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Effect of Integrated Weed Management Practices on Vegetative Growth Characters in Onion (*Allium cepa* L.)

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ABSTRACT

The maximum plant height at 30, 60 and 90 DAT was recorded T_2 (Weed free), as compared to T_4 (Pendimethalin @ 750 g a i/ha). The maximum total number of leaf/plant (7.20) was found T2 (Weed free) as compared to number of leaf/plant (7.04) was found in T_4 (Pendimethalin @ 750 g a i/ha). The minimum number of days required for bulb formation was recorded under T_2 (Weed free), followed by T_4 (Pendimethalin @ 750 g a. i. /ha). As compared to other treatments. While maximum number of days required for bulb formation was recored in control.The minimum number of days taken to maturity was recorded under T_0 (Control) followed by T_3 as compared to other treatments. While maximum number of days taken to maturity was rescored in (Oxyflurfen@100 g a i/ha + HW at 40 DAT). The maximum neck thickness was noted under the treatment T_2 (Weed free) fallowed by T_4 (Pendimethalin @ 750 g a i/ha) as compared to other treatments in onion.

Key words: *Onion, Weed Vegetative Growth, Pendimethalin.*

INTRODUCTION

Onion (*Allium cepa* L.) is a bulbous crop and it belongs to the family Alliaceae having chromosome number 2n=16. The number of species in the genus is around 600. Onion is one of the most important crops grown in India and worldwide. It is only vegetable in which India figures prominently in the world for production and export[7]. China is the leading country in production of onion followed by India and then the USA. Presently, an annual production of onion is 20.99 million tonnes from an area of about 1.22 million hectare having a productivity of 21.2 million tonnes/ha[4].

It is an important and indispensable item in every kitchen as vegetable cum condiment, hence, commands an extensive internal market. It is rich in minerals like phosphorus and calcium, vitamin C, protein and carbohydrates and is great demand because of many medicinal properties also. Raw onion has an antiseptic value through the alimentary canal.

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It promotes bile production and reduces blood sugar. In order to meet the increasing demand of the consumers and fill the gap in off-season, onion is now gaining popularity as kharif season crop also. Country' s share in world onion trade is 12 % next only to Netherland and onion alone fetches more than 75 per cent of foreign exchange that comes from export of fresh vegetables. The most important onion growing states are Maharashtra, Karnataka, Orissa, Tamil Nadu, Uttar Pradesh, Andhra Pradesh, Rajasthan, and Bihar are the major onion producing states in India. Maharashtra, however, is the leading state with 23.4% area and 27.50%. Anti-fungal activities in onion is due to a phenolic factor i.e., catechol. Onion is used for treating problems including loss of appetite, upset stomach, and gall bladder disorder, for treating heart and blood vessel problems including chest pain (angina) and high blood pressure; and for "preventing hardening of the arteries" atherosclerosis[8].

Severe weed problems in onion and huge yield losses due to weed competition are a global problem. A weed interferes with the development of onion bulb by competing with moisture nutrients, light and space, thereby reducing bulb yield to the extent of 40-80%[10]. The conventional methods of weed control i.e. hand weeding is no doubt effective but it is time consuming, cumbersome and under many situations becomes uneconomical. Onion is sown at very narrow spacing, therefore, cultural methods of weed control could not be performed and manual control becomes unaffordable. Hence, recommended pre and post emergence herbicides to control weeds in onion *viz*., pendimethalin, oxadiargyl, quizalofop-ethyl and fenoxaprop- p-ethyl mostly used by the farmers. Jilani *et al*[1]., the applied herbicides persist in soil. The persistence of any herbicides may differ with agro-climatic situations. The residue chemist uses this concept to determine the rate at which an herbicide is degraded in soil which is costly. But cheap and easy method to know the herbicide residue in soil is bioassay in which, sensitive crops are grown in treated soil and provides useful information regarding herbicides residues[6]. Hence, keeping in view of the above facts, the present investigation study was undertaken to find out the effect of integrated weed management in onion.

MATERIALS AND METHODS

The present experiment integrated weed management in onion was carried out during the rabi season 2016-17. The experiment was conducted at Horticultural Research Farm of the Department of Applied Plant Science (Horticulture), School for Biosciences & Biotechnology, Babasaheb Bhimrao Ambedkar University. The layout of experimental field was laid down in Randomized Block Design in which nine along with 3 replications .Treatment combinations were i.e Control, (Hand weeding at 20 DAT), (Weed free), (Oxyfluorfen@ 100 a.i/ ha), (Pendimethalin @ 750 g a i/ha), (Agil @ 100 g i/ha), (Oxyflurfen@100 g a i/ha + HW at 40 DAT), (Agil @ 100 g a i / ha+HW at 20 DAT), (Oxyflurfen @ 100 g a i/ha + Agil @ 100 g a i/ha).The soil of experimental field is sandy loam and slightly alkaline in nature with the soil pH 8.2. Onion seeds cultivar, Pusa Red were sown on nursery beds of Horticultural Research Farm, by broadcasting method 22 Nov, 2016.Raised bed about 4-5-meter-long, 1-meter width and 15 cm above the ground level was prepared. The seeds beds were covered with paddy straw, mulches with polythene paper above the bed to protect the young seedling from adverse climate condition. 60 to 65 days after sowing, bulb lets were ready for transplanting. The observations on height of plant (cm), number of leaves per plants, neck thickness, number of days taken to bulb and number of days taken to maturity. On set of the Rabi season these healthy bulb uniform shape and size were selected and transplanted well prepared field Statistical analysis of the data obtained in different set of experiments was calculated following the standard procedure as stated by Panse and Sukhatme[5].

RESULTS AND DISCUSSION

Effect of integrated weed management practices on vegetative growth characters:

The results obtained during the investigation in respect to integrated weed management on growth parameters viz., height of plant, number of leaves per plant, neck thickness, number of day taken for bulb formation and number of day taken to maturity etc discussed as below.

The data gathered in connection with plant height at 30, 60 and 90 days after transplanting due to influence of weed management have been displayed in Table. 1 and revealed the expressive differences in plant height at 30, 60 and 90 DAT due to various treatments of weed management The maximum plant height at 30 DAT i.e. (21.44cm) were noted by the application of T_2 (weed free) followed by T_4 Pendimethalin @ 750 g a. i. /ha i.e. (18.82 cm). The improvement was significantly highest than rest of the treatment however, lowest value i.e (12.20 cm) were recorded in T_0 (Control).The maximum plant height at 60 DAT i.e. (38.13cm) were noted by the application of T_2 (weed free) followed by T_4 Pendimethalin @ 750 g a. i. /ha i.e. (35.91 cm). The improvement was significantly highest than rest of the treatment however, lowest value i e (25.89 cm) were recorded in T_0 (Control). The maximum plant height at 90 DAT i.e. (58.25cm) were noted by the application of T_2 weed free followed by T_4 Pendimethalin @ 750 g a. i./ha i.e. (56.67 cm). The improvement was significantly highest than rest of the treatment however, lowest value i. e (42.82 cm) were recorded in T_0 (Control). The study revealed that the maximum number of leaves of per plant at 30 DAT i.e. (2.91) were noted by the application of T_2 (Weed free) followed by T_4 Pendimethalin @ 750 g a. i. /ha i.e. (2.80). The improvement was significantly highest than rest of the treatment however, lowest value i. e. (2.18) were recorded in T_0 (Control)**.**The maximum number of leaves of per plant at 60 DAT i.e. (6.59) were noted by the application of T_2 (weed free) followed by T_4 Pendimethalin @ 750 g a. i. /ha i.e. (6.38).The improvement was significantly highest than rest of the treatment however, lowest value i. e (4.47) were recorded in T_0 (Control)**.**The maximum number of leaves of per plant at 90 DAT i.e. (7.20) were noted by the application of T_2 (weed free) followed by T_4 Pendimethalin @ 750 g a. i. /ha i.e. (7.04). The improvement was significantly highest than rest of the treatment however, lowest value i. e (5.02) were recorded in T_0 (Control). The maximum neck thickness at 30 DAT i.e. (1.03cm) were noted by the application of T2 (weed free) followed by T_4 Pendimethalin @ 750 g a. i. /ha i.e. (0.84cm). The improvement was significantly highest than rest of the treatment however, lowest value i.e. (0.43cm) were recorded in T_0 (Control)**.** The maximum neck thickness at 60 DAT i.e. (2.77 cm) were noted by the application of T2 (weed free) followed by T_4 Pendimethalin @ 750 g a. i. /ha i.e. (2.66 cm). The improvement was significantly highest than rest of the treatment however, lowest value i.e. (1.51 cm) were recorded in T_0 (Control)**.** The maximum neck thinness at 90 DAT i.e. (4.88 cm) were noted by the application of T2 (weed free) followed by T_4 Pendimethalin @ 750 g a. i. /ha i.e. (4.32 cm). The improvement was significantly highest than rest of the treatment however, lowest value i.e. (2.21 cm) were recorded in T_0 (Control)**.** Similar the data of Table 1. Showed the maximum number of day taken to bulb formation was 68.49 at maximum under treatment T_2 (Weed free) followed by 67.30 days under treatment T_4 (Pendimethalin @750g a.i. /ha) treatment. The minimum was recording taken after 54.86 days under treatment T_0 (Control)**.** The data of Table 1. showed the maximum number of day taken to maturity was maximum in 145.33 DAT under treatment T_6 (Oxyflurfen@100 g a i/ha + HW at 40 DAT) and minimum in123.00 DAT under treatment T_o (control). These finding were in accordance with the result obtained Ved, *et al*[9]., Kachare *et al*[2]., and Kachare *et al*[3]., in onion.

Table 1: Effect of integrated weed management on vegetative growth of onion

Treatments	Plant Height (cm)			Number of leaves per plant			Neck thickness (cm)			Number of day taken to bulb formation	Number of day taken to maturity
	30DAT	60DAT	90DAT	30DAT	60DAT	90DAT	30DAT	60DAT	90DAT		
T_0 (Control)	12.20	25.89	42.82	2.18	4.47	5.02	0.43	1.51	2.21	54.86	123.00
T_1 (Hand weeding at 20&40 DAT)	17.29	33.98	54.42	2.48	5.77	6.44	0.46	1.97	3.33	65.19	136.33
T_2 (Weed free)	21.44	38.13	58.25	2.91	6.59	7.20	1.03	2.77	4.88	68.49	135.67
T_3 (Oxyfluorfen@100g a.i./ha)	12.88	25.54	43.78	2.32	4.71	5.90	0.54	2.41	2.38	59.35	142.00
T_4 (Pendimethalin @750g a.i./ha)	18.82	35.91	56.67	2.80	6.38	7.04	0.84	2.66	4.32	67.30	134.00
T_5 (Agil@100g a.i./ha)	14.96	29.86	45.33	2.39	5.15	5.74	0.53	1.82	3.07	63.43	132.33
T_6 (Oxyflurfen @ 100g a.i./ha+ HW at 40 DAT)	17.77	34.86	56.24	2.74	6.19	6.89	0.68	2.32	3.56	66.39	145.33
T_7 (Agil @ 100g a.i./ha+ HW at 20 DAT)	15.52	32.89	52.76	2.47	4.97	6.10	0.61	1.75	3.22	63.29	133.00
T_8 (Oxyfluorfen @ 100g a.i./ha+Agil @ 100g a.i./ha)	14.36	27.01	44.30	2.36	4.90	5.86	0.65	2.22	2.43	60.58	127.67
CD at 5% (P = 0.05)	0.539	0.690	0.844	0.081	0.264	0.484	0.017	0.020	0.189	0.272	1.267
SE.m ±	0.178	0.228	0.279	0.027	0.087	0.160	0.006	0.009	0.063	0.823	3.831

CONCLUSION

On the basis of result presented it can be concluded that hand weeding was more effective than application of Pendimethalin in enhancing vegetative, morphological and qualitative parameters of onion plants and fruits. With regard to the effect of Integrated weed management on vegetative growth characters it was observed that hand weeding was superior mostly all the treatments under study viz. plant height, number of leaves per plants, neck thickness, number of day taken to bulb formation, number of day taken to maturity. However, since this is based on experiment, further trials may be needed to substantiate the results in onion.

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