Indian Journal of Weed Science **48**(4): 458–459, 2016
DOI: 10.5958/0974-8164.2016.00119.2

Short communication

Weed dynamics and weed control efficiency under different weed management practices for increased productivity of mustard

Sumitra Devi Bamboriya*, M.K. Kaushik, Shanti Devi Bamboriya[1] and R.C. Tiwari
Maharana Pratap University of Agriculture and Technology, Udaipur, Rajasthan 313 001

Received: 14 October 2016; Revised: 26 November 2016

Key words: Herbicides, Mustard, Post-emergence, Weed dynamics, Weed management

Brassica juncea is the third important oilseed crop in the world after soybean and oilpalm. In India, as mustard is exclusively grown under irrigated conditions, problem of weeds poses a serious threat to its potential production. Among the factors responsible for low productivity of Indian mustard, poor weed management ranged from 10-58% yield loss (Banga and Yadav 2001). Weed management is necessary to achieve higher yield as weeds compete for water, nutrients, light, oxygen and carbon dioxide and space. At present, hand weeding is the only method employed for controlling weeds in this crop. But most of the farmers of India do not adopt weed management in mustard field, because of unavailability of adequate labour at peak period of crop weeds competition and rising in labour wages. Manual weeding is effective but, it is cumbersome, time consuming and uneconomical. Herbicide would be one of the possible options to minimize weed menace, and may also increase the profit, better weed control and save time and labour. Hence, keeping in view above considerations, the present study was undertaken to study the effect of weed management on weed dynamics and yield of mustard.

An experiment was conducted during *Rabi* season of 2014-15 at Rajasthan College of Agriculture, Udaipur to study effect of weed management practices on weed dynamics and productivity of mustard (*Brassica juncea* L.). The soil of experimental site was clay loam in texture, having slight alkaline reaction (pH 8.2), medium in available nitrogen (281.4 kg/ha), phosphorus (24.5 kg/ha) and potassium (238 kg/ha). The experiment consisted of weedy check, one hand weeding at 20 days after sowing (DAS), two hand weeding at 20 and 40 DAS, fenoxaprop-p-ethyl 0.075 kg/ha at 10 DAS, fluazifop-p-butyl 0.055 kg/ha at 10 DAS, quizalofop-p-ethyl 0.050 kg/ha at 30 DAS, fenoxaprop-p-ethyl 0.075 kg/ha at 10 DAS + one hoeing at 40 DAS, fluazifop-p-butyl 0.055 kg/ha at 10 DAS + one hoeing at 40 DAS, isoproturon 1.25 kg/ha at 30 DAS and weed free check. The experiment was laid out in a randomized block design and replicated four times. Mustard variety '*Bio-902*' was sown on 1st Nov, 2014 at 40 x 10 cm row and plant to plant spacing with a seed rate of 3 kg/ha. The 1/3 dose of nitrogen and full dose of phosphorus was applied at the time of sowing and remaining 2/3 nitrogen was top dressed in two equal splits at first (35 DAS) and second irrigation (70 DAS), respectively. Herbicides were sprayed by knapsack sprayer fitted with flat fan T-jet nozzle using a spray volume of 500 l/ha. Weedy check plots remained infested with native population of weeds till harvest. Observations on weeds were recorded with the help of quadrate 0.5 x 0.5 m placed randomly at 2 spots in each plot at 60 DAS. The data on weeds were subjected to square root transformation ($\sqrt{x+0.5}$) to normalize their distribution (Gomez and Gomez 1984). Weed indices like weed control efficiency was calculated by using the formulae suggested by Varshney (1990).

The experimental crop was infested with *Phalaris minor, Cyperus rotundus, Cynodon dactylon, Chenopodium album, Chenopodium murale, Rumex acetosella, Convolvulus arvensis, Parthenium hysterophorus, Anagallis arvensis* and *Cichorium intybus*. The above data showed that dicot weeds were dominant at the experimental site.

Significantly the lowest weed density and dry weight and highest weed control efficiency were observed in two hand weeding at 20 and 40 DAS followed by fluazifop-p-butyl 0.055 kg/ha at 10 DAS + hoeing at 40 DAS and fenoxaprop-p-ethyl 0.075 kg/ha at 10 DAS + hoeing at 40 DAS. The results were also supported by the results of Chauhan *et al*. (2005) and Degra *et al*. (2011).

***Corresponding author:** sumisaani@gmail.com
[1]ICAR-Indian Agricultural Research Institute, New Delhi 110 012

Table 1. Effect of weed control on weed density, dry matter accumulation and weed control efficiency at 60 DAS in Indian mustard

Treatment	Weed density (no./m^2)			Weed dry matter (kg/ha)			Weed control efficiency (%)		
	Monocot	Dicot	Total	Monocot	Dicot	Total	Monocot	Dicot	Total
Fenoxaprop-p-ethyl 0.075 kg/ha at 10 DAS	3.6(12.7)	6.8(45.7)	7.6(58.5)	75.0	101.9	176.9	60.0	18.3	43.5
Fluazifop-p-butyl 0.055 kg/ha at 10 DAS	3.6(12.6)	6.7(44.7)	7.6(57.3)	74.6	100.3	174.8	60.4	19.5	44.2
Quizalofop-p-ethyl 0.050 kg/ha at 30 DAS	3.2(10.0)	6.7(44.5)	7.4(54.5)	64.9	89.8	154.5	65.5	28.0	50.6
Fenoxaprop-p-ethyl 0.075 kg/ha at 10 DAS + one hoeing at 40 DAS	1.6(2.0)	1.9(3.5)	2.4(5.5)	17.9	15.4	33.4	90.5	87.6	89.3
Fluazifop-p-butyl 0.055 kg/ha at 10 DAS + one hoeing at 40 DAS	1.6(2.1)	1.9(3.2)	2.4(5.4)	14.6	15.2	29.8	92.3	87.7	90.4
Isoproturon 1.25 kg/ha at 30 DAS	4.4(18.6)	6.4(40.0)	7.7(58.6)	93.8	86.9	180.7	50.2	30.6	42.3
One hand weeding at 20 DAS	3.4 (11.2)	6.4(41.0)	7.3(52.2)	71.5	64.6	136.1	62.0	48.4	56.6
Two hand weeding at 20 and 40 DAS	1.6(2.1)	1.9(3.0)	2.4(5.1)	12.6	14.5	27.1	93.3	88.4	91.3
Weedy check	8.6* (73.0)	9.3(85.7)	12.6(158.7)	188.3	125.2	313.6	0.00	0.0	0.0
Weed free check	0.7(0.0)	0.7(0.0)	0.7(0.0)	0.0	0.0	0.00	100.0	100.0	100.0
LSD (P=0.05)	0.3	0.4	0.4	8.9	9.9	13.3	-	-	-

Figures in parentheses are original value subjected to square root transformation ($\sqrt{x+0.5}$)

Table 2. Effect of weed control on yield of Indian mustard

Treatment	Yield (t/ha)			Harvest index (%)
	Seed	Straw	Biological	
Fenoxaprop-p-ethyl 0.075 kg/ha at 10 DAS	1.49	4.69	6.18	24.1
Fluazifop-p-butyl 0.055 kg/ha at 10 DAS	1.50	4.70	6.20	24.3
Quizalofop-p-ethyl 0.050 kg/ha at 30 DAS	1.52	4.80	6.32	24.0
Fenoxaprop-p-ethyl 0.075 kg/ha at 10 DAS + one hoeing at 40 DAS	1.91	5.20	7.12	26.8
Fluazifop-p-butyl 0.055 kg/ha at 10 DAS + one hoeing at 40 DAS	1.91	5.22	7.14	26.8
Isoproturon 1.25 kg/ha at 30 DAS	1.39	4.56	5.95	23.5
One hand weeding at 20 DAS	1.65	4.89	6.55	25.3
Two hand weeding at 20 and 40 DAS	1.95	5.57	7.52	26.0
Weedy check	1.17	3.94	5.11	22.8
Weed free check	1.98	5.78	7.76	25.5
LSD (P=0.05)	0.18	0.47	0.46	NS

Different weed management treatments significantly affected the seed and straw yield of mustard. Seed yield increased significantly in absence of crop-weed competition, which was created due to two hand weeding at 20 and 40 DAS followed by fluazifop-p-butyl 0.055 kg/ha at 10 DAS + hoeing 40 DAS and fenoxaprop-p-ethyl 0.075 kg/ha at 10 DAS + hoeing at 40 DAS. The results so obtained for highest seed and straw yield under weed free check were in close conformity with the findings of Chauhan *et al.* (2005) and Kour *et al.* (2014).

SUMMARY

The lowest weed density and weed dry weight, and highest weed control efficiency was recorded in two hand weeding at 20 and 40 DAS. However, it was also noticed that herbicides along with one hand hoeing were equally good in terms of suppressing weed population at 60 DAS. The maximum seed yield was observed under two hand weeding at 20 and 40 DAS.

REFERENCES

Banga RS and Yadav A. 2001. Evaluation of herbicides against complex weed flora in Indian mustard. *Haryana Journal of Agronomy* **17**: 48-51.

Chauhan, YS, Bhargava MK and Jain VK. 2005. Weed management in Indian mustard. *Indian Journal of Agronomy* **50**: 149-151.

Degra ML, Pareek BL, Shivran RK and Jat RD. 2011. Integrated weed management in Indian mustard and its residual effect on succeeding fodder pearl millet. *Indian Journal of Weed Science* **43**: 73-76.

Gomez KA and Gomez AA. 1984. *Statistical Procedures for Agricultural Research* (2nd Edition). John Willey and Sons, Singapore.

Kour R, Sharma BC, Kumar A, Nandan B and Kour P. 2014. Effect of weed management on chickpea (*Cicer arietinum*) + Indian mustard (*Brassica juncea*) intercropping system under irrigated conditions of Jammu region. *Indian Journal of Agronomy* **59**: 242-246.

Varsheny JG. 1990. Chemical control of weeds in soybean. *Indian Journal of Weed Science* **22**: 17-22.