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Integrated weed management on uptake of phosphorus and yield of onion (*Allium cepa* L.)

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Abstract

Field experiment were conducted during rabi 2019 and 2020 at the RRS Agwanpur Farm, department of horticulture, RRS, Agwanpur, Saharsa. The results showed that, significantly lowest uptake of phosphorus by weed and higher uptake by onion crop were observed under herbicides along with 2 hand weeding as compared to other treatments. The pre-emergence application of Fluchloralin @ 1.2 kg/ ha + 3 Hand weeding at 35 and 65 days after transplantation reduced weed menace and obtained highest yield of onion. Bulbs for local consumption as well as for export purposes. India ranks second in area and production in the world after China and third after Netherland and Spain.

Keywords: *Allium cepa* L., phosphorus and yield of onion, weed management

Introduction

Onion (*Allium cepa* L.) is an important vegetable crop grown all over the India. Bulbs for local consumption as well as for export purposes. India ranks second in area and production in the world after China and third after Netherland and Spain. for its different types of use, nutritive values and increasing export potential. The Yield potential is decreasing due to severe weed competition as it grows in uplands. Being a slow growing crop and having erect tubular leaves, it suffers heavily from weed competition during initial growth stages. Ineffective weed management is one of the most important factors of low bulb yield. Herbicides are important tool for weed control but are not effective in controlling all the weeds present in the crop. In an integrated approach each method has its own role to play in the overall weed management. Hence, the present study was undertaken to find out a suitable weed management practice for controlling weeds in onion crop and to study the pattern of phosphorus removal by the crop and weeds.

Materials and Methods

An experiment was conducted during Rabi season of The year 2019 and 2020 at the RRS, farm, Department of Horticulture, RRS Agwanpur, Saharsa. The soil of the experimental plot was Sandy loan. The experiment was laid out in randomised block design with 17 treatment (table 1) replicated thrice. 65 days old seedlings of onion variety Agrifounded light Red was transplanted on 10th January, 2019 and 2020 at a spacing of 15 X 10 cm in flat beds. All the herbicides under study were applied before transplanting of the seedlings as a pre-emergence treatment. weeds in each plot were sampled randomly with the help of 0.52 m² quadrant to record their density and weed dry matter. Phosphorus content in weeds and onion bulbs was determined on dry weight basis by standard procedure and uptake, was estimated by multiplying content by the corresponding figure of dry weight of bulb and weeds.

Results and Discussion

The prominent weed species in the experimental plots were *Cyperus rotundus*, *Cynodon dactylon*, *Physalis minima*, *Chenopodium album*, *Tribulus terrestris* and *Amaranthus viridis*.

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Table 1: Weed dry matter, uptake of phosphorus and onion yield as influenced by different herbicidal treatments.

Treatment	Dose	Weed dry matter (gm ²) at harvest		Phosphorus uptake by weed (kg/ha)			Phosphorus uptake by crop (kg/ha)			Yield of onion bulb (tonnes/ha)
		2019	2020	2019	2020	Pooled	2019	2020	Pooled	Pooled
Fluchlorian	2.20	126.97 (11.29)	136.09(11.55)	3.96	4.49	4.19	113.80	123.82	118.83	61.5
Fluchlorian + 1 HW 50 DAT	1.25	28.76 (5.42)	66.41(8.17)	1.32	3.91	2.61	132.27	135.07	133.92	67.5
Fluchlorian + 2HW 35, 65 DAT	1.25	14.11 (3.83)	20.84(4.61)	0.91	1.02	0.97	144.96	147.98	146.53	73.4
Pendimethalin	1.25	151.82 (12.58)	110.91(10.63)	4.78	3.51	14.31	107.52	125.61	116.53	56.9
Pendimethalin + 1 HW 50 DAT	0.75	39.5 1(6.29)	75.00(8.61)	1.69	5.29	3.47	127.33	130.41	128.81	65.1
Pendimethalin + 2 35, 65 DAT	0.75	16.15 (4.09)	23.77(4.91)	1.52	1.63	1.52	139.31	141.61	140.43	70.1
Alachlor	2.25	161.11 (12.72)	168.97(12.98)	5.27	6.31	5.73	102.27	110.29	106.28	54.2
Alachlor + 1 HW 50 DAT	1.25	41.57 (6.52)	72.69(8.57)	1.99	5.87	3.92	118.37	122.53	120.52	66.2
Alachlor + 2HW 35, 65 DAT	1.25	22.90 (4.71)	30.40(5.53)	1.51	2.21	1.83	127.85	135.81	131.84	66.3
Trifluralin	1.25	133.43 (11.61)	145.37(11.98)	4.19	7.51	5.82	114.09	123.92	118.98	59.7
Trifluralin + 1HW 50 DAT	0.75	45.57 (6.82)	76.97(8.82)	2.13	4.72	3.09	119.31	129.92	124.61	62.9
Trifluralin + 2HW 35,65 DAT	0.75	18.51 (4.38)	26.91(5.17)	1.71	1.53	1.61	129.25	43.31	136.27	67.4
Oxyfluorfen	0.25	19.61 (10.97)	131.49(11.51)	3.71	5.54	4.62	112.98	118.92	115.93	58.5
Oxyfluorfen + 1 HW 50 DAT	0.20	50.82 (7.17)	854.20(9.21)	2.51	.95	3.21	126.09	130.43	128.21	64.2
Oxyfluorfen + 2HW 35,65 DAT	0.20	24.07(5.10)	29.27(5.52)	1.57	1.61	1.63	135.98	142.12	139.10	69.1
Three HW 25,45,65 DAT	---	18.96(4.31)	33.32(5.92)	2.22	2.83	2.51	131.63	141.92	136.81	68.3
Un weeded control	---	219.27(19.81)	347.41(18.71)	8.57	13.27	10.92	64.17	60.62	62.37	32.1
SE (m) +	---	0.47	0.79	0.51	.67	0.41	7.72	4.51	4.53	1.7
CD (P=0.05)	---	1.29	2.21	1.27	1.91	1.13	22.18	12.97	12.62	4.7

The data regarding dry matter of weed, Phosphorus uptake and yield of onion bulb as Influenced by different herbicidal treatment are presented in table 1.

During both the years of experimentation and application of fluchloralin @ 1.25 kg/ha + 2 HW at 35 and 65 DAT produced significantly lower dry matter of weed (14.00g and 20.92g respectively). This might be due to effective weed control and hence caused greater reduction in dry matter accumulation by weeds.

The uptake of phosphorus by weed and crop was significantly influenced by different herbicidal treatments. The pooled mean indicated that an application of fluchloralin @ 5kg/ha + 2HW at 35 and 65 DAT removed significantly minimum phosphorus by weed (0.97 kg/ha. The weight control treatment checked the world population with growth and others interfere read in written update which might have resulted in lowest Phosphorus uptake by weed however an invariant control most significantly maximum Phosphorus by weed (10.83 kg ha⁻¹). Similar results were reported by Raghav *et al.* (1987). The pre-emergence application of fluchloralin @ 1.25 kg/ha + 2 HW at 35 and 65 DAT removed significantly the highest Phosphorus by onion crop (146.51 kg ha⁻¹) and the lowest amount was recorded in the unweeded control (62.37 kg ha⁻¹). This might be due to the better weed control, poor updates of phosphorus by weed during maximum growth period coupled with favorable condition for growth and development of onion bulbs similar result where reported by Raghav *et al.* (1987).The pooled data revealed that an integrated treatment of fluchloralin @1.25 kg/ha + 2 HW at 35 and 65 DAT recorded significantly the highest yield of onion bulbs (73.4 ha⁻¹). How is the lowest yield of onion bulbs (32.1 ha⁻¹) was recorded under an unweeded control. Shivpuri authority of fluchloralin along with hand weeding for increasing yield of onion bulbs were reported by Saikia *et al.* (1997) ^[2] and Sukhadia *et al.* (2002) ^[3].

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