 bc	2756.0 b	3651.0 b	24.50 e
S_1T_2	87.40 ef	3.63 cd	29.40 ef	57.43 f	2.34	856.7 c	1902.0 e	2759.0 e	31.05 c
S_1T_3	89.33 def	3.70 cd	29.97 ef	61.42 e	2.65	876.0 bc	2017.0 de	2893.0 de	30.28 cd
S_1T_4	92.57 cde	4.00c	31.50 de	63.49 e	2.74	880.3 bc	2026.0 de	2906.0 de	30.29 cd
S_1T_5	93.93 cd	4.03 c	33.93 d	67.79 d	2.92	892.3 bc	2242.0 cd	3135.0 d	28.47 d
S_2T_0	91.83 cde	4.03 c	33.20 d	56.97 f	1.70	869.0 c	1485.0 fg	2354.0 f	36.92 a
S_2T_1	109.8 a	5.96 a	56.57 a	81.53 a	3.54	1054.0 a	3139.0 a	4193.0 a	25.14 e
S_2T_2	94.23 cd	4.10 c	39.23 c	60.48 ef	2.85	883.3 bc	1520.0 f	2403.0 f	36.77 a
S_2T_3	95.67 c	4.80 b	47.97 b	68.23 d	3.00	926.3 bc	2195.0 d	3122.0 d	29.67 cd
S_2T_4	103.4 b	5.36 ab	54.70 a	73.83 bc	3.26	956.0 b	2236.0 cd	3192.0 cd	29.96 cd
S_2T_5	107.3 ab	5.63 a	55.27 a	76.90 b	3.40	1053.0 a	2425.0 c	3478.0 bc	30.27 cd
$\overline{Sx}$	**1.76**	**0.216**	**1.04**	**1.18**	**0.089**	**25.56**	**69.63**	**102.8**	**0.700**
Level of sig.	*	*	**	*	**NS**	**	**	**	**
CV (%)	**3.20**	**8.54**	**4.55**	**3.09**	**5.67**	**4.91**	**5.74**	**5.93**	**3.97**

In a column figure having similar and no letter(s) do not differ significantly at 5% level whereas figures with dissimilar letter(s) differ significantly as per DMRT at same level; Sig. = Significance

**= Significant at 1% level of probability and *= Significant at 5% level of probability

S_1 = Broadcast sowing and S_2 = Line sowing

T_0 = No weeding, T_1 = Weed free, T_2 = One hand weeding at 15 DAS, T_3 = two hand weedings at 15 and 30 DAS, T_4 = three hand weedings at 15, 30 and 45 DAS and T_5 = Application of Panida herbicide.

From the Table 4, it is found that the harvest index varied significantly from 24.50 to 36.92% due to the interactions effect of between sowing methods and weeding regimes treatments (Table 4). However, un–weeded treatment at line sowing showed the highest HI but it was statistically similar (36.77%) to one hand weeding at 15 DAS in this study. Similarly, weed free treatment at broadcast sowing showed the lowest HI and it was also statistically identical (25.14%) to same treatments at line sowing (Table 4).

CONCLUSION

From the study, it may be concluded that the line sowing method and weed free treatments were more successful for remarkable production of sesame. However, application of Panida herbicide with the line sowing method produced the second highest seed yield which is very close to the yield produced by line sowing method and weed free treatments. From the findings of the study, it is suggested that farmers could cultivate sesame in line sowing method using Panida herbicide for higher seed yield since it is not feasible for farmers to keep their field weed free in all the growing season of the crop.

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CONFLICT OF INTEREST

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

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