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Efficacy of post emergence herbicides (PoE) on growth, yield and quality of late sown wheat (*Triticum aestivum*)

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Abstract

The present investigation was conducted during *rabi* 2014-15 at P. G. Research Farm, Agronomy Section, College of Agriculture, Dhule (Maharashtra) to study the Efficacy of post emergence herbicides (PoE) on growth, yield and quality of late sown wheat (*Triticum aestivum*). Among this Experiment consisted of 8 treatments laid out in randomized block design with three replications. The treatment included, weedy check, weed free check, clodinafop (60 g ha⁻¹), sulfosulfuron (25 g ha⁻¹) metsulfuron methyl (4 g ha⁻¹), metribuzin (100 g ha⁻¹), clodinafop + metsulfuron methyl (60 + 4 g ha⁻¹) and sulfosulfuron + metsulfuron methyl (25 + 4 g ha⁻¹) were used in this experiment.. Significantly higher grain and straw yield the grain and straw yield (kg ha⁻¹) of wheat was found to be significantly higher (4746.86 and 5966.86 kg ha⁻¹, respectively) in treatment of weed free check (T₂). The next best among the herbicides treatment was combine application of sulfosulfuron + metsulfuron methyl (25 + 4 g ha⁻¹) (T₈) (4304.46 and 5418.66 kg ha⁻¹, respectively) recorded higher grain and straw yield as compared to rest of herbicide treatments for weed control. While treatment T₈, was found at par with clodinafop + metsulfuron - methyl (60 + 4 g ha⁻¹) (T₇). protein content in wheat grain revealed that the differences among the various weed management treatments were found non-significant. Protein content in grain varied between 11.00 to 12.13 per cent in different treatments. Among the herbicide treatments tried in the experiment, application of tank mix herbicides treatments were found significantly better than their solo application in respect of grain and straw yield of wheat. The grain and straw yield of wheat was significantly the lowest under weedy check treatment (T₁).

Keyword: Grain yield, straw yield, post emergence herbicide, net return, B:C ratio

Introduction

Weeds are not controlled during critical period of weed crop competition; there is reduction in the yield of wheat from 80% percent depending upon the weed flora and density ^[1]. Hand weeding is a traditional and effective method of weed control, but untimely and continues rains as well as unavailability of labour during peak period of demand, are the main limitations of manual weeding. Keeping this fact in view, the present investigation is undertaken to study the Efficacy of post emergence herbicides (PoE) on growth, yield and quality of late sown wheat (*Triticum aestivum*)".

Methodology

The present investigation was conducted during *rabi* 2014 at P. G. Research Farm, Agronomy Section, College of Agriculture, Dhule. Experiment consisted of ten treatments laid out in randomized block design with three replications. The different weed control treatments comprised of weedy check, weed free check, clodinafop, sulfosulfuron, metribuzin, metsulfuron-methyl, clodinafop + metsulfuron-methyl (60+4 g a.i. ha) and sulfosulfuron+metsulfuron-methyl (25 + 4 g a.i. ha) (PoE) were used in this experiment. The soil of the experimental field was clay in the texture, with low in available nitrogen and available phosphorus and rich in available potassium.

Results

The quality character like protein and Grain yield and straw yield of wheat was found to be significantly higher in treatment of weed free. Among all the treatments, weed free check (T₂) recorded the highest grain yield (4746.86 kg ha⁻¹) whereas weedy check (T₁) recorded the

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lowest values (2282.66 kg ha⁻¹). Among the herbicide treatment, tank-mix application of herbicides i.e. sulfosulfuron + metsulfuron-methyl (25 + 4 g ha⁻¹(PoE) (T₈), obtained significantly higher grain yield (4304.46 kg ha⁻¹) as compared to other treatments of weed control and it was at par with clodinafop + metsulfuron methyl (60 + 4 g ha⁻¹) (PoE) (T₇) (4115.03 kg ha⁻¹) similarly Weed free check (T₂) recorded significantly the higher straw yield of wheat (5966.00 kg ha⁻¹). Followed by tank mix application of herbicides i.e. sulfosulfuron + metsulfuron-methyl (25 + 4 g ha⁻¹(PoE) (T₈), was found in second order but it was at par with application of clodinafop + metsulfuron methyl (60 + 4 g ha⁻¹ (PoE) (T₇) which recorded 5418.66 and 5073.00 kg ha⁻¹ straw yield of wheat, respectively. Significantly the lowest straw yield of wheat (3327.33 kg ha⁻¹) was observed under treatment weedy check (T₁ [2, 3, 4, & 5]) However, The highest net returns of (₹ 54891 ha⁻¹) was observed under treatment

weed free check (T₂) followed by application of tank-mix post emergence herbicides i.e. sulfosulfuron+ metsulfuron-methyl (25 + 4 g ha⁻¹(PoE) (T₈) and clodinafop +metsulfuron methyl (60 + 4 g ha⁻¹) (PoE) (T₇), recorded ₹ 54782 and 50867, net returns ha⁻¹, respectively. Whereas, least net returns of ₹ 7139 ha⁻¹ was recorded with weedy check (T₁). And The benefit cost ratio was maximum in tank mix application of herbicide i.e. sulfosulfuron + metsulfuron-methyl (25 + 4 g ha⁻¹(PoE) (T₈), (2.91) followed by clodinafop + metsulfuron methyl (60 + 4 g ha⁻¹)(PoE) (T₇) (2.76), weed free check (T₂) (2.47), Sulfosulfuron (25 g ha⁻¹) (2.42), metsulfuron-methyl (4 g ha⁻¹) (2.40) and weedy check (T₁) (1.25). The tank-mix application of herbicides recorded maximum gross returns, net returns and benefit cost ratio in wheat crop as compared to application of single herbicide only. These results corroborate with the finding of [6 & 7].

Table 1: Effect of different weed management treatments on weed growth, yield and economics of Wheat

Treatment Details	Protein content (%)	Grain yield (Kg ha ⁻¹)	Straw yield (Kg ha ⁻¹)	Net returns (₹ ha ⁻¹)	B:C ratio
T ₁ : Weedy check	11.000	2282.66	3327.33	7139	1.25
T ₂ : Weed free check	12.000	4746.86	5966.66	54891	2.47
T ₃ : Clodinafop (60 g ha ⁻¹)	11.000	3248.66	4215.00	34257	2.19
T ₄ : Sulfosulfuron (25 g ha ⁻¹)	11.467	3561.50	4530.33	40519	2.42
T ₅ : Metsulfuron methyl (4 g ha ⁻¹)	11.333	3529.36	4434.00	40022	2.40
T ₆ : Metribuzin (100 g ha ⁻¹)	11.800	3334.6	4372.6	36219	2.27
T ₇ :Clodinafop +Metsulfuron methyl (60 + 4 g ha ⁻¹)	11.400	4115.0	5073.0	50867	2.76
T ₈ : Sulfosulfuron + Metsulfuron methyl (25+4 g ha ⁻¹)	12.133	4304.4	5418.6	54782	2.91

PoE = Post-emergence

Conclusion

Combine use of post emergence spray of *i.e.* sulfosulfuron + metsulfuron-methyl (25 + 4 g a.i. ha) (PoE) is found beneficial for yield of wheat crop.

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