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Effect of Integrated Weed Management on Weed indices in Transplanted Ragi

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Key words: Transplanted ragi, Integrated weed management, Total weed count, Weed biomass, Weed control index

Finger millet (*Eleusine coracana* L.) is one of the important staple food crops in India, next to sorghum and pearl millet [1]. It contains 9.2% protein, 1.3% fat, 76.3% carbohydrate, 2.2% minerals and 3.9% ash besides vitamin A and B. The grains are rich in phosphorus, potassium, amino acid. It also a rich source of calcium for growing children and aged people [2]. The cultivated area of finger millet in India is 11.9 lakh hectares and production is 19.8 lakh tonnes with an average productivity of 1662 kg ha⁻¹. Karnataka ranks first in production with 12.8 lakh tonnes followed by Tamil Nadu with 3.2 lakh tonnes. Weeds are the major problems; the farmer is faced with in the production of crop. Weeds are well competitors for natural resources and absorbs much faster and in relatively larger amounts than crops. In order to check the losses caused by weeds is vital to control all types of weeds during crop growth period to enhance growth and yield [3]. In finger millet, initial growth period is subjected to heavy weed problem resulting into higher competition and drastic yield reduction [4]. The critical period of crop weed competition in ragi is from 25 to 45 DAS [5]. The benefits of using herbicides have many folds which includes effective control of wide spectrum of weeds and economical in operation [6].

The combination of herbicide along with commonly used weed control method is the best integrated approach for efficient weed control in finger millet [7]. Since, single method is not able to control all the weeds up to desired level, combination of herbicides and commonly following weed control methods controlling the weeds effectively and increases the weed control efficiency. Hence, the present investigation has been carried out to evaluate effect of integrated weed management practice on weed indices in transplanted ragi.

Field experiment was conducted at Appedu village, Chetpet block, Tiruvannamalai, Tamil Nadu during summer,

2020. The experimental site was located at 12°53'N latitude, 79°32'E longitude and at an altitude of 171 m above MSL. The crop period does not receive a rain fall during crop season. The mean maximum and minimum temperature recorded during the cropping season were 33.7°C and 25.9°C and the mean relative humidity ranged from 68 to 77 per cent. The soil of the experimental field was sandy clay loam in texture with pH of 7.18 and EC of 0.19 dS m⁻¹. The experimental soil was low in available nitrogen (133.38 kg ha⁻¹), medium in available phosphorus (14.82 kg ha⁻¹) and medium in available (247.00 kg ha⁻¹). The field experiment was laid out in randomized block design (RBD) with three replications and ten treatments. The treatments comprised of T₁- oxadiargyl 80% WP @ 100 g a.i./ha on 3 DAT, T₂- Bensulfuron methyl 0.6% + pretilachlor 6% G @ 660 g a.i./ha on 3 DAT, T₃- Bispyribac sodium 10% SC @ 25 g a.i./ha on 20 DAT, T₄- oxadiargyl 80% WP @ 100 g a.i./ha on 3 DAT *fb* bispyribac sodium 10% SC @ 25 g a.i./ha on 20 DAT, T₅- Bensulfuron methyl 0.6% + pretilachlor 6% G @ 660 g a.i./ha on 3 DAT *fb* bispyribac sodium 10% SC @ 25 g a.i./ha on 20 DAT, T₆- Two hand weeding on 15 and 30 DAT, T₇-oxadiargyl 80% WP @ 100 g a.i./ha on 3 DAT *fb* one hand weeding on 30 DAT, T₈-Bensulfuron methyl 0.6% + pretilachlor 6% G @ 660 g a.i./ha on 3 DAT *fb* one hand weeding on 30 DAT, T₉ - One hand weeding on 15 DAT *fb* bispyribac sodium 10% SC @ 25 g a.i./ha on 25 DAT and T₁₀ - unweeded control. The ragi variety CO15 was grown during the course of investigation. Total weed count and weed biomass were recorded at 15 and 30 days after transplanting (DAT) by adopting standard procedure. Weed control index was worked out on the basis of weed biomass recorded in each treatment by using formula as suggested by Misra and Josh [8].

$$WCI = \frac{\text{Weed biomass in unweeded control plot} - \text{Weed biomass in treated plot}}{\text{Weed biomass in unweeded control plot}} \times 100$$

Effect on weeds

Weed flora present in the experimental field was composite in nature comprising of grasses, sedges and

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broad-leaved weeds (BLW). The major grass weeds are *Echinochloa colonum*, *Chloris barbata*, *Dactyloctenium aegyptium*, *Eragrostis tenella*, sedge, *Cyperus rotundus* and broad-leaved weeds, *Digera arvensis*, *Corchorus trilocularis* and *Phyllanthus niruri* were the dominant weed species in transplanted ragi [9].

Effect on total weed count and weed biomass

Integrated weed management practices in transplanted ragi have significantly influenced the total weed count and weed biomass (Table 1) at 15 and 30 DAT, pre-emergence application of bensulfuron methyl 0.6% + pretilachlor 6% G @ 660 g a.i./ha on 3 DAT *fb* one hand weeding on 30 DAT (T₈) registered the lower total weed count (8.17 and 13.13 No/m² at 15 and 30 DAT, respectively) and weed biomass (13.42 and 22.54 kg/ha at 15 and 30 DAT, respectively). This was followed by two hand weeding on 15 and 30 DAT (T₆), it was on par with pre-emergence application of oxadiargyl 80% WP @ 100 g a.i./ha on 3 DAT *fb* one hand weeding on 30 DAT.

Pre-emergence application of bensulfuron methyl 0.6% + pretilachlor 6% G @ 660 g a.i./ha on 3 DAT *fb* one hand weeding on 30 DAT markedly reduced the total weed count and weed biomass in transplanted ragi. The primary mode of action is to inhibit the aceto lactate synthase which

inhibits the protein synthesis and cell division as well as translocation of photosynthase to the growing points due this reason the weed count and weed biomass has reduced [10]. Unweeded control (T₁₀) recorded the higher total weed count (110.73 and 139.26 No/m² at 15 and 30 DAT, respectively) and weed biomass (214.40 and 252.80 kg/ha at 15 and 30 DAT, respectively) [11].

Effect on weed control index

Adoption of integrated weed management practices had significant effect on weed control index (Table 1). Pre-emergence application of bensulfuron methyl 0.6% + pretilachlor 6% G @ 660 g a.i./ha on 3 DAT *fb* one hand weeding on 30 DAT (T₈) registered the higher weed control index (93.74 and 91.00 per cent at 15 and 30 DAT). This was followed by two hand weeding on 15 and 30 DAT (T₆) (90.64 and 85.18 per cent at 15 and 30 DAT). It was on par with pre-emergence application of oxadiargyl 80% WP @ 100 g a.i./ha on 3 DAT *fb* one hand weeding on 30 DAT. The higher weed control index is resulted due to the reduced total weed population and weed biomass. This might due to the reason that pre-emergence herbicide application reduces the weed emergence at early stages, hand weeding eliminated most of the weeds and crop meets its requirement easily from the soil [12].

Table 1 Effect of integrated weed management practices on total weed count (No/m²), total weed biomass (kg/ha), weed control index (%) in transplanted ragi

Treatments	Total weed count (No./m ²)		Total weed biomass (kg/ha)		Weed control index (%)	
	15 DAT	30 DAT	15 DAT	30 DAT	15 DAT	30 DAT
T ₁ : Oxadiargyl 80% WP @ 100 g a.i./ha on 3 DAT	8.07 (64.77)	9.48 (89.42)	75.76	125.46	64.66	50.37
T ₂ : Bensulfuron methyl 0.6 % + Pretilachlor 6% G @ 660 ga.i./ha on 3 DAT	7.28 (52.64)	8.25 (67.64)	62.55	109.09	70.82	56.84
T ₃ : Bispyribac sodium 10% SC @ 25 g a.i./ha on 20 DAT	9.71 (93.82)	10.45 (108.61)	108.60	168.57	49.34	33.31
T ₄ : Oxadiargyl 80% WP @ 100 g a.i./ha on 3 DAT + Bispyribac sodium 10% SC @ 25 g a.i./ha on 20 DAT	6.03 (35.97)	6.91 (47.29)	42.18	75.35	80.15	70.19
T ₅ : Bensulfuron methyl 0.6 % + Pretilachlor 6% G @ 660 g a.i./ha on 3 DAT + Bispyribac sodium 10% SC @ 25 g a.i./ha on 20 DAT	4.83 (22.86)	5.96 (35.06)	26.77	54.34	87.51	78.50
T ₆ : Two hand weeding on 15 and 30 DAT	3.74 (13.50)	4.59 (20.63)	20.05	37.46	90.64	85.18
T ₇ : Oxadiargyl 80% WP @ 100 g a.i./ha on 3 DAT + One hand weeding on 30 DAT	3.93 (15.02)	4.77 (22.34)	21.72	38.95	89.86	84.59
T ₈ : Bensulfuron methyl 0.6 % + Pretilachlor 6% G @ 660 g a.i./ha on 3 DAT + One hand weeding on 30 DAT	2.94 (8.17)	3.69 (13.13)	13.42	22.54	93.74	91.00
T ₉ : One hand weeding on 15 DAT + Bispyribac sodium 10% SC @ 25 g a.i./ha on 25 DAT	6.18 (37.74)	7.06 (49.35)	42.76	76.78	80.00	69.62
T ₁₀ : Unweeded control	10.54 (110.73)	11.82 (139.26)	214.40	252.80	-	-
SEm±	0.13	0.17	2.25	3.94	-	-
CD(P=0.05)	0.40	0.52	6.75	11.83		

Figures in the parenthesis indicates the original values

SUMMARY

Field experiment was conducted at Appedu village, Chetpet block, Tiruvannamalai during summer, 2020 to evaluate the effect of integrated weed management practices in transplanted ragi. The results revealed that the lowest total

weed count, weed biomass and higher weed control index were recorded in pre-emergence application of bensulfuron methyl 0.6% + pretilachlor 6% G @ 660 g a.i./ha on 3 DAT *fb* one hand weeding on 30 days after treatment (DAT) and it was followed by two hand weeding on 15 and 30 days after treatment (DAT).

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