International Journal of Botany Studies
www.botanyjournals.com
ISSN: 2455-541X
Received: 13-08-2021, Accepted: 27-08-2021, Published: 13-09-2021
Volume 6, Issue 5, 2021, Page No. 433-435

Efficacy of integrated weed management on growth attributes in transplanted ragi

S Kalaisudarson*, J Keerthana, A Sundari, A P Srinivasaperumal, K Suseendran, R Manivannan
Department of Agronomy, Department of Soil Science and Agricultural Chemistry, Faculty of Agriculture, Annamalai University, Annamalainagar, Tamil Nadu, India

Abstract
Field experiment was conducted at Appedu village, Chetpet block, Tiruvannamalai during summer, 2020 to evaluate the efficacy of integrated weed management practices in transplanted ragi. The experiment was laid out in randomized block design with three replications. The integrated weed management practices *viz.*, oxadiargyl 80% WP @ 100 g a.i./ha on 3 DAT, 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, oxadiargyl 80% WP @ 100 g a.i./ha on 3 DAT *fb* bispyribac sodium 10% SC @ 25 g a a.i./ha on 20 DAT, 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, two hand weeding on 15 and 30 DAT, oxadiargyl 80% WP @ 100 g a.i./ha on 3 DAT *fb* one hand weeding on 30 DAT, bensulfuron methyl 0.6% + pretilachlor 6% G @ 660 g a.i./ha on 3 DAT *fb* one hand weeding on 30 DAT, one hand weeding on 15 DAT *fb* bispyribac sodium 10% SC @ 25 g a.i./ha on 25 DAT and unweeded control. Among the integrated weed management practices, 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 was most effectively suppressing the weeds and improves the growth attributes in transplanted ragi.

Keywords: IWM, plant height, LAI, growth attributes and ragi

Introduction
Millets are important stable food crops to the millions of the people in the arid and semi-arid regions of the world due to their greater resistance to pest and disease and good adaptation to a wide range of environment. Millets are mostly cultivated as rainfed crop and it succeeds under stressful situation where other crops fail to produce an acceptable harvest. Finger millet is commonly known as ragi is one of the important stable food crops of South India, next to sorghum and pearl millet. Finger millet contains 9.2 % protein, 1.3 % fat, 76.3 % carbohydrate, 2.2 % minerals and 3.9 % ash besides vitamin A and B. It is rich in phosphorus, potassium, amino acid and also a rich source of calcium for growing children and aged people (Tomar *et al*., 2011) [5]. In India, the cultivated area of finger millet is 11.9 lakh hectares and the 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 tones. Whereas the average productivity of Tamil Nadu is high (3257 kg ha^{-1}) followed by Karnataka (Agricultural statistics at a Glance, 2019) [3]. In crop production weeds are the major problems faced by the farmer. Weeds are the competitors for all the natural resources and absorbs much faster and in relatively larger amounts than crops, to check the losses caused by weeds is vital to control all types of weeds during crop growth period to increase the growth and yield (Walia *et al.*, 2012) [6]. Initial growth period is subjected to heavy weed problem resulting into higher competition and drastic yield reduction in finger millet (Adikant Pradhan *et al.*, 2012) [1]. The critical period of crop weed competition in ragi is from 25 to 45 DAS and the herbicides are economical and cost effective in managing weeds during initial stages as compared to hand weeding (Kumara *et al*., 2007) [4]. Integrated weed management is an effective management strategy to enhance judicious use of herbicides along with any one of the methods is effective and economically feasible weed control practice. Since, individual approach is not able to effective in control all the weeds upto desired level, combination of herbicide along with mechanical method of weed control method as an integrated approach is the best suited method of weed management practice in transplanted finger millet. Hence, the present study has been carried out to evaluate effective integrated weed management approach on growth attributes in transplanted ragi.

Materials and Methods
A field experiment was conducted at Appedu village, Chetpet block, Tiruvannamalai, Tamil Nadu during summer, 2020. The experimental site was located at $12^{0}53$'N latitude, $79^{0}32$'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^{0}C and 25.9^{0}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 ragi variety CO15 was grown during the course of study. The growth attributes are recorded at 30, 45 DAT and at harvest stage of the crop.

Results and Discussion
Effect on plant height
All the weed control treatments exerted significant influence over the plant height at 30, 45 DAT and at harvest. Among the treatments, pre-emergence application of Bensulfuron

methyl 0.6% + Pretilachlor 6% G @ 660 g a.i. ha^{-1} on 3 DAT + One hand weeding on 30 DAT (T_8) produced taller plant height of 57.05 cm, 79.79 cm and 92.67 cm at 30, 45 DAT and at harvest, respectively. This was followed by two hand weeding on 15 and 30 DAT (T_6), which was on par with pre-emergence application of Oxadiargy l 80% WP @ 100 g a.i. ha^{-1} on 3 DAT + One hand weeding on 30 DAT (T_7). The least plant height of 25.40 cm, 40.86 cm and 58.45 cm at 30, 45 DAT and at harvest respectively were observed with unweeded control (T_{10}).

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 recorded the higher plant height. Competition due to microclimate around plants due to weed control may allowed plants to grow profusely during vegetative growth and resulted in to more accumulation of photosynthesis, which ultimately converted into higher economic yield. Maintaining high soil fertility status by way of removing less plant nutrient through weeds might modify the growth and yield attributes. Significant improvement in growth characters also might have resulted in maximum plant height. These findings are in close conformity with those reported by Yathisha *et al.*, 2020 [7]. Unweeded control recorded the least plant height because of the poor control of weeds that leads to heavy competition between the crop and weeds.

Effect on LAI

Among the integrated weed management practices, pre-emergence application of Bensulfuron methyl 0.6% + Pretilachlor 6% G @ 660 g a.i. ha^{-1} on 3 DAT + One hand weeding on 30 DAT (T_8) significantly registered the highest leaf area index of 3.87. This was followed by two hand weeding on 15 and 30 DAT (T_6) recorded the leaf area index (3.55). The unweeded control (T_{10}) registered the lowest leaf area index (1.15). Reduction of weed density might have improved the availability of resources such as, space, soil moisture, light and nutrients to the crop thus resulted in higher growth parameters. Pre-emergence application of Bensulfuron methyl 0.6% + Pretilachlor 6% G @ 660 g a.i. ha^{-1} on 3 DAT + One hand weeding on 30 DAT recorded the higher leaf area index. Improved nutrient uptake by ragi and crop vigour due to elimination of the weeds there by offering perfect and prolonged weed control which might have contributed to increase LAI in this treatment.

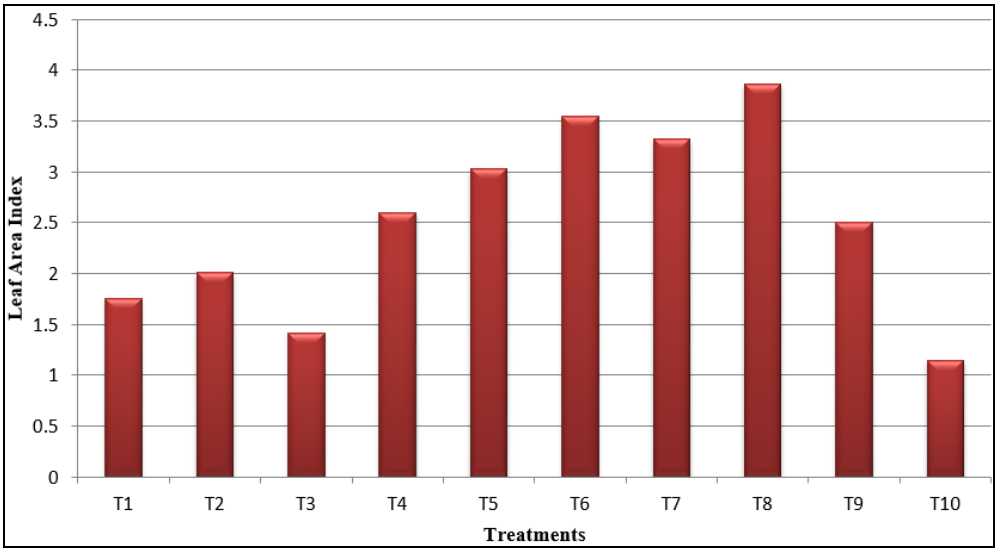

Fig 1

T_1 - Oxadiargyl 80% WP @ 100 g a.i. ha^{-1} on 3 DAT
T_2 - Bensulfuron methyl 0.6% + Pretilachlor 6% G @ 660 g a.i. ha^{-1} on 3 DAT
T_3 - Bispyribac sodium 10% SC @ 25 g a.i. ha^{-1} on 20 DAT
T_4 - Oxadiargyl 80% WP @ 100 g a.i. ha^{-1} on 3 DAT + Bispyribac sodium 10% SC @ 25 g a.i. ha^{-1} on 20 DAT
T_5 - Bensulfuron methyl 0.6% + Pretilachlor 6% G @ 660 g a.i. ha^{-1} on 3 DAT + Bispyribac sodium 10% SC @ 25 g a.i. ha^{-1} on 20DAT
T_6 - Two hand weeding on 15 and 30 DAT

Effect on crop dry matter production

The data computed on crop dry matter production (kg ha^{-1}) at 30, 45 DAT and at harvest are furnished in Table 1. Dry matter production was significantly influenced by all the treatments. The dry matter production increased with increased in age of crop and reached its peak at maturity. Among the weed control measures, pre-emergence application of Bensulfuron methyl 0.6% + Pretilachlor 6% G @ 660 g a.i. ha^{-1} on 3 DAT + One hand weeding on 30 DAT (T_8) recorded the highest dry matter production (683, 1585 and 9787 kg ha^{-1} at 30, 45 DAT and at harvest, respectively). This was followed by two hand weeding on 15 and 30 DAT (T_6). The unweeded control (T_{10}) registered the lowest crop dry matter production (248, 1065 and 5869 kg ha^{-1} at 30, 45 DAT and at harvest, respectively). Pre-emergence application of Bensulfuron methyl 0.6% + Pretilachlor 6% G @ 660 g a.i. ha^{-1} on 3 DAT + One hand weeding on 30 DAT recorded the highest dry matter production.

This treatment resulted in better control of weeds and provided weed free condition for longer period of crop growth and resulted in increase of all growth parameters as well as it might be due to effective control of weeds. This cumulatively facilitated the crop to utilize more nutrient and water for better growth and development measured in terms of various growth attributing characters such as plant height, LAI and DMP.

These findings are close agreement with those reported by Afsaribanu *et al*. (2017) [2].

Table 1: Efficacy of integrated weed management on growth attributes in transplanted ragi.

Treatments	Plant height (cm)			LAI	Crop drymatter production (kg ha^{-1})		
	30 DAT	45 DAT	Harvest		30 DAT	45 DAT	Harvest
T_1 - Oxadiargyl 80% WP @ 100 g a.i./ha on 3 DAT	32.42	51.37	68.68	1.75	367	1196	7131
T_2 - Bensulfuron methyl 0.6 % + Pretilachlor 6% G @ 660 g a.i./ha on 3 DAT	35.78	56.74	73.69	2.01	415	1256	7840
T_3 - Bispyribac sodium 10% SC @ 25 g a.i./ha on 20 DAT	29.09	46.72	63.53	1.42	311	1130	6890
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	42.67	61.14	79.34	2.60	495	1352	8250
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	46.57	67.99	83.60	3.03	550	1428	8765
T_6 - Two hand weeding on 15 and 30 DAT	52.66	74.06	89.26	3.55	631	1510	9487
T_7 - Oxadiargyl 80% WP @ 100 g a.i./ha on 3 DAT + One hand weeding on 30 DAT	51.67	72.31	88.36	3.32	612	1494	9339
T_8 - Bensulfuron methyl 0.6 % + Pretilachlor 6% G @ 660 g a.i./ha on 3 DAT + One hand weeding on 30 DAT	57.05	79.79	92.67	3.87	683	1585	9787
T_9 - One hand weeding on 15 DAT + Bispyribac sodium 10% SC @ 25 g a.i./ha on 25 DAT	41.64	61.87	78.72	2.51	480	1330	8120
T_{10} - Unweeded control	25.40	40.86	58.45	1.15	248	1065	5869
S.Em+CD(P=0.05)	1.09 3.28	1.38 4.15	1.12 3.36	0.08 0.25	10.89 32.67	19.43 58.31	75.21 225.64

Conclusion

From this field experiment, it could be concluded that 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 was most effectively suppressing the weeds and improves the growth attributes in transplanted ragi.

References

1. Adikant Pradhan A, Rajput AS, Thakur A. Effect of weed management practices on finger millet under rainfed conditions. Indian Journal of Weed Science,2012:44(2):115-117.
2. Afsaribanu, Fathima PS, Denesh GR, Sunil CM. Effect of weed management practices on nutrient uptake by transplanted finger millet and its associated weeds. Research in Environment and Life Science,2017:10(7): 645-648.
3. Agricultural statistics at a Glance. Govt. of India, Ministry of Agricuture & Farmers Welfare, Dept. of Agricuture cooperation & Farmers Welfare, Directorate of Economics & Statistics, 2019.
4. Kumara O, Basavaraj Naik T, Palaiah P. Effect of weed management practices and fertility levels on growth and yield parameters in finger millet. Karnataka Journal of Agricultural Sciences,2007:20(2):230-233.
5. Tomar GS, Taunk SK, Choudhary JL. Science of crop production part-1 *kharif* crop. Kushal publication, Varanasi, India, 2011, 182-183.
6. Walia US, Walia SS, Amandeep SS, Shelly N. Bioefficacy of pre and postemergence herbicides in direct-seeded rice in cental Punjab. Indian Journal of Weed Science,2012:44:30-33.
7. Yathisha KP, Yogananda SB, Thimmegowda P, Sanjay MT, Prakash SS. Growth and yield of direct seeded finger millet (*Eleusine coracana* L.) as influenced by weed management practices. Journal of Crop and Weed,2020:16(3):67-72.