*Andhra Pradesh J Agril. Sci* : 7(4): 193-197, 2021 **PERFORMANCE OF DIFFERENT PRE-EMERGENCE HERBICIDES ON WEED GROWTH, NUTRIENT UPTAKE AND YIELD OF FOXTAIL MILLET**

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**ABSTRACT**

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A field experiment was conducted during *kharif* 2020 at S.V. Agricultural College, Tirupati, Andhra Pradesh to identify the performance of different pre-emergence herbicides on weed growth, nutrient uptake and yield of foxtail millet. The present study has revealed that the lowest weed density and weed dry weight as well as higher WCE including nutrient uptake of foxtail millet were recorded with HW twice (W10) at 20 and 40 DAS followed by PE application of pretilachlor 500 g ha-1 *fb* intercultivation at 20 DAS (W4). Heavy weed infestation in unweeded check drained nutrient uptake by 45.67, 18.03 and 35 kg ha-1 of nitrogen, phosphorous and potassium, respectively. Hand weeding twice obtained higher grain yield, but benefit-cost ratio was lag behind the best weed management practice *i.e.,* PE application pretilachlor 500 g ha-1 *fb* intercultivation at 20 DAS.

**KEYWORDS**: Broad-spectrum, Intercultivation, Nutrient uptake, Pre-emergence herbicide, Pretilachlor

**INTRODUCTION**

Foxtail millet (*Setaria italic* (L.) Beauv) a member of the family Poaceae, is highly drought resistant crop grown under rainfed condition and produces high quality grains than many other cereals under extreme conditions like unfertile soil, intense heat and prolonged drought. In India, the cultivation of foxtail millet is confined to Andhra Pradesh, Karnataka and Tamil Nadu. Generally, small millets are relatively poor competitors for growth resources than weeds, especially during the early stages of the crop. The critical period of crop-weed competition in finger millet was up to four weeks after sowing, to obtain higher grain yield (Nanjappa and Hosmani, 1985). Pre-emergence herbicide improves the weed control and production efficiency in major millets due to their bigger seed size and comparatively deeper depth of sowing than small millets. The yield potential of minor millets including foxtail millet has been very low under rainfed areas because of lack of good management practices (Pandey *et al*., 2018). Keeping the facts in view, the present investigation was undertaken to know the performance of different pre-emergence herbicides on nutrient uptake and yield of foxtail millet.

**MATERIAL AND METHODS**

A field experiment was conducted during *kharif*, 2020 at wetland farm of S.V. Agricultural College,

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Acharya N.G. Ranga Agricultural University, Tirupati, Andhra Pradesh in foxtail millet. The experimental field was sandy clay loam in texture which is low in organic carbon (0.35%). The soil is neutral in reaction (pH 6.9), low in available N (176.0 kg ha-1), high in available phosphorus (38 kg ha-1) and potassium (232.0 kg ha-1). The experiment was laid out in a randomized block design with eleven treatments and replicated thrice. Foxtail millet was sown at a spacing of 30 × 10 cm on 14th August, 2020. The weed management practices consisted of pre emergence (PE) application of pretilachlor, isoproturon and pyrazosulfuron-ethyl 500, 500 and 15 g ha-1, respectively. All the pre-emergence herbicides were supplemented with intercultivation or post-emergence application of penoxsulam 20 g ha-1 at 20 DAS. Hand weeding twice and unweeded check were also included as standard checks (Table 1). Pre-emergence herbicides were applied at 1 DAS and intercultivation / post emergence herbicide, penoxsulam was applied at 20 DAS. All the pre-and post-emergence herbicides were applied with the help of knapsack sprayer fitted with flat fan nozzle and spray volume of 500 L ha-1. Uniform dose of 20 kg N and 20 kg P2O5 ha-1 was applied in the form of urea and single super phosphate respectively to all the plots. Nitrogen in the form of urea was applied in two splits *viz*., half of the dose as basal and the remaining half of the dose as top dressing at 30 DAS and entire dose of phosphorous in the form of single super phosphate was

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applied as basal at the time of sowing itself. The rest of the packages of practices were adopted as per recommendations of the Acharya N.G. Ranga Agricultural University. Weed density and dry weight were recorded randomly with the help of 0.25 m2 quadrate. The data on weed density and dry weight were transformed to square

root ( X + 0.5 transformation to normalize their distribution. Weed control efficiency was computed as per the method suggested by Mani *et al.* (1973). The crop was harvested on 5th November, 2020. The nutrient uptake (kg ha-1) by crop and weeds was calculated as per the methods suggested by (Subbiah and Asija, 1956; Olsen *et al*., 1954) respectively at harvest in foxtail millet. Plant height and dry matter production, yield attributes, grain and straw yield were recorded at harvest as per the standard procedure. The net returns were arrived at by deducting the cost of cultivation from gross returns for the corresponding treatments. Benefit-cost ratio was calculated after dividing gross returns with cost of cultivation.

**RESULTS AND DISCUSSION**

**Weed growth**

The lowest density and dry weight of all the categories of weeds were noticed with HW twice which was significantly lesser than rest of the weed management practices tried. These results are in agreement with the findings of Patil *et al.* (2013). The next best treatment was the PE application of pretilachlor 500 g ha-1 *fb* intercultivation at 20 DAS, which was comparable with the PE application of pyrazosulfuron-ethyl 15 g ha-1 *fb* intercultivation at 20 DAS and isoproturon 500 g ha-1 *fb* intercultivation at 20 DAS. These results are in conformity with the findings of Yathisha *et al*. (2020). The higher density and dry weight of total weeds was noticed with PE application of isoproturon 500 g ha-1 *fb* penoxsulam 20 g ha-1 at 20 DAS among the herbicidal treatments. These results are in conformity with findings of Mishra *et al*. (2016). Pre-emergence application of pretilachlor 500 g ha-1 *fb* intercultivation at 20 DAS resulted in lesser density and dry weight of total weeds with higher WCE, which was statistically similar to PE application of pryrazosulfuron-ethyl 15 g ha-1 *fb* intercultivation at 20 DAS and both of them were significantly less effective in obtaining broad-spectrum weed control than HW twice. Among the herbicidal treatments, significantly higher density and dry weight of weeds as well as lower WCE

were obtained with PE application of isoproturon 500 g ha-1 *fb* penoxsulam 20 g ha-1 applied at 20 DAS.

**Nutrient uptake**

The lowest nutrient uptake by weeds at harvest was associated with HW twice which was significantly lesser than rest of the treatments. Pre-emergence application of pretilachlor 500 g ha-1 *fb* intercultivation was found to be the next best treatment in reducing nutrient drain by weeds. This might be due to control of all weeds and thereby reduced the dry weight of total weeds leading to decreased nutrient uptake in these weed management practices. The nutrient loss due to heavy weed infestation in unweeded check (W11) was 45.67, 18.03 and 35 kg ha-1 of nitrogen, phosphorus and potassium, respectively (Table 1). Significantly higher uptake of nitrogen, phosphorus and potassium by foxtail millet at harvest was recorded with HW twice than rest of the weed management practices. Pre-emergence application of pretilachlor 500 g ha-1 *fb* intercultivation at 20 DAS resulted in higher nutrients uptake by crop, which was at par with PE application of pyrazosulfuron-ethyl 15 g ha-1 *fb* intercultivation (W6) and isoproturon 500 g ha-1 *fb* intercultivation. These three weed management practices offered broad-spectrum weed control during the critical period of crop-weed competition of crop growth that lead to increased plant height, and dry matter production and thereby increased uptake of nutrients by crop. These results are in conformity with findings of Pandey *et al*. (2018). Pre-emergence application of pretilachlor 500 g ha-1 *fb* intercultivation resulted in higher uptake of 63.33, 16.93 and 57.00 kg ha-1 of nitrogen, phosphorus and potassium respectively (Table 2). The above said weed management practices resulted in higher harvest index of foxtail millet.

**Yield and Economics**

Hand weeding twice at 20 and 40 DAS resulted in higher grain and straw yield which was significantly higher than rest of the weed management practices. The next best weed management practice in obtaining higher grain and straw yield was PE application of pretilachlor 500 g ha-1 *fb* intercultivation (Table 2). The reduction in grain yield of foxtail millet in unweeded check (W11) and PE application of isoproturon *fb* penoxsulam was 63.41 and 70.63 per cent compared to best weed management practices *i.e*., HW twice.The highest net returns and benefit-cost ratio was obtained with PE application of

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Performance of pre-emergence herbicides on weeds, nutrient uptake and yield of foxtail millet

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Performance of pre-emergence herbicides on weeds, nutrient uptake and yield of foxtail millet

pretilachlor 500 g ha-1 *fb* intercultivation at 20 DAS. Hand weeding twice was lag behind in obtaining benefit-cost ratio than above weed management practice due to increased cost of weeding.

The present field experiment has revealed that pre emergence application of pretilachlor 500 g ha-1*fb* intercultivation at 20 DAS resulted in higher grain yield and benefit-cost ratio, apart from obtaining broad spectrum weed control and nutrient uptake in foxtail millet in sandy clay loam soils of Southern Agroclimatic Zone of Andhra Pradesh. Hand weeding twice obtained higher grain yield, but benefit-cost ratio was lag behind the best weed management practice *i.e.,* PE application pretilachlor 500 g ha-1 *fb* intercultivation at 20 DAS (W4). The present experiment indicated that wherever the labour availability for hand weeding is abundant and cheaper, one can go for hand weeding or opt for the said herbicide recommendation taking into the economical considerations.

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