EFFECT OF INTEGRATED WEED MANAGEMENT IN *RABI* GREENGRAM

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ABSTRACT

A field experiment was conducted at College Farm, N.M. College of Agriculture, Navsari Agricultural University, Navsari during the year2010-11 to study the "Effect of integrated weed management in rabigreengram".The experiment results revealed that treatment of weed free up to harvest (2 hand weeding&hand hoeing) recorded the lowest weed population, lowest dry weight of weed (5.17 g/m2), higher seed (1125 kg/ha) and haulm (2115 kg/ha) yields followed by the treatment of Pendimethalin @ 1.00 kg/ha with one hand hoeing at 45 days after sowing. However, all the varieties found equally suitable with similar yield potential having no significant variations among each other.

KEY WORDS:Greengram, integrated weed management, weed population, yield

INTRODUCTION

Infestations of weeds, especially at early stages of crop growth, possess considerable threat in achieving desired yield of greengram crop. Competition with the weeds leads to 30 to 80 per cent reduction in grain yield of greengram during summer and *kharif* seasons, while 70 to 80 per cent during *rabi* season (Singh, 1993). Initial 45 days period considered being critical period with respect to crop weed competition in greengram (Singh *et al.*, 1996), and hence, inhibition of weed growth is essential for better crop yield. The conventional methods of weed control (hoeing or hand weeding) are labour intensive, expensive, insufficient and may cause damage to the crop. Chemical weed control is not common and the use of herbicides may prove uneconomical due to low yield potential of greengram. For getting higher yield from greengram crop, weed management play a vital role. Keeping these points in view, an experiment was carried out to study the "Effect of integrated weed management in *rabi* greengram".

MATERIALS AND METHODS

A field experiment was conducted during *rabi* season of 2010-2011 at the College Farm, Navsari Agricultural University, Navsari entitled "Effect of integrated weed management in *rabi*greengram". The soil of the experimental field was clayey in texture, low in available nitrogen (254.00 kg/ha), medium in available phosphorus (32.83 kg/ha) and fairly rich in available potash (349.00 kg/ha).Eighteen treatment combinations consisting of three

varieties viz., Meha (V_1), CO-4 (V_2) and RTM-1 (V_3) and six weed management treatments viz., Unweeded control (W_1), Weed free up to harvest (2 H.W. &hand hoeing) (W_2), Pendimethalin @ 1.00 kg/ha + 1 H.H. at 45 DAS (W_3), Imazythapyr @ 0.1 kg/ha at 15 DAS (W_4), Alachlor @ 1.00 kg/ha + 1 H.H. at 45 DAS (W_5) and Quizalofop-p-ethyl @ 0.05 kg/ha at 15 DAS (W_6) were tested by employing factorial randomized block design (FRBD) with three replications. Greengram varieties were sown a row spacing of 30 cm during second week of October. The crop was fertilized with recommend dose of 20-40-0 NPK kg/ha.The crop was managed as per the standard package of practices. The observations on weed flora, dry weight of weeds at different growth stages as well as yield were recorded from the net plot. The data related to each parameter of the experiment were statistically analyzed using MSTATC software. LSD test at 5% probability level was applied when analysis of variance showed significant effect for treatments (Steel and Torrie, 1980).

RESULTS AND DISCUSSION

Weed flora

Predominant weed species found in the experimental field consisted of monocot weeds like *Echinochloacrusgalli* (L.) Beauv, *Digitariasanguinalis* (L.)Scop.,*Sorghum halepense* (L.) Pers., *Cynodondactylon* (L.) Pers. and *Bracharia spp*.; dicot weeds, viz., *Amaranthusviridis* L., *Alternantherasessilis*, *Digeraarvensis*Forsk, *Convolvulus arvensis* L., *Trianthemaportulacastrum*, *Euphorbia hirta* L., *Euphorbia maduraspti*ensis and *Physalis minima* L. and sedges *Cyperusrotundus* (L.).

Effect of varieties

All varieties of greengram found equally suitable with similar yield potential for *rabi* cultivation under South Gujarat conditions as well as equally competitive with weeds.

Effect of weed management practices

Effect on weed population and dry weight of weed

Significantly the highest weed population (Table1) of monocot, dicot, and sedge were noted under unweeded control (W_1) at all the growth stages of greengram. All the weed management treatments significantly reduced the population of weeds compared to unweeded control. At all the different stages of plant growth, treatment W_2 i.e. weed free up to harvest (2 H.W. &hand hoeing) recorded significantly the lowest weed population followed by treatment having application of pendimethalin 1.00 kg/ha + 1 H.H. at 45 DAS (W_3) than other treatments at 30 and 60 DAS and at harvest, whereas at 45 DAS, it was followed by the treatment W_4 (Imazythapyr @ 0.1 kg/ha at 15 DAS) with respect to dicot weeds, because of effective weed control by these treatments. The results are in close confirmation with the findings of Kumar *et al.* (2004) and Kushwah and Vyas (2005).

The highest dry matter of weeds (Table2) at 60 DAS and at harvest was observed in unweeded control (W_1) treatment. Treatment W_2 (weed free up to harvest- 2 H.W. &hand hoeing) recorded the lowest dry weight of weeds followed by the treatment having application of pendimethalin @ 1.00 kg/ha + 1 H.H at 45 DAS (W_3) and alachlor @ 1.00 kg/ha + 1 H.H at 45 DAS (W_5). These findings are in close agreement with those reported by Kumar *et al.* (2004).

Effect on seed and haulm yield

Various weed management treatments influenced significantly the seed and haulm yield of greengram (Table 2). Significantly the highest seed yield and haulm yield were recorded under treatment of weed free up to harvest (2 H.W. &hand hoeing) being at par with treatment having application of pendimethalin @ 1.00 kg/ha + 1 H.H at 45 DAS (W_3) and alachlor @ 1.00 kg/ha + 1 H.H at 45 DAS (W_5). Significantly the lowest seed and haulm yields were recorded under unweeded control treatment (W_1). The remarkable increase in seed and haulm yield under the treatments weed free up to harvest (2 H.W. &hand hoeing) (W_2), pendimethalin @ 1.00 kg/ha + 1 H.H at 45 DAS (W_3) and alachlor @ 1.00 kg/ha + 1 H.H at 45 DAS (W_5) might be due to effective control of weeds in terms of reduced weed population and dry weight of weeds. These findings are in close agreement with those reported by Raj *et al.* (2010).

CONCLUSION

Based on the results of the field experimentation, it seems quite logical to conclude that higher yield of *rabi* greengram on vertisols of South Gujarat can be obtained by using either Meha, CO-4 or RTM-1 variety of rabigreengram and by keeping them weed free by two hand weedingsand one hand hoeings or by pre-emergence application of pendimethalin @ 1 kg/ha coupled with one hand hoeing at 45 days after sowing.

REFERENCES

Kumar, R.;Thakral, S. K. and Kumar, S. (2004). Response of greengram to weed control and fertilizer application under different planting systems.*Indian J. Weed Sci*. **36**(1-2): 131-132.

Kushwah, S. S. and Vyas, M. D. (2005). Efficacy of herbicides against weed in rainfed soybean (*Glycine Max*) under VindhyanPlatue of M.P. *Indian J. Weed Sci*.**38**(1-2): 62-64.

Raj, V. C.;Arvadia, M.K. and Patel, D.D. (2010). Effect of integrated weed management practices on rabigreengram. Green Farming, **1**(4): 377-379.

Singh, A. N.; Singh, S. and Bhan, V.M. (1996).Effect of herbicide on direct sown drilled rice (Oryza sativa) and associated weeds.*Indian J.Agron*.,**41**(4): 616.

Singh, G. (1993).Integrated Weed Management in Pulses.*In: Proceedings of International Symposium Organized by Indian Society of Weed Science* at Hissar, November, 18-20. Vol. I: 335-342.

Steel, R.G.D. and Torrie, J.H. (1980). Principles and Procedures of Statistics, 2nd Edition, pp. 172-77. McGraw Hill Book Book Co., Singapore.

Table1: Weed population/m^2 at 30, 45, 60 DAS and at harvest as influenced by various weed management treatments in *rabi* greengram

Treatments	Weed Population at 30 DAS			Weed Population at 45 DAS			Weed Population at 60 DAS			Weed Population at Harvest		
	Monocot	Dicot	Sedge	Monocot	Dicot	Sedge	Monocot	Dicot	Sedge	Monocot	Dicot	Sedge
Varieties (V)												
V_1 = Meha	3.96	4.13	4.22	5.04	5.04	5.00	4.75	5.06	5.24	5.45	5.53	5.55
V_2 = CO-4	3.93	4.08	4.11	5.20	5.07	5.04	4.75	5.11	5.10	5.24	5.73	5.47
V_3 = RTM-1	4.03	3.97	4.29	5.07	5.22	5.06	4.87	4.99	5.28	5.46	5.77	5.50
S. Em. ±	0.10	0.10	0.11	0.12	0.14	0.11	0.09	0.12	0.10	0.10	0.11	0.12
C.D. (P=0.05)	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Weed Management (W)												
W_1 =Unweeded Control	5.38	5.54	5.38	9.99	9.42	9.47	3.18	10.01	10.27	10.41	11.28	10.97
W_2 =Weed free up to harvest (2 H.W. &hand hoeing)	2.91	3.03	3.04	2.70	2.98	2.94	1.36	2.36	2.45	3.22	3.77	3.79
W_3 =Pendimethalin @ 1.00 kg/ha +1 H.H. at 45 DAS	3.17	3.28	3.19	4.80	4.85	4.81	1.72	3.81	3.73	3.91	4.15	4.30
W_4 =Imazethapyr @ 0.1 kg/ha at 15 DAS	4.31	4.46	4.46	4.14	3.30	4.22	2.22	4.94	5.58	4.94	5.08	4.62
W_5 =Alacholar @ 1.00 kg/ha +1 H.H. at 45 DAS	3.58	3.38	4.21	4.83	5.62	4.42	1.95	4.10	4.43	4.57	4.62	4.67
W_6 =Quizalofop-p-ethyl @ 0.05 kg/ha at 15 DAS	4.49	4.66	4.77	4.16	4.50	4.34	2.26	4.82	4.78	5.24	5.14	4.68
S. Em. ±	0.14	0.14	0.15	0.17	0.20	0.16	0.13	0.17	0.14	0.14	0.16	0.17
C.D. (P=0.05)	0.39	0.41	0.44	0.49	0.58	0.46	0.38	0.50	0.40	0.41	0.46	0.48
Interaction												
CD	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
C.V.%	10.27	10.43	10.81	9.94	11.83	9.57	8.25	10.31	8.01	8.02	8.51	9.07

Data of weed population are after $\sqrt{x}$ transformed value
DAS= days after sowing; NS = Non significant; HW = Hand weeding; HH = Hand hoeing

Table 2: Dry weight of weed at 60 DAS and at harvest, seed and haulm yield of greengramas influenced by various weed management treatments

Treatments	Dry Weight of Weeds		Seed Yield(kg/ha)	Haulm Yield(kg/ha)	Harvest Index (%)
	60 DAS (g/m^2)	At Harvest (kg/ha^1)			
Varieties (V)					
V_1 = Meha	8.95	33.18 (1101.16)	950.00	1760.22	35.01
V_2 = CO-4	8.61	33.03 (1091.38)	964.61	1843.33	34.92
V_3 = RTM-1	8.70	32.87 (1080.49)	893.33	1740.22	34.34
S. Em. ±	0.15	23.79	22.77	42.86	0.88
C.D. (P=0.05)	NS	NS	NS	NS	NS
Weed Management (W)					
W_1 =Unweeded Control	20.33	66.33 (4374.39)	504.33	876.44	36.98
W_2 =Weed free up to harvest (2 H.W. &hand hoeing)	5.17	16.67 (277.90)	1125.44	2115.00	34.77
W_3 =Pendimethalin @ 1.00 kg/ha +1 H.H. at 45 DAS	5.97	19.37 (375.56)	1094.11	2032.44	35.00
W_4 =Imazethapyr @ 0.1 kg/ha at 15 DAS	7.25	23.12 (535.02)	919.22	1876.11	32.90
W_5 =Alacholar @ 1.00 kg/ha +1 H.H. at 45 DAS	6.50	20.79 (443.60)	1065.44	1953.11	35.54
W_6 =Quizalofop-p-ethyl @ 0.05 kg/ha at 15 DAS	7.32	23.46 (550.58)	917.33	1843.48	33.34
S. Em. ±	0.21	33.50	32.20	60.61	1.25
C.D. (P=0.05)	0.61	96.25	92.54	174.18	NS
Interaction					
CD	NS	NS	NS	NS	NS
C.V.%	9.32	9.21	10.30	10.21	10.76

HW= hand weeding; HH= hand hoeing; DAS= days after sowing, Data of weed dry weight are after $\sqrt{x}$ transformed value; The data in parentheses indicate original value

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