RESEARCH ARTICLE

EFFECT OF WEED MANAGEMENT PRACTICES ON GROWTH AND YIELD OF SESAME (*SESAMUM INDICUM* L.)

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Abstract: A fled experiment was conducted during the *Kharif* Season of 2009-10 at Research farm, project coordinating Unit (Sesame and Niger). Jabalpur, Madhya Pradesh to study the effect of Pre-emergence herbicides, alone or in conjunction with manual weeding on weed pressure, productivity and economics of Tit (Sesame indicum L.) Podiumthaliana @ 0.50 kg/ha as pre-emergence (PE) + one hand weeding at 40 DAS, reduced the weed biomass similar to recommended practice of weed control i.e. hand weeding twice done at 20 & 40 DAS. Application of oxyfluorfen @ 0.15 Kg/ha as pre-emergence (PE) was found more remunerative as it recorded the higher value of NMR and B:C ratio (6446 and 1.64) as compared to other treatments.

Keywords: Til, Herbicide, Weed management

INTRODUCTION

Oil seeds are the raw material for vegetable oils, occupying a significant place in Fulia's national economy next to food grains.Oil seeds are important sources of both fats and proteins. Sesame occupies a prestigious position next only to groundnut, rapeseed and mustard. Sesame is one of the important oil seed crops grown in India. It contains a considerable quality of edible oil (48 to 55 %) protein (20 to 21%), sugar (14 to 16%), fibre (6 to 8 %) and minerals (5 to 7%) for human and animal meals. In India, it is cultivated in about 1.63 million hectares with production of 0.52 million tunes and productivity of 319 (kg/ha). The major sesame producing states in the country are Rajasthan, Uttar Pradesh, Gujarat, Orissa, Maharashtra, Tamil Nadu and West Bengal. Madhya Pradesh covers nearly 1.50 lakh hectare area under this crop with production of 0.58 lakh tunes and productivity of 387 Kg/ha (Damodaram and Hegde, 2007).

Sesame is mostly grown on marginal and sub marginal lands having low organic matter and poor soil fertility. Among the different factors responsible for low productivity of this crop weed infestation is one of the major constraints posing the biggest challenge to sesame cultivation? The major weed flora associated with sesame found in Jabalpur region are grasses viz., Fluorineindica, sataria glace, Echinochloa crusgulli, Cynoden dactylon, sedgesCyprusrotundas and Cyprusaria and a number of broad leaved weeks i.e. cyanosis axillariz, Ageratum conizoides, celosia argentia, Amaranthusspinosus etc. These weeds compare with the crop for moisture, nutrients, space and light. Sesame crop has slow growth in early stage and the criticalperiod of crop weed competition is between 15 to 30 DAS (Kondap and Rao 1978). The losses caused by weeds were estimated to be between 49 and 70 percent in sesame (Ghosh and Mukhopadhyay, 1981). The conventional methods of weed control like hand pulling hoeing etc. are very much effective but due to high wages and an availability of labourers coupled with unfavourable. Weather conditions for such operations make them impracticable. Weed control by using herbicides is one of the easier, time saving and economical alternative as compared to manual weeding (Kao and Narayana Rao, 1985). There are many herbicides formulations and kinds viz., Pendimethalin, alachlor and oxyfluorfen are available and often being introduced in the market, which are presently being used for controlling weeds in seasons. There for, the present investigation was under taken the effect of weed management practices on growth and yield of sesame.

MATERIALS AND METHODS

The experiment was conducted at Research farm, Project coordinating unit (Sesame and Niger). JNKVV, Jabalpur (23^0 90'' and 79 58 '' E) during the Kharif season of 2009. The area has subtropical climatic conditions,with hot dry summers and cool dry winters. Mean annual rainfall of the area for 10 years B 1284 mm and nearly 90% of the total annual rainfall mainly receives during the period between ends of time to end September. The rainfall of the locality is often erratic and ill-distributed alone with an occasional long dry spells or frequent heavy rainy days during rainy season. The maximum and minimum temperature ranyes between 24^0C to 45^0C and 4^0C to 32^0C, respectively. The relative humidity during rainy season, which reduces as 60 to 70 and 30 to 40% during winter and summer seasons, respectively.

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The total rainfall received during the crop season was 1234.8 mm which was equally distributed in 38 rainy days from June second week to second week of November. The soil was clay 100 m (50.75% clay) in texture and neutral in reaction (pH 7.40) with electrical conductivity 0.43 ds/m, low in available N (198.0 Kg/ha) and medium in available P(18.6 kg/ha) and high in available K (322.6kg/ha). A combination of 10 treatments, Viz. one hand weeding at 20 DAS, two hand weeding at 20 and 40 DAS, one hand hoeing at 20 DAS, pendimethalin 0.50 kg/ha PE, pendimethalin 0.75 kg/ha PE, OXyfluorfen 0.10 kg/ha PE, Oxyfluorfen 0.15 kg/ha PE, pendimethalin 0.50 kg/ha + hand weeding at 40 DAS, Oxyfluorfen 0.15 kg/ha + hand weeding at 40 DAS and control (Weedy cheek). Were tested in rondo wised block design and replicated thrice. The herbicide spray solution was prepared by mixing the required quantity of herbicide as per the recommended dose required quality of herbicide as per the recommended dose required per plot in weaker @ 500 litres/ha. Til 'GT-2' was sown at 30cmx 10 an spacing on July 19 2009. The recommended dose of fertilizers, i.e. 60 kg N/ha, 40 kg P_20 5/ha and 20 kg k_2o/ha was applied through area, SSP and muriatic of Potash respectively. Full quantity of phosphorus, Potassium and one therequality of nitrogen was applied as basal dose as per the treatments. Remaining two third quality of nitrogen was top dressed at 30 day growth stage of cnp. The five plants were randomly selected from sampled area of each treatment plot. These plants were tagged with luggage label. The study of weeds was recommended at 40 DAS and at harvest by quadrate method. The quadrate of 0.25 square meters (0.5 m x 0.5m) was randomlypleased at four places in each plot and then the species wise and total weed count was recorded. The data thus obtained, were transformed and expressed in number per square meter. The percentage composition of weed flora was estimated from weedy cheek plot. The relative density of individual weed was worked out as per formula proposed by mishra (1968).

No. of individuals of the same species.

Relative Density (%) =

No. of individuals of all species.

Weed index is the ratio of the percent reduction in the seed yield under a particular treatment due to the presence of weeds as compared to the seed yield determined in weed free plot as suggested by Gill and Kumar (1969). It is expressed in percentage and it is determined with the formula

$$WI\ (\%) = \frac{X-Y}{X} \times 100$$

where

WI= Weed index

X= seed yield from weed free plot (hand weeding)

Y= seed yield from the treated plot for which weed indea isto be worked out.

Data recorded from the different observations were tabulated and then analysed statistically by using the methods of analysis of variance as suggested by pause and Sukhatme (1967). The significance of the treatment at 5% level of probably was tested with 'F' test.

RESULTS AND DISCUSSION

Weeds

Weed flora in the experimental field consisted of monocotylednous weeds, viz. Digitaria adscendens (L.) S cop., Echinochloa Crusgalli (L.) P. Beauv. and commelina communis (L.) Hask. Picoty ledonous phyllanthus virari (L.) Hook F. and Cyanotic axillariessnuff.

All the treatments were found to be reduce significantly weed density of monocotyledonous, and dicotyledonous weeds at 30 days after sowing (DAS) and 60 days after sowing (DAS) as compared to absolute control. Application of pendimethulin 0.50 kg/ha + one hand weeding at 40 days after sowing (DAS) reduced the density of Echinocloa Crusgadli and application of oxyfluorfen 0.15 kg/ha + one hand weeding at 40 days after sowing (DAS) reduced the density of this weed (2.12 m^{-2}) at 30 and 60 days after sowing (DAS) respectively, to that of hand weeding twice at 20 and 40 DAS and proved significantly over one hand weeding and hand hocking at 20 days after sowing (DAS), oxyfluorfen 0.15 kg/ha and 0.10 kg/ha. Pendimetholin 0.50 and 0.75 kg/ha, including weed cheek.

Integrated weed management through application of *oxyflourfen* 0.15 kg/ha + one hand weeding at 40 DAS reduced the density of Digit aria*adscendens* weed and pre emergence application of pendimethalin 0.50 + one hand weeding at 40 DASreduced the density of Digit aria*adscendens* at 30 and 60 DAS, respectively to that of hand weeding twice at 20 and 40 DAS and proved significantly superior over one hand height and hand weeding at 20 DAS, application of pendimetholin 0.75 kg/ha and oxyflourfer 0.10 and 0.15 kg/ha including weedy cheek during 30 and 60 days after wowing. Application of oxyfluorten 0.10 kg./ha reduced the density of commeling communiz weed (1.25 m^{-2}) and proved significantly superior over integrated weed management through application of oxyfluorfen 0.15 kg/ha + one hand weeding at 40 DAS, perndimetholin 0.75 and 0.50 kg/ha alone and one hand hoeng or one hand weeding at 20 DAS, oxyfluorfen 0.15 kg/ha including weedy cheek. However, hence of the treatments suppressed hand weeding twice which hand almost zeros density of *commelina communis* at 60 DAS and proved excelled to all the weed control treatments. one hand weeding as well as one hand hoeing at 20 DAS and preemergence application of perdimetholin 0.50 kg/ha + one hand weeding at 40 DAS were at pure in reducing the density of *commelina communism* weed

and found significantly superior over rest of the treatmentsincluding weedy cheek plot had maximum. During of this weed (3.89 m^2). The density of phyllanthus viruri at 30 DAS was minimum (4.37^{m-2}) under integrated weed management through application of penelimethalim 0.50 kg/ha + one hand weeding at 40 DAS and proved significantly superior over oxyfluorfen 0.15 kg/ha + one hand weeding at 40 DAS (7.10m^{-2}), one hand weeding or one hand weeding at 20 DAS, alone application of pendimethalin 0.75 and 0.50 kg/ha and oxyfluorten 0.15 and 0.10 kg/ha including weedy cheek plot which had maximum (11.62m^{-2}) density of this weed. However, none of the treatments surpassed hand weeding twice which had almost zero density of phyllanthus miruri at 60 DAS and proved excelled to all the weed control treatments. Almost similar trend was observed due to weed controltreatment against phyllanthus viruri. The density of cyanotic axillaris weed was maximum under weedy check plot (4.22m^{-2}) where no weed control measures were adopted. Application of oxyfluorfen 0.15 kg/ha + one hand weeding at 40 DAS reduced the density of cyanoticaxillaries weed (1.77m^{-2}) to that of hand weeding twice at 20 and 40 DAS (1.35m^{-2}) had lower density of this weed and proved significantly superior over pendimetholin 0.50 kh/ha + one hand weeding at 40 DAS (2.12m^{-2}), hand weeding or weeding (2.12m^{-2}) at 20 DAS, pendimetholin 0.75 and 0.50 kg/ha, oxyfluorten 0.15 and 0.10 kg/ha including weedy check. Almost similar trend was observed due to weed control treatment against Cyanoticmaxillary at 60 DAS.

Echinochloa Crucially.

Integrated weed management through application of pendimethalin 0.50 kg/ha + one hand weeding at 40DAS had over dry weight of Echinochloa crusguils (7.23g/m^2) and proved significantly superior over integrated weed management through application of oxyfluorfen 0.15 kg/ha + one hand weeding at 40 DAS (11.76 g/ha^2)one hand hoping (18.52g/m^2) including weedy check (20.92g/m^2). Oxyfluorfen 0.15 and 0.10 kg/ha, pendimethalin 0.75 and 0.50 kg/ha, one hand weeding at 20 DAS.

At 60 DAS almost similar trend was found in a dry weight of sesame. Integrated weed management through application of pendimetholin 0.50 kg/ha + one hand weeding at 40 DAS (9.75 g/m^2) was circuited the dry matter of Echinochoa crusgalli to the greater extent and proved significantly superior over one hand weeding (12.65 g/m^2) or one hand hoeing at 20 DAS (26.60g/m^2) including weedy check (30.08g/m^2). However, significant variation among pendithalin 0.50 kg/ha + one hand weeding at 40 DAS, oxyfluorfen 0.15 kg/ha + one hand weeding at 40 DAS, hand weeding twice at 20 and 40 DAS, pendimethalin 0.75 and 0.50 kg/ha and oxyfluorfen 0.15 kg/ha did not exhibit.

Weed biomass

Weed biomass is presented in table 2 Maximum weed biomass was recorded in weedy check plot (753.50g/m^{-2}) at 30 DAS. Application of pendimethalin 0.50 kg/ha + one hand weeding at 40 DAS (244.30g/m^2) reduced the dry weigh of this weed to that of hand weeding twice at 20 and 40 DAS (242.57g/m^2) had lower weed biomass and proved significantly superior over rest of the weed control treatments being at pa to oxyfluorfern 0.15 and 0.10 kg/ha. pendimethalin 0.75 and 0.50 kg/ha.

Integrated weed management through application of oxyfluerfen 0.15 kh/ha + one hand weeding at 40 DAS that reduced the weed biomass (431.09 g/m^2) to that of hand weeding twice at 20 and 40 DAS (423-49g/m^2) and proved significantly superior over pendimethalin 0.50 kg/ha (573.66g/m^2) including weedy check plot (1660.2 g/m^2) being at par to oxyfluorfen 0.15 kg/ha application of pendimethalin 0.50 kg/ha + one hand weeding at 40 DAS (442.34 g/m^2) Pendimethalin 0.75 kg/ha one hand weeding at 20 DAS (487.15 g/m^2). at 60 DAS.

WCE (%)

The maximum WCE was recorded in integrated weed management through application of pendimetholin 0.50 kg/ha one hand weeding at 40 DAS (67.58%) which reduced the weed biomass of all weeds to that of hand weeding twice at 20 and 40 DAS and proved significantly superior over other weed control treatments, including widely check, being at par to oxyfluorfen 0.15 kg/ha (64.46%), pendimefhalin 0.75 kg/ha (63.55%) at 30 DAS. But 60 DAS the maximum WCE was recorded in application of oxyfluorfen 0.15 kg./ha + one hand weeding at 40 DAS (74.03%) which reduced the weed biomass of all weeds to that of hand weeding twice at 20 and 40 DAS and proved significantly superior over other weed control treatments, including weedy check. being at par to oxyfluorfen 0.15 kg/ha (72.89%) alone and one hand weeding at 20 DAS (70.66%). However, oxyfluorfen 0.15.

Growth attributes-

The results revealed that all the weed control treatments significantly improved the growth parameters. Integrated weed management through oxyfluorfen 0.15 kg/ha pre-emergence + one hand weeding at 40 DAS to affect plant height, basal branches, crop biomass and (AI table-3)The maximum plant height (162.9cm) was registered in application of oxyfluorfen 0.15 kg/ha pre-emergence + one hand weeding at 40 DAS had significantly superior over weedy check plot, bait at par to T_3, T_3, T_7, T_4, T_6, T_2, T_5, T_9, and T_8, The maximum (4.86) number of basal branches per plant was noticed under one hand weeding at 20 DAS followed by oxyfluorfen 0.15 kg/ha (4.85) and application of oxyfluerfen 0.15 kg/ha + one hand weeding at 40 DAS (4.85) were significantly superior over other weed control treatments. The minimum basal branches per plant were significantly observed in weedy check plot (2.38). Combined application of

oxyfluorfen 0.15 kg/ha + one hand weeding at 40 DAS produced higher crop biomass (591.99 g/m^2/day). Which was at par with hand weeding twice at 20 and 40 DAS (609.94 g/m^2/day) and proved signisficantly superior over all weed control treatments? The minimum crop biomass (315.87g/m^2/day) was significantly observed in weedy check plot as compared to all of the treatments. The similar trend was found in case of LAI at 60 DAS. The maximum (5.70) LAI was registered with application of oxyfluorfen 0.15 kg/ha + one hand weeding at 40 DAS and proved significantly superior over all of the weed control treatments.

Yield attributes and yield-

Yield attributes and yields except seeds/capsule and test weight was significantly affected with weed control treatments (Table-4). Among the weed control treatments, integration of oxyfluorfen 0.15 kg/ha pre-emergence + one wand weeding at 40 DAS recorded significantly highest , seed yield (kg/ha), straw yield(kg/ha) and harvest index as compared to the absolute control, and was at par with hand weeding twice at 20 and 40 DAS. Hand weeding twice at 20 and 40 DAS had recorded significantly maximum number of capsule/plant (30.4) over the other treatments. Application of oxyfluorfen 0.15 kg/ha + one hand weeding at 40 DAS as well as pendinmethalin 0.50 kg/ha + one hand weeding at 40 DAS as well as pending at 40 DAS recorded maximum castle /plant 29.8 and 28.9 respectively followed by oxyfluorfen 0.15 kg/ha which had significant differences in different weed control treatments in respect of seeds/capsule and t4est weight. The maximum and minimum (22. 55 and 20.15) seeds per capsule was observed under the application of oxyfluorfen 0.15 kg/ha + one hand weeding at 40 DAS and absolute control, respectively. While almost similar values was found among the different weed control treatments in respect of test weight. The highest seed yield and straw yield (500 and 2230 kg/ha) were recorded significantly under the integrated weed management through application of oxyfluorfen 0.15 kg/ha + one hand weeding at 40 DAS, similar seed yield (510 kg/ha) were significantly obtained with recommended practice of hand weeding twice at 20 and 40 DAS, and proved significantly superior over other weed control treatments. While application of oxyfluorfen 0.15 kg/ha had produced seed yield (495 kg/ha), pendimetholin 0.75 kg/ha (485 kg/ha) and pendimetholin 0.50 kg/ha + one hand weeding at 40 (DAS) (485 kg/ha) being at par with each other similarly. The stras yield (2260 kg/ha) were significantly obtained with the practice of hand weeding twice at 20 and 40 DAS and proved superior over other treatments. Application of oxyfluorfen 0.15 and 0.10 kg/ha (2205 and 2080 kg/ha), pendimetholin 0.75 and 0.50 kg/ha) (2200 and 2140 kg/ha), integration of pendimetholin. 0.50 kg/ha + one hand weeding at 40 DAS and one hand weeding at 20 DAS (2085 kg/ha) were proved significantly at par with each other. The maximum harvest index (18.55%) was significantly obtained with the application of oxyfluorfen 0.15 kg/ha + one hand weeding at 40 DAS similar to hand weeding twice at 20 and 40 DAS (18.69%) and proved significantly superior over weedy check plot (18.06%) being at par with oxyfluorfen 0.10 and 0.15 kg/ha, one hand hoeing at 20 DAS (18.41%) , pendimetholin 0.50 and 0.75 kg/ha and integrated weed management through application of pendimetholin 0.50 kg/ha + one hand weeding at 40 DAS (18.15%)

Quality parameters-

Oil content (%) of sesame was not affected due to different weed control treatments. The differences did not appear significant among treatments (Table 5) The maximum and minimum (49.40 and 49.04%) values were recorded under hand weeding twice at 20 and 40 DAS and oxyfluorfen 0.10 Kg/ha, respectively. The oil yield varied markedly due to weed control treatments. Integration of oxyfluorfen 0.15 kg/ha + one hand weeding at 40 DAS yielded maximum (249 kg/ha) oil yield and found significantly superior over other weed control measure, and on a par with lose application of oxyfluorfen 0.15 kg/ha and pendimethalin 0.75 kg/ha. However, two hands weeding at 20 and 40 DAS recorded significantly highest oil yield over other treatments.

Economics:

Oxyfluorfen 0.15 kg/ha as PE proved significantly higher not returns, followed by application of pendimethalin 0.50 kg/ha and higher rate 0.75 kg/ha (Table 5). The absolute control gave significantly lowest net returns. Similarly oxyfluorfun 0.15 kg/ha as PE recorded significantly highest benefit cost ration (1.64). Followed by higher rate of pendimatholin 0.75 kg/ha (1.62) PE, being at par to oxyfluorfen 0.10 kg/ha PE and pendimetholin 0.50 kg/ha PE.

Thus, Pre-emergence application of oxyfluorfen 0.15 kg/ha followed by higher rate of pendimethalin 0.75 kg/ha as a pre emergence or pre emergence application of pendimetholin 0.50 kg/ha or application of oxyfluorfen 0.10 kg/ha as a pre-emergence can be used to get higher productivity and economic returns in Kharif Till in Jabalpur region of M.R.

Table 1. Weed density at 30 and 60 DAS in sesame as influenced by different weed control treatments.

Treatments	Echinochloa cousgalli		digitaria adscendense		Commenlina communis		Phyllanthus niruri		Cynotis axillaris	
	30 DAS	60 DAS	30 DAS	60 DAS	30 DAS	60 DAS	30 DAS	60 DAS	30 DAS	60 DAS
Absolute control	7.51	7.19	7.10	7.33	3.71	3.89	11.62	11.56	4.22	4.06
20 DAS	3.24	2.91	2.12	2.79	2.27	1.35	7.10	7.60	2.12	1.77
Two hand weeding at 20 and 40 DAS	1.35	1.77	1.35	1.77	0.70	0.70	1.77	2.67	1.35	1.34
one hand hoeing at 20 DAS	3.13	3.13	2.12	2.67	1.77	1.35	7.51	7.60	2.12	2.12
Pendi metholin 0.50 Kg/ha pre-em.	3.53	3.71	2.91	3.53	2.29	2.67	7.77	7.51	3.13	3.13
Pendimethalion 0.75 kg/ha Pre-em.	3.34	3.34	2.67	3.13	1.77	2.21	7.51	7.77	2.67	2.41
Oxyfluorfen 0.10 kg/ha Pre-em.	4.22	4.22	4.37	4.37	1.25	3.13	8.59	8.43	3.89	3.34
Oxyfluorfen 0.15 kg/ha Pre-em.	3.71	3.71	4.06	4.22	2.91	2.91	8.11	7.94	3.53	2.91
Pendimethalin 0.50 kg/ha Pre-em +1 hand weeding at 40 DAS	1.77	2.12	1.77	1.77	1.35	1.35	4.37	4.22	2.12	1.77
Oxyfluorfen 0.15 kg/ha Pre-em. +1 hand weeding at 40 DAS	2.12	2.12	1.77	2.12	1.77	1.77	7.10	7.56	1.77	1.77
SEM ±	0.16	0.21	0.28	0.17	0.10	0.08	0.43	0.52	0.24	0.06
CD (=0.05)	0.44	0.62	0.83	0.49	0.32	0.23	1.11	1.41	0.67	0.18

Table 2. Dry Weight g/m^2 of weed and control efficiency at 30 and 60 DAS as affected by weed control treatments.

Treatments	Echinochloa crusgalli		Digitaria adscendense		Commenlina communis		Phyllanthus niruri		Cynotis axillaris		Weed biomass (g/m^2)		Weed control efficiency (%)		Weed Index (%)
	30 DAS	60 DAS	30 DAS	60 DAS	30 DAS	60 DAS	30 DAS	60 DAS	30 DAS	60 DAS	30 DAS	60 DAS	30 DAS	60 DAS	50.98
Absolute control	20.92	3.08	8.44	12.07	8.54	12.15	9.64	14.05	9.05	16.35	753.50	1660.2	0.00	0.00	6.86
one hand weeding at 20 DAS	8.90	12.65	5.88	8.57	8.42	8.64	8.70	12.07	7.08	5.97	315.81	487.15	58.09	70.66	0.00
Two hand weeding at 20 and 40 DAS	7.33	10.28	6.40	9.21	7.48	10.76	6.57	9.68	7.16	5.10	242.57	423.49	67.81	74.49	10.78
One hand hoeing at 20 DAS	18.52	26.60	5.23	7.48	4.56	7.26	7.01	10.28	6.68	10.35	482.39	1023.45	35.98	38.17	5.88
Pendi metholin 0.50 Kg/ha pre-em.	8.17	11.44	7.74	10.72	6.01	12.07	7.82	11.12	8.09	7.81	286.73	274.16	61.95	65.42	4.90
Pendimethalion 0.75 kg/ha Pre-em.	7.68	10.76	6.95	9.46	7.79	10.94	7.11	9.88	7.66	29.50	274.68	450.1	63.55	72.89	7.84
Oxyfluorfen 0.10 kg/ha Pre-em.	7.86	11.08	7.30	10.47	7.73	11.77	7.21	10.93	7.91	1.07	286.97	609.32	61.92	63.30	4.90
Oxyfluorfen 0.15 kg/ha Pre-em.	7.59	10.37	6.72	9.11	7.87	10.47	6.90	9.53	7.62	6.86	267.83	435.29	64.46	73.78	2.94
Pendimethalin 0.50 kg/ha Pre-em +1 hand weeding at 40 DAS	7.23	9.75	6.59	8.98	7.23	10.44	6.72	9.27	7.33	8.60	244.30	422.34	67.58	73.36	1.96
Oxyfluorfen 0.15 kg/ha Pre-em. +1 hand weeding at 40 DAS	11.76	10.08	5.37	8.58	7.61	10.47	6.84	9.09	7.08	8.12	319.37	431.09	57.62	74.03	-
SEM ±	0.61	0.68	0.82	0.81	0.38	0.47	0.60	0.91	0.50	0.76	19.46	35.52	1.71	1.64	-
CD (=0.05)	1.82	1.92	2.21	2.34	1.23	1.58	2.01	3.02	1.63	NS	58.28	106.31	5.14	4.92	-

Table 3. Effect of different weed control treatments on growth attributes.

Treatments	Plant height (cm)	Basal branches/plant		Crop biomass g/m^2	LAI 60 DAS
Absolute control	153.2	2.38	315.87	5.17	
20 DAS	160.5	4.86	472.42	5.67	
Two hand weeding at 20 and 40 DAS	162.7	4.80	609.94	5.72	
one hand hoeing at 20 DAS	161.3	4.69	454.33	5.61	
Pendi metholin 0.50 Kg/ha pre-em.	160.2	4.64	542.37	5.67	
Pendimethalion 0.75 kg/ha Pre-em.	161.6	4.67	556.67	5.64	
Oxyfluorfen 0.10 kg/ha Pre-em.	161.4	4.74	512.80	5.58	
Oxyfluorfen 0.15 kg/ha Pre-em.	160.3	4.85	520.29	5.68	
Pendimethalin 0.50 kg/ha Pre-em +1 hand weeding at 40 DAS	160.2	4.73	492.29	5.63	
Oxyfluorfen 0.15 kg/ha Pre-em. +1 hand weeding at 40 DAS	162.9	4.85	591.99	5.70	
SEM ±	1.44	0.017	8.95	0.012	
CD (=0.05)	4.30	0.052	22.85	0.034	

Table 4. Effect of different weed control treatments on yield attributes.

Treatments	Capsules /plant	seeds/capsule	Test weight (g)	Seed yield (kg/ha)	Straw yield (kg/ha)	Harvest index	Weed index
Absolute control	15.7	20.15	2.96	250	1127	18.06	50.98
20 DAS	28.3	22.40	2.94	475	2085	18.31	6.86
Two hand weeding at 20 and 40 DAS	30.4	22.58	2.92	51	2260	18.69	0.00
one hand hoeing at 20 DAS	26.6	22.38	2.96	455	1935	18.41	10.78
Pendi metholin 0.50 Kg/ha pre-em.	28.9	22.30	2.93	480	2140	18.32	5.88
Pendimethalion 0.75 kg/ha Pre-em.	29.8	22.35	2.95	485	2200	18.33	4.90
Oxyfluorfen 0.10 kg/ha Pre-em.	28.6	22.50	2.98	470	2080	18.43	7.84
Oxyfluorfen 0.15 kg/ha Pre-em.	29.7	22.15	2.99	495	2205	18.33	4.90
Pendimethalin 0.50 kg/ha Pre-em +1 hand weeding at 40 DAS	28.9	22.45	2.94	485	2160	18.15	2.94
Oxyfluorfen 0.15 kg/ha Pre-em. +1 hand weeding at 40 DAS	29.8	22.55	2.91	500	2230	18.55	1.96
SEM ±	0.17	0.01	0.01	9	72	0.14	-
CD (=0.05)	0.53	NS	NS	28	215	0.45	-

Table 5. Effect of different weed control treatments on quality parameters and economics of sesame.

Treatments	Oil content (%)	Oil yield (kg/ha)	Net returns (kg/ha)	B:C ratio
Absolute control	49.14	123	113	0.98
20 DAS	49.30	234	5356	1.51
Two hand weeding at 20 and 40 DAS	49.40	253	4537	1.36
one hand hoeing at 20 DAS	49.23	220	5543	1.59
Pendi metholin 0.50 Kg/ha pre-em.	49.12	236	6377	1.61
Pendimethalion 0.75 kg/ha Pre-em.	49.10	246	6212	1.62
Oxyfluorfen 0.10 kg/ha Pre-em.	49.04	230	6002	1.61
Oxyfluorfen 0.15 kg/ha Pre-em.	49.23	248	6446	1.64
Pendimethalin 0.50 kg/ha Pre-em +1 hand weeding at 40 DAS	49.24	238	4572	1.39
Oxyfluorfen 0.15 kg/ha Pre-em. +1 hand weeding at 40 DAS	49.35	249	4974	1.42
SEM ±	0.13	1.39	106	0.01
CD (=0.05)	NS	4.15	313	0.03

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