

Original Research Article

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To Find out the Suitable Post Emergence Herbicides for Controlling Weeds in Pigeonpea

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ABSTRACT

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As pigeonpea is long duration crop, many flushes of weed germinate at the later stages which compete with the crop. It is therefore, essential to use the post emergence herbicides in conjunction with pre emergence herbicides for the effective control of weeds. Presently, imazethapyr is a very effective post emergence herbicide for controlling broad leaf weeds in *kharif* pulses including pigeonpea but its weed control efficacy has not been judged in combination with propaquizafop for wide spectrum weed control in different parts of the country including Jabalpur an experiment was conducted at Product Testing Unit, Department of Agronomy, JNKVV, Jabalpur during *kharif* season of 2015. Weedy check had the highest weed biomass and it was reduced significantly when weeds were controlled either chemically or mechanically. Among the herbicidal treatments, post emergence application of propaquizafop + imazethapyr at 62.5+75 g/ha or higher rate (100+100 g/ha) arrested the weed biomass production remarkably and proved superior to alone application of propaquizafop (50, 62.5, 100 and 125 g/ha), fenaxaprop-p-ethyl (100 g/ha) and imazethapyr (100 g/ha).

Introduction

As pigeonpea is long duration crop, many flushes of weed germinate at the later stages which compete with the crop. It is therefore, essential to use the post emergence herbicides in conjunction with pre emergence herbicides for the effective control of weeds. Presently, Propaquizafop (50 g/ha) is a very effective post emergence herbicide for controlling grassy weeds in soybean (Tiwari and Mathew 2002). On the other hand, Misra *et al.*, (2001) found that Imazethapyr (75 g/ha) gave an effective control of grassy as well as broad

leaved weeds in soybean. Taking into consideration the above facts and availability of new herbicides it becomes imperative to find out the suitable post-emergence herbicide for weed control in pigeonpea. But efficacy of Propaquizafop has not been tested with Imazethapyr for wide spectrum weed control in pigeonpea in different parts of the country including Jabalpur.

Materials and Methods

The present experiment was conducted at Product testing unit, Department of

Agronomy, Jawaharlal Nehru Krishi Vishwa Vidyalaya, Jabalpur (M.P.) during *khariif* 2015. The field selected for experimentation was uniformly infested with localized specific weeds. The laboratory studies were carried out in the department. All physical facilities viz., labours, agrochemicals, equipments and irrigation water etc. were adequately available as and when needed on the research farm.

Application of herbicides

The herbicide spray solutions were prepared by mixing required quantity of different herbicides (Propaquizafop, Imazethapyr, Fenoxaprop-p-ethyl alone or in combinations) as per the herbicidal treatments in 500 liter water ha⁻¹. The spray solution for individual plot was prepared separately as per the treatment. These herbicides were sprayed at 20 DAS with 2 ml of MSO adjuvant to facilitate absorption of the herbicides by the weeds, avoiding washing of the herbicide by possible rains. After completing the spraying of one herbicide, in respective plots of all replications, the sprayer was cleaned thoroughly including nozzle with detergent and fresh water, before being used for spraying of another herbicides. Knapsack sprayer with flat fan nozzle was used for the spraying of herbicidal treatments. Uniform pressure was maintained to pump out nearly

equal quantity of the herbicide as fine mist during the course of spray in each plot.

Results and Discussion

The weed biomass was maximum under weedy check plots. Application of Propaquizafop alone at different doses at 50, 62.5, 100 and 125 gha⁻¹ gradually reduced the weed biomass. Among the doses of Propaquizafop, the weed biomass was less (185.70 g m⁻²) with 125 gha⁻¹. The combined application of Propaquizafop 62.5 gha⁻¹ + Imazethapyr 75 gha⁻¹ and Propaquizafop 100 gha⁻¹ + Imazethapyr 100 gha⁻¹ further reduced weed biomass (107.23 and 64.83 g m⁻²). However, hand weeding twice curtail the biomass to greater extent (13.83 gm⁻²).

It is clear from the data that among the weed control treatments, combined application of Propaquizafop 100 gha⁻¹ + Imazethapyr 100 gha⁻¹ had the higher WCE (81.29%) followed by Propaquizafop 62.5 gha⁻¹ + Imazethapyr 75 gha⁻¹ which curtail the weed biomass to 71.89%. Alone application of Propaquizafop at different doses (50, 62.5, 100 and 125 gha⁻¹), Fenoxaprop-p-ethyl 100 gha⁻¹ and Imazethapyr at 100 gha⁻¹ had lesser WCE as compared to combined application of Propaquizafop+Imazethapyr (Table 1).

Table.1 Weed biomass (g m-2) at different days after application and Weed Control Efficiency at 45 DAA as influenced by weed control treatments

Treatment	Weed biomass(g m ⁻²)	Weed Control Efficiency (%)
	45	45
T ₁ Propaquizafop (50 gha ⁻¹)	320.11	26.47
T ₂ Propaquizafop (62.5 gha ⁻¹)	304.07	30.03
T ₃ Propaquizafop (100 gha ⁻¹)	204.27	50.48
T ₄ Propaquizafop (125 gha ⁻¹)	185.70	54.54
T ₅ Fenoxaprop-p-ethyl (100 gha ⁻¹)	218.36	47.11
T ₆ Imazethapyr (100 gha ⁻¹)	188.20	54.12
T ₇ Propaquizafop+ Imazethapyr (62.5+75 gha ⁻¹)	107.23	71.89
T ₈ Propaquizafop+ Imazethapyr (100+100 gha ⁻¹)	64.83	81.29
T ₉ Hand weeding (20 and 40 DAS)	13.83	96.14
T ₁₀ Weedy check	439.17	-

Weed control efficiency of a treatment has strong relationship with weed biomass. The trend of different weed control treatments for increased weed control efficiency was in order of decrease in weed biomass production. Alone application of Propaquizafop at the lower doses (50 and 62.5 gha⁻¹) had the lower value of weed control efficiency (26.47 and 30.03%) because of poor control of weeds. While the increased doses of Propaquizafop 100 and 125 gha⁻¹ had increased the WCE (50.48 and 54.54%), and similar result was also found with Fenoxaprop-p-ethyl at 100 gha⁻¹ due to poor activity against broad leaved weeds as it was only effective against grassy weeds. Marked increase in weed control efficiency was noticed with Propaquizafop 62.5 gha⁻¹ + Imazethapyr 75 gha⁻¹ applied together (71.89%) or Propaquizafop 100 gha⁻¹ + Imazethapyr 100 gha⁻¹ (81.29 %). This was because of better control of monocot and dicot weeds. The maximum weed control efficiency (96.14 %) was noticed under hand weeding twice due to complete check on weeds, similar results were reported by Kurchania *et al.*, (1999), Mallareddy *et al.*, (2008), Meena *et al.*, (2011) and Gupta *et al.*, (2013).

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