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## Effect of new generation herbicides on the growth, yield and economics of lentil (*Lens culinaris* Medik.)

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### Abstract

The present research entitled “Effect of new generation herbicides on the growth and yield of lentil (*Lens culinaris* Medik.)” conducted during *rabi* season of 2023-24 at Research cum Instructional Farm, College of agriculture IGKV, Raipur, Chhattisgarh. The experiment was conducted in Randomized block design with 3 replication and 8 treatment *viz.*, Pendimethalin (30% EC) 750 g a.i. ha<sup>-1</sup> as PE, Imazethapyr (10% SL) 50 g a.i. ha<sup>-1</sup> as PE, Pendimethalin (30% EC) 750 g a.i. ha<sup>-1</sup> as PE *fb* Quizalofop-p-ethyl (5% EC) 100 g a.i. ha<sup>-1</sup> at 20 DAS, Oxyfluorfen (23.5% EC) 150 g a.i. ha<sup>-1</sup> PE *fb* Propaquizafop (10% EC) 100 g a.i. ha<sup>-1</sup> at 20 DAS, Imazethapyr (10% SL) 50 g a.i. ha<sup>-1</sup> at 20 DAS, Quizalofop-p-ethyl (5% EC) 100 g a.i. ha<sup>-1</sup> at 20 DAS, Weedy check and Weed free check (Hand weeding twice at 20 & 40 DAS). Results revealed that growth attributing characters *viz.*, plant height, number of branches plant<sup>-1</sup>, number of leaves plant<sup>-1</sup>, leaf area plant<sup>-1</sup>, dry matter accumulation, as well as seed yield, stover yield and harvest index were found to be maximum under hand weeding twice at 20 and 40 DAS followed by Oxyfluorfen (23.5% EC) 150 g a.i. ha<sup>-1</sup> PE *fb* Propaquizafop (10% EC) 100 g a.i. ha<sup>-1</sup> at 20 DAS. Minimum values of above characters were observed in weedy check. In terms of economics, maximum gross return and net return were fetched under hand weeding twice at 20 and 40 DAS followed by Oxyfluorfen (23.5% EC) 150 g a.i. ha<sup>-1</sup> PE *fb* Propaquizafop (10% EC) 100 g a.i. ha<sup>-1</sup> at 20 DAS, but maximum B: C ratio was fetched under Oxyfluorfen (23.5% EC) 150 g a.i. ha<sup>-1</sup> PE *fb* Propaquizafop (10% EC) 100 g a.i. ha<sup>-1</sup> at 20 DAS and the lowest gross return, net return and B:C ratio were received under weedy check.

**Keywords:** Lentil, new generation herbicide, Oxyfluorfen, Propaquizafop, Quizalofop-p-ethyl

### Introduction

Among the various pulse crops grown in India, lentil (*Lens culinaris* Medik.) holds an important position because of its ability to adapt to wider climatic and edaphic conditions. Lentil is also one of the world's oldest and most important pulse. Lentil is known by different names in different parts of the world *viz.*, Massour, Mangu, Masura, Renuka, Mangalaya etc. (Kay, 1979) [5]. In, India, it is an important cool season grain legume crop and it is the second major winter sown legume after chickpea. It is hardier and capable of withstanding extremes of weather and soil conditions. However, due to its short stature, slow initial growth and long duration, lentil lacks the ability to compete with broad-leaved weeds and grasses, which adversely affect the growth and productivity of the crop. Weeds have been found to reduce lentil yields by 40-66 percent (Singh *et al.*, 2015) [8]. Broad-leaved weeds may become dominant in the early stages of crop growth due to their fast growing and deep rooting ability. Weed control is critical in the first 50- 60 days after planting of lentils (Singh, 1993) [7]. To obtain increased yield and higher revenue, a weed free crop environment is essential. Thus, weed control is the most important factor in ensuring a high yield in the lentil crop (Erman *et al.*, 2008) [4]. As lentil crop is relatively poor competitors to weeds especially in early growing period, pre-emergence herbicide application is recommended. Pre-emergence herbicides control weeds effectively only for the initial period of about one-month, whereas later emerging weeds also compete with crop plants. In addition to this, lentil is a long-term crop with critical weed competition ranging from 40 to 60 DAS, early weed control herbicides are often ineffective in achieving higher yields, even when farmers use pre-emergence herbicides. Weed control at later stages of the crop growth cycle can be aided by using pre-emergence and post-emergence herbicides in series, as well as applying post-emergence herbicides. Among the existing herbicides pendimethalin is

widely adopted as pre-emergence herbicide for controlling weeds in pulse crops including lentil since long back (Balyan and Malik, 1996) [2]. Thus, it becomes necessary to test the effectiveness of new pre and post-emergence herbicides for the effective weed control in lentil.

## Results and Discussion

### Effect on growth

Results (Table 1) revealed that hand weeding twice at 20 and 40 DAS recorded the significantly maximum plant height, number of branches plant<sup>-1</sup>, number of leaves plant<sup>-1</sup>, leaf area per plant (cm<sup>2</sup>) and dry matter accumulation (g plant<sup>-1</sup>) were noticed with hand weeding twice at 20 and 40 DAS (T8) followed by Oxyfluorfen (23.5% EC) 150 g a.i. ha<sup>-1</sup> PE fb Propaquizafop (10% EC) 100 g a.i. ha<sup>-1</sup> at 20 DAS (T4). Similar results have also been reported by Ahlawat *et al.* (1979) [1] and Turk and Tawaha (2002) [9].

### Effect on yield

The maximum seed yield (979 kg ha<sup>-1</sup>) was recorded under hand weeding twice at 20 and 40 DAS but among the chemical weed management treatments, significantly maximum seed yield (888 kg ha<sup>-1</sup>) was observed under Oxyfluorfen (23.5% EC) 150 g a.i. ha<sup>-1</sup> PE fb Propaquizafop (10% EC) 100 g a.i. ha<sup>-1</sup> at 20 DAS. Weed removal at early stage had reduced the weed competition

to the lowest possible limit and provided almost weed free environment under Hand weeding twice at 20 and 40 DAS (T8). This can probably be the reason for higher seed yield in Hand weeding treatment than other treatments. The present findings are closely related with the findings of Turk and Tawaha (2002) [9], Elkoca *et al.* (2005) [3] and Maleki *et al.* (2010) [6].

### Effect on economics

As regards to economic returns (Table 3), the highest gross monetary return (Rs 64805 ha<sup>-1</sup>) and net monetary return (Rs 35024 ha<sup>-1</sup>) were noticed with hand weeding twice at 20 and 40 DAS (T8) followed by Oxyfluorfen (23.5% EC) 150 g a.i. ha<sup>-1</sup> PE fb Propaquizafop (10% EC) 100 g a.i. ha<sup>-1</sup> at 20 DAS (T4) with gross monetary return (Rs 58673 ha<sup>-1</sup>) and net monetary return (Rs 35007 ha<sup>-1</sup>). Maximum B: C ratio (2.48) was noticed under Oxyfluorfen (23.5% EC) 150 g a.i. ha<sup>-1</sup> PE fb Propaquizafop (10% EC) 100 g a.i. ha<sup>-1</sup> at 20 DAS (T4) followed by B: C ratio of 2.30 under Imazethapyr (10% SL) 50 g a.i. ha<sup>-1</sup> as PE (T2).

Based on the result obtained in the present investigation, it can be concluded that Oxyfluorfen (23.5% EC) 150 g a.i. ha<sup>-1</sup> PE fb Propaquizafop (10% EC) 100 g a.i. ha<sup>-1</sup> at 20 DAS found more effective and remunerative as compared all the herbicide treatments.

**Table 1:** Growth attributes of lentil at 60 DAS as influenced by weed management practices

Weed management practices	Plant height (cm)	No. of branches plant <sup>-1</sup>	No. of leaves plant <sup>-1</sup>	Leaf area plant <sup>-1</sup> (cm <sup>2</sup> )	Dry matter accumulation (g plant <sup>-1</sup> )
T1 - Pendimethalin (30% EC) 750 g a.i. ha <sup>-1</sup> as PE	34.70	5.80	66.67	145.07	2.32
T2 - Imazethapyr (10% SL) 50 g a.i. ha <sup>-1</sup> as PE	34.10	5.67	66.13	134.90	2.38
T3 - Pendimethalin (30% EC) 750 g a.i. ha <sup>-1</sup> as PE fb Quizalofop-p-ethyl (5% EC) 100 g a.i. ha <sup>-1</sup> at 20 DAS	35.03	6.77	70.60	150.77	2.41
T4 - Oxyfluorfen (23.5% EC) 150 g a.i. ha <sup>-1</sup> PE fb Propaquizafop (10% EC) 100 g a.i. ha <sup>-1</sup> at 20 DAS	35.63	7.53	71.53	151.10	2.46
T5 - Imazethapyr (10% SL) 50 g a.i. ha <sup>-1</sup> at 20 DAS	35.07	5.57	64.67	138.73	2.33
T6 - Quizalofop-p-ethyl (5% EC) 100 g a.i. ha <sup>-1</sup> at 20 DAS	35.03	5.40	62.40	136.77	2.15
T7 - Weedy check	30.10	4.07	51.67	122.00	1.76
T8 - Weed free check (Hand weeding twice at 20 & 40 DAS)	36.27	7.90	74.67	171.93	2.53
S.Em±	0.95	0.59	1.50	7.42	0.15
CD (P=0.05)	2.88	1.79	4.54	22.49	0.45

**Table 2:** Yield of lentil as influenced by weed management practices

Weed management practices	Seed yield (kg ha <sup>-1</sup> )	Stover yield (kg ha <sup>-1</sup> )	Harvest index (%)
T1 - Pendimethalin (30% EC) 750 g a.i. ha <sup>-1</sup> as PE	794	1525	34.2
T2 - Imazethapyr (10% SL) 50 g a.i. ha <sup>-1</sup> as PE	783	1508	34.2
T3 - Pendimethalin (30% EC) 750 g a.i. ha <sup>-1</sup> as PE fb Quizalofop-p-ethyl (5% EC) 100 g a.i. ha <sup>-1</sup> at 20 DAS	840	1566	34.9
T4 - Oxyfluorfen (23.5% EC) 150 g a.i. ha <sup>-1</sup> PE fb Propaquizafop (10% EC) 100 g a.i. ha <sup>-1</sup> at 20 DAS	888	1607	35.6
T5 - Imazethapyr (10% SL) 50 g a.i. ha <sup>-1</sup> at 20 DAS	707	1467	32.5
T6 - Quizalofop-p-ethyl (5% EC) 100 g a.i. ha <sup>-1</sup> at 20 DAS	678	1429	32.2
T7 - Weedy check	517	1269	28.9
T8 - Weed free check (Hand weeding twice at 20 & 40 DAS)	979	1690	36.7
S.Em±	37.8	52.2	0.9
CD (P=0.05)	114.8	158.4	2.7

**Table 3:** Economics of lentil as influenced by weed management practices

Weed management practices	Cost of cultivation (Rs ha <sup>-1</sup> )	Gross returns (Rs ha <sup>-1</sup> )	Net returns (Rs ha <sup>-1</sup> )	B:C ratio
T1 - Pendimethalin (30% EC) 750 g a.i. ha <sup>-1</sup> as PE	22991	52553	29562	2.29
T2 - Imazethapyr (10% SL) 50 g a.i. ha <sup>-1</sup> as PE	22561	51829	29268	2.30
T3 - Pendimethalin (30% EC) 750 g a.i. ha <sup>-1</sup> as PE fb Quizalofop-p-ethyl (5% EC) 100 g a.i. ha <sup>-1</sup> at 20 DAS	26241	55527	29286	2.12
T4 - Oxyfluorfen (23.5% EC) 150 g a.i. ha <sup>-1</sup> PE fb Propaquizafop (10% EC) 100 g a.i. ha <sup>-1</sup> at 20 DAS	23666	58673	35007	2.48
T5 - Imazethapyr (10% SL) 50 g a.i. ha <sup>-1</sup> at 20 DAS	22561	46863	24302	2.08
T6 - Quizalofop-p-ethyl (5% EC) 100 g a.i. ha <sup>-1</sup> at 20 DAS	24981	45006	20025	1.80
T7 - Weedy check	21031	34459	13428	1.64
T8 - Weed free check (Hand weeding twice at 20 & 40 DAS)	29781	64805	35024	2.18

**References**

1. Ahlawat IPS, Singh A, Saraf CS. Study on weed control in lentil. LENS. 1979;6:19-21.
2. Balyan RS, Malik RK. Weed management studies in chickpea (*Cicer arietinum*). J Res Haryana Agric Univ Hisar. 1996;26:191-4.
3. Elkoca E, Kantar F, Zengin H. Weed control in lentil (*Lens culinaris* Medik.) in eastern Turkey. N Z J Crop Hortic Sci. 2005;33:223-31.
4. Erman M, Tepe I, Bukun B, Yergin R, Taskesen M. Critical per weed competition in spring lentil (*Lens culinaris* Medik.) under un-irrigated rainfed conditions. Indian J Agric Sci. 2008;78:893-6.
5. Kay D. Food Legumes. Trop Dev Res Inst (TPI). Crop Prod Dig. 1979;(3):48-71.
6. Maleki FM, Hosseini NM, Alizadeh HM. Effect of weed control treatments on yield and yield components of lentil (*Lens culinaris* Medik.). In: Proceedings of 3rd Iranian Weed Science Congress, Vol 2: Key papers, weed management and herbicides, Babolsar, Iran, 17-18 February, 2010. p. 465-7.
7. Singh G. Integrated weed management in pulses. In: Proceedings of International Symposium on IWM for Sustainable Agriculture held in Hisar. 1993. p. 335-42.
8. Singh P, Singh L, Lone BA, Qayoom S, Ahmad L, Ganai MA, *et al.* Response of lentil (*Lens culinaris* Medik.) and weed to different weed management practices under temperate conditions. J Agri Res. 2015;2(1):72-4.
9. Turk MA, Tawaha AM. Lentil (*Lens culinaris* Medik.) response to frequencies of hand weeding. Indian J Agric Res. 2002;36(2):137-140.