

Original Research Article

## INTERACTION EFFECT OF IRRIGATION FREQUENCY AND WEED MANAGEMENT ON GROWTH AND YIELD OF SESAME

### ABSTRACT

A field experiment was conducted at the Sher-e-Bangla Agricultural University Farm, Dhaka during Kharif-1 (March – June), 2014 to study the effect of irrigation frequency and weed management on growth and yield of sesame (*Sesamum indicum*). The experiment was consisted of two treatment factors, viz., factor- A: four levels of irrigation frequency [I0 = no irrigation; I1= single irrigation at 20 days after sowing (DAS); I2 = two irrigations at 20 and 40 DAS, and I3 = three irrigations at 20, 40 and 60 DAS] and factor- B: four levels of weed management [W0 = no weeding; W1 = one hand weeding at 20 DAS; W2 = two hand weeding at 20 and 40 DAS, and W3 = application post emergence herbicide at 20 and 40 DAS]. The experiment was laid out in a split design with three replications assigning irrigation frequency in the main plot and weed management practices in the sub- plot. Significant variations were found due to irrigation frequency, weed management practices and their interaction in the growth, yield components, seed yield, stover yield, biological yield and harvest index of sesame. The highest plant height (104.4 cm), number of leaves plant-1 (104.6), number of branches plant-1 (6.44), number of capsules plant-1(54.97), number of seeds capsule-1 (58.53), 1000 seeds weight (3.213 g), seed yield (1.413 t ha-1) and harvest index (29.26%) were obtained with the interaction effect of I3W2 (three times irrigation + two hand weeding). But the shortest plant height (78.18), lowest dry weight plant 1 (15.36 g), number of leaves plant-1 (65.11), number of branches plant-1 (4.789), number of capsules plant-1 (44.77), number of seeds capsule-1 (49.60), 1000 seeds weight (2.910 g), and seed yield (0.944 t ha-1) were obtained with the interaction effect of I0W0 (no irrigation + no weeding).

KEY WORDS: Sesame, Irrigation Frequency, Weed Management. Growth, Yield

### Introduction

Sesame (*Sesamum indicum* L) is a minor crop, cultivated for edible oil in the Africa, some part of Asia (China, Myanmar, India, Pakistan, Korea), Turkey, Mexico, South America etc. It is a broadleaf plant, has 5 to 6 feet height. Oil content in sesame seed is very high, nearly 50%-60%, protein 23-25%, carbohydrate 13.5% and ash 5% [1,2,3]. Many nutritional elements, like Fe, Mg, Mn, Cu, Ca, Vit B1, E, are found in sesame oil. Not only the oil, but also oil cake, younger leaves are also used as good feed for poultry, goat, sheep, cattle, fish, and also in soap factory. (4,5). In summer in Bangladesh the sesame production was 28187.96 mton, area was 72329.47 acre. And winter sesame was 2526.72 m ton within 6144.67 acre of land [6]. According to FAOSTAT, in 2021-2022 the worldwide production was 6741479.41 t and area was 12836776 ha [7]. To meet the demand, we need to increase the production. Proper irrigation practice and weed management can increase the productivity. Scanty or overflow irrigation only can increase the

irrigation cost not the production. Same happens with the poor weed management. This paper will discuss with the interaction effect of irrigation and weed management. This paper will discuss the interaction effect of irrigation frequency and different weed management practices on growth and yield of sesame.

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## MATERIALS AND METHODS

### Experiment site and soil

A field experiment was conducted at the Sher-e-Bangla Agricultural University (SAU), Dhaka, Bangladesh during *Khharif-1* (March – June), 2014 to study the effect of irrigation frequency and weed management practices on growth and yield of sesame.

### Climate

The experimental field was situated under Sub-tropical climate; usually the rainfall is heavy during *khharif* season (April to September) and scantily in *rabi* season (October to March).

### Crop

BARI Til-4 (*Sesamum indicum* L.) is a broadleaf plant of about 0.9-1.2m tall, although height dependent on the variety and growing conditions.

### Treatments

Four levels of irrigation and four levels of weed management and their interaction were used in the experiment. These were:

#### Factor- A: Four levels of irrigation

I<sub>0</sub> = No irrigation

I<sub>1</sub> = One irrigation at 20 DAS

I<sub>2</sub> = Two irrigation at 20 and 40 DAS

I<sub>3</sub> = Three irrigation at 20, 40 and 60 DAS

#### Factor- B: Four levels of weed management

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W<sub>0</sub> = No weeding

W<sub>1</sub> = One hand weeding at 20DAS

$W_2$  = Two hand weeding at 20 DAS and 40 DAS

$W_3$  = Post emergent herbicide at 20 DAS and 40 DAS

#### **Interaction between irrigation and weed management**

$I_0 \times W_0$	$I_1 \times W_1$	$I_2 \times W_2$	$I_3 \times W_3$
$I_0 \times W_1$	$I_1 \times W_2$	$I_2 \times W_3$	$I_3 \times W_0$
$I_0 \times W_2$	$I_1 \times W_3$	$I_2 \times W_0$	$I_3 \times W_1$
$I_0 \times W_3$	$I_1 \times W_0$	$I_2 \times W_1$	$I_3 \times W_2$

#### **Experimental design**

The experiment was laid out in Split plot design with 3 replications. Irrigation frequency was applied in main plot and weed management in sub plot. The size of unit plot was 2.0 m x 2.0 m. The total number of treatments was (4 levels of irrigation  $\times$  4 levels of weed management) 16 and the number of plots were 48 as there was three numbers of replication.

#### **Land preparation**

The experimental land was ploughed with a tractor followed by harrowing to attain a desirable filth. All uprooted weeds and stubbles of the previous crop were removed from the experimental field. The land was finally prepared with power tiller to ensure a good land preparation. The land was leveled by tractor drawn leveler.

#### **Sowing**

The seeds of the variety BARI Til-4 were collected from the Bangladesh Agricultural Research Institute (BARI), Joydebpur, Gazipur. Seeds were subjected to germination test and were treated with Vitavax-200 at the rate of 2.5 g kg<sup>-1</sup> of seeds before sowing. Seeds were sown on March 15, 2014 in solid lines. Three to five seeds were sown per hill. Missing hills were sown with seeds to maintain desired plant population.

#### **Cultural practices**

The desired population density was maintained by thinning plants 8 days after emergence. Irrigation and weeding were performed as per treatments. Plant protection measures were performed as needed to uniform germination, better crop establishment and proper plant growth.

## **Sampling**

The sampling was done first at 15 days after sowing and it was continued at an interval of 15 days, viz. 30, 45, 60 days after sowing (DAS). At each harvest, three plants were selected randomly from each plot. The selected plants of each plot were uprooted carefully by a khurpi and washed in running tap water to remove the soil. The number of leaves, branches and pods were recorded separately. The components were oven dried at 60<sup>o</sup> for 72 hours to record constant dry weight. From each plot the weight of the straw were taken. Biological yield and the harvest index were also calculated from this data.

## **Data collection**

The data on the following parameters of three plants were recorded at each harvest.

### **Growth data**

- Plant height (cm)
- Number of branch plant<sup>-1</sup>
- Number of leaves plant<sup>-1</sup>

### **Yield data**

- Number of capsule plant<sup>-1</sup>
- Number of seeds capsule<sup>-1</sup>
- 1000 seeds weight (g)
- Yield plant<sup>-1</sup>(g)
- Total seed yield(t ha<sup>-1</sup>)
- Stover yield (t ha<sup>-1</sup>)
- Harvest Index

### **Dry weight of weed (g m<sup>-2</sup>)**

After weeding, treatment wise weeds were packed and oven dried to determine the dry weight.

## Statistical analysis

The data collected on different parameters were statistically analyzed to obtain the level of significance using the MSTAT- C computer package program developed by Russel (1986). Mean difference among the treatments were tested with least significant differences (LSD) at 5% level of significance.

**Comment [h3]:** You use LSD for large number of treatments. So your test can commit > 75% type I error. Why not you use recent stat models and Duncan, tukey mean comparison?

## RESULTS AND DISCUSSION

### Plant height

The interaction effect of irrigation frequency and weed management on plant height was significant at different days after sowing (Table 1). It was observed that on the plant height at 30 DAS and 45 DAS interaction had no significant effect but at 60 DAS and at harvest the significantly highest plant height was recorded in the treatment combination of I<sub>3</sub>W<sub>2</sub> (99.66 and 104.4 cm, respectively), which was not significantly different from I<sub>3</sub>W<sub>3</sub> at 60 DAS and at harvest. On the other hand, the lowest plant height (70.65 and 78.18 cm) at 60 DAS and at harvest respectively was recorded in the treatment combination of I<sub>0</sub>W<sub>0</sub>. Irrigation frequency makes water available for plants and weed control decreases crop weed competition, plant can grow well without competition it might be the reason of significance of interaction of treatments.

Irrigation regimes significantly affected growth of sesame. It might be due to nutrient availability as a result of irrigation. Similar phenomenon was also observed by Nadeem et al. [8] in sesame. Weeding regime also significantly (P<0.05) affected plant height ( Ahmed et al., 2009) [9].

**Table 1. Interaction effect of irrigation frequency and weed management practices on plant height of sesame at different days after sowing**

Treatments	Plant height (cm)				
	15 DAS	30 DAS	45 DAS	60 DAS	At harvest
I <sub>0</sub> W <sub>0</sub>	14.3	23	37.81	70.65 g	78.18 h
I <sub>0</sub> W <sub>1</sub>	17.22	23.91	41.3	74.30 f	87.49 g
I <sub>0</sub> W <sub>2</sub>	12.39	22.84	43.53	79.20 e	94.69 f
I <sub>0</sub> W <sub>3</sub>	13.67	22.94	44.77	78.32 e	97.44 def

<b>I<sub>1</sub>W<sub>0</sub></b>	18.56	26.33	41.72	71.77 fg	96.13 ef
<b>I<sub>1</sub>W<sub>1</sub></b>	16.5	26.62	46.17	80.42 e	99.51 bcde
<b>I<sub>1</sub>W<sub>2</sub></b>	14.58	26.52	47.75	90.90 d	101.0 abcd
<b>I<sub>1</sub>W<sub>3</sub></b>	16.72	27.31	47.94	96.89 abc	101.2 abc
<b>I<sub>2</sub>W<sub>0</sub></b>	16.17	24.53	41.72	90.71 d	98.43 cde
<b>I<sub>2</sub>W<sub>1</sub></b>	22.17	26.23	46.83	96.03 c	102.3 b
<b>I<sub>2</sub>W<sub>2</sub></b>	16.73	25.62	48.75	96.68 bc	103.5 ab
<b>I<sub>2</sub>W<sub>3</sub></b>	14.67	26.09	47.94	97.64 abc	103.0 ab
<b>I<sub>3</sub>W<sub>0</sub></b>	12.44	25.04	46.5	95.24 c	101.5 abc
<b>I<sub>3</sub>W<sub>1</sub></b>	19.61	26.11	48.75	99.27 ab	102.5 b
<b>I<sub>3</sub>W<sub>2</sub></b>	18.38	24.92	48.94	99.66 a	104.4 a
<b>I<sub>3</sub>W<sub>3</sub></b>	15.84	26.09	48.84	97.99 ab	104.3 a
<b>CV%</b>	10.53	8.03	7.08	9.90	11.18
<b>LSD (0.05)</b>	NS	NS	NS	2.80	1.76

I<sub>0</sub> = No irrigation; I<sub>1</sub> = Single irrigation at 20 DAS; I<sub>2</sub> = Two times irrigation at 20 and 40 DAS; I<sub>3</sub> = Three times irrigation at 20, 40 and 60 DAS; W<sub>0</sub> = No weeding; W<sub>1</sub> = One hand weeding at 20 DAS; W<sub>2</sub> = Two hand weeding at 20 and 40 DAS; W<sub>3</sub> = Application of herbicide at 20 and 40 DAS; NS = Non- significant.

#### Number of branches plant<sup>-1</sup>

The interaction effect of irrigation frequency and weed management on number of branches plant<sup>-1</sup> was not significant at 45 and 60 DAS (Table 2 ). It was observed that the highest number of branches plant<sup>-1</sup> was with the treatment combination of I<sub>3</sub>W<sub>2</sub> (6.444) at harvest which was not significantly different from I<sub>3</sub>W<sub>3</sub> at 30 harvest. On the other hand lowest number of branch plant<sup>-1</sup> was observed with the treatment combination of I<sub>0</sub>W<sub>0</sub> and I<sub>1</sub>W<sub>1</sub>. The results obtained from all other treatment combinations were significantly different. The branches of plant are effected by weed Baskaran and Solaimalai [10].

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**Table 2. Interaction effect of irrigation frequency and weed management on Branches plant<sup>-1</sup> of sesame at different days after sowing**

Treatments	Branches plant <sup>-1</sup>		
	45 DAS	60 DAS	Atharvest
I <sub>0</sub> W <sub>0</sub>	3.33	3.67	3.993 h
I <sub>0</sub> W <sub>1</sub>	3.45	3.913	4.111 h
I <sub>0</sub> W <sub>2</sub>	3.55	4.008	4.223 gh
I <sub>0</sub> W <sub>3</sub>	3.60	4.251	4.513 fgh
I <sub>1</sub> W <sub>0</sub>	3.77	4.343	4.607 efgh
I <sub>1</sub> W <sub>1</sub>	3.97	4.555	4.666 efgh
I <sub>1</sub> W <sub>2</sub>	4.32	4.677	4.889 defgh
I <sub>1</sub> W <sub>3</sub>	4.43	4.844	4.886 defgh
I <sub>2</sub> W <sub>0</sub>	3.99	4.351	5.111 cdefg
I <sub>2</sub> W <sub>1</sub>	4.55	4.903	5.333 bcdef
I <sub>2</sub> W <sub>2</sub>	4.89	4.966	5.626 abcd
I <sub>2</sub> W <sub>3</sub>	5.18	4.94	5.597 abcd
I <sub>3</sub> W <sub>0</sub>	4.16	4.67	5.444 bcde
I <sub>3</sub> W <sub>1</sub>	4.74	5.118	5.950 abc
I <sub>3</sub> W <sub>2</sub>	6.00	6.15	6.444 a
I <sub>3</sub> W <sub>3</sub>	5.109	5.324	6.222 ab
CV%	8.96	7.93	9.45
LSD (0.05)	NS	NS	0.804

I<sub>0</sub> = No irrigation; I<sub>1</sub> = Single irrigation at 20 DAS; I<sub>2</sub> = Two times irrigation at 20 and 40 DAS; I<sub>3</sub> = Three times irrigation at 20, 40 and 60 DAS; W<sub>0</sub> = No weeding; W<sub>1</sub> = One hand weeding at 20 DAS; W<sub>2</sub> = Two hand weeding at 20 and 40 DAS; W<sub>3</sub> = Application of herbicide at 20 and 40 DAS; NS = Non- significant.

**Number of Leaves plant<sup>-1</sup>**

The interaction effect of irrigation frequency and weed management on number of leaves plant<sup>-1</sup> was not significant up to 30 DAS but was significant at 45 and 60 DAS. (Table 3). It was observed that the highest number of branches plant<sup>-1</sup> was with the treatment combination of I<sub>3</sub>W<sub>2</sub> (75.78 and 104.6) at 45 DAS and 60 DAS respectively. Leaves number plant<sup>-1</sup> of 45 DAS in this interaction was not significantly different from I<sub>3</sub>W<sub>3</sub>. On the other hand the lowest number of leaves plant-1 was observed with the treatment combination of I<sub>0</sub>W<sub>0</sub> at 45 DAS and 60 DAS but there was no significant difference with I<sub>0</sub>W<sub>1</sub> at 60 DAS. .The results obtained from all other treatment combination were significantly different from each other. The results also supported by Bahador and Moosavi [11].

**Table 3. Interaction effect of irrigation frequency and weed management on leaf area of sesame plant at different days after sowing**

Treatments	Number of leaves plant <sup>-1</sup>			
	15 DAS	30 DAS	45 DAS	60 DAS
I <sub>0</sub> W <sub>0</sub>	7.889	10.33	51.66 j	65.11 j
I <sub>0</sub> W <sub>1</sub>	7.889	11.11	55.66 i	68.04 ij
I <sub>0</sub> W <sub>2</sub>	7.222	11.78	59.55 h	71.63 h
I <sub>0</sub> W <sub>3</sub>	7.666	12.67	60.56 gh	72.78 h
I <sub>1</sub> W <sub>0</sub>	7.777	10.44	62.41 fg	70.2 hi
I <sub>1</sub> W <sub>1</sub>	8	13.11	67.78 d	77.44 g
I <sub>1</sub> W <sub>2</sub>	7.555	13.67	71.56 c	83.67 ef
I <sub>1</sub> W <sub>3</sub>	7.666	14.67	72.00 bc	82.11 f
I <sub>2</sub> W <sub>0</sub>	8.333	11.22	63.78 ef	77.33 g
I <sub>2</sub> W <sub>1</sub>	9	12.44	67.22 d	83.56 ef
I <sub>2</sub> W <sub>2</sub>	8.111	13.33	72.11 bc	89.56 c
I <sub>2</sub> W <sub>3</sub>	7.555	14.2	71.33 c	88.44 cd
I <sub>3</sub> W <sub>0</sub>	6.777	11.19	63.97 ef	85.67 de
I <sub>3</sub> W <sub>1</sub>	7.666	12.11	65.22 de	97.44 b
I <sub>3</sub> W <sub>2</sub>	7.444	14	75.78 a	104.6 a

<b>I<sub>3</sub>W<sub>3</sub></b>	8.111	15.04	73.43 ab	98.78 b
<b>CV%</b>	13.24	9.16	8.50	12.59
<b>LSD (0.05)</b>	NS	NS	1.74	3.55

I<sub>0</sub> = No irrigation; I<sub>1</sub> = Single irrigation at 20 DAS; I<sub>2</sub> = Two times irrigation at 20 and 40 DAS; I<sub>3</sub> = Three times irrigation at 20, 40 and 60 DAS; W<sub>0</sub> = No weeding; W<sub>1</sub> = One hand weeding at 20 DAS; W<sub>2</sub> = Two hand weeding at 20 and 40 DAS; W<sub>3</sub> = Application of herbicide at 20 and 40 DAS; NS = Non- significant.

### **Number of capsules plant<sup>-1</sup>**

The interaction effect of irrigation frequency and weed management on the number of capsules plant<sup>-1</sup> of sesame had significant effect at harvest (Table 4). It was observed that the highest number of capsules plant<sup>-1</sup> was recorded with the treatment combination of I<sub>3</sub>W<sub>3</sub>(54.97) which were significantly similar with I<sub>3</sub>W<sub>3</sub> at harvest. On the other hand, the lowest number of capsules plant<sup>-1</sup> (44.77) was recorded with the treatment combination of I<sub>0</sub>W<sub>0</sub> which was significantly similar with I<sub>1</sub>W<sub>0</sub> at harvest. The results obtained from all other treatment combinations were significantly different compared to highest and lowest results. Similar trend in number of capsules plant-1 in sesame was reported by Nadeem et. al [8] and Ahmad [12].

### **Number of seeds capsule<sup>-1</sup>**

Interaction effect of irrigation frequency and weed management on the number of seeds capsules<sup>-1</sup> had significant effect at harvest (Table 4). It was observed that the highest number of seeds capsules<sup>-1</sup> was recorded with the treatment combination of I<sub>3</sub>W<sub>2</sub> (58.53). On the other hand the lowest number of seeds capsules-1 (49.60) was recorded with the treatment combination of I<sub>0</sub>W<sub>0</sub> which was significantly similar with I<sub>1</sub>W<sub>0</sub> and I<sub>0</sub>W<sub>1</sub> at harvest. The results obtained from all other treatment combinations were significantly different compared to highest and lowest results. It was also reported by Ahmed et al.[13]

### **Weight of 1000 seeds (g)**

The interaction effect of irrigation frequency and weed management on 1000 seeds weight had significant effect (Table 4). It was observed that the highest 1000 seeds weight was recorded with the treatment combination of  $I_3W_2$  (3.213 g) which was statistically similar with the treatment combination of  $I_2W_3$ ,  $I_3W_1$  and  $I_3W_3$ . On the other hand the lowest 1000 seed weight (2.91 g) was recorded with the treatment combination of  $I_0W_0$  which was significantly similar with  $I_1W_0$ . The results obtained from all other treatment combinations were significantly different compared to highest and lowest results. Similar results were observed by Ahmad [12].

**Table 4: Interaction effect of irrigation frequency and weed management on different yield contributing characters of sesame**

Treatments	Number of capsules plant <sup>-1</sup>	Number of seeds capsule <sup>-1</sup>	Weight of 1000 seeds (g)
$I_0W_0$	44.77 i	49.60 j	2.910 h
$I_0W_1$	44.96 hi	49.95 hij	2.930 h
$I_0W_2$	45.24 g	50.13 ghi	2.983 g
$I_0W_3$	45.88 f	50.24 gh	3.027 fg
$I_1W_0$	44.79 i	49.73 ij	3.007 g
$I_1W_1$	45.97 f	52.94 f	3.077 ef
$I_1W_2$	46.86 e	53.63 e	3.117 cde
$I_1W_3$	46.94 e	53.92 e	3.130 bcd
$I_2W_0$	44.97 hi	50.07 ghi	3.093 de
$I_2W_1$	48.97 d	54.89 d	3.167 abc
$I_2W_2$	50.95 c	55.36 c	3.177 ab
$I_2W_3$	50.98 c	55.57 c	3.183 a
$I_3W_0$	45.15 gh	50.47 g	3.093 de
$I_3W_1$	52.97 b	57.96 b	3.190 a
$I_3W_2$	54.97 a	58.53 a	3.213 a
$I_3W_3$	54.88 a	58.20 ab	3.190 a
CV%	5.23	6.42	7.62
LSD (0.05)	0.19	0.03	0.053

$I_0$  = No irrigation;  $I_1$  = Single irrigation at 20 DAS;  $I_2$  = Two times irrigation at 20 and 40 DAS;  $I_3$  = Three times irrigation at 20, 40 and 60 DAS;  $W_0$  = No weeding;  $W_1$  = One hand weeding at 20 DAS;  $W_2$  = Two hand weeding at 20 and 40 DAS;  $W_3$  = Application of herbicide at 20 and 40 DAS.

### **Seed yield plant<sup>-1</sup>**

Irrigation frequency and weed management practices on Seed yield plant-1 (g) had significant effect (Table 5). It was observed that the highest Seed yield plant-1 was recorded with the treatment combination of  $I_3 W_2$  (10.21 g) which was not significantly different from  $I_3 W_3$ . On the other hand the lowest Seed yield plant-1 (6.626 g) was recorded with the treatment combination of  $I_0 W_0$  which was similar to the combination of  $I_1 W_0$ . The results obtained from all other treatment combinations were significantly different compared to highest and lowest results. Similar result was also reported by Nadeem et al. [8] and Ahmed et al. [14].

### **Seed yield (tha<sup>-1</sup>)**

The interaction effect of irrigation frequency and weed management on seed yield (t ha<sup>-1</sup>) had significant effect (Table 5). It was observed that the highest yield was recorded with the treatment combination of  $I_3 W_2$  (1.413 t ha<sup>-1</sup>) which had no significant difference with the treatment combination of  $I_3 W_3$ . On the other hand the lowest yield (0.944 t ha<sup>-1</sup>) was recorded with the treatment combination of  $I_0 W_0$  which was similar to the treatment combination of  $I_0 W_1$ . The results obtained from all other treatment combinations were significantly different compared to highest and lowest results. The similar trends were observed by Nadeem et al. [8] and Ali et al. [15]. Similar result was obtained by Ahmad [12] and by Singh [16].

### **Stover Yield (t ha<sup>-1</sup>)**

The interaction effect of irrigation frequency and weed management on stover yield (t ha<sup>-1</sup>) had significant effect (Table 5). It was observed that the highest stover yield was recorded with the treatment combination of  $I_3 W_1$  (3.446 t ha<sup>-1</sup>). On the other hand the lowest stover yield (2.452 t ha<sup>-1</sup>) was recorded with the treatment combination of  $I_0 W_0$ . The results obtained from all other treatment combinations were significantly different compared to highest and lowest results.

### Harvest Index (%)

It was observed that the highest harvest index (29.26%) was recorded with the treatment combination of I<sub>3</sub>W<sub>2</sub> which was significantly similar with I<sub>3</sub>W<sub>3</sub>. On the other hand the lowest harvest index (22.40%) was recorded with the treatment combination of I<sub>3</sub>W<sub>0</sub>. The results obtained from all other treatment combinations were significantly different compared to highest and lowest results.

**Table 5: Interaction effect of irrigation frequency and weed management on yield parameters of sesame**

Treatments	Seed yield plant <sup>-1</sup>	Seed yield (tha <sup>-1</sup> )	Stover yield (tha <sup>-1</sup> )	Harvest Index
I <sub>0</sub> W <sub>0</sub>	6.627 j	0.94 e	2.542 g	27.10 bc
I <sub>0</sub> W <sub>1</sub>	6.760 ij	0.95 e	2.646 f	26.46 cdef
I <sub>0</sub> W <sub>2</sub>	6.837 hi	0.96 de	2.695 f	26.32 def
I <sub>0</sub> W <sub>3</sub>	6.970 gh	0.97 de	2.793 e	25.84 fg
I <sub>1</sub> W <sub>0</sub>	6.680 j	0.96 de	2.854 e	25.33 gh
I <sub>1</sub> W <sub>1</sub>	7.480 f	1.02 cd	2.959 d	25.75 fgh
I <sub>1</sub> W <sub>2</sub>	7.747 e	1.04 cd	2.975 d	26.03 efg
I <sub>1</sub> W <sub>3</sub>	7.830 e	1.05 cd	3.034 d	25.87 fg
I <sub>2</sub> W <sub>0</sub>	6.870 hi	0.97 de	3.207 c	23.33 i
I <sub>2</sub> W <sub>1</sub>	8.337 d	1.12 c	3.365 b	25.02 h
I <sub>2</sub> W <sub>2</sub>	8.910 c	1.23 b	3.389 ab	26.69 cde
I <sub>2</sub> W <sub>3</sub>	8.913 c	1.24 b	3.391 ab	26.86 cd
I <sub>3</sub> W <sub>0</sub>	7.040 g	0.98 de	3.404 ab	22.40 j
I <sub>3</sub> W <sub>1</sub>	9.707 b	1.32 ab	3.446 a	27.72 b
I <sub>3</sub> W <sub>2</sub>	10.21 a	1.41 a	3.415 ab	29.26 a
I <sub>3</sub> W <sub>3</sub>	10.09 a	1.41 a	3.431 ab	29.13 a
CV%	8.20	8.60	7.79	8.25
LSD (0.05)	0.141	0.10	0.075	0.763

I<sub>0</sub> = No irrigation; I<sub>1</sub> = Single irrigation at 20 DAS; I<sub>2</sub> = Two times irrigation at 20 and 40 DAS; I<sub>3</sub> = Three times irrigation at 20, 40 and 60 DAS; W<sub>0</sub> = No weeding; W<sub>1</sub> = One hand weeding at

20 DAS; W<sub>2</sub> = Two hand weeding at 20 and 40 DAS; W<sub>3</sub> = Application of herbicide at 20 and 40 DAS.

## Conclusion

Plant height (cm), number of branches plant-1, number of capsules plant-1, number of seeds capsule-1, 1000 seed weight (g), yield plant-1 (g), total yield (t ha-1), stover yield (t ha-1) and harvest index were also significantly influenced by different interaction effect of irrigation frequency and weed management practices. The tallest plant (104.4 cm) was obtained by the combined effect of I3W2 (Three times irrigation + Two hand weeding) and the smallest plant height (78.18 cm) was obtained by I0W0 (No irrigation + No weeding). The highest number of branches plant-1 (6.444), dry weight plant-1 (23.58 g) and yield plant-1 (10.21 g) were recorded with the combined effect of I3W2 (Three times irrigation + Two hand weeding). The highest total yield (1.413 t ha-1) stover yield (3.446 t ha-1) were found with I3W2 (Three times irrigation + Two hand weeding) and I3W1 (Three times irrigation + One hand weeding) respectively. The lowest total yield (0.944 t ha-1) and stover yield (2.542 t ha-1) were recorded with the combined effect of I0W0 (No irrigation + No weeding). In case of highest number of capsules plant-1 (54.97), number of seeds capsule-1 (58.53), 1000 seed weight (3.213 g) and harvest index (29.26) were obtained with the combined effect I3W2 (Three times irrigation + Two hand weeding). But the lowest number of seeds capsule-1 (49.60) and 1000 seed weight (2.910 g), harvest index (22.40) were obtained with the combined effect of I0W0 (No irrigation + No weeding) and I3W0 (Three times irrigation + No weeding) respectively. Therefore, three times irrigation at 20, 40 and 60 DAS (I3), two hand weeding at 20 and 40 DAS (W2) and their interaction (I3W2) are the most effective on the growth and yield of sesame. It may be concluded that three irrigation along with weed control could be better option to increase sesame yield.

**Comment [h5]:** Without the knowledge of the amount of water you added and the economic feasibility of the treatments your conclusion is not much valid.

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