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Yield and Yield Contributing Characters of Sesame as Affected by Different Management Practices

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Abstract: An experiment was conducted at Agricultural Research Station, Comilla during summer (Kharif) season, 2009 to estimate the proportionate yield and economic loss of sesame due to different management factors and to identify major factors of yield loss reduction of sesame. From the results of the experiment, it was found that the yield reduction of sesame variety BARI Til-3 were reduced over the recommended package of practices by 24.6%, 15.10%, 15.05% and 7.40% from the treatments with delay sowing, no seed treatment, no insect control and no disease control respectively. The highest net return (Tk.18320/ha) was obtained from the treatment with recommended package. The highest economic loss Tk. 11840/- was recorded from the treatment with delay sowing and the second highest economic loss Tk. 6980/- was found from no seed treated plot. The highest yield (1595.67 kg ha^{-1}) was found from full package treatment followed by no fungicide treatment (1477.33 kg ha^{-1}) and the lowest yield (1201.3 kg ha^{-1}) was found from delay sowing treatment. To minimize the yield gap and economic loss of sesame, full Package of management Practices should be apply.

Key words: *Sesamum indicum* · Sowing time · Seed treatment · Irrigation · Pest management · BCR

INTRODUCTION

Sesame (*Sesamum indicum* L.) is the second largest source of edible oil seed crop in Bangladeh. It is cultivated in almost everywhere of the country. In Bangladesh 96,000 ha of land is cultivated for sesame production and 25,000 metric tons is produced [1]. Sesame contains 42%-50% oil, 25% protein and 16-18% carbohydrate. We can get a very good quality edible and medicinal oil from sesame and it can be conserved for a long time. Til oil-cake is good feed for poultry, fish, cattle, goat, sheep etc. As sesame (*Sesamum indicum* L.), drought tolerant oil seed crops are grown successfully in the early summer (March-May) in Bangladesh under rain fed condition. The yield of this crop in Bangladesh is found lower compared to that in other countries. The main reason behind this lower yield is lack of high yielding variety and poor management practices [2]. The performance of sesame variety in the research station is very good but in the farmer's field performance is not so satisfactory [3]. The yield of sesame variety may be increased by improving management practices. There are many reasons of yield loss such as delayed sowing, imbalanced fertilities, lack of irrigation, lack of insect and disease control etc. Many research results showed that different fertilizers have significant positive effect on sesame yield. Other management practices such as delay sowing, weed, insect and disease infestation also reduce seed yield of sesame. Lacking of any one of the above factors, may be responsible for yield loss. So, the experiment was undertaken to identify the reasons of yield loss and to make a recommendation to minimize yield loss.

MATERIALS AND METHODS

The experiment was conducted at agricultural research station, Comilla during the kharif-I season, 2009. The experiment was laid out in randomized complete block design with three replications. The unit plot size was 4m x 3m. There were five treatments in the experiment are:

T_1= Recommended package (RP): Seed treatment + Timely sowing + Necessary Irrigation + Insect control + Disease control

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T_2= RP without seed treatment
T_3= RP with delay sowing
T_4= RP without insect control
T_5= RP without disease control

Sesame cv. BARI Til-3 was used in the experiment at the rate of 8 kg ha^{-1}. The seeds were sown on 16th March, 2009 and 3 April, 2009 in timely (T_1, T_2, T_4, T_5) and delay sowing (T_3) respectively. Fertilizers were given 50, 30, 25, 20, 1.8, 1.7 kg ha^{-1} N, P, K, S Zn and B respectively. Half urea and all other fertilizers were applied during final land preparation; remaining urea was top dressed at 25 days after sowing. Thinning was done at 15 days after sowing for maintaining proper spacing. Weedings were also done at 15 and 25 days after sowing. Irrigation was given two times at 30 DAS (before flowering) and 60 DAS (Pod formation stage). Ripcord® was given three times @ 3 g L^{-1} of water for controlling the infestation of sesame hairy caterpillar (without T_4 treatment). Bavistin® was sprayed @ 2 g L^{-1} of water for controlling the stem rot disease (without T_5 treatment). At maturity, before harvesting ten randomly selected plants were uprooted to collect data on plant height, number of branch/plant, number of pod/plant, number of seed/pod, 1000 seed weight and yield was taken from one square meter of each plot. Data were statistically analyzed with MSTAT [4] and treatment means were compared by DMRT [5] and economic analysis of different treatments were done considering market price of inputs and products.

RESULTS AND DISCUSSION

The result showed that branch plant^{-1}, pod plant^{-1} and seed yield were significantly influenced by different management practices (Table 1). The highest number of branch plant^{-1} (3.63) were found from T_1 (Recommended package) treatment which were statistically similar (3.56) with T_3 treatment that was followed by T_2 (3.20) and the lowest number of branch plant^{-1} was obtain from T_4 treatment (2.40). The highest number of pod plant^{-1} (68.77) was found from T_1 which was statistically similar with T_4 (66.60) treatment and the lowest number of pod were found from the treatment T_2 (41.40). The highest seed yield (1595.67 kg ha^{-1}) were found from T_1 (full Package) treatment which was statistically similar with T_5 (1477 kg ha^{-1}) treatment and the lowest yield (1201.33 kg ha^{-1}), was found from late sowing treatment (T_3). These results were supported by other researchers [6-8]. The highest gross return (Tk. 47870/-) and net return (18320/-) were obtained from the treatment with full package of practice (Table 2). The second highest gross return (444319/-) and net return (16419/-) were obtained from the treatment T_5. The highest yield reduction 393 kg/ha which was (24.60%) lower than the recommended package in recorded from the treatment T_3 (late sowing). It was found that less number of pod was formed from the late sowing treated plot and ultimately seed yield was reduced severely. The second highest yield reduction (241 kg ha^{-1}) was found from T_2 treatment which was

Table 1: Yield and yield attributes of sesame cv. BARI Til-3 as influenced by different management practices during Kharif-2009 at ARS, Comilla, Bangladesh

Treatments	Plant population	Plant height (cm)	No. of branches plant^{-1}	No. of pods plant^{-1}	1000-seed weight (g)	Seed yield (kg ha^{-1})
T_1	56.67	147.60	3.63 a	68.77 a	3.17	1595.67 a
T_2	56.33	143.20	3.20 c	41.40 c	3.0	1354.67 bc
T_3	57.33	137.47	3.56 b	52.20 b	3.10	1201.33 c
T_4	58.33	140.20	2.40 e	66.60 a	3.10	1355.33 bc
T_5	57.00	144.73	2.73 d	56.33 b	3.20	1477.33 ab
LSD	NS	NS	0.036	8.54	NS	216.60
CV (%)	5.23	3.31	6.18	7.96	3.96	8.24

Values in a column sharing common letters do not differ significantly (P<0.05)
T_1 = Recommended package; (Seed treatment + Timely sowing + Recommended fertilizer + Irrigation + Insect control + Disease control)
T_2 = Recommended package without seed treatment
T_3 = Recommended package with delay sowing
T_4 = Recommended package without Insect control
T_5 = Recommended package without Disease control

Table 2: Partial economic analysis of sesame cv. BARI Til-3 at different management practices during kharif-I, 2009 at ARS, Comilla, Bangladesh

	Seed yield reduction over T_1						
Treatment	kg ha^{-1}	%	Gross return (Tk/ha)	Variable cost (Tk/ha)	Net return (Tk/ha)	Economic loss (Tk/ha)	BCR
T_1	-	-	47870	29550	18320	-	1.61
T_2	241.0	15.10	40640	29300	11340	6980	1.38
T_3	393.3	24.60	36030	29550	6480	11840	1.21
T_4	240.3	15.05	40659	28000	12659	5661	1.45
T_5	118.3	7.40	44319	27900	16419	1901	1.58

Price of products Price of fertilizers Tk./kg Price of other inputs
Seed: Tk. 60/kg Insecticide: 1550 Tk. Fungicide: 1650 Tk. Urea: 12/- Gypsum: 5.50/- TSP: 40/- Boric acid:140/-
MP: 35 Zinc sulphate: 110/- Irrigation: 800 Tk./irrigation Human labor: 140 Tk./day

15.10 % lower than the treatment T_1 (RP). The highest economic loss (Tk.11840/- per ha) was obtained from the treatment with delay sowing. The highest benefit cost ratio (1.60) was found from the full package treatment T_1 followed by T_5 treatment (1.58) and the lowest BCR was found from T_3 (Late sowing) treatment (1.21). More or less every production factor is contributing for reducing yield of sesame. Reddy [9] also observed related findings.

CONCLUSION

To get maximum yield of sesame recommended package should be followed. Without following any one management practice yield may be reduce severely and also observed that following delay sowing drastically reduced the seed yield of sesame.

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