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Assesment of Weed Control Efficiency (WCE) and Weed Growth Rate (WGR) Using Different Weed Management Practices on Pigeopnpea (*Cajanus cajan* L. MILL SP.)

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ABSTRACT

The present investigation entitled with "yield and yield attributes of pigeonpea influenced by different weed management practices (Cajanus cajan L. Mill sp.)" was carried out during kharif season of 2015-16 at Instructional cum Research Farm, Indira Gandhi Krishi Vishwavidyalaya, Raipur (C.G.). The soil of experimental field was clayey in texture, low in nitrogen, medium in phosphorus and high in potassium contents with neutral pH. the maximum weed control efficiency was observed under treatment(T_3) two hand weeding twice at 30 and 60 DAS followed by (T_{10}) PE pendimethalin @ 1.25 kg ha^{-1} + oxyfluorfen @ 125 g ha^{-1}tank mix fb imazethapyr @ 60 g ha^{-1} at 20 DAS . The lowest weed control efficiency was observed under treatmen(T_1) unweeded control at all the observational stages. Weed growth rate showed increasing trend upto 60-80 DAS and decreasing trend thereafter till harvest.

Key words: *Pigeonpea, Weed Growth Rate, Weed Control Efficiency*

INTRODUCTION

Pulses play a vital role in improving soil fertility and owing to their unique ability to fix atmospheric nitrogen have rightly been named as "Unique Jewels of Indian crop husbandry". They are an integral part of the cropping system of the farmers all over the country, because these crops fit well in the cropping system. Besides being cheaper source of protein, grain legumes are the group of crops having unique quality of fixing atmospheric nitrogen and also provide nutritious fodder for cattle. By virtue of their unique plant type, low water and nutrient requirement and deep rooted system, they can tolerate drought condition better than cereals and millets. Because of its slow initial growth is very sensitive to weed competition in the first 45 to 60 days of growth. Only when the plants have reached a height of about one meter can they effectively compete with the weeds. Therefore, effective weed control at the early growth stage of the crop is one of the most important factors contributing to high yield, If pigeon pea is grown as a rainfed crop, the early season weed flora mainly comprises annual grasses followed later by perennial sedges and board-leaved weeds.

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Weeds control methods very greatly with the status of agriculture and the nature of the cropping system.

Among these factors one of the most severe problems which hinders productivity of pigeonpea is the problem of weed infestation[1]. reported that on an average, weed can reduce the yield by 40-64% in pigeonpea. The weeds in pigeonpea can lead to 80% reduction in yield of pigeonpea[7]. Among the pulses, pigeonpea is the only crop that has characteristically slow initial growth making it less competitive with weeds if not controlled within time. This problem gets more intensified due to scarce labour availability. The traditional system of hand weeding is based on the premise of cheap and readily available labour. As manual weeding apart from being labourious, time consuming and costly may not be under taken at appropriate time due to unfavourable soil and climatic condition therefore the labour availability for farming is becoming a major limiting factor. Under given circumstances farmers need alternate production system using chemical weed management that are more efficient, less labour intensive and offer a quick response enabling farmers to produce more at less costs.

MATERIAL AND METHODS

The experiment entitled **"Assesment of weed control efficiency (WCE) and weed growth rate (WGR) using different weed management practices on pigeonpea (*Cajanus cajan* L. mill sp.)"** was carried out during *kharif* season (8 July to 25 January) of 2015-16 at the Instructional Cum Research Farm, Indira Gandhi Krishi Vishwavidyalaya, Raipur, Chhattisgarh. The experiment was laid out in Randomized Block Design with three replications. There were twelve (12) treatment combinations comprised of pre- and post emergence application of different herbicide molecules either alone or in combination. Pigeonpea variety Rajiv lochan developed by IGKV, Raipur. It matures at 160-200 days and gives 20-22q ha^{-1} yield. It is a resistant to fusarium wilt, sterility mosaic and moderately resistant to *H. armigera* and *H. testulalis* pod boror and is tolerant to drought. It is suitable for rainfed conditions on *dorsa* and *bharry* (vertisols) soils and rice bunds. It is also suitable Rabi cultivation on bunds and intercropping with soybean. The treatments are T1 - Unweeded control, T2 - One hand weeding at 30 DAS, T3 - Two hand weeding at 30 & 60 DAS, T4 - PE Pendimethalin @ 1.50 kg ha-1, T5 -PE Oxyfluorfen @125 g ha-1, T6 - POE Imazethapyr @ 75g ha-1 at 20 DAS, T7 - PE Pendimethalin @ 1.25 kg ha-1*fb* Imazethapyr @ 60g ha-1 at 20 DAS, T8 - PE Oxyfluorfen @ 125 g ha-1*fb* Imazethapyr 60g ha-1 at 20 DAS, T9 - PE Pendimethalin @ 1.25 kg ha-1 + Oxyfluorfen @ 125 g ha-1(tank mix), T10 - PE (Pendimethalin @ 1.25 kg ha-1+Oxyfluorfen @ 125 g ha-1tank mix) *fb* Imazethapyr @ 60 g ha-1 at 20 DAS, T11 - PE (Pendimethalin 30% + Imazethapyr 2%) @ 960 gha-1(Vellor 32), T12 -POE (Imazethapyr 35% + Imazamox 35%) @ 100 gha-1 at 15 DAS (Odyssey).

RESULT AND DISCUSSION

Weed control efficiency computed at 20, 40, 60, 80 DAS and at harvest is presented in Table1.1 At 20,40, 60, 80 DAS and at harvest, at 20 DAS maximum weed control efficiency was observed under treatment (T_{10}) PE pendimethalin @ 1.25 kg ha^{-1} +oxyfluorfen @ 125 g ha^{-1} tank mix *fb* imazethapyr @ 60 g ha^{-1} at 20 DAS, (T_7) PE pendimethalin @ 1.25 kg ha^{-1} *fb* imazethapyr @ 60g ha^{-1} at 20 DAS and (T_5) PE oxyfluorfen @125 g ha^{-1} whereas 20-40 DAS because of the application of pre emergence herbicides. At 40, 60, 80, 120 DAS and at harvest. the maximum weed control efficiency was observed under treatment (T_3) two hand weeding twice at 30 and 60 DAS followed by (T_{10}) PE pendimethalin @ 1.25 kg ha^{-1} + oxyfluorfen @ 125 g ha^{-1}tank mix *fb* imazethapyr @ 60 g ha^{-1} at 20 DAS . The lowest weed control efficiency was observed under treatment (T_1) unweeded control at all the observational stages. These results might be due to owing to less weed density and production of dry matter by weeds in the treated plots. The performance of crops is directly related to the weed control efficiency.

The higher weed control efficiency with these treatments could be attributed to lower weed number and dry weight in these treatments. Similar results were observed by Pramila *et al.*[4], Rajput and Kushwah[6], Pandya[5], Pandya *et al.*[5], Tiwari *et al*[8], and Vyas and Kushwah[2], Padmaja *et al.*[3]. However, least weed control efficiency was observed in (T_1) unweeded control throughout the crop growth period. It was due to higher total weed population and total weed dry weight

Weed growth rate was observed during 0-20, 20-40, 40-60, 60-80, 80-120 DAS and 120 DAS- at harvest and data are presented in Fig1.1, which indicate that the weed growth rate showed increasing trend upto 60-80 DAS and decreasing trend thereafter till harvest. Throughout the crop growth period, various weed management practices, (T_3) two hand weeding at 30 and 60 DAS registered significantly lowest weed growth rate , whereas highest weed growth rate was recorded under (T_1) unweeded control plot. At 0-20 DAS minimum weed growth rate was noted under treatment (T_{10}) PE pendimethalin @ 1.25 kg ha^{-1}+oxyfluorfen @ 125 g ha^{-1}tank mix *fb* imazethapyr @ 60 g ha^{-1} at 20 DAS followed by (T_7) PE pendimethalin @ 1.25 kg ha^{-1}*fb* imazethapyr @ 60g ha^{-1} at 20 DAS and (T_5)PE oxyfluorfen @125 g ha^{-1} whereas 20-40 DAS, (T_2) one hand weeding and (T_3) two hand weeding. At 40-60 DAS, minimum weed growth rate was found under (T_3) two hand weeding followed by (T_{10}) PE pendimethalin @ 1.25 kg ha^{-1}+oxyfluorfen @ 125 g ha^{-1}tank mix, whereas 60-80 DAS minimum weed growth rate was found under (T_3) two hand weeding followed by (T_{10}) PE pendimethalin @ 1.25 kg ha^{-1}+oxyfluorfen @ 125 g ha^{-1}tank mix. At 80-120 DAS and at harvest minimum growth rate was recorded under (T_3) two hand weeding and maximum weed growth rate under (T_1) unweeded control at all the stages of observations.

Higher WGR under treated plot may be due to the favourable condition for weed growth and development, as weeds are more compititive in nature than the crop. The results obtained also might be due to more accumulation of photosynthesis by weeds and increase in density of weeds.

Table 1.1: Weed control efficiency (%) of pigeonpea as affected by different weed management practices at different stages of crop growth

Treatment	Weed control efficiency (%)					
	20 DAS	40 DAS	60 DAS	80 DAS	120 DAS	At harvest
T_1 :- Unweeded control	-	-	-	-	-	-
T_2 :- One hand weeding at 30 DAS	7.90	79.11	60.93	69.66	69.46	53.28
T_3 :- Two hand weeding at 30 & 60 DAS	6.74	82.33	86.43	89.16	86.85	79.71
T_4 :- PE Pendimethalin @ 1.50 kg ha^{-1}	61.91	35.95	47.07	54.80	54.89	46.79
T_5 :- PE Oxyflurfen @125 g ha^{-1}	65.78	42.33	53.61	59.27	57.43	39.81
T_6 :- POE Imazethapyr @ 75g ha^{-1} at 20 DAS	11.54	35.66	47.50	62.95	63.21	49.81
T_7 :- PE Pendimethalin @ 1.25 kg ha^{-1}*fb* Imazethapyr @ 60g ha^{-1} at 20DAS	65.86	77.77	81.49	85.05	83.48	77.35
T_8 :- PE Oxyflurfen @ 125 g ha^{-1}*fb* Imazethapyr 60g ha^{-1} at 20 DAS	63.42	80.36	83.49	84.68	82.67	77.06
T_9 :- PE Pendimethalin @ 1.25 kg ha^{-1} + Oxyflurfen @ 125 g ha^{-1}(tank mix)	59.69	53.88	53.80	66.48	66.43	51.77
T_{10} :- PE (Pendimethalin @ 1.25 kg ha^{-1}+Oxyflurfen @ 125 g ha^{-1}tank mix) *fb* Imazethapyr @ 60 g ha^{-1} at 20 DAS	70.92	74.94	82.41	84.58	79.58	76.52
T_{11} :- PE (Pendimethalin 30% + Imazethapyr 2%) @ 960 gha^{-1}(Vellor 32)	62.79	32.93	21.32	45.27	41.20	30.36
T_{12} :- POE (Imazethapyr 35% + Imazamox 35%) @ 100 gha^{-1} at 15 DAS (Odyssey)	34.39	37.29	19.62	41.00	26.10	26.18

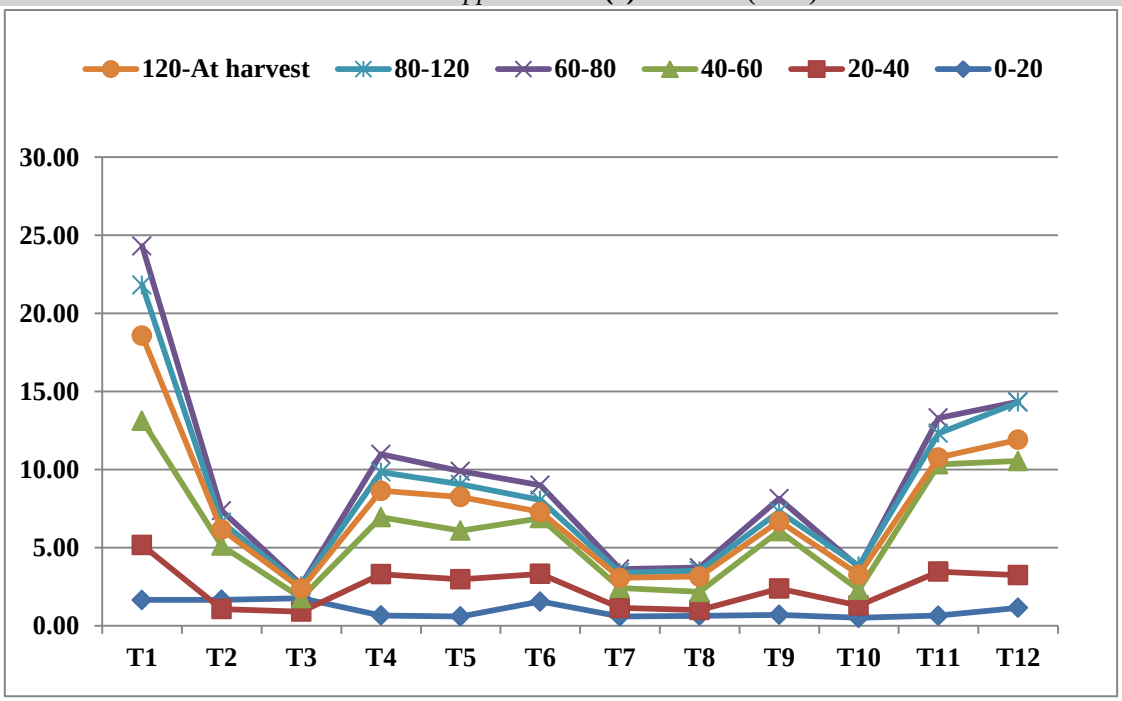

Fig. 1.1 Weed growth rate (g day^{-1} m^{-2}) as affected by different weed management practices at different stages of crop growth

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