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HK Pithiya
Department of Agronomy, C. P. College of Agriculture, SDAU, S. K. Nagar, Gujarat, India

KI Patel
Associate Research Scientist, Agriculture Research Station, Sardarkrushinagar Dantiwada Agricultural University, Kholvada, Sidhpur, Gujarat, India

JS Desai
Department of Agronomy, C. P. College of Agriculture, SDAU, S. K. Nagar, Gujarat, India

PM Patel
Department of Agronomy, C. P. College of Agriculture, SDAU, S. K. Nagar, Gujarat, India

Corresponding Author:
HK Pithiya
Department of Agronomy, C. P. College of Agriculture, SDAU, S. K. Nagar, Gujarat, India

Weed control in summer greengram (*Vigna radiata* L.)

HK Pithiya, KI Patel, JS Desai and PM Patel

Abstract
A field experiment entitled "Weed Control in Summer Greengram (*Vigna radiata* L.)" was conducted at Agronomy Instructional Farm, Chimanbhai Patel College of Agriculture, Sardarkrushinagar Dantiwada Agricultural University, Sardarkrushinagar during Summer season of 2020. The treatments comprised of ten methods of weed control *viz*., pendimethalin @ 1 kg a.i./ha PE (T_1), imazethapyr 50 g a.i./ha at PoE at 25 DAS (T_2), ready mixture of pendimethalin + imazethapyr 800 g a.i./ha PE (T_3), ready mixture of imazethapyr + imazamox 70 g a.i./ha PoE at 25 DAS (T_4), tank mixture of imazethapyr 30 g a.i./ha + quizalofop-p-ethyl 15 g a.i./ha as PoE at 25 DAS (T_5), ready mixture of clodinafop propargyl + acifluorfen sodium 250 g a.i./ha as PoE at 25 DAS (T_6), tank mixture fomesafen 220 g a.i/ha + fluazifop p butyl at 220 g a.i./ha as PoE at 25 DAS (T_7), hand weeding at 25 DAS and 40 DAS (T_8), weedy check (T_9), Weed free (T_{10}) were evaluated in randomized block design with replicating thrice. The plant height, number of branches/plant, number of pods/plant and number of seeds/pod were significantly higher in weed free treatment and was at par with ready mix application of clodinafop propargyl + acifluorfen sodium 250 g a.i./ha as PoE at 25 DAS. The highest seed yield and stover yield was recorded under weed free treatments, and was remained statistically at par with ready mixture of clodinafop propargyl + acifluorfen sodium 250 g a.i./ha as PoE at 25 DAS. In terms of economics, besides weed free situation, most advantageous treatment is ready mixture of clodinafop propargyl + acifluorfen sodium 250 g a.i./ha as PoE at 25 DAS accounted higher net realization followed by hand weeding at 25 DAS and 40 DAS and tank mixture of imazethapyr 30 g a.i./ha + quizalofop-p-ethyl 15 g a.i./ha as PoE at 25 DAS.

Keywords: Weed control, clodinafop propargyl, aciflurofen sodium, green gram

Introduction
Among the pulses, greengram (*Vigna radiata* L.) is one of the most important and extensively cultivated crop in India, which is cultivated in arid and semi-arid region. Greengram is the third most important pulse crop of India covering an area of 4.58 million ha with a total production of 2.50 million tonnes and an average productivity of 548 kg/ha (Anon. 2019-20) [1]. It occupies a prominent place and gain popularly by virtue of its photo and thermo insensitiveness. It belongs to family Fabaceae. Green gram is locally known as "Mug, Moong, Mungo or Golden gram". It originated from Indo-Burma and area of south East Asia. Its food value is essentially due to its high protein content about 25%, 1.3% fat, 3.5% mineral, 4.1% fiber and 56.7% carbohydrate. The grains are mainly used as dal or to make flour and green pods used as vegetables. In India mung beans are also consumed as a snack, called "Dal mung". The dried mung beans are socked in water, then partly dried to a dry matter content of about 42%, and then fried in hot oil. Traditionally it prepared at home and now a day, it is available from industrial producers. The germinated greengram seed containing Vitamin-C and easily digestible protein which is ideally useful in the diet of infants. In spite of the importance of this crop in our daily diet average productivity of this crop is very low in India as well as in the Gujarat. The low production of this crop is mainly due to crop-weed competition and other reasons.

Weeds are one of the most important biological constraints in agricultural production systems. Weeds are a serious constraint for production and easy harvesting in grain amaranth. Weed competes with the crop for moisture, nutrient, light and space. Yield losses may be less if only few weeds are present, but heavy infestations may cause complete crop failures and in some cases, when perennial weeds get established, the land cannot be used for crop production until the infestation has been controlled. Weeds spread easily, because of their enormous seed production and once established are not easily eradicated. Life cycle of most of them coincide with that of crop they invade, thus ensuring mixing of their seed with those of the crops. The loss of mung bean yield due to weeds ranges from 65.4 to 79.0% (Dungarwal *et al.*, 2003) [5].

The magnitude of losses largely depends upon the composition of weed flora, period of weed-crop competition and its intensity. Weeds emerge with the summer sown crops and create severe competition unless controlled timely and effectively. In present days we are using majority of single herbicide molecules which is control limited weed flora. But the recent trend to use different two or more herbicides mixture either tank mix or ready mix at the time of application. No single herbicide will be capable to destroy all type of weeds without crop injury because of higher dose requirements for increasing the spectrum of weeds kill. These combinations of herbicides result into wide spectra to control of weeds. So, if weed growth is controlled during crop weed competition period, crop yield will be equivalent to that weed free crop. Therefore, it is essential to control weeds during this period. Due to combinations of different herbicides, their synergistic or additive effect may also increase weed control efficiency. The combination approach thereby, reduces the cost of weed management, prevent herbicide resistance in weeds and facilitates improvement in overall weed management. So, such kind of study to find out the relative efficiency of different herbicide when applied alone or in combination with cultural operation in summer greengram is an urgent need for timely control of weeds infestation and obtaining higher yield.

Materials and Methods

An experiment entitled on "Weed Control in Summer Greengram (*Vigna radiata* L.)" was conducted at Agronomy Instructional Farm, Chimanbhai Patel College of Agriculture, Sardarkrushinagar Dantiwada Agricultural University, Sardarkrushinagar during summer season of 2020. The soil of experimental field was loamy sand in texture with low in organic carbon and available nitrogen, medium in available phosphorus and potassium and having pH value of 7.45. The treatments comprised of ten methods of weed control *viz*., pendimethalin @ 1 kg a.i./ha PE (T_1), imazethapyr 50 g a.i./ha at PoE at 25 DAS (T_2), ready mixture of pendimethalin + imazethapyr 800 g a.i./ha PE (T_3), ready mixture of imazethapyr + imazamox 70 g a.i./ha PoE at 25 DAS (T_4), tank mixture of imazethapyr 30 g a.i./ha + quizalofop-p-ethyl 15 g a.i./ha as PoE at 25 DAS (T_5), ready mixture of clodinafop propargyl + acifluorfen sodium 250 g a.i./ha as PoE at 25 DAS (T6), tank mixture fomesafen 220 g a.i/ha + fluazifop p butyl at 220 g a.i./ha as PoE at 25 DAS (T_7), hand weeding at 25 DAS and 40 DAS (T_8), weedy check (T_9), Weed free (T_{10}) were evaluated in randomized block design with replicating thrice. GM 6 variety of greengram crop was grown with 45 cm spacing between the rows. The greengram crop was fertilized with 20 kg nitrogen and 40 kg phosphorus per ha. Urea and single super phosphate were used as a source for nitrogen and phosphorus, respectively. Pre-emergence herbicide was applied after sowing with required quantity were sprayed by knapsack sprayer with flat fan nozzle using 500 liters of water per hectare. All the recommended package of practices was followed for the crop. The data were statistically analyzed for various characters as described by (Panse and Sukhatme, 1967) [13].

Results and Discussion

Significantly higher plant height at 20 DAS (18.40 cm) and at harvest (52.40 cm) was observed under weed free treatment. But, was at par with ready mixture of Clodinafop Propargyl + Acifluorfen sodium 250 g a.i./ha as PoE at 25 DAS (17.52 and 50.05 cm at 20 DAS and at harvest, respectively) and hand weeding at 25 DAS and 40 DAS (16.62 cm and 47.13 cm, at 20 DAS and at harvest, respectively) at 20 DAS. Maximum number of branches per plant (5.09) was observed under weed free treatments which remained statistically at par with ready mixture of Clodinafop Propargyl + Acifluorfen sodium 250 g a.i./ha as PoE at 25 DAS (5.01), hand weeding at 25 DAS and 40 DAS (T_8: 4.81) and tank mixture of Imazethapyr 30 g a.i./ha + Quizalofop-p-ethyl 15 g a.i./ha as PoE at 25 DAS (T_5: 4.61) respectively. Significantly higher number of pods per plant (40.80) recorded under weed free treatment (T_{10}) which was remained statistically at par with ready mixture of Clodinafop Propargyl + Acifluorfen sodium 250 g a.i./ha as PoE at 25 DAS (T_6: 38.63), hand weeding at 25 DAS and 40 DAS (37.66) and tank mixture of Imazethapyr 30 g a.i./ha + Quizalofop-p-ethyl 15 g a.i./ha as PoE at 25 DAS (36.90) respectively. Maximum number of seeds per pod (12.20) was observed under weed free treatment and was statistically at par with ready mixture of Clodinafop Propargyl + Acifluorfen sodium 250 g a.i./ha as PoE at 25 DAS (11.99), hand weeding at 25 DAS and 40 DAS (11.83), tank mixture of Imazethapyr 30 g a.i./ha + Quizalofop-p-ethyl 15 g a.i./ha as PoE at 25 DAS (11.20), tank mixture of Fomesafen 220 g a.i. + Fluazifop-p-ethyl 220 g a.i./ha as PoE at 25 DAS (11.03) and ready mixture of Pendimethalin + Imazethapyr 800 g a.i./ha PE (10.79) respectively. Significantly higher yield (1397 kg/ha) recorded under weed free treatment which remained statistically at par with ready mixture of Clodinafop Propargyl + Acifluorfen sodium 250 g/ha as PoE at 25 DAS (1233 kg/ha). The highest stover yield (2207 kg/ha) was recorded under weed free treatment which remained statistically at par with ready mixture of Clodinafop Propargyl + Acifluorfen sodium 250 g a.i./ha as PoE at 25 DAS (2075 kg/ha), hand weeding at 25 DAS and 40 DAS (2046 kg/ha), and tank mixture of Imazethapyr 30 g a.i./ha + Fluazifop-p-ethyl 15 g a.i./ha as PoE at 25 DAS (1925 kg/ha). From the economic point of view besides weed free situation, most advantageous treatment is ready mixture of Clodinafop Propargyl + Acifluorfen sodium 250 g a.i./ha as PoE at 25 DAS accounted higher net realization (46965 ₹/ha) and B: C ratio (2.46)

The higher value of plant height mainly ascribed to better control of weeds, increase water and nutrient uptake by crop by means of reduced weed crop competition. These findings are in agreement with those reported by Kundu *et al*. (2009) [10], Chhodavadia *et al.* (2013) [2], Komal *et al.* (2015) [8] and Mamata *et al.* (2016) [11]. The higher number of branches per plant noted under T_{10} (weed free) might be due to effective control of weeds and higher weed control efficiency of different weed managements which resulted into lower weed index, which cumulatively facilitated the crop to utilize more nutrients and water for better growth and development in terms of various growth attributing characters. Similar results were also reported by Komal *et al.* (2015) [8], Mamata *et al.* (2016) [11] and Rupareliya *et al.* 2020) [15]. Increase in yield attributes might due to less crop-weed competition throughout growth period of the crop, resulted in increased water and nutrient uptake, which might have accelerated photosynthetic rate, thereby increasing the supply of carbohydrates, resulted in cell division, multiplication and elongation leading to increase in yield attributes. These results are in agreement with Gupta *et al.* (2013) [6], Komal *et al.* (2015) [8] and Kumar

et al. (2016) [9]. The increase in seed yield was mainly due to maintenance of weed free environment, pecially during critical growth stages of crop, reduce crop weed competition helped in better growth and development of greengram crop resulting in higher yield. Seed yield is primarily a function of accumulation of photosynthates resulted in growth and increase yield attributes, contributed towards higher seed yield. These findings are in accordance with the finding those of Gupta *et al.* (2013) [6], Mishra *et al.* (2013) [12], Upadhyay *et al.* (2012) [17], Rajib *et al.* (2014) [14], Komal *et al.* (2015) [8], Tamang *et al.* (2015) [16], Mamata *et al.* (2016) [11], Deshmukh *et al.* (2017) [4], Verma *et al.* (2017) [18], Deshmukh *et al.* (2018) [3] and Rupareliya *et al.* (2020) [15]. Due to timely weed management, maximum nitrogen was utilized by crop, which directly affects the vegetative growth of plant. The significantly increase in growth character by avoiding crop weed competition is responsible for higher straw yield under these treatments. These results are in close agreement with findings of Rajib *et al.* (2014) [14], Komal *et al.* (2015) [8], Kumar *et al.* (2016) [9], Deshmukh *et al.* (2018) [3] and Rupareliya *et al.* (2020) [15]

Table 1: Effect of different weed control treatments on plant heigh and number of branches per plant in summer greengram

Treatments	Plant height (cm)		Number of branches/plant
	At 20 DAS	At harvest	
Pendimethalin 1.0 kg a.i./ha as PE	15.53	42.49	3.98
Imazethapyr 50 g a.i./ha at PoE at 25DAS	13.23	40.32	3.84
Ready mixture of Pendimethalin + Imazethapyr 800 g a.i./ha PE	15.57	43.66	4.08
Ready mixture of Imazethapyr + Imazamox 70 g a.i./ha PoE at 25 DAS	14.20	42.12	3.91
Tank mixture of Imazethapyr 30 g a.i./ha + Quizalofop-p-ethyl 15 g a.i./ha as PoE at 25 DAS	16.30	46.79	4.61
Ready mixture of Clodinafop Propargyl +Acifluorfen sodium 250 g a.i./ha as PoE at 25 DAS	17.52	50.05	5.01
Tank mixture Fomesafen 220 g a.i./ha+ Fluazifop p butyl at 220 g a.i./ha as PoE at 25 DAS	16.00	45.25	4.14
Hand weeding at 25 DAS and 40 DAS	16.62	47.13	4.81
Weedy check	13.20	39.15	3.74
Weed free	18.40	52.40	5.09
S.Em.	0.69	2.69	0.24
C.D. at 5%	2.07	8.00	0.72
C.V. %	9.50	10.39	9.80

Table 2: Effect of different weed control treatments on number of pods/plant, number of seeds/pod, seed and stover yield in summer greengram

Treatments	Number of pods/plant at harvest	Number of seeds/pod at harvest	Seed yield (kg/ha)	Stover yield (kg/ha)
Pendimethalin 1.0 kg a.i./ha as PE	35.43	10.53	1021	1807
Imazethapyr 50 g a.i./ha at PoE at 25 DAS	33.83	10.13	990	1705
Ready mixture of Pendimethalin + Imazethapyr 800 g a.i./ha PE	35.66	10.79	1067	1815
Ready mixture of Imazethapyr + Imazamox 70 g a.i./ha PoE at 25 DAS	34.71	10.30	1015	1775
Tank mixture of Imazethapyr 30 g a.i./ha + Quizalofop-p-ethyl 15 g a.i./ha as PoE at 25 DAS	36.90	11.20	1097	1925
Ready mixture of Clodinafop Propargyl +Acifluorfen sodium 250 g a.i./ha as PoE at 25 DAS	38.63	11.99	1233	2075
Tank mixture Fomesafen 220 g a.i./ha+ Fluazifop p butyl at 220 g a.i./ha as PoE at 25 DAS	36.10	11.03	1080	1853
Hand weeding at 25 DAS and 40 DAS	37.66	11.83	1222	2046
Weedy check	32.76	10.05	905	1702
Weed free	40.80	12.20	1397	2207
S.Em.	1.49	0.48	56.22	96.75
C.D. at 5%	4.45	1.45	167.04	287.45
C.V. %	7.17	7.71	8.82	8.86

Table 3: Economics of different weed control treatments in summer greengram

Treatments	Total cost of cultivation (₹ /ha)	Gross return (₹ /ha)	Net return ₹ /ha)	B:C ratio
Pendimethalin 1.0 kg a.i./ha as PE	31821	65778	33957	2.07
Imazethapyr 50 g a.i./ha at PoE at 25 DAS	31229	63663	32434	2.04
Ready mixture of Pendimethalin + Imazethapyr 800 g a.i./ha PE	33489	68558	35069	2.05
Ready mixture of Imazethapyr + Imazamox 70 g a.i./ha PoE at 25 DAS	30655	65338	34683	2.13
Tank mixture of Imazethapyr 30 g a.i./ha + Quizalofop-p-ethyl 15 g a.i./ha as PoE at 25 DAS	31398	70633	39235	2.25
Ready mixture of Clodinafop Propargyl +Acifluorfen sodium 250 g a.i./ha as PoE at 25 DAS	32203	79168	46965	2.46
Tank mixture Fomesafen 220 g a.i./ha+ Fluazifop p butyl at 220 g a.i./ha as PoE at 25 DAS	35321	69433	34112	1.97
Hand weeding at 25 DAS and 40 DAS	34129	78435	44306	2.30
Weedy check	29969	58555	28586	1.95
Weed free	35949	89338	53389	2.49

Conclusion

From the experimental results it can concluded that the summer greengram crop keep weed free for better yield and net realization but under paucity of labours, apply ready mixture of Clodinafop propargyl + Acifluorfen sodium 250 g a.i./ha as Post emergence at 25 DAS for getting higher yield

and net realization.

References

1. Anonymous. Ministry of Agriculture and Farmers Welfare. Govt. of India [Internet]; c2019-20. Available from: www.indiastat.http
2. Chhodavadia SK, Mathukiya RK, Dobariya VK. Pre- and postemergence herbicides for integrated weed management in summer green gram. Indian Journal of Weed Science. 2013;45(2):137-139.
3. Deshmukh DD, Gokhale DN, Deshmukh VA, Kote GN. Effect of weed management on growth and yield of greengram (*Vigna radiata* L.). International Journal of Current Microbiology and Applied Sciences. 2018;Special Issue-6:2012-2016. ISSN: 2319-7692.
4. Deshmukh SB, Ujjainkar VV, Deshmukh VV. Impact assessment of frontline demonstrations on green gram. Journal of Applied and Natural Science. 2017;9(4):2456-2460.
5. Dungarwal HS, Chalot PC, Nagda BL. Chemical weed control in urdbean (*Vigna radiata* L.). Indian Journal of Weed Science. 2003;35:283-284.
6. Gupta V, Singh M, Kumar A, Sharma BC, Kher D. Influence of weed management practices on weed dynamics and yield of urdbean (*Vigna mungo*) under rainfed conditions of Jammu. Indian Journal of Agronomy. 2013;58:220-225.
7. [Author Last Name] [Initials], [Author Last Name] [Initials], [Author Last Name] [Initials]. [Title of the article]. Annuls of Agricultural Research. 2024;34(1):81-87.
8. Komal SP Singh, R.S. Yadav. Effect of weed management on growth, yield and nutrient uptake of greengram (*Vigna radiata* L.). Indian Journal of Weed Science. 2015;47(2):206-210.
9. Kumar N, Hazra KK, Nadarajan N. Efficacy of post-emergence application of Imazethapyr in summer mungbean (*Vigna radiata* L.). Legume Research. 2016. ISSN: 0976-0571.
10. Kundu R, Bera PS, Brahmachari K. Effect of different weed management practices in summer mung bean (*Vigna radiata* L.). Journal of Crop and Weed. 2009;5(2):117-121.
11. Mamata D, Singh AP, Chowdhury TD, Kumar B. Management of complex weed flora in chickpea. Indian Journal of Weed Science. 2016;48(1):79-82.
12. Mishra P, Singh H, Babu S, Pal S. Bio-efficacy of some early post emergence herbicides in soybean (*Glycine max* L.). [Journal Name]. 2013.
13. Panse VG, Sukhatme PV. Statistical methods of agricultural workers. ICAR Publ. New Delhi; c1967. p. 381.
14. Rajib D, Patra BC, Mandal MK, Pathak A. Integrated weed management in blackgram (*Vigna mungo* L.) and its effect on soil microflora under Sandy loam soil of West Bengal. The Bioscan. 2014;9(4):1593-1596.
15. Rupareliya VV, Mathukia RK, Gohil BS, Javiya PP. Effect of post-emergence herbicides and their mixture on growth, yield and quality of soybean (*Glycine max* L.). Journal of Pharmacognosy and Phytochemistry. 2020;9(6):1161-1164.
16. Tamang D, Nath R, Sengupta K. Effect of herbicide application on weed management in green gram (*Vigna radiata* L.). Crop Science Technology. 2015;3(2):1-4.
17. Upadhyay VB, Bharti V, Rawat A. Bioefficacy of post-emergence herbicides in soybean. Indian Journal of Weed Science. 2012;44(4):261-263.
18. Verma SK, Prasad SK, Kumar S, Singh SB, Singh RP, Singh YV. Effect of mulching and herbicides on weeds, yield and economics of greengram (*Vigna radiata* L.) grown under eight-year old agri hortisystem. Research on Crops. 2017;18:438-443.