Andhra Pradesh J Agril. Sci : 1(3): 30-32, 2015

YIELD AND ECONOMICS OF BROADCASTED SESAME (*Sesamum indicum* L.) AS INFLUENCED BY DIFFERENT PRE-AND POST-EMERGENCE HERBICIDES

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ABSTRACT

A field experiment was conducted during summer, 2015 at S.V. Agricultural College Farm, Tirupati to identify the effective and economical weed management practices for the control of weeds in sesame. The weed flora associated in the experimental field were *Cyperus rotundus* (40.0%), *Commelina benghalensis* (10.0%), *Cleome viscosa* (8.0%), *Boerhavia diffusa* (5.0%), *Phyllanthus niruri* (5.0%), *Dactyloctenium aegyptium* (5.0%) and *Digitaria sanguinalis* (4.0 %). Among the different weed management practices tried, two hand weedings at 20 and 40 DAS has recorded the lowest weed dry weight and highest crop dry matter production, seed yield and haulm yield. The next best weed management practice was the pre-emergence application of oxyfluorfen 75 g ha^{-1} + quizalofop 50 g ha^{-1} in recording higher seed and haulm yield. However, the highest benefit-cost ratio (2.27) was realized with pre-emergence application of oxyfluorfen 75 g ha^{-1} + propaquizafop 60 g ha^{-1} applied at 20 DAS, which was at par with pre-emergence application of oxyfluorfen 75 g ha^{-1} + quizalofop 50 g ha^{-1} applied at 20 DAS (2.25).

KEYWORDS: Herbicides, Sesame, Weed management, Yield.

INTRODUCTION

Sesame (*Sesamum indicum* L.) is the oldest oilseed crop known to human being and used by man since antiquity. It is a major oilseed crop because of its drought resistance, ease of extraction and greater stability of oil. The importance of sesame lies in its high oil content upto 50 per cent, rich in protein, calcium, iron and methionine, which are very important for pregnant and lactating women (Gupta *et al.,* 1998). Sesame oil serves as an antioxidant in the manufacture of margarine and salad creams. In India, sesame is occupying an area of 1.70 million hectares and total production of 0.68 million tonnes with average productivity of 402 kg ha^{-1} during 2012-13. In Andhra Pradesh, it is grown in an area of 0.67 lakh ha with annual production of 0.21 lakh tonnes and average productivity of 313 kg ha^{-1} during 2012-13 (www.indiastat.com). The crop is grown during *kharif, rabi* and summer seasons.

MATERIAL AND METHODS

A field experiment was conducted at S.V. Agricultural College Farm, Tirupati campus of Acharya N.G. Ranga Agricultural University during summer, 2015. The soil of the experimental site was sandy loam in texture, acidic in soil reaction, low in organic carbon, available nitrogen, phosphorus and medium in available potassium. The experiment was laid out in randomized block design with eleven treatments and replicated thrice. The treatments consisted of eleven weed management practices *viz.,* pre-emergence application of pendimethalin 750 g ha^{-1}, oxyfluorfen 75 g ha^{-1}, oxadiargyl 75 g ha^{-1} and these herbicides were applied as pre-emergence followed by post-emergence application of herbicides *viz.,* quizalofop 50 g ha^{-1} and propaquizafop 60 g ha^{-1} at 20 DAS, including hand weedings twice at 20 and 40 DAS treatment and unweeded check. Pre- and post-emergence herbicides were applied at 1 and 20 DAS of crop with help of knap sack sprayer fitted with flat fan nozzle by using spray fluid of 500 l ha^{-1} for uniform distribution. All the agronomic except weed management practices adopted as per the university manual for broadcasted sesame. The variety sarada (YLM-66) was sown on 12-01-2015 and harvested on 09-04-2015. Weed and crop dry matter production including seed, haulm yield were recorded.

RESULTS AND DISCUSSION

Different weed management practices significantly influenced the weed dry weight and crop dry matter production including yield and economics of broadcasted sesame. The predominant weed species observed in the experimental field were *Cyperus rotundus* (40.0%), *Commelina bengalensis* (15.0%), *Cleome viscosa*

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Table 1. Weed dry weight, yield and economics of sesame as influenced by different weed management practices

Treatments	Dose (g *a.i* ha^{-1})	Time of application (DAS)	Weed dry weight at harvest (g m^{-2})	Dry matter production (kg ha^{-1})	Seed yield (kg ha^{-1})	Haulm yield (kg ha^{-1})	Harvest index (%)	B : C ratio
Pendimethalin	750	1	98.30 (9.98)	2964	554	1085	33.80	1.67
Oxyfluorfen	75	1	98.94 (10.01)	3123	582	1108	34.43	1.88
Oxadiargyl	75	1	102.88 (10.20)	3071	527	1046	33.50	1.70
Pendimethalin + quizalofop	750 + 50	1 + 20	68.93 (8.36)	4199	752	1332	36.08	2.04
Oxyfluorfen + quizalofop	75 + 50	1 + 20	57.50 (7.67)	4567	784	1374	36.32	2.25
Oxadiargyl + quizalofop	75 + 50	1 + 20	77.95 (8.89)	3293	677	1255	35.04	1.95
Pendimethalin + propaquizafop	750 + 60	1 + 20	72.94 (8.60)	4060	751	1331	36.07	2.06
Oxyfluorfen + propaquizafop	75 + 60	1 + 20	60.82 (7.86)	4421	779	1366	36.31	2.27
Oxadiargyl + propaquizafop	75 + 60	1 + 20	80.47 (9.03)	3274	666	1236	35.01	1.94
Two hand weedings	-	20 + 40	18.37 (4.36)	5059	833	1418	37.00	1.97
Unweeded check			144.52 (12.04)	2813	486	993	32.86	1.65
CD (P=0.05)			0.75	148.3	25.0	32.5	0.53	0.03

(10.0%), *Boerhavia diffusa* (10.0%), *Phyllanthus niruri* (5.0%) and *Dactyloctenium aegyptium* (5.0%) in unweeded check plots at harvest.

Among the different weed management practices, the lowest weed dry weight and the highest crop dry matter production were recorded with two hand weedings at 20 and 40 DAS, which was significantly higher than with rest of the weed management practices (Table-1). The next best weed management practice was the pre-emergence application of oxyfluorfen 75 g ha^{-1} + quizalofop 50 g ha^{-1} applied at 20 DAS. This might be due to elimination of weed competition during the critical stage of the crop might have increased the crop dry matter production. These results are in conformity with those of Gnanavel and Anbhazhagan (2006). Pre-emergence application of oxadiargyl alone or in combination with quizalofop 50 g ha^{-1} or propaquizafop 60 g ha^{-1} applied at 20 DAS were not effective in suppressing the weed biomass and increasing the crop dry matter production significantly. Unweeded check resulted in the highest weed dry weight due to heavy weed infestation, which inturn reduced the crop dry matter production owing to severe competition for growth resources.

Seed yield, haulm yield and harvest index of sesame were significantly influenced by pre-and post-emergence herbicides. Hand weeding twice at 20 and 40 DAS resulted in increased seed and haulm yield including higher harvest index. All these parameters were comparable with pre-emergence application of oxyfluorfen 75 g ha^{-1} + quizalofop 50 g ha^{-1} applied at 20 DAS. This might be due to maintenance of weed free environment, resulted in increased growth and yield attributes, owing to better partitioning of photosynthates from source to sink. Similar results were also recorded with the findings of Chauhan *et al.* (2005). The seed yield of sesame was increased by 71.39 and 38.36 per cent with two hand weedings at 20 and 40 DAS and pre-emergence application of oxyfluorfen 75 g ha^{-1} + quizalofop 50 g ha^{-1} applied 20 DAS, compared to unweeded check. Among the sequential application of herbicides, the lowest seed and haulm yield including harvest index was recorded with pre-emergence application of oxadiargyl 75 g ha^{-1} + quizalofop 50 g ha^{-1} applied at 20 DAS due to phytotoxicity of oxadiargyl coupled with poor weed control efficiency. The lowest seed and haulm yield with lower harvest index was registered with unweeded check, due to reduced availability of growth resources led to reduced growth and yield components. These results are in agreement with those of Vafaei *et al.* (2013). The highest benefit-cost ratio was realized with pre-emergence application of oxyfluorfen 75 g ha^{-1} + quizalofop 50 g ha^{-1} applied at 20 DAS, which was significantly higher than two hand weedings at 20 and 40 DAS, due to decreased cost of weeding in sequential application of herbicides than two hand weedings (Sheoran *et al.,* 2012).

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