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STUDIES ON WEED CONTROL EFFICACY OF METRIBUZIN 70% WP IN WHEAT (*Triticum aestivum*)

***N.Ramesh**

Department of Agronomy, Faculty of Agriculture, Annamalai University, Annamalai nagar, Chidambaram - 608002, Tamil Nadu

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ABSTRACT

Present investigation entitled influence of Metribuzin on weed control in irrigated wheat *Triticum aestivum* was conducted at in Paiyur village of Kaveripattinam taluk, Krishnagiri district of Tamil Nadu, during 2011 - 2012 with following treatment details.The experiment was conducted with three replication in randomized block design and with following treatment details (T_1) Metribuzin 70% WP@0.175 kg a.i ha^{-1} , (T_2) Metribuzin 70% WP@0.210 kg a.i ha^{-1} , (T_3) Metribuzin 70% WP@0.420 kg a.i ha^{-1} , (T_4) standard treatment 0.210 kg ha^{-1} , (T_5) standard treatment (Isoproturon) 1.500 kg ha^{-1} and (T_6) control of the treatment.Among the various treatment the treatment (T_3) Metribuzin 70% WP@0.420 kg a.i ha^{-1}recorded the highest growth and yield components of wheat and the least weed population, weed biomass and nutrient depletion by weeds season I,II. This was followed by the treatment (T_2) Metribuzin 70% WP@0.210 kg ha^{-1} . And the next in order was (T_4) standard treatment 70% WP@0.210 kg ha^{-1} . Though the treatment (T_3) Metribuzin 70% WP@0.420 kg ha^{-1} and (T_2) Metribuzin 70% WP@0.210 kg ha^{-1} recorded highest gross income and net income. The treatment (T_3) Metribuzin 70% WP@0.420 kg ha^{-1} registered the highest BCR ratio or 2.05 and 2.06 in season I and season II respectively. Hence from the result it is concluded that the (T_3) Metribuzin 70% WP@0.420 kg ha^{-1} is economically feasible to the farmers to manage the weed and realize better returns.

Keywords: *Triticum aestivum***,** Metribuzin,Isoproturon, Yield components, weed population, weed biomass and nutrient depletion.

1.INTRODUCTION

Weeds are a major impediment to crop production through their ability to compete for resources and their impact on product quality and are the major factors which cause yield reduction of 15-50%, depending on weed density and type of weed flora and makes the weed control more complex.

In wheat, initial 30 - 40 days are critical do far as the crop-weed competition is concerned. Uncontrolled weeds depending on intensity and duration of competition may reduce the wheat productivity by 10 - 40%. Wheat field is generally infested with both grassy and non-grassy weeds. Abdul Khaliq and Amar Matloob (2011).Weeds are one of the major factors affecting the productivity, resulting in 30-50 percent losses in crop yield and therefore need immediate cause severe loss to yield and deplete soil nutrients considerably. These nutrient losses caused by weeds could be effectively tackled either through the use of effective herbicides or effective weed management treatments.

Herbicides are the most successful weed control technology ever developed. No doubt weed control through chemicals is easy, economical and labour efficient, the over dependence resulted in some serious environmental and ecological implications and continuous use of herbicides for weed control leads to residue hazards, weed shift and buildup of resistance in weeds. In order to minimize the losses caused by weeds and also to reduce the sole dependence on costly and controversial inputs such as herbicides, considerable interest has aroused recently throughout the world in evolving technologies, which are within the reach of common farmers, which is ecologically sound and socially acceptable. The recent awareness is to minimize the use of herbicides for weed management due to higher cost of cultivation (weeding). This needs to initiate research on new herbicides which become more attractive in the field of weed

Corresponding author: *Dr.* ***N.Ramesh*** *r, Assistant Professor of Agronomy, Department of Agronomy, Faculty of Agriculture, Annamalai Universitv. Annamalainaaar-608002. Tamilnadu*

management.Keeping these facts in mind. The present investigation was undertaken to assess the effect of Metribuin on wheat farmers' field.

2.MATERIALS AND METHODS

Field experiment was conducted in farmers' field, at Paiyur, Village Kaveripattinam taluk, Krishnagiri district of Tamil Nadu, during November 2011. The farm is located at 12°21'N latitude and 78°18'E longitude at an altitude of 490m above MSL. The confirmative trial on weed management was conducted in the same location during November 2012.

The soil was sandy loam in texture with pH 6.5. The available N, P and K were 150, 18 and 280 kg/ha, respectively. Six treatment consisting of (T_1) Metribuzin 70% WP@0.175 kg a.i ha^{-1} , (T_2) Metribuzin 70% WP@0.210 kg a.i ha^{-1} , (T_3) Metribuzin 70% WP@0.420 kg a.i ha^{-1} , (T_4) standard treatment 0.210 kg ha^{-1} , (T_5) standard treatment (isoproturon) 1.500kg ha^{-1} and (T_6) control weedy check were tried in randomized block design with three replications.The seeds were sown by adopting a seed rate of 100 kg ha^{-1} seeds were sown 20 cm line and 22.5 cm apart row spacing with seed drill and covered with soil.In wheat recommended dose of fertilizer 80 kg N, 40 kg P_2O_5 and 40 kg K_2O per ha were applied. Apply half dose of N and full dose of P_2O_5 were applied at the time of sowing, remaining 50 per cent of nitrogen was given as top dressing at 30 days after sowing (DAS). The nutrients were applied in the form of urea, DAP and MOP.Metribuzin was sprayed as post emergency at 30 DAS 70%WP for the 30 to 35 DAS using 600 liter of water ha^{-1} through knapsack sprayer according to the treatment schedule.

3.RESULT AND DISCUSSION

Among the different metribuzin doses, the treatment (T_3) metribuzin 70 % WP 0.420 kg ha^{-1} registered the least weed population of 3.76 weed biomass of 135.66 kg ha^{-1} highest weed control index of 77.84 per cent and least number of depletion of weed *viz.,* 17.85, 2.30 and 12.36 kg ha^{-1} of N, P and K during season I. similarly during season II, the treatment (T_3) metribution 70% WP 0.420 kg ha^{-1} recorded least weed production of 3.80 kg ha^{-1}. This is in conformity with the results of Gul Hassan *et al*. (2005), Dorota Gaweda *et al.* (2012).which in turn resulted in higher grain yield of Wheat.Weed biomass of 207.50 highest weed control index of 74.40 per cent and least number of depletion of weed *viz.,* 16.53, 2.50 and 14.22 kg ha^{-1} of N, P and K respectively. This may be due to effective control of weeds during early stages of crop growth by herbicide and in later stages. Similar results were reported by Malik *et al.* (2005) Jitendra kumar *et al.* (2010).

The treatment (T_3) metribuzin 70% WP 0.420 kg ha^{-1} registered the highest plant height of 56.30 cm and 79.46 cm at 60 DAS and harvest stage of crop and crop dry matter production of 4.95 t ha^{-1} and 8.95 at 60 DAS and harvest stage during the season I. respectively. Similarly, during season II, among the different levels of metribuzin, the treatment (T_3) metribuzin 70% WP 0.420 kg ha^{-1} registered the highest plant height of 56.47 cm and 79.83 at 60 DAS and harvest of crop and height dry matter production of 4.96 and 8.92 at ha^{-1} 60 DAS and harvest stage. The increase in the dry matter of wheat was attributed to the decrease weed population and lesser dry weight of weeds thus resulted in decreased competition by weeds to moisture, light and nutrients. The effect of which can be traced back to increased dry matter accumulation in stem leaves and grains. Raiz *et al.* (2009) Song *et al.* (2007) and Punia *et al.* (2005) have reported significant reduction in the dry matter accumulation and lower grain yield in wheat under weedy check.Among the different levels of metribuzin, the treatment (T_3) metribution 70% WP 0.42 kg ha^{-1} registered the highest plant LAI of 1.96 and 1.99 during season I and II respectively. Similarly, among the different levels of metribuzin, during I and II, season respectively.The treatment (T_3) metribuzin 70% WP 0.420 kg ha^{-1} registered highest thousand seed weight of 37.90g and 37.93g during respectively. Similarly, during season, I and II. Among the various treatment in the (T_3) metribuzin 70% WP 0.420 kg ha^{-1} recorded highest number of tillers per plant and number of grains per spikelets and number of spikes per spike 6.57, 40.40 and 14.16 respectively recorded in the season I. In the season II the treatment (T_3) metribuzin 70% WP 0.420 kg ha^{-1} recorded higher number of tillers per hill and number grains per spikelet and number of spike per plat 6.37, 39.40 and 14.20 respectively recorded in the season. EI-Metwally *et al.* (2010) and zand *et al.* (2007) reported that increase in grain yield of wheat was associated with increase in the weight of grains per plant.

Among the different levels of Metribuzin, the treatment T_3 Metribuzin 70% WP 0.420 kg ha^{-1} registered higher grain yield and straw yield, 2354.50 kg ha^{-1} and 5470.00 kg ha^{-1} during season 1. The season -II different levels of Metribuzin, the treatment T_3 Metribuzin 70% WP 0.420 kg ha^{-1} registered higher grain yield and straw yield, 2361.45 kg ha^{-1} and 5486.66 kg ha^{-1} during season II. Similarly, (T_3) Metribuzin 70% WP 0.420 kg ha^{-1} register higher harvest index of 55.60 and 55.54 during season I and II respectively. Sanjeev kumar *et al.* (2010) also reported increased grain number per plant due to weed control treatments.Similarly, in the different treatment, the treatment (T_3) metribuzin 70%WP 0.420 Kg ha^{-1} registered the higher nutrient uptake of 73.35, 29.27 and 74.04 Kg ha^{-1} N, P and K respectively during season I. and during season II, treatment (T_3) metribuzin 70%WP 0.420 Kg ha^{-1} recorded higher nutrient uptake of 76.38, 28.52 and 75.50 Kg ha^{-1} N, P and K respectively. Gul Hassan *et al.*(2005) and Chaudhary *et al.* (2008) reported similar results.Among the different levels of metribuzin the treatment (T_3) metribuzin 70%WP 0.420 Kg ha^{-1} registered the higher gross income and net income, 46,910 Rs. ha^{-1}, 24,059.64 Rs. ha^{-1} and however the treatment (T_3) metribuzin 70% WP 0.420 Kg ha^{-1} recorded highest BCR of 2.05 during the season I.

Similarly season II among the different levels of metribuzin, the treatment (T_3) metribuzin 70%WP 0.420 Kg ha^{-1} recorded higher gross income of 47,229 Rs. ha^{-1} and 24,378.64 Rs.ha^{-1} respectively. And the treatment (T_3) metribuzin 70% WP 0.420 Kg ha^{-1} registered highest BCR of 2.06. Chaudhary *et al.* (2008) and Muhammad Asif Shehzad *et al.* (2012) reported additional net profit in metribuzin treatment.

Table 1: Effect ofMetribuzin on the Weed density m^{-2} at 30 DASandWeed biomass (Kg ha^{-1}) at60 DAS,Weed control index (%), Plant height(cm) 60 DAS and Leaf area index in season I & II

Treatments	Dose of formulation Kg ha^{-1}	Weed density (m^{-2}) 30 DAS		Weed biomass (Kg ha^{-1}) 60 DAS		Weed control Index (%)		Plant height (cm) 60 DAS		Leaf area index	
		Season I	Season II	Season I	Season II	Season I	Season II	Season I	Season II	Season I	Season II
		Broad leaf weeds	Grasses								
T_1 Metribuzin 70% WP	0.175	(3.25) 10.59	(3.25) 10.62	413.03	408.20	32.4	24.43	50.53	50.61	1.83	1.84
T_2 Metribuzin 70% WP	0.210	(2.48) 6.17	(2.46) 6.07	202.53	207.50	66.92	61.58	54.56	54.85	1.90	1.93
T_3 Metribuzin 70% WP	0.420	(1.93) 3.76	(1.94) 3.80	135.66	138.26	77.84	74.40	56.30	56.47	1.96	1.99
T_4 Standard treatment	0.210	(2.85) 8.16	(3.02) 9.13	287.23	289.16	53.08	46.47	53.23	53.66	1.86	1.89
T_5 Isoproturon	1.500	(4.94) 24.44	(4.89) 23.92	534.13	418.30	12.76	22.56	48.26	48.74	1.75	1.75
T_6 Control	Weedy check	(6.42) 41.30	(6.12) 37.47	612.26	540.20	-	-	46.23	46.53	1.61	1.69
SEd		0.13	0.28	8.25	8.75	-	-	1.17	1.07	0.01	0.01
CD (0.5%)		0.27	0.56	16.5	17.5	-	-	2.54	2.59	0.02	0.02

* The figures in the parenthesis are original values

Table 2: Effect of Metribuzin on number of grains per spikelet, Dry matter production at harvest t ha^{-1}, 1000 grain weight (g), Grain yield(kg ha^{-1}), Straw yield (kg ha^{-1}) and Harvest index in Season I & II.

Treatments	Dose of formulation kg ha^{-1}	Number of grains per spikelet		DMP at harvest stage (t ha^{-1})		1000 grain weight (g)		Grain yield (kg ha^{-1})		Straw yield (kg ha^{-1})		Harvest index	
		Season I	Season II	Season I	Season II	Season I	Season II	Season I	Season II	Season I	Season II	Season I	Season II
T_1 Metribuzin 70% WP	0.175	32.15	32.80	7.95	7.88	36.16	36.19	1830.30	1835.20	4950.00	4950.00	44.36	44.44
T_2 Metribuzin 70% WP	0.210	37.98	36.98	8.51	8.65	37.06	37.43	2070.35	2080.37	5246.66	5280.00	51.26	51.33
T_3 Metribuzin 70% WP	0.420	40.40	39.40	8.95	8.92	37.90	37.93	2345.50	2361.45	5470.00	5486.66	55.60	55.54
T_4 Standard treatment	0.210	35.39	35.72	8.43	8.43	36.60	36.72	1910.40	1920.32	5047.00	5047.00	44.73	44.62
T_5 Isoproturon	1.500	31.30	32.30	7.79	7.69	35.53	35.73	1715.50	1723.50	4764.33	4731.00	43.50	43.24
T_6 Control	Weedy check	25.67	25.01	7.31	7.33	34.90	34.86	1370.50	1380.55	4123.33	4090.00	41.50	41.32
Sed		0.61	0.91	0.20	0.19	0.82	0.75	42.5	42.8	85.2	102.7	1.06	0.97
CD (0.5%)		1.22	1.82	0.41	0.38	1.81	1.82	93.6	94.1	204.6	246.5	2.31	2.33

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