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Integrated Weed Management in *Coleus amboinicus/aromaticus* (Benth.)

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ABSTRACT

Pre-emergence application of oxyfluorfen at 0.15 kg ha^{-1} followed by one hand weeding at 35 days after planting recorded the least weed count and weed dry matter production (22.1 g m^{-2}) favouring higher herbage yield (31.84 t ha^{-1}). Application of oxyfluorfen, fluchloralin, pendimethalin and alachlor at lower doses in combination with one hand weeding produced significantly higher herbage yields than application of these herbicides alone in higher doses.

INTRODUCTION

Coleus amboinicus/aromaticus (Benth.) is an important medicinal plant, which has larger demands and is traded in medicinal drug markets of the world. Recent studies indicate that coleus plant has remarkable bactericidal, nematicidal, molluscicidal properties (Vasquez *et al.*, 1999) besides allelopathic inhibition on *Eichhornia crassipes* (Mart.) Solm. Laubach. The same is also shown to be allelopathic on many other aquatic weeds and algal growth (Kathiresan, 2000). Weed control is important in coleus, since it is a long duration and irrigated crop. Weeds grow luxuriantly and compete with this crop, because of its slow growth and establishment during initial stages. Keeping this fact in view, the present investigation was undertaken to evaluate the performance of various herbicides applied alone or in combination with hand weeding.

MATERIALS AND METHODS

Field experiment was conducted during 2001 and 2002 in farmers' field near Annamalai University, to study the effect of weed control measures on herbage yield of coleus plant. The soil of the experimental field was loamy sand with a pH of 7.4 and was low in available nitrogen, medium in available phosphorus and high in available potassium. A set of 10 treatments (Table 1) was laid out in randomized block design with three replications. Recommended dose of 100 kg N, 50 kg P_2O_5 and 50 kg K_2O ha^{-1} was applied to the crop. Forty days old seedlings of coleus were planted with spacing of 60 x 45 cm. Herbicides were applied as pre-emergence using 600 l of water per hectare. Fluchloralin was applied prior to planting on a dry soil and was immediately followed by irrigation. Weed species and their dry matter production were recorded from four randomly selected quadrats (0.25 m^{-2}) in each plot.

RESULTS AND DISCUSSION

Effect on Weeds

The predominant weed species in the experimental plots were : *Cyperus rotundus* (L.) (19.4%), *Cynodon dactylon* (L.) (9.4%), *Echinochloa colona* (L.) (19.4%), *Trianthema portulacastrum* (L.) (21.0%), *Eclipta alba* (L.) (19.4%) and *Cleome viscosa* (L.) (11.3%). All the weed control treatments caused significant reduction in total weed density and weed dry weight when compared to unweeded control. Oxyfluorfen at 0.15 kg ha^{-1} followed by one weeding at 35 days after planting (DAP) recorded the least weed count (Table 1) and weed dry weight (22.1 g m^{-2}). This was followed by application of fluchloralin at 1.0 kg ha^{-1} supplemented with one weeding at 35 DAP. Unweeded control registered the highest weed

Table 1. Effect of treatments on weed density 60 DAP (No. m^{-2}) (Mean of two crop seasons)

Treatment	Dose ($g\ ha^{-1}$)	*C. rotundus*	*C. dactylon*	*E. colona*	*T. portulacastrum*	*E. alba*	*C. viscosa*
Control	-	3.54 (12)	2.55 (6)	3.54 (12)	2.12 (4)	3.54 (12)	2.74 (7)
Weeding 25 and 45 DAP	-	2.12 (4)	1.23 (l)	1.87 (3)	2.12 (4)	1.58 (2)	0.71 (0)
Oxyfluorfen	250	2.92 (8)	2.12 (4)	2.12 (4)	1.23 (l)	1.87 (3)	2.55 (6)
Oxyfluorfen fb weeding 35 DAP	150	1.87 (3)	1.23 (l)	1.87 (3)	2.12 (4)	1.23 (l)	1.23 (l)
Fluchloralin	1500	3.08 (9)	1.23 (l)	2.74 (7)	2.35 (5)	2.12 (4)	2.12 (4)
Fluchloralin fb weeding 35 DAP	1000	2.12 (4)	1.58 (2)	1.23 (l)	1.58 (2)	2.35 (5)	1.23 (l)
Pendimethalin	1500	3.24 (10)	2.12 (4)	3.08 (9)	2.12 (4)	2.12 (4)	2.35 (5)
Pendimethalin fb weeding 35 DAP	1000	1.87 (3)	2.12 (4)	2.55 (6)	1.87 (3)	1.87 (3)	1.87 (3)
Alachlor	2000	3.24 (10)	1.58 (2)	2.55 (6)	2.74 (7)	2.35 (5)	2.35 (5)
Alachlor fb weeding 35 DAP	1000	2.35 (5)	1.87 (3)	2.35 (5)	2.35 (5)	1.87 (3)	2.55 (6)
LSD (P=0.05)		0.55	0.42	0.39	0.28	0.49	0.47

Figures in parentheses are original values.

Table 2. Effect of treatments on weeds and the crop (Mean of the two crop seasons)

Treatment	Dose ($g\ ha^{-1}$)	Weed dry weight $g\ m^{-2}$ (60 DAP)	Plant height (cm)	No. of branches $plant^{-1}$	Yield ($t\ ha^{-1}$)
Control	-	118.3	52.0	23.1	11.87
Weeding 25 and 45 DAP	-	27.9	75.9	43.8	30.29
Oxyfluorfen	250	49.0	64.4	35.6	22.29
Oxyfluorfen fb weeding 35 DAP	150	22.1	78.6	48.5	31.84
Fluchloralin	1500	50.2	63.0	34.1	21.04
Fluchloralin fb weeding 35 DAP	1000	25.8	76.7	44.9	30.75
Pendimethalin	1500	54.0	61.0	33.0	20.39
Pendimethalin fb weeding 35 DAP	1000	30.4	70.7	40.9	28.40
Alachlor	2000	54.2	58.7	30.4	19.75
Alachlor fb weeding 35 DAP	1000	33.8	69.4	39.5	27.55
LSD (P=0.05)		37.2	3.51	3.05	0.75

population and weed dry weight (118.3 g m^{-2}). Excellent control of annual weeds by oxyfluorfen at 0.15 kg ha^{-1} during the initial stages followed by the physical removal of weeds (that emerged late in the season or that were of perennial habit) due to hand weeding supplement contributed for the superior performance of these integrated measures. The results are in conformity with the findings of Golhe (2001). Applications of herbicides alone were found to be less effective in reducing weed count and weed dry matter production.

Effect on Crop

All the weed management treatments significantly increased the herbage yield of coleus over unweeded control (Table 2). Significantly lower values of plant height, number of branches $plant^{-1}$ and herbage yield were recorded under unweeded control. The pre-emergence application of oxyfluorfen at 0.15 kg ha^{-1} followed by one weeding at 35 DAP was effective and significantly superior to the rest of the treatments by recording highest herbage yield of 31.84 t ha^{-1}. The herbage yield under fluchloralin at 1.0 kg ha^{-1} supplemented with one weeding at 35 DAP was comparable to that of oxyfluorfen at 0.15 kg ha^{-1} followed by one hand weeding. This is due to suppression of weed competition by integrated weed control treatments offering efficient and prolonged weed control leading to higher herbage yield. Application of oxyfluorfen, fluchloralin, pendimethalin and alachlor at lower doses in combination with one weeding produced significantly higher herbage yields than application of these herbicides alone at higher doses.

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