Madras Agric. J., 94 (1-6) : 127-130 January-June 2007
https://doi.org/10.29321/MAJ.10.100648

Research Notes

Weed management in irrigated onion *(Allium cepa L.)* under plane zone of western Maharashtra

J.V. KATHEPURI, V.Y.SANKPAL, H.L. GHADAGE AND S.M. JAWALE
College of Agriculture, Pune-411 005. Maharashtra.

Onion is popular among the farmers because of its commercial value. In Maharashtra, it is mainly grown as a commercial vegetable crop on an area of 66.5 thousand hectares with production of 804.0 thousand tones of bulbs and is leading in the country. Crop-weed competition has long been recognized as one of the major constraints for low production of onion. Weeds cause reduction of 40-80% of bulb yield (Patel *et al*., 1983). Due to closer planting and shallow root system of onion, manual weeding is tedious, expensive and time consuming. Moreover, non availability of sufficient labour at critical period of crop weed competition and some time field conditions do not permit the manual weeding. The average bulb yield of onion can be improved through combination of proper chemical and mechanical weed control at appropriate time. Keeping this in view the present study was undertaken to compare the effect of different weed control methods on irrigated onion.

The experiment was conducted at College of Agriculture, Pune, during winter season of 2002-2003. The soil was medium deep, moderately well-drained, sandy clay loam with low, medium and high available N, P and K respectively. The trial was laid out in randomized block design with 3 replications. The treatments comprises T_1 pendimethalin 1.0 kg/ha pre emergence, T_2 pendimethalin 1.0 kg (PPI) + pendimethalin 1.0 kg (POE), T_3 pendimethalin (PPI) + HW at 40 days after transplanting, T_4 oxyfluorfen 0.2 kg/ha (PPI), T_5 oxyfluorfen 0.2 kg/ha (PPI) + oxyfluorfen 0.2 kg/ha (POE), T_6 oxyfluorfen 0.2 kg/ha (PPI) + HW at 40 days after transplanting, T_7 Two HW at 20 and 40 days after transplanting and T_8 weedy check.

One month-old healthy seedlings of onion cv. 'N-2-4-1' were transplanted in the flat beds at distance of 15 cm x 10 cm on 13th November during 2002. A basal dose of 50 kg each of N, P_2O_5 and K_2O/ha was applied through urea, single super phosphate and muriate of potash, respectively and 50 kg N/ha was top dressed at 30 days after transplanting.

One light irrigation was given just after transplanting and others were given as and when required. All the other package of practices were applied with a manually operated foot sprayer using flat fan nozzle. Weed count was taken by using the quadrate and transformed into log (x + 2) value. Weed-control efficiency was computed by arriving a ratio for the differences in weed population between control and treated plots and to the weed population of control plot, expressed in percent. The weed samples were air-dried and then oven-dried at 80 ± 2°C till a constant weight was obtained and expressed in kg/ha. All the bio-metric observations on plants and weeds were recorded at harvest and data were analysed statistically.

Table 1. Effect of weed control methods on number and dry matter of weeds, weed index, weed control efficiency and nitrogen uptake.

Treatments	Weed population (No/m^2)	Weed dry weight (kg ha^{-1})	Weed index	Weed control efficiency	N removal by weeds (kg ha^{-1})
T_1 - Pendimethalin 1.0 kg/ha PPI	72.66	696.00	17.38	57.41	15.17
T_2 - T_1 + Pendimethalin 1.0kg ha (POE) 20 DAT	67.00	614.00	5.97	62.41	12.47
T_3 - T_1 + HW 40 DAT	54.33	578.66	1.35	64.59	12.16
T_4 - Oxyfluorfen 0.2 kg/ha (PPI)	79.66	725.00	19.26	55.63	15.65
T_5 - T_4 + Oxyfluorfen 0.2 kg/ha (POE) 20 DAT	70.66	647.33	7.61	60.39	13.96
T_6 - T_4 + HW 40 DAT	46.32	601.33	2.79	63.20	12.66
T_7 - Two HW (20 DAT and 40 DAT)	53.33	571.66	-	65.02	9.17
T_8 - Weedy check	102.00	1634.33	57.78	--	40.29
C.D. (p=0.05)	0.73	17.69	-	-	1.72

PPI = Pre-plant incorporation, HW = hand-weeling, DAT = days after transplanting, POE = post emergence

Table 2. Effect of weed control methods on N uptake by plants, dry matter of plants, bulb yield and net returns in onion

Treatments	N uptake by plants at harvest (kg ha^{-1})	Dry matter of plants at harvest (kg ha^{-1})	Bulb yield (q/ha)	Net returns (Rs./ha)	B:C ratio
T_1 - Pendimethalin 1.0 kg/ha PPI	57.81	9590	238.57	48136	1:3.0
T_2 - T_1 + Pendimethalin 1.0kg ha (POE) 20 DAT	69.16	9732	271.52	56511	1:3.2
T_3 - T_1 + HW 40 DAT	74.48	9882	284.85	6100	1:3.4
T_4 - Oxyfluorfen 0.2 kg/ha (PPI)	55.79	9493	233.12	4650	1:2.9
T_5 - T_4 + Oxyfluorfen 0.2 kg/ha (POE) 20 DAT	63.49	9654	266.78	55100	1:3.2
T_6 - T_4 + HW 40 DAT	72.97	9817	280.69	59757	1:3.4
T_7 - Two HW (20 DAT and 40 DAT)	78.93	10033	288.76	62663	1:3.6
T_8 - Weedy check	25.63	5346	121.91	14648	1:1.6
C.D. (p=0.05)	1.77	119	2.07	-	-

PPI = Pre-plant incorporation, HW = hand-weeling, DAT = days after transplanting, POE = post emergence

Among various weed management practices, two HW at 20 and 40 days after transplanting and pendimethalin 1 kg (PPI) + HW at 40 days after transplanting were most effective in reducing weed density and weed dry weight significantly (Table 1). Weed control efficiency was higher under weed free conditions *i.e.* 2 HW at 20 and 40 days after transplanting followed by pendimethalin 1 kg/ ha (PPI) + HW at 40 days after transplanting. Oxyfluorfen 0.2 kg/ha (POE) showed the lowest weed control efficiency and the results corroborate the findings of Ved Prakasli *et al.* (2000). The weed control methods showed significant difference in N removal by weeds. Nitrogen uptake through weed was minimum under weed free condition *i.e*. 2 HW at 20 and 40 days after transplanting followed by pendimethalin 1.0 kg (PPI) + HW at 40 days after transplanting due to lower weed dry-matter production and less growth of weed. Weedy check removed the highest amount of nitrogen because of higher weed dry matter (Table 1). The onion crop removed the highest amount of nitrogen under 2 HW at 20 and 40 days after transplanting followed by pendimethalin 1 kg/ha + HW at 40 days after transplanting and Oxyfluorfen 0.2 kg/ha + HW at 40 days after transplanting might be due to favourable soil moisture and nutrient status of the soil. The lower nutrient removal by crop was recorded in weedy check which was due to lowest bulb yield of onion (Table.2) (Kolhe, 2001).

Weed control methods differed significantly with respect to crop dry matter production. Higher crop dry matter production was recorded in two hand weeding at 20 and 40 days after transplanting. The reduction in crop dry matter production was 46.7% by weed infestation when compared to hand weeding twice. Chemical weed management in combination with hand-weeding once could improve this situation satisfactory. Hand weeding at 20 and 40 days after transplanting or chemical weed control with HW at 40 days after transplanting recorded significantly more bulb yield when compared with weedy check (Table 2). Among the herbicides tried, pre-emergence application of pendimethalin at 1.0 kg/ha coupled with 1 hand-weeding at 40 days after transplanting had a pronounced effect on the yield as compared with other herbicides. Ved Prakash *et al.* (2000) also reported similar and beneficial effect of pendimethalin in the control of weeds in onion crop. The increase in bulb yield might be due to combined action of pre-emergence application of pendimethalin which suppressed the initial weed growth and manual removal of weeds which emerged later.

Net returns realized from two hand weeding at 20 and 40 days after transplanting were higher than that of weedy check. Lower net returns worked out from weedy check was due to lower bulbs yield. Chemical weed control, pendimethalin 1 kg/ha (PPI) in combination with one hand weeding at 40 days after transplanting was equally better with hand weeding twice in terms of economy. Two hand weedings at 20 and 40 days after transplanting and pendimethalin 1 kg/ha + HW at 40 days after transplanting enhance the net return of Rs. 65663 and Rs. 61000 per hectare during winter season. The higher net returns were obtained because of good control of weeds with higher yield in these treatments. Satao and Dandge (1999) and Ravinder Singh *et al.* (2001) also reported similar increased net returns.

Thus either two hand weedings at 20 and 40 days after transplanting or pendimethalin 1 kg/ha + HW at 40 days after transplanting was found to be most effective integrated weed

management method for getting higher yield and economic return in irrigated onion.

References

Kblhe, S.S. (2001). Integrated Weed Management in onion *(Allium cepa* L.) *Indian J. Weed Sci.,* **33 (1-2):** 26-29.

Patel, C.L., Patel, Z.G. and Patel, R.B. (1983). Integrated weed management in onion bulbs crop. *Indian J. Weed Sci.,* **15(1) :** 7-11.

Ravinder-Singh., Nandal, T.R., Shukla, Y.R. and Singh, R. (2001). Weed intensity and onion bulb yield as influenced by different weed management practices. *Crop Res. Hissar,* **22 (1):** 32-37.

Satao, R.N. and Dandge, M. S. (1999). Economics of weed control treatments in onion *Crop Res. Hissar,* **18:** 3, 480-481.

Singh, R., Kolhi, U.K. and Nadai, T.R. (1997a). Efficiency of some selected weedicides against onion weeds in Himachal Pradesh *J. of Hill Res.,* **10 (2)**: 200-201.

Ved - Prakash., Pandey, A.K., Singh, R.D., Mani, V.P. and Prakash, V. (2000). Integrated weed management in winter onion *(Allium cepa* L.) under mid-hill conditions of north-western Himalayas. *Indian J. Agron.,* **45 (4):** 816-821.

Madras Agric. J., 94 (1-6) : 130-133 January-June 2007

Research Notes

Evaluation of BIPM Module on tomato fruit borer *(Helicoverpa armigera)* larval population

D.VIJAYALAKSHMI

Department of Agricultural Entomology, Tamil Nadu Agricultural University, Coimbatore - 641 003.

Tomato fruit borer, *Helicoverpa armigera* Hub. is a polyphagous pest which unto 60 per cent yield loss in tomato (Manjunath *et al.,* 1985). Synthetic insecticides are often used to suppress *H. armigera* population, because of their wide availability and potential for quick intervention. Even though insecticides are effective the demerits like resistance, residue, pest resurgence, non-target effect and environmental pollution restrict their use. As an alternative to insecticides, bioagents are ecofriendly and thus reduce the above mentioned problems. Isolated effects have been made to check *H. armigera* infestation by using one of the organic farming methods like biocontrol agents. Organic farming produces healthy plants that are better able to resist insect predation. Organic farmer's primary strategy in controlling pest is prevention through good plant nutrition and management. Biocontrol agents are very important component of organic farming. The important bioagents are: the egg parasitoid, *Trichogramma sp.* (Mani and Krishnamoorthy, 1983; Divakar, Pawar, 1987 and Kakar *et al.,* 1990), predator, *Rhynochorus* (Ambrose and Claver, 1999a), pathogens Bt (Krishna *et al.,* 12981) and HaNPV (Natarajan *et al.,* 1991). Even though *T. chilonis* is highly effective