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Herbicidal effect of imazethapyr and its ready-mix with imazamox on performance on yield and NPK uptake and content by green gram (*Vigna radiata* L.)

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Abstract
The experiment was conducted in Randomized Block Design (RBD) with three replications comprising fifteen treatments of weed management were Imazethapyr @ 70 g ha^{-1} as pre plant incorporation, Imazethapyr 80 g ha^{-1} as pre plant incorporation, Imazethapyr @ 70 g ha^{-1} as pre emergence, Imazethapyr @ 80 g ha^{-1} as pre emergence, Imazethapyr @ 70 g ha^{-1} at 3-4 leaf stage, Imazethapyr @ 80 g ha^{-1} at 3-4 leaf stage, Imazethapyr + Imazamox (RM) @ 70 g ha^{-1} as pre emergence, Imazethapyr + Imazamox (RM) @ 80 g ha^{-1} as pre emergence, Imazethapyr + Imazamox (RM) @ 70 g ha^{-1} at 3-4 leaf stage, Imazethapyr + Imazamox (RM) @ 80 g ha^{-1} at 3-4 leaf stage, Pendimenthalin @ 1000 g ha^{-1} as pre emergence, Imazethapyr + Pendimenthalin (RM) @ 1000 g ha^{-1} as pre emergence, Hand weeding 20&40 DAS, Weed free, Weedy Check. The soil of experiment site was low in Organic Carbon and Nitrogen and medium in available Phosphorus and available Potassium and alkaline in reaction. The findings of present study revealed that chemical methods of weed control signify reduction in weed density and dry weight of weeds effectively over weedy check. Among the weed management treatments, the maxium plant height, no. Of tillers, dry matter accumulation, and yield attributes *viz*. No. of spikes, spikelets/spike, spike length, No. of grains/spike, Thousand grain weight, grain (1020 kg ha $^{-1}$) and straw (1652 kg/ha) yield was observed with the application of Imazethapyr + Imazamox @ 80 g/ha at 3-4 leaf stage and established its superiority over rest of the herbicide. Similarly, this treatment also resulted into higher weed control efficiency, Nitrogren, Phosphorus and potassium uptake by crop, Net return and benefits: cost ratio. These values were very close to weed free treatment. The percent increase in grain and straw yield was 1020 kg, respectively over weedy check.

Keywords: Weed, NPK uptake, grain yield, herbicides

Introduction
Green gram (*Vigna radiata* L.) has been grown in India since ancient times. It is also known as mung-bean and golden gram. It is important short duration, predominantly rainy season pulse crop grown in many part of India. Green gram reported to be originated in India. Green gram is grown widely for use as a human food. Largely consumed as dal in northern India other used as fried snacks. It is supposed to be easily digestible and hence is preferred by patient also. It contains about 25% protein, 60% carbohydrate and 1.3% fat. It can be used for both seed and forage production. It plays an important role not only in human diet, but also in improving the soil fertility through biological nitrogen fixation with Rhyzobium (Upadhyay *et al*. 2015) [17]. Globally pulses are grown in area of 76 m ha with a production of about 68 mt. The average productivity at the global level is about 800 kg ha^{-1}. India is the largest producer, consumer and processor of pulses in the world which account for 33% of the world area and 22% of the world production of pulses. In India the total pulse area is about 25 m ha with production about 18 mt. with average productivity of 750 kg ha^{-1}. The demand of pulses is fast increasing, both in developed and developing countries, where they meet the minimum protein requirement of an increasing population turning to a vegetarian diet. Green gram grown in India on an area of 3.55 m ha with production about 1.82 mt. and productivity 512 $kgha^{-1}$ and in U.P on an area 78,000 ha with production 45,000 ton and productivity 854 $kgha^{-1}$. The area of pulses crop has not increased much during the past 60-65 year except in 2017 and 2018, it showed an increase of 1.5 to 2.0m ha. In order to ensure self-sufficiency, the pulse requirement

in the country is projected at 27.5 mt by the year 2025. (Datta and Singh, 2015) [6]. Pulse cultivation enriches soil by adding nitrogen and improves the physical, chemical and biological soil properties. Pulses are grown since age in different part of the world. They are well suited to diverse environment and fit in various cropping system- owing to their wide adaptability, low input requirement, fast growth, nitrogen fixing and weed smothering ability. Green gram is grown as rainfed or irrigated condition in wider rows. Cultural and mechanical weed control can be practiced, but it is not always feasible due to their high cost, non- availability of labour at appropriate time, prevailing weather condition, long window of weed emergence in the growing season and continuous moisture during rainy season is a problem which make it difficult to remove within specified time when they are most potent of injury to crop. So chemical methods of weed management offer good scope for harvesting a good crop of green gram. Weed management is an important factor for enhancing the productivity of green gram, as weeds compete for nutrient, water, light and space with crop plant during early growth period. Yield losses in green gram due to weeds have been estimated to range between 30-50%. Annual broad leaf weed, carpet weed (*Trianthema portulacastrum*) germinates at the same time as green gram and complete its life cycle within 60 days (Balyan, 1985) [4] and grassy weed, barnyard grass (*Echinochloa colona*) germinate immediately after onset of rains and irrigation, are two aggressive weed and if not controlled at proper time, can cause heavy yield losses. The extent of yield reduction due to weeds in green gram have been reported to be 42-68% (Patro and Prusty, 2002, Singh *et al*., 2004) [14, 15] depending upon intensity and type of weed flora. Thus it is necessary to eliminate weeds from crop at proper time and with suitable methods. The most commonly used herbicides for controlling weeds in green gram are trifluralin, linuron, acetachlor (Malik *et al*., 2000) [12] and pendimethalin, alachlor and fluchloralin (Mishra and Singh, 1993) [13]. Imazethapyr is a new herbicide of imidazolinone group registered for use in soybean, groundnut and other legumes (Herbicide Handbook USA, 2002). Imazethapyr can be applied as pre-plant incorporation, pre-emergence, and post-emergence to control grasses and broadleaved weeds in pulse crops (Anonymous 2006) [2].

Materials and Methods

The experiment was conducted during kharif season 2022 at Agronomy Research Farm of Dolphin (PG) college of Science and Agriculture, Chunni Kalan; a campus of Punjabi University, Patiala, Punjab. Geographically, it is situated on the Fatehgarh Sahib Chandigarh road, Chunni Kalan it is located at 30^0 09 N latitude and 76^0 33 E longitude at an altitude of 281 meters above the mean sea level.

The experiment was laid out in a randomized block design (RBD) with 3 replication. Green gram was hand sown at a seed rate of 15 kg /ha. The herbicide treatments included pre emergence (PE & PoE) along with a weed free and weedy check treatments as Control. In the plots of hand weeding treatments weeding was done by manual labor with help of khurpi as per the treatment. The pre emergence herbicide, Imazethapyr @ 70 g ha^{-1} as pre plant incorporation, Imazethapyr @ 80 g ha^{-1} as pre plant incorporation, Imazethapyr @ 70 g ha^{-1} as pre emergence, Imazethapyr @80 g ha^{-1} as pre emergence, Imazethapyr @ 70 g ha^{-1} at 3-4 leaf Stage, Imazethapyr @ 80 g ha^{-1} at 3-4 leaf Stage, Imazethapyr +imazamox (RM) @ 70 g ha^{-1} as pre emergence, Imazethapyr +imazamox (RM) @ 80 g ha^{-1} as pre emergence, Imazethapyr +imazamox (RM) @ 70 g ha^{-1} at 3-4 leaf Stage, Imazethapyr +imazamox (RM) @ 80 g ha^{-1} at 3-4 leaf Stage, Pendimethalin @ 1000 g ha^{-1} as pre emergence and Imazethapyr + Pendimethalin(RM)@ 1000 g ha^{-1} as pre emergence. The detailed of the treatment combinations are mentioned in table 1. The field was fertilized with N:P_2O_5: K_2O @ 20kg N + 50 P_2O_5 + 25 kg K2O / ha in form urea, DAP and MOP Respectively. Weight of biomass and grain yield per plot was recorded after harvest. Harvest index (%).

The harvest index of green gram was obtained by dividing the economical yield (grains yield) with the biological yield (grains + straw) and represented in percentage.

$$Harvest\ \ Index = \frac{Economic\ yield(q/ha)}{Biological\ yield(q/ha)} x100$$

After harvest the crop N, P and K content separately in grain and straw of each treatment plot was estimated samples for NPK estimation were taken from grain and straw of three sample plants in each treatment plot. Estimation of N, P and K in crop samples was done by modified Kjeldahl method, spectrophotometer method and flame photometric methods, respectively (Jackson, 1973) [9].

In case of weeds, N, P and K contents were determined in dry matter of whole plant at harvest. Weed samples for estimation were taken from dry matter of different treatment plots at respective stages of observation. Similar method of estimation as described in case of crop, were used for weed samples also.

Nutrient uptake by crop and weeds

In crop, total, N, P and K uptake separately was worked out at crop harvest. The amount of N, P, K taken up in grain and straw was separately calculated by multiplying their content with corresponding yield. The figures of nutrients uptake in grain and straw of same treatment plot were added together and sum was recorded as total uptake in kg $ha^{-1.}$ The uptake of N, P and K was recorded separately in all treatment plots.

Nutrient uptake by weeds was also calculated by multiplying their content with dry matter production in respective treatment plot. It was also worked out and recorded in kg ha^{-1} separately for N, P and K.

Nutrient uptake (kg/ha) = Nutrient contant (%) x crop yield dry matter (g/ha)

The experimental data obtained during the course of study were subjected to statistical analysis using analysis of variance technique (ANOVA) for split plot design as prescribed by Gomez & Gomez, (1984) [7].

Result and Discussion

Table 1: Grain, straw, biological yield (q/ha) and harvest index of green gram as influenced by various weed management treatments HW, hand weeding

Treatments	Seed yield (kg ha^{-1})	Straw yield (kg ha^{-1})	Biological yield (kg ha^{-1})	Harvest index (%)
Imazethapyr @ 70 g ha^{-1} as pre plant incorporation	430	908	1338	32.1
Imazethapyr @ 80 g ha^{-1} as pre plant incorporation	445	921	1366	32.5
Imazethapyr @ 70 g ha^{-1} as pre emergence	490	983	1473	33.2
Imazethapyr @80 g ha^{-1} as pre emergence	540	1045	1585	34.0
Imazethapyr @ 70 g ha^{-1} at 3-4 leaf Stage	835	1475	2310	36.1
Imazethapyr @ 80 g ha^{-1} at 3-4 leaf Stage	915	1530	2445	37.4
Imazethapyr +imazamox (RM) @ 70 g ha^{-1} as pre emergence	510	903	1413	36.02
Imazethapyr +imazamox (RM) @ 80 g ha^{-1} as pre emergence	570	988	1558	36.5
Imazethapyr +imazamox (RM) @ 70 g ha^{-1} at 3-4 leaf Stage	928	1553	2481	37.4
Imazethapyr +imazamox (RM) @ 80 g ha^{-1} at 3-4 leaf Stage	1020	1652	2672	38.1
Pendimethalin @ 1000 g ha^{-1} as pre emergence	544	984	1528	35.6
Imazethapyr +pendimethalin (RM) @ 1000 g ha^{-1} as pre emergence	780	1303	2086	37.3
Hand weeding at 20&40 DAS	1078	1768	2846	37.8
Weed free	1143	1858.8	3001.8	38.0
Weedy check	334	715	1049	31.4
S Em ±	4.2	16.7	9.1	1.0
CD at 5%	12.3	48.0	26.2	2.9

Revealed that all weed control treatments significantly increased the grain yield over weedy check. The maximum grain yield (1143 kg ha^{-1}) was found with weed free treatment which was significantly higher than other weed control treatments. Among the herbicidal treatments, higher grain yield (1020 kg ha^{-1}) was recorded with POE application of Imazethapyr +imazamox (RM) @ 80 g ha^{-1} followed by POE application of Imazethapyr +imazamox (RM) @ 70 g ha^{-1} (928 kg ha^{-1}) which was higher than other herbicide treatments. Seed yield was significantly increased in weed free (242.3%) in comparison to weedy check treatment. revealed that the maximum straw yield (1828.8 kg ha^{-1}) was recorded in weed free treatment followed by two hand weeding (1768 kg ha^{-1}) at 20 and 40 DAS. Among the herbicidal treatments, maximum straw yield (1652 kg $^{ha-}$1) was recorded with POE application of Imazethapyr +imazamox (RM) @ 80 g ha^{-1} followed by POE application of Imazethapyr +imazamox (RM) @ 70 g ha^{-1} (1553 kg ha^{-1}). Straw yield was significantly lower in weedy check in comparison to all other treatments. Revealed that the all weed control treatments increases the biological yield over weedy check. The maximum biological yield (2971 kg ha^{-1}) was recorded in weed free plot which was higher than other treatments closely followed by two hand weeding at 20 and 40 DAS (2846 kg ha^{-1}). Among the herbicidal treatments, POE application of Imazethapyr +imazamox (RM) @ 80 g ha^{-1} give maximum biological yield (2672 kg ha^{-1}) followed by POE application of Imazethapyr +imazamox (RM) @ 70 g ha^{-1} (2481 kg ha^{-1}). Biological yield was significantly lower in weedy check in comparison to all other treatments. Revealed that all weed control treatments increased the harvest index over weedy check. The maximum harvest index (38.1) recorded with POE application of Imazethapyr +imazamox (RM) @ 80 g ha^{-1} followed by weed free plot (38.0). Significantly lower harvest index (31.4) was recorded in weedy check and among the herbicidal treatments significantly lower harvest index was recorded with PRE application of imazethapyr @ 70 g ha^{-1} (32.1). These finding are supported by the results of Chin and Pandey (2001) [5], Tewari *et al.* (2004) [16] and Ali *et al.* (2011) [18].

Nitrogen content (%) and uptake (kg ha^{-1})

The higher nitrogen content (3.97%) was recorded under weed free plot followed by two hand weeding at 20 and 40 DAS (3.89%). Among the herbicide treatments, POE application of Imazethapyr +imazamox (RM) @ 70 g ha^{-1} give higher nitrogen content (3.91%) followed by POE application of Imazethapyr +imazamox (RM) @ 80 g ha^{-1} (3.91%). significantly lower nitrogen content (3.35%) was recorded in weedy check plot. The higher nitrogen uptake (45.4 kg ha^{-1}) was recorded under weed free plot followed by two hand weeding at 20 and 40 DAS (42 kg ha^{-1}). Among the herbicide treatments, POE application of Imazethapyr +imazamox (RM) @ 80 g ha^{-1} give higher nitrogen uptake (39.9 kg ha^{-1}) followed by POE application of Imazethapyr +imazamox (RM) @ 70 g ha^{-1} (35.6 g ha^{-1}). Significantly lower nitrogen uptake (11.2 g ha^{-1}) was recorded in weedy check plot.

Phosphors content (%) and uptake (kg ha^{-1})

The higher *phosphors* content (0.42%) was recorded under weed free plot followed by two hand weeding at 20 and 40 DAS (0.42%). Among the herbicide treatments, POE application of Imazethapyr +imazamox (RM) @ 80 g ha^{-1} give higher *phosphors* content (0.41%) closely followed by PRE application of Imazethapyr + pendimethalin (RM) @ 1000 g ha^{-1} 0.40%). The higher *phosphors* uptake (4.80 kg ha^{-1}) was recorded under weed free plot followed by two hand weeding at 20 and 40 DAS (4.53 kg ha^{-1}). Among the herbicide treatments, POE application of Imazethapyr +imazamox (RM) @ 80 g ha^{-1} give higher nitrogen uptake (4.18 kg ha^{-1}) followed by POE application of Imazethapyr (RM) @ 80 g ha^{-1} (3.57 g ha^{-1}). Significantly lower *phosphors* uptake (1.07 kg ha^{-1}) was recorded in weedy check plot.

Potassium content (%) and uptake (kg ha^{-1})

The higher potassium content (1.12%) was recorded under weed free plot followed by two hand weeding at 20 and 40 DAS (1.09%). Among the herbicide treatments, POE application of Imazethapyr +imazamox (RM) @ 80 g ha^{-1} give higher potassium content (0.95%) followed by POE application of Imazethapyr +imazamox (RM) @ 70 g ha^{-1} and PRE application of imazethapyr + pendimethalin @ 1000 g ha^{-1} (0.89 and 0.89%) respectively. significantly lower potassium content (3.35%) was recorded in weedy check plot. The higher potassium uptake (12.80 kg ha^{-1}) was recorded under weed free plot followed by two hand weeding at 20 and 40 DAS (11.75 kg ha^{-1}). Among the herbicide treatments,

POE application of Imazethapyr +imazamox (RM) @ 80 g ha^{-1} give higher potassium uptake (9.69 kg ha^{-1}) followed by POE application of Imazethapyr + imazamox (RM) @ 70 g ha^{-1} (3.57 g ha^{-1}). Significantly lower potassium uptake (2.27 kg ha^{-1}) was recorded in weedy check plot.

Nitrogen content (%) and uptake (kg ha^{-1}) in Straw

The higher nitrogen content (1.48%) was recorded under weed free plot followed by two hand weeding at 20 and 40 DAS (1.34%). Among the herbicide treatments, POE application of Imazethapyr +imazamox (RM) @ 80 g ha^{-1} give higher nitrogen content (1.41%) followed by POE application of Imazethapyr +imazamox (RM) @ 70 g ha^{-1} (1.38%). significantly lower nitrogen content (0.92%) was recorded in weedy check plot. higher nitrogen uptake (27.1 kg ha^{-1}) was recorded under weed free plot followed by two hand weeding at 20 and 40 DAS (23.7 kg ha^{-1}). Among the herbicide treatments, POE application of Imazethapyr +imazamox (RM) @ 80 g ha^{-1} give higher nitrogen uptake (23.3 kg ha^{-1}) followed by POE application of Imazethapyr +imazamox (RM) @ 70 g ha^{-1} (20.7 g ha^{-1}). Significantly lower nitrogen uptake (6.6 g ha^{-1}) was recorded in weedy check plot.

Phosphors content (%) and uptake (kg ha^{-1}) in Straw: The higher *phosphors* content (0.20%) was recorded under weed free plot followed by two hand weeding at 20 and 40 DAS (0.18%). Among the herbicide treatments, the higher *phosphors* content was recorded with POE application of Imazethapyr +imazamox (RM) @ 80 g ha^{-1} (0.19%), POE application of Imazethapyr + imazamox (RM) @ 70 g ha^{-1} (0.19%) and POE application of imazethapyr @ 80 g ha^{-1}(0.19%) closely followed by POE application of imazethapyr @ 70 g ha^{-1}(0.18%). The higher *phosphors* uptake (3.7 kg ha^{-1}) was recorded under weed free plot followed by two hand weeding at 20 and 40 DAS (3.2 kg ha^{-1}). Among the herbicide treatments, POE application of Imazethapyr + imazamox (RM) @ 80 g ha^{-1} give higher phosphors uptake (3.1 kg ha^{-1}) followed by POE application of Imazethapyr + imazamox (RM) @ 70 g ha^{-1} (2.9 kg ha^{-1}). Significantly lower *phosphors* uptake (1.1 kg ha^{-1}) was recorded in weedy check plot.

Table 2: Nutrient content and uptake of green gram as influenced by various weed management treatment

Treatment	Nutrient content in green gram (%)						Nutrient uptake in green gram (kg ha^{-1})					
	Grain			Straw			Grain			Straw		
	N	P	K	N	P	K	N	P	K	N	P	K
Imazethapyr @ 70 g ha^{-1} as pre plant incorporation	3.69	0.33	0.71	1.03	0.16	1.03	15.9	1.42	3.05	9.4	1.5	9.4
Imazethapyr @ 80 g ha^{-1} as pre plant incorporation	3.70	0.35	0.70	1.03	0.16	1.05	16.5	1.56	3.12	9.5	1.5	9.7
Imazethapyr @ 70 g ha^{-1} as pre emergence	3.42	0.34	0.72	1.05	0.18	1.07	16.8	1.67	3.53	10.3	1.8	10.5
Imazethapyr @80 g ha^{-1} as pre emergence	3.62	0.35	0.76	1.08	0.17	1.07	19.6	1.89	4.10	11.3	1.8	11.2
Imazethapyr @ 70 g ha^{-1} at 3-4 leaf Stage	3.61	0.38	0.80	1.09	0.18	1.21	30.2	3.17	6.68	16.1	2.7	17.8
Imazethapyr @ 80 g ha^{-1} at 3-4 leaf Stage	3.54	0.39	0.82	1.12	0.19	1.26	32.4	3.57	7.50	17.1	2.9	19.3
Imazethapyr +imazamox (RM) @ 70 g ha^{-1} as pre emergence	3.76	0.36	0.73	1.04	0.16	1.0	19.2	1.84	3.72	9.4	1.4	9.0
Imazethapyr +imazamox (RM) @ 80 g ha^{-1} as pre emergence	3.73	0.37	0.78	1.06	0.16	1.02	21.3	2.11	4.45	10.5	1.6	10.1
Imazethapyr +imazamox (RM) @ 70 g ha^{-1} at 3-4 leaf Stage	3.96	0.39	0.89	1.38	0.19	1.09	35.6	3.50	7.99	20.7	2.9	16.4
Imazethapyr +imazamox (RM) @ 80 g ha^{-1} at 3-4 leaf Stage	3.91	0.41	0.95	1.41	0.19	1.12	39.9	4.18	9.69	23.3	3.1	18.5
Pendimethalin @ 1000 g ha^{-1} as pre emergence	3.52	0.35	0.87	1.02	0.16	1.01	19.2	1.90	4.73	10.0	1.6	9.9
Imazethapyr + Pendimethalin(RM)@ 1000 g ha^{-1} as pre emergence	3.67	0.40	0.89	1.06	0.15	1.04	28.7	3.12	6.94	13.8	2.0	13.6
Hand weeding at 20&40 DAS	3.89	0.42	1.09	1.34	0.18	1.27	42	4.53	11.75	23.7	3.2	22.5
Weed free	3.97	0.42	1.12	1.48	0.20	1.29	45.4	4.80	12.80	27.1	3.7	23.6
Weedy check	3.35	0.32	0.68	0.92	0.15	1.03	11.2	1.07	2.27	6.6	1.1	7.4
S Em $\pm$	0.13	0.02	0.03	0.04	0.01	0.05	1.2	0.12	0.28	0.62	0.09	1.6
CD at 5%	NS	0.06	0.10	0.12	0.03	0.12	3.2	0.34	0.82	1.8	0.26	0.56

Potassium content (%) and uptake (kg ha^{-1}) in Straw

The higher potassium content (1.29%) was recorded under weed free plot followed by two hand weeding at 20 and 40 DAS (1.27%). Among the herbicide treatments, POE application of Imazethapyr @ 80 g ha^{-1} give higher potassium content (1.26%) followed by POE application of Imazethapyr @ 70 g ha^{-1}(1.26). significantly lower potassium content (1.02%) was recorded in weedy check plot. The higher *potassium* uptake (23.6 kg ha^{-1}) was recorded under weed free plot followed by two hand weeding at 20 and 40 DAS (22.5 kg ha^{-1}). Among the herbicide treatments, POE application of Imazethapyr @ 80 g ha^{-1} give higher potassium uptake (19.3kg ha^{-1}) followed by POE application of Imazethapyr + imazamox (RM) @ 80 g ha^{-1} (18.5 g ha^{-1}). Significantly lower potassium uptake (7.4 kg ha^{-1}) was recorded in weedy check plot. The similar findings were also reported by Kumar *et al.* (2003) [11] and Khot *et al.* (2012) [10].

Summary and Conclusion

The study was undertaken to devise an efficient herbicide treatment combination of efficient weed control and higher yield and nutrient uptake. A field experiment was conducted to evaluated the performance of different herbicides for weed control and increasing yield as well as nutrient uptake in green gram (*Vigna radiata L.)* at Dolphin Pg college Science and Agriculture during Kharif season in 2022.The commonly used herbicide for restricting weed growth in wheat crop were taken in various combinations and appropriate doses. the effect of weed *management* practices on weed growth, crop growth, yield studies, yield attributes, nutrient uptake and economics of green gram crop. The experiment was conducted in RBD with three replications keeping one factor study. Fifteen methods of weed management practices *viz.* Imazethapyr @ 70 g ha^{-1} as pre plant incorporation, Imazethapyr @ 80 g ha^{-1} as pre plant incorporation, Imazethapyr @ 70 g ha^{-1} as pre emergence, Imazethapyr @80 g ha^{-1} as pre emergence, Imazethapyr @ 70 g ha^{-1} at 3-4 leaf Stage, Imazethapyr @ 80 g ha^{-1} at 3-4 leaf Stage, Imazethapyr +imazamox (RM) @ 70 g ha^{-1} as pre emergence, Imazethapyr +imazamox (RM) @ 80 g ha^{-1} as pre emergence, Imazethapyr +imazamox (RM) @ 70 g ha^{-1} at 3-4 leaf Stage, Imazethapyr +imazamox (RM) @ 80 g ha^{-1} at 3-4 leaf Stage,

Pendimethalin @ 1000 g ha^{-1} as pre emergence, Imazethapyr + Pendimethalin (RM)@ 1000 g ha^{-1} as pre emergence, Hand weeding at 20&40 DAS, Weed free and Weedy check. Weed management practices showed significant effect on biological yield, grain yield and straw yields. Weed free treatment was found significantly superior to rest of the weed management practices. Based on the results of one year experimentation, it seems quite logical to conclude that potential production, profit and economics efficient on weed management practices on green gram crop. The highest grain and straw yields of green gram were recorded under treatment weed free and also minimum total weed density and dry weight were recorded under treatment weed free. Among the herbicidal treatment imazethapyr + imazamox @ 80 g ha^{-1} recorded maximum grain yield and all parameter of crop growth, net return, benefit: cost ratio and minimum weeds. Thus imazethapyr + imazamox @ 80 g ha^{-1} POE may be suggested for effectively control of weeds in green gram and also for obtaining maximum economical grain yield, net return, and benefit: cost ratio of green gram crop.

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