

Efficacy of Post-Emergence Herbicides in Greengram

S. Krishnaprabu*

Department of Agronomy, Faculty of Agriculture, Annamalai University - 608 002

*Corresponding Author E-mail: prabu1977krishna@gmail.com

Received: 2.06.2018 | Revised: 16.07.2018 | Accepted: 23.07.2018

ABSTRACT

Weeding and hoeing are common cultural and manual weed management methods for greengram. Manual weeding at right stage is difficult, time consuming and expensive due to intermittent rainfall during rainy season and scanty labour, therefore, farmers rarely adopt manual weeding for weed control. Under such situation, herbicides use with suitable dose remains the pertinent choice for controlling the weeds. Herbicides in isolation, however, are unable to do complete weed control because of their selective kill. Manual weeding or spraying of recommended pre-emergence herbicide is some time difficult in rainy season for efficient weed control and pre-emergence herbicides control weed during early growth stage, but later, newly germinated weeds flora cannot be controlled by pre-emergence application. This warrants the use of post emergence herbicide for weed control. Under this situation, supplement of herbicides along with physical method prove in augmenting the yield of green gram (Gupta et al. 1990). Thus, an experiment was conducted with an aim to control early weeds of the greengram crop during rainy season with the help of combinations of pre and post applied herbicides.

Key words: Pendimethalin, Imazethapyr, Imazamox, Moongbean Weed.

INTRODUCTION

An experiment was conducted at Experimental farm, Annamalai University during summer season of 2015 in order to find out suitable pre and post-emergence herbicide for the control of weeds during early growth stage of greengram crop. The soil of the experimental field was loamy sand with pH 8.22. Fertility status of experiment field was poor in organic carbon (0.08), low in available nitrogen (78.0 kg ha⁻¹), medium in available phosphorus (22.0 kg ha⁻¹) and potassium (210.0 kg ha⁻¹). The crop was raised with 20 kg ha⁻¹ N, 40 kg

ha⁻¹ P₂O₅ and 40 kg ha⁻¹ K₂O with cultivar VBN2. A set of sixteen treatment combinations with pre emergence pendimethalin and post-emergence imazethapyr and imazamox comprising weedy check and weed free was made and replicated thrice in randomized block design. The pre - emergence herbicides was sprayed immediately after sowing on wet soil and the post-emergence herbicides was applied 20 and 30 DAS as per treatment with knapsack sprayer.

Cite this article: Krishnaprabu, S., Efficacy of post-emergence herbicides in Greengram, *Int. J. Pure App. Biosci.* 6(4): 762-765 (2018). doi: <http://dx.doi.org/10.18782/2320-7051.7257>

Weed flora of experimental field consisted of *Amaranthus spinosus* L., *Digera arvensis* L., *Trianthema portulacastrum* L., *Gisekia poredious* L., *Euphorbia hirta* L., *Aristida depressa* L., *Portulaca oleracea* L., *Cenchrus biflorus* L., *Cleome viscosa* L., *Tribulus terrestris* L., *Cor chorus tridense* L., *Cyperus rotundus* L., *Eleusine verticillata* L., *Eragrastris tennela* L. and *Aerva tomentosa* L.

All the treatments were responsible for significant reduction in weed density and dry weight of weeds over control. Weed free treatment resulted in lowest weed density and dry weight of weeds. However, treatment pendimethalin @ 0.75 kg ha⁻¹ as pre emergence + imazethapyr + imazamox @ 40 g ha⁻¹ at 30 DAS as post emergence recorded significantly least number of weed (0.06) and weed dry matter (0.06 g m⁻²) than any other treatment except weed free check (Table 1).

MATERIAL AND METHODS

Table1. Weed density, weed dry weight, weed (nom⁻²) control efficiency (gm⁻²) and weed index as influenced by different weed management practices

| Treatments | Weed density (no m ⁻²) | Weed dry weight (g m ⁻²) | Weed control Efficiency (%) | Weed index (%) |
|--|---------------------------------------|---|--------------------------------|-------------------|
| Weedy check (W ₁) | 8.14(65.80) | 46.92 | - | 50.56 |
| Weed free(W ₂) | 0.71(0.00) | 0.00 | 100.00 | - |
| Pendimethalin 0.75 kg ha ⁻¹ (W ₃) | 2.81(7.42) | 6.33 | 89.00 | 14.06 |
| Pendimethalin 0.75 kg ha ⁻¹ + HW 30 DAS(W ₄) | 1.04(0.59) | 0.54 | 98.79 | 2.40 |
| Imazethapyr 40 g ha ⁻¹ 20 DAS(W ₅) | 1.90(3.15) | 5.60 | 93.83 | 19.09 |
| Imazethapyr 50 g ha ⁻¹ 20 DAS(W ₆) | 1.88(3.09) | 5.70 | 93.97 | 16.45 |
| Imazethapyr 60 g ha ⁻¹ 20 DAS(W ₇) | 1.87(3.00) | 5.72 | 94.14 | 16.77 |
| Imazethapyr 40 g ha ⁻¹ 20 DAS + HW 40 DAS(W ₈) | 1.10(0.71) | 1.49 | 98.30 | 12.14 |
| Imazethapyr 50 g ha ⁻¹ 20 DAS + HW 40 DAS(W ₉) | 1.00(0.50) | 1.15 | 98.47 | 10.30 |
| Imazethapyr 60 g ha ⁻¹ 20 DAS + HW 40 DAS(W ₁₀) | 1.17(0.86) | 2.13 | 98.56 | 9.82 |
| Imazethapyr+Imazamox 40 g ha ⁻¹ 20 DAS(W ₁₁) | 0.96(0.43) | 0.29 | 99.36 | 15.42 |
| Imazethapyr+Imazamox 60 g ha ⁻¹ 20 DAS(W ₁₂) | 0.91(0.32) | 0.21 | 99.50 | 14.62 |
| Pendimethalin 0.75 kg ha ⁻¹ + Imazethapyr 40 g ha ⁻¹ 20 DAS(W ₁₃) | 0.90(0.31) | 0.30 | 99.55 | 2.88 |
| Imazethapyr+Imazamox 40 g ha ⁻¹ 20 DAS + HW 40 DAS(W ₁₄) | 0.83(0.19) | 0.39 | 99.58 | 7.51 |
| Imazethapyr+Imazamox 60 g ha ⁻¹ 20 DAS + HW 40 DAS(W ₁₅) | 0.75(0.06) | 0.15 | 99.78 | 6.07 |
| Pendimethalin 0.75 kg ha ⁻¹ + Imazethapyr+ Imazamox 40 g ha ⁻¹ 20 DAS + HW 40 DAS (W ₁₆) | 0.75(0.06) | 0.06 | 99.85 | 4.79 |
| SEm+ | 0.06 | 0.16 | | |
| CD (P=0.05) | 0.17 | 0.46 | | |

HW= Hand weeding DAS=Day after sowing check (Table 1).

This might be due to control of weeds during early growth stage by pre emergence application of pendimethalin and post emergence application of imazethapyr at 30 DAS. The treatment combination of pre and post applied herbicide after sowing and 30 DAS was able to control the further infestation of weeds in greengram crop. Further the crop covers the soil surface and smothers the growth of weeds results into least number of weeds at harvest.

RESULTS AND DISCUSSION

Highest weed control efficiency (100) and lowest weed index percentage were observed

in weed free treatment. Besides weed free, treatments pendimethalin 0.75 kg ha⁻¹ as pre-emergence + imazethapyr + imazamox 40 g ha⁻¹ at 30 DAS as post-emergence, imazethapyr + imazamox 60 g ha⁻¹ at 20 DAS as post-emergence + one hand weeding at 40 DAS and imazethapyr + imazamox 40 g ha⁻¹ at 20 DAS as postemergence + one hand weeding at 40 DAS recorded lower weed index 4.79, 6.07 and 7.51 and higher weed control efficiency 99.85, 99.78, 99.58 and 98.58 per cent. This might be due to elimination of weeds by manual weeding and interculturing or by herbicides. The integrated effect on dry weight of weeds and seed yield

under these treatments might have been responsible for excellent weed indices. These findings are akin to report of Bhandari *et al.*¹. The lowest weed index was noticed in treatment of pendimethalin 0.75 kg ha⁻¹ as pre-emergence + hand weeding at 30 DAS (2.40) followed by pendimethalin 0.75 kg ha⁻¹ as pre-emergence + imazethapyr 40 g ha⁻¹ at 30 DAS as post-emergence (2.88). Lowest weed control efficiency and highest weed index percentage (50.56) were recorded in weed free.

All weed management practices significantly enhanced seed yield over weedy check. There was no significant difference between seed yield with all of the treatments except weedy check. Weed free treatment produced the highest seed yield (1252 kg ha⁻¹) followed by pendimethalin 0.75 kg ha⁻¹ as pre-emergence + one hand weeding 30 DAS (1222 kg ha⁻¹) while it was minimum under weedy check (619 kg ha⁻¹).

Table 2. Seed yield, straw yield, gross return, net return and B: C ratio as influenced by different weed management practices.

| Treatments | Seed yield (kg ha ⁻¹) | Straw yield (kg ha ⁻¹) | Gross return (ha ⁻¹) | Net returns (ha ⁻¹) | B:C ratio |
|--|-----------------------------------|------------------------------------|----------------------------------|---------------------------------|-----------|
| Weedy check (W ₁) | 619 | 1691 | 36974 | 15188 | 1.70 |
| Weed free (W ₂) | 1252 | 3180 | 74544 | 50102 | 3.05 |
| Pendimethalin 0.75 kg ha ⁻¹ (W ₃) | 1076 | 2822 | 64153 | 40704 | 2.74 |
| Pendimethalin 0.75 kg ha ⁻¹ + HW 30 DAS (W ₄) | 1222 | 3111 | 72764 | 47987 | 2.94 |
| Imazethapyr 40 g ha ⁻¹ 20 DAS (W ₅) | 1013 | 2736 | 60476 | 37823 | 2.67 |
| Imazethapyr 50 g ha ⁻¹ 20 DAS (W ₆) | 1046 | 2812 | 62433 | 39688 | 2.74 |
| Imazethapyr 60 g ha ⁻¹ 20 DAS (W ₇) | 1042 | 2762 | 62156 | 39318 | 2.72 |
| Imazethapyr 40 g ha ⁻¹ 20 DAS + HW 40 DAS (W ₈) | 1100 | 2899 | 65598 | 41616 | 2.74 |
| Imazethapyr 50 g ha ⁻¹ 20 DAS + HW 40 DAS (W ₉) | 1123 | 2947 | 66957 | 42884 | 2.78 |
| Imazethapyr 60 g ha ⁻¹ 20 DAS + HW 40 DAS (W ₁₀) | 1129 | 2946 | 67299 | 43133 | 2.78 |
| Imazethapyr+Imazamox 40 g ha ⁻¹ 20 DAS (W ₁₁) | 1059 | 2816 | 63178 | 40686 | 2.81 |
| Imazethapyr+Imazamox 60 g ha ⁻¹ 20 DAS (W ₁₂) | 1069 | 2832 | 63764 | 41169 | 2.82 |
| Pendimethalin 0.75 kg ha ⁻¹ + Imazethapyr 40 g ha ⁻¹ 20 DAS (W ₁₃) | 1216 | 3114 | 72426 | 48108 | 2.98 |
| Imazethapyr+Imazamox 40 g ha ⁻¹ 20 DAS + HW 40 DAS (W ₁₄) | 1158 | 3006 | 69011 | 45191 | 2.90 |
| Imazethapyr+Imazamox 60 g ha ⁻¹ 20 DAS + HW 40 DAS (W ₁₅) | 1176 | 3032 | 70063 | 46140 | 2.93 |
| Pendimethalin 0.75 kg ha ⁻¹ + Imazethapyr+ Imazamox 40 g ha ⁻¹ 20 DAS + HW 40 DAS (W ₁₆) | 1192 | 3077 | 71021 | 46864 | 2.94 |
| SEm+ | 84 | 201 | | 3602 | 0.183 |
| CD (P=0.05) | 241 | 580 | | 10404 | 0.53 |

The monetary returns were found to be significantly influenced by different weed control treatments. The maximum gross returns of ' 74544 ha⁻¹, net returns of "50102 ha⁻¹ and benefit: cost ratio (3.05) was obtained with weed free treatment. Among herbicide weed control treatments maximum gross return (' 72764 ha⁻¹) was recorded with treatment pendimethalin 0.75 kg ha⁻¹ as pre-emergence + hand weeding at 30 DAS whereas maximum net returns (' 48108 ha⁻¹) and benefit: cost ratio (2.98) were recorded with treatment pendimethalin 0.75 kg ha⁻¹ as

preemergence + imazethapyr 40 g ha⁻¹ at 30 DAS as post-emergence. These findings are in close vicinity with those reported by Sardana *et al.* (2006) and Yadav *et al.*⁵. Weedy check recorded lowest gross monetary return ('36974 ha⁻¹), net monetary return (' 15188 ha⁻¹) and benefit: cost ratio (1.70).

CONCLUSION

All weed control treatments are almost equally important in controlling weeds and improving crop yield. Weed free treatment was superior most with respect to yield (1252 kg ha⁻¹), yield

attributes, quality and net profit (' 50102 ha⁻¹) and B:C ratio (3.05). The next best treatment with respect to net returns (' 48108 ha⁻¹) and B:C ratio (2.98) was found pendimethalin 0.75 kg ha⁻¹ as pre-emergence + imazethapyr 40 g ha⁻¹ at 20 DAS as post emergence.

REFERENCES

1. Bhandari, V., Singh, J., Randhawa, J. S. and in summer blackgram (*Phaseolus mungo*) (2004).
2. Randhawa, R. S., Studies on weed control *Indian Journal of Weed Science*, **36**: 129-130 (2004).
3. Gupta, V. K., Katyial, S. K., Panwar, R. S. and Malik, R. K., Integrated weed management in summer mungbean (*Vigna radiata*). *Indian Journal of Weed Science*, **22**: 38-42 (1990).
4. Sardana V., Singh S. and Sheoran, P., Efficacy and economics of weed management practices in blackgram (*Vigna mungo* L.) under rainfed conditions. *Indian Journal of Weed Science*, **38(1&2)**: 77-80 (2006).
5. Yadav, R. S., Singh, S. P., Vikas, S. and Bairwa, R. C., Herbicidal weed control in green gram in Arid zone of Rajasthan 97 "Biennial conference of Indian society of weed science on "Emerging challenges in weed management". Directorate of weed science research, Jabalpur (2014).