



ISSN (E): 2277- 7695

ISSN (P): 2349-8242

NAAS Rating: 5.03

TPI 2019; 8(8): 21-23

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www.thepharmajournal.com

Received: 11-06-2019

Accepted: 15-07-2019

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Effect of spacing and varieties on growth attributes of rabi onion (*Allium cepa* L.)

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Abstract

A field experiment was conducted during 2018-19 at Horticulture Research Farm-2, Department of Horticulture, SAS&T, BBAU, Lucknow, studies on the "Effect of spacing and varieties on growth attributes of rabi onion (*Allium cepa* L.). In trial different spacing (20×7.5 cm, 20×10 cm and 20×15cm) and three varieties Agrifound Light Red, NHRDF-2 and NHRDF-3 was taken for study the layout of experimental field was laid down in Factorial Randomized Block Design with three replications. It is clearly revealed that the plant height, number of leaves per plant, neck thickness was found maximum in Agrifound Light Red variety with the spacing of 20×10 cm.

Keywords: Onion, growth parameters, spacing and varieties

Introduction

Onion (*Allium cepa* L.) is most important bulbous vegetable crop. It belongs to family Alliaceae order Asparagales composed of 795 species in genera. Its chromosome number is $2n=16$. It is an important vegetable crop grown in India. India exports 12 per cent of total world export of onion. It is more than 75% of foreign exchange that comes from export of fresh vegetables. The onion plant has a fan of hollow, bluish-green leaves and its bulb at the base of the plant begins to swell, when a certain day-length is reached. The bulbs are composed of shortened, compressed, underground stems surrounded by fleshy modified scales (leaves) that envelope a central bud at the tip of the stem. It is originated from Central Asia. It is a biennial plant, but is usually grown as an annual and shallow rooted crop. It is basically long day plant for bulb production and grown during Rabi season. The leaves are yellowish to bluish green and grow alternately in a flattened, fan-shaped swathe. The important contents like allicin, allin and sulphites etc. are present in onion. These compounds are helps to fighting cancer, high blood cholesterol and sugar, liver problems and intestinal problems. It has diuretic and stimulant property. The antifungal property of onion is due to presence of catechol a phenolic compound. 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. It is used in processed form i.e. flakes powder is used for making pickles. (Bhagchandani *et al.*, 1980) [1]. Onion is a cool season crop and it grows well in climate with extremes of high or low temperatures. For good vegetative growth lower temperatures, (daily mean 13-21°C) and short photoperiod are required while for bulb development high temperatures (daily mean 15-25°C) and long photoperiod are required. Rabi onion varieties require day length of 10-11 hours while, Rabi onion varieties require day length of 12-13 hours. Cole *et al* (1996) [3] reported that highest commercial bulb yield was reported at higher planting density, while the highest proportion of large bulb and average bulb weight were examined at lower planting density.

Materials and Methods

The present investigation entitled "Effect of spacing and varieties on growth attributes of rabi onion (*Allium cepa* L.) was carried out in the Department of Horticulture, School of Agricultural Sciences and Technology during the year 2018-19. The analytical work was done in Department of Horticulture, School of Agricultural Sciences and Technology, Babasaheb Bhimrao Ambedkar University, Lucknow (Uttar Pradesh). The experiment was laid out in Randomized Block Design with factorial with three replications. Observations recorded to be

growth parameter were recorded periodically like plant height, number of leaves, neck thickness. Statistical analysis of data obtained in different set of experiments was calculated

following the standard procedure as stated by Panse and Sukhatme

Table 1: Effect of spacing and varieties on growth attributes of rabi onion (*Allium cepa* L.)

Treatment		Plant height (cm)				Number of leaves/plants				Neck thickness (cm)			
		30DAP	60DAP	90DAP	120DAP	30DAP	60DAP	90DAP	120DAP	30DAP	60DAP	90DAP	120DAP
Effect of varieties													
Agri found Light Red	V ₁	15.69	44.76	63.25	59.35	3.40	4.55	6.18	10.37	0.427	0.713	1.996	2.114
NHRDF-3	V ₂	16.61	41.07	63.04	50.82	3.36	4.41	5.95	10.12	0.327	0.506	1.839	2.058
NHRDF-2	V ₃	15.95	38.71	61.52	60.08	3.49	4.47	6.38	10.18	0.334	0.567	1.883	2.121
SE m±		0.082	0.489	0.086	0.085	0.020	0.033	0.117	0.260	0.012	0.032	0.025	0.036
CD (P=0.05)		0.247	1.478	0.261	0.257	0.059	0.101	0.355	0.786	0.038	0.097	0.077	0.106
Effect of spacing													
20×7.5	S ₁	16.88	43.45	60.68	53.06	3.42	4.44	5.97	9.66	0.348	0.574	1.912	2.046
20×10	S ₂	15.46	39.67	63.40	57.52	3.37	4.40	6.04	9.88	0.388	0.578	1.817	2.107
20×15	S ₃	15.91	41.42	63.74	59.66	3.45	4.45	6.50	11.13	0.352	0.633	1.989	2.141
SE m±		0.082	0.489	0.086	0.085	0.020	0.033	0.117	0.260	0.012	0.032	0.025	0.036
CD (P=0.05)		0.247	1.478	0.261	0.257	0.059	0.101	0.355	0.786	0.038	0.097	0.077	0.106
Interaction effect (V×S)													
V ₁ S ₁		19.28	48.43	59.30	54.56	3.28	4.53	5.71	8.66	0.347	0.673	1.990	2.107
V ₁ S ₂		13.55	42.59	67.14	64.72	3.33	4.46	6.16	10.73	0.513	0.613	1.953	2.080
V ₁ S ₃		14.23	43.27	63.32	58.78	3.58	4.66	6.66	11.73	0.420	0.853	2.043	2.157
V ₂ S ₁		15.81	41.88	64.45	48.41	3.45	4.38	5.93	9.55	0.330	0.470	1.713	1.920
V ₂ S ₂		15.36	35.64	62.51	49.41	3.30	4.45	5.58	9.33	0.317	0.503	1.853	2.110
V ₂ S ₃		18.65	45.69	62.17	54.64	3.28	4.41	6.33	11.50	0.333	0.543	1.950	2.143
V ₃ S ₁		15.55	40.04	58.30	56.23	3.50	4.41	6.28	10.78	0.367	0.580	2.033	2.110
V ₃ S ₂		17.46	40.78	60.56	58.42	3.48	4.43	6.38	9.57	0.333	0.617	1.643	2.130
V ₃ S ₃		14.84	35.32	65.72	65.58	3.40	4.56	6.50	10.18	0.303	0.503	1.973	2.123
SEm±		0.142	0.847	0.150	0.147	0.034	0.058	0.203	0.450	0.022	0.055	0.044	0.063
CD (P=0.05)		0.429	2.561	0.453	0.445	0.103	0.171	0.598	1.361	0.065	0.162	0.134	0.185

Results and Discussion

The growth parameter, were recorded periodically like plant height, number of leaves, neck thickness. The recorded data revealed that there was significant effect of plant spacing on growth parameter. The interaction data on combined effect should indicate that plant spacing was found significant effect on plant height, number of leaves neck thickness and width of leaves were recorded during the study.

The plant height in general recorded at 30 DAP in variety V₂ (NHRDF -2) but at 60 and 90 DAP it was recorded highest in variety V₁ ((Agri found Light Red) respectively and 120DAP it was recorded highest in variety V₃ (NHRDF-2). The minimum plant height was observed in V₁ (Agri found Light Red) at 30DAP but 60DAP and 90DAP is minimum plant height observed in V₃ (NHRDF-2) and 120DAP is minimum plant height observed in V₂ (NHRDF-3) during the growth period. Among the spacing maximum plant height recorded in S₁ (20x7.5 cm) at 30, 60DAP but 90DAP and 120DAP it is recorded highest plant spacing S₃ (20x15 cm). Among interaction maximum height reported V₁S₁ at 30, 60 DAP but at 90 DAP maximum in V₁S₂ at 120DAP maximum plant height in V₃S₃. This may be due to either genetically controlled and affected by environmental factor, fertility status of soil. These results are in conformity with finding of Mc-Geary (1985) [5].

In leaves character maximum number of leaves recorded V₃ (NHRDF-2) and at spacing maximum height recognised at S₃ (20x15 cm) at 30 and 90 DAP but at 60 and 120 DAP maximum in S₃ (20x15 cm). The interaction value indicates maximum number of leaves at V₁S₃, at 30, 60, 90 DAP respectively 120DAP recorded maximum number of leaves in V₃S₃. This result is in conformity with the findings of Das, *et al.* (1972) [4]; Mc-Geary (1985) [5]; Kumar *et al.* (1998) [8];

Singh, *et al.* (1999) [7] and Bijaya Devi *et al.* (2008) [2].

The data neck thickness stated that maximum thickness was recorded in varieties V₁ (Agri found Light Red) at 30, 60 and 90 DAP respectively but latter recorded maximum in V₃ (NHRDF-2) at 120 DAP. The spacing data indicate maximum diameter of stem found in S₂ (20x10 cm) at 30 DAP but latter maximum at S₃ (20x15 cm) at 60, 90 and 120 DAP respectively. The interaction among these indicate maximum at V₁S₂ at 30 DAP but at 30, 90 and 120 DAP maximum V₁S₃. The result is quite similar with finding of Mc-Geary (1985) [5].

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