International Journal of Farm Sciences **6(1)** : 33-36, 2016

Studies on effect of integrated weed management practices on nutrient uptake in greengram, *Vigna radiata* (L) Wilczek

KOMAL KATARIA, SP SINGH and KOMAL KATHURIA

College of Agriculture, Swami Keshwanand Rajasthan Agricultural University Bikaner 334006 Rajasthan, India

Email for correspondence: komalkatariaafo@gmail.com

ABSTRACT

The experiment was carried out to study the effect of integrated weed management practices on nutrient uptake by greengram crop and weeds. Judicious combination of chemical and cultural methods for controlling weeds in greengram effectively maximized nutrient uptake by crop and reduced uptake of nutrients by weeds. It was found that all weed control treatments significantly reduced the N, P and K uptake by weeds at harvest. The nil uptake of N, P and K by weeds and highest total uptake of N (97.16 kg/ha), P (12.56 kg/ha) and K (94.56 kg/ha) by the crop was recorded under weed free treatment which was at par with Pendimethalin 0.75 kg/ha as pre-emergence + Imazethapyr + Imazamox 40 g/ha at 30 DAS as post-emergence, Imazethapyr + Imazamox 60 g/ha at 20 DAS as post-emergence + one hand weeding at 40 DAS, Imazethapyr + Imazamox 40 g/ha at 20 DAS as post-emergence + one hand weeding at 40 DAS, Pendimethalin 0.75 kg/ha as post-emergence + Imazethapyr 40 g/ha at 30 DAS as post-emergence, Imazethapyr + Imazamox 60 g/ha at 20 DAS as post-emergence and Imazethapyr + Imazamox 40 g/ha at 20 DAS as post-emergence during the experimentation.

Keywords: Greengram; herbicide; weeds; nutrient uptake; control

INTRODUCTION

Greengram is an important pulse crop of India which is cultivated in nearly 3.35 million hectare area with the production of 1.82 MT and average productivity of 512 kg/ha. Lack of improved cultural practices, cultivation on marginal and sub-marginal lands of poor fertility, inadequate fertilization, monsoon dependent cultivation, high sensitivity to pests and diseases and non-availability of suitable varieties are the major factors responsible for low yield of greengram. Along with these the major cause of minimizing production is severe weed infestation in crop.

Weeds compete with crop for resources like moisture, light, space and nutrients. Weeds usually absorb mineral nutrients faster than many of the crop plants and accumulate them in their tissues in relatively larger amount and therefore derive greater benefit (Das and Yaduraju

1996). Among the plant nutrients nitrogen, phosphorus and potassium are limiting ones and among them nitrogen is the first nutrient to become limiting due to crop-weed competition. Thus an experiment was conducted with an objective to identify a judicious combination of chemical and cultural methods for controlling weeds in greengram that maximizes nutrient uptake by the crop and reduces the uptake of nutrients by weeds effectively.

MATERIAL and METHODS

The experiment was conducted in randomized block design with sixteen treatments replicated thrice. 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) and medium in available phosphorus (22.0 kg/ha) and potassium (210.0 kg/ha). Weed flora of experimental field consisted of *Amaranthus spinosus* L, *Digera arvensis* L, Tri*anthema portulacastrum* L , *Gisekia poredious* L, *Euphorbia hirta* L, *Aristida depressa* L, *Portulaca oleracea* L, *Cenchrus biflorus* L, *Cleome viscosa* L, *Tribulus terrestris* L, *Corchorus tridense* L, *Cyperus rotundus* L, *Eleusine verticillata* L, *Eragrastris tennela* L and *Aerva tomentosa* L.

Greengram variety SML-668 was sown with seed rate of 20 kg/ha and plant spacing of 30 × 10 cm. The recommended fertilizers N, P_2O_5 and K_2O (20:40:40 kg/ha) were applied as basal dose through urea, single super phosphate and muriate of potash respectively. The pre-emergence herbicides were sprayed immediately after sowing on wet soil and post-emergence at 20 and 30 DAS as per treatment with knapsack sprayer. Weed free was achieved by two hand weedings at 20 and 40 DAS.

RESULTS and DISCUSSION

The data in Table 1 reveal that N, P and K uptake by weeds almost followed the footsteps of weed biomass in trend. It was found that all weed control treatments significantly reduced the N, P and K uptake by weeds at harvest. The nil uptake of N, P and K by weeds was recorded with weed free which was at par with Pendimethalin 0.75 kg/ha as pre-emergence + Imazethapyr + Imazamox 40 g/ha at 30 DAS as post-emergence, Imazethapyr + Imazamox 60 g/ha at 20 DAS as post-emergence + one hand weeding at 40 DAS, Imazethapyr + Imazamox 40 g/ha at 20 DAS as post-emergence + one hand weeding at 40 DAS, Pendimethalin 0.75 kg/ha as post-emergence + Imazethapyr 40 g/ha at 30 DAS as post-emergence, Imazethapyr + Imazamox 60 g/ha at 20 DAS as post-emergence and Imazethapyr + Imazamox 40 g/ha at 20 DAS as post-emergence during the experimentation. Nutrient uptake is the product of per cent nutrient content

Table1. Effect of different treatments on protein content and nutrient uptake by weeds and crop in greengram

Treatment	Protein content (%)	Nutrient uptake (kg/ha) by					
		Crop			Weeds		
		N	P	K	N	P	K
Weedy check (W_1)	20.31	44.97	6.02	46.31	61.95	12.07	51.30
Weed free (W_2)	22.31	97.16	12.56	94.56	0.00	0.00	0.00
Pendimethalin 0.75 kg/ha(W_3)	20.94	79.46	10.53	79.75	8.68	1.68	7.01
Pendimethalin 0.75 kg/ha + HW 30 DAS (W_4)	22.06	94.18	12.10	91.59	0.73	0.14	0.59
Imazethapyr 40 g/ha 20 DAS (W_5)	20.50	74.16	9.86	75.84	6.73	1.33	5.60
Imazethapyr 50 g/ha 20 DAS (W_6)	20.56	76.92	10.21	78.33	6.84	1.36	5.66
Imazethapyr 60 g/ha 20 DAS (W_7)	20.63	76.40	10.10	77.19	6.85	1.24	5.13
Imazethapyr 40 g/ha 20 DAS + HW 40 DAS (W_8)	21.19	81.80	10.84	82.01	1.76	0.37	1.53
Imazethapyr 50 g/ha 20 DAS + HW 40 DAS (W_9)	21.25	84.28	11.02	84.13	1.36	0.29	1.21
Imazethapyr 60 g/ha 20 DAS + HW 40 DAS (W_{10})	21.38	85.23	11.12	84.73	2.55	0.54	2.29
Imazethapyr + Imazamox 40 g/ha 20 DAS (W_{11})	20.81	78.38	10.31	78.90	0.39	0.08	0.32
Imazethapyr + Imazamox 60 g/ha 20 DAS (W_{12})	20.88	79.31	10.47	79.46	0.28	0.05	0.22
Pendimethalin 0.75 kg/ha + Imazethapyr 40 g/ha 20 DAS (W_{13})	22.00	94.00	12.16	90.95	0.37	0.07	0.31
Imazethapyr + Imazamox 40 g/ha 20 DAS + HW 40 DAS (W_{14})	21.63	88.61	11.44	86.91	0.47	0.10	0.40
Imazethapyr + Imazamox 60 g/ha 20 DAS + HW 40 DAS (W_{15})	21.69	90.42	11.63	87.83	0.17	0.04	0.17
Pendimethalin 0.75 kg/ha + Imazethapyr + Imazamox 40 g/ha 20 DAS + HW 40 DAS (W_{16})	21.69	91.14	11.82	89.28	0.08	0.02	0.07
SEm±	0.58	6.60	0.82	5.77	0.22	0.04	0.22
$CD_{0.05}$	NS	19.07	2.36	16.67	0.62	0.12	0.64

HW= Hand weeding, DAS= Days after sowing

and biomass thus similarity in the trend of uptake and total weed biomass production was an expected outcome. It can also be explained in the light of the fact that these treatments controlled the weeds effectively, might have made more nutrients available to crop and consequently encouraged higher concentration of nutrients and more yield and thereby higher uptake of nutrients by crop. Reduced nutrient uptake by weeds under the influence of different weed control measures has also been reported by Chhokar et al (1995), Gaikwad and Pawar (2003), Chhodavadia et al (2013) and Rajput et al (2014).

All the weed control measures tended to improve the uptake of nitrogen, phosphorus and potassium by seed and straw significantly compared to weedy check (Table 1). The highest N, P and K uptake by the crop was recorded with weed free treatment closely followed by all other weed control treatments which might be ascribed to higher yield with these treatments. Higher uptake by crop might be due to decreased crop weed competition that concurrently increased nutrient availability and led to better crop growth and higher crop biomass production coupled with more nutrient content. These results are in agreement with the findings of Gaikwad and Pawar (2003), Singh et al (2006) and Rajput et al (2014). Protein content of seed in greengram was not affected with any weed management practices.

REFERENCES

Chhodavadia SK, Mathukiya RK and Dobariya VK 2013. Pre- and post-emergence herbicides for integrated weed management in summer greengram. Indian Journal of Weed Science **45(2):** 137-139.

Chhokar RS, Balyan BS and Pahuja SS 1995. The critical period of weed competition in soybean, Glycine max (L) Merrill. Indian Journal of Weed Science **27:** 197-200.

Das TK and Yaduraju NT 1996. Crop-weed competition studies in some Kharif crops. I: Physiological parameters. Indian Journal of Agricultural Research **30(3-4):** 235-241.

Gaikwad RP and Pawar VS 2003. Effect of herbicide on soybean crop and weeds. Indian Journal of Weed Science **35:** 145-147.

Rajput Kavita D, Kamble AS, Sonawane RK and Bhale VM 2014. Influence of herbicides and cultural practices on uptake of nutrients by weeds and blackgram 212. Emerging Challenges in Weed Management, Biennial Conference, Indian Society of Weed Science, Directorate of Weed Science Research, Jabalpur, MP, India.

Singh P, Nepalia V and Tomar SS 2006. Effect of weed control and nutrient management on soybean (*Glycine max*) productivity. Indian Journal of Agronomy **51:** 314-317.

.

Received: 30.3.2015 ***Accepted: 1.9.2015***