



doi: <https://doi.org/10.20546/ijcrar.2024.1201.005>

## **Efficacy and Verification of Post-Emergence Herbicide Haloxyfop -P- Methyl 108 EC against Annual Grass Weeds in Faba Bean (*Vicia faba*) at south eastern Ethiopia**

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### **Abstract**

The experiment was carried out to examine the effect of Haloxyfop-P- methyl 108 efficiency on performance against commonly problematic annual grasses weeds in faba at Sinana agricultural Research Center using RCBD design in three replications. The experimental site was predominately susceptible to different weed species belonging to broad leaved and grass weed families. *Amaranthus hybridus* L, *Galinsoga parviflora*, *Guzotia scabra*, *Oxalis latifolia*, *Raphanus raphanistrum* were the major one from broad leaved group of plants whereas *Avena fatua*, *Gallium spurium*, *Setaria pumlia* were predominantly observed grass weeds in the study area. The highest weed control were recorded from weed free plot when Haloxyfop-P- methyl 108 and gallant super were followed respectively. The study gave clues as to how farmers using pot emergence herbicide Gallant super and Haloxyfop-P- methyl 108 could minimize weed population density in faba bean field.

### **Article Info**

*Received: 10 November 2023*

*Accepted: 28 December 2023*

*Available Online: 20 January 2024*

### **Keywords**

Grass weed, Hand weeding, Post-emergence herbicide, herbicides

### **Introduction**

Weeds pose great problem to grain production in Ethiopia especially cereal production in Southeast Ethiopia is hampered due to the aggressiveness of both grass and broadleaf weeds. This might be due to multiple factors such as: herbicides currently in use are ineffective; resistance development of some weed biotypes; unavailability or inaccessibility of herbicides in amount, type and at required time; increasing cost of herbicides; weed flora shift due to continuous monocropping of cereals and frequent use of one type of herbicide; morphological similarity of weed species with the cereal crops (especially at early stage); introduction of farm machineries that aggravate the dissemination of weed seeds and continuous return to the soil-seed bank,

etc. (Rezene and Yohannes, 2003). Selective herbicides are effective in controlling target weeds but inefficiency may arise in case the weeds develop resistance to certain selective herbicides and due to uncontrolled factors that may reduce the efficiency of the chemicals.

Faba bean is the major food legumes grown for human consumption, as green pods or dry seeds, as well as for animal feed and use for soil fertility replenishment. It is the most important and widely grown pulse crop, in southern Ethiopia.

Faba bean is very sensitive to weed competition particularly at its early growing stage to early flowering stage; yield loss of 20-95 % was recorded in Ethiopia (Fesehaie, 1994). This is mainly because of farmers'

belief that weeds have no influence on legumes. Twice hand-weeding (four and seven weeks after planting) are recommended to control the weeds in faba bean. But these operations were found laborious, time and energy consuming and least preferred by farmers due to labor resource limitations. So far, little information is available on the response of faba bean to alternative herbicides.

Therefore, the purpose of this study will be to examine the effect of Haloxypop-P-methyl 108 efficiency on performance against commonly problematic annual grasses weeds in faba bean.

## **Materials and Methods**

The herbicide test was conducted by Sinana Agricultural Research Center under Oromia Agricultural Research Institute by the agreement signed between the institute and the chemical agent called “Shandong Vicome Greenland Chemical Co., Ltd.” The trial was conducted at on-station of Sinana Agricultural Research Center and two sites of on-farm (Selka) of Sinana district in the Bale highlands. The test crop is Faba bean (variety Alloshe). HALOXYFOP-P-METHYL 108 was sprayed post emergence after 25-35 days after crop emergency. It was sprayed with the rate of 0.5 liter/ha.

## **Results and Discussion**

### **Weed control**

Herbicide treatments applied to faba bean resulted difference in all yield and yield components relative to the untreated control (Table 1). The application of haloxypop-p-methyle 108 with the dose of 0.5 L ha has been more successful in the control of grass weed as compared to weedy check.

Similarly, other studies have found that gallant supper 0.6 L ha of applied post emergence provides better grass weed control. There was no statistical difference in weed control between haloxypop-p-methyle 108 EC and gallant supper applied (Table1).

The least level of control were observed in unweeded plot. These results are similar to Blackshaw *et al.*, (2000), who found that pursuit applied post-emergence at 20 or 35 g ai haG1 as a follow up application to a grass herbicide provided good control of weed in dry beans. Weed management practitioners must adjust haloxypop-p-methyl 108 herbicide doses based on weed species composition.

### **Effect of treatments on plant height**

Plant height was not significantly influenced by POST herbicide treatments (Table 1). Plant height is important in broad bean production as shorter plants may have greater shatter loss at the cutter bar of combine during harvesting resulting in reduced harvested seed yield. The highest plant heights (137.3 cm) were observed from weed free plot followed by application of Haloxypop-p-methyl 108 EC (132.5cm) and the shortest plants were observed weedy check plots (126.1 cm). Both herbicide treatments were no statistical difference in plant height among herbicide treatments. Height reduction of broad bean plants not only shows competition with weeds but also confirms the inhibitory effect of herbicides on crops. Marwat *et al.*, (2003) reported that applying some herbicide applications on plant height were significant.

### **Effect of treatments on pod number per plant and 1000 seed weight**

Comparison of pod number per plant was not showed significant differences among herbicide treatments (Table 1). The highest (16) pod number per plant was observed in Haloxypop-p-methyl 108 EC treatment were as the lowest (13) pod number per plant was found in weedy check. In comparison, the most effective herbicide in relation to thousand seed weight was found that had no statistically differences with other treatment.

### **Effect of treatments on seed yield**

Seed yield was equal in all POST herbicide treatments and there was no statistical difference in seed yield among herbicide treatments. The lowest 1815.4 kg/ha was recorded from weedy plot and the highest (3234.6 kg/ha) was recorded from two times hand weeding followed by (2994.4 kg/ha) seed yield was recorded from application of Haloxypop-P-methyl herbicide. These results are in conformation with those of Baghestani *et al.*, (2008) and Chhokar *et al.*, (2008), who reported that herbicides offer sizeable increase in crop productivity corresponding to their weed control spectrum.

Behdarvandi and Modhaj (2007) reported that controlling weeds and decreasing their densities via reduction in plant competition (between rapeseed and weed), relied on appropriate radiation distribution in various layers of canopy and improvement in the micro climate could increase pods per plant, grains per pod and grain yield. Similar results were reported in other research (Miri and Rahimi, 2009).

**Table.1** Effect of HALOXYFOP-P-METHYL 108 on Faba bean yield and yield components in the highlands of Bale, Combined over locations

Treatments	PH	MD	PPP	BM kg/ha	Gy kg/ha	TSW
Gallant supper	129.5 <sup>bc</sup>	135 <sup>a</sup>	14 <sup>b</sup>	5966.25 <sup>b</sup>	2886.2 <sup>ab</sup>	536.4 <sup>a</sup>
Haloxypop-p-methyl 108 EC	132.5 <sup>b</sup>	131 <sup>a</sup>	16 <sup>a</sup>	6104.75 <sup>b</sup>	2994.4 <sup>ab</sup>	518.8 <sup>a</sup>
Two times Hand weeding	137.3 <sup>a</sup>	129 <sup>b</sup>	16 <sup>a</sup>	6858.75 <sup>a</sup>	3234.6 <sup>a</sup>	508.1 <sup>a</sup>
No weeding	126.1 <sup>c</sup>	126 <sup>b</sup>	13 <sup>b</sup>	5459.5 <sup>c</sup>	1815.4 <sup>b</sup>	504.2 <sup>a</sup>
CV (%)	4.67	1.65	4.18	2.73	10.35	8.85
LSD (0.05)	4.13	5.97	1.7	164.14	108.98	ns

GY = Grain yield, PH= Plant height, MD=Maturity Date, TKW= Thousand kernel weight, BM= Biomass yield, PPP = pod per plant

### Effect of treatments on biological yield

Similar to seed yield, biological yield was equal in all POST herbicide treatments and there was no statistical difference in biological yield among herbicide treatments. The lowest and the highest biological yield recorded 5459.5 kg/ha and 6858.75 kg/ha and 5966.25 kg/ha were recorded in the weedy check treatment and two times hand weeding followed by application of Haloxypop-P-methyl respectively (Table1).

### Recommendation

Two times hand weeding and Post emergence application of HALOXYFOP-P-METHYL 108 has produced a yield advantage of 11.79 % as compared to weedy check. HALOXYFOP-P-METHYL 108 is the recommended herbicide for the control of grass weeds in faba bean producing better yield than weedy check. Therefore, if economically affordable and available to farmers, the new chemical HALOXYFOP-P-METHYL 108 EC is recommended for use as grassy weeds management option especially for cereal dominated mono-cropping in the highlands of Bale, where the weeds are aggressive due to continuous use of selective herbicides and consequent buildup of resistance and inefficiency of the selective chemicals.

Moreover, in the crop potential districts of Bale, commercial and near commercial farms are most frequent in which hand weeding is not suitable and difficult for critical stage of weeding. For such large scale production systems, where hand weeding is laborious, time-consuming, and costly, it is difficult or may not always be possible to facilitate timely weed control. Thus, it is very wise to recommend the herbicide HALOXYFOP-P-METHYL 108 for use against major grassy weeds applied post emergence for improved yield

and yield components of faba bean in Bale and similar agro-ecologies. I recommended the herbicide HALOXYFOP-P-METHYL 108 EC to be registered.

### Acknowledgements

The authors wish to acknowledge funding from the Shandong Vicome Greenland Chemical Co., Ltd. The authors would like to thank Sinana Agricultural Research Center for support field and facilities. Especial thanks are also extended to the Sinana Agricultural Research Center for support field and facilities and Sinana pulse and oil crops Research Technology Generation Team for their assistance in conducting the experiment and data collection.

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**How to cite this article:**

Tamiru Meleta and Reta Dargei. 2024. Efficacy and Verification of Post-Emergence Herbicide Haloxyfop -P-Methyl 108 EC against Annual Grass Weeds in Faba Bean (*Vicia faba*) at south eastern Ethiopia. *Int.J.Curr.Res.Aca.Rev.* 12(1), 47-50. doi: <https://doi.org/10.20546/ijcrar.2024.1201.005>