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STUDY ON GROWTH, YIELD AND QUALITY OF ONION INFLUENCED BY NITROGEN AND ROW SPACING UNDER ARID CONDITION OF RAJASTHAN

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SUMMARY

The present investigation on the effect of nitrogen and row spacing on onion crop cv. N-53 was carried out under arid conditions at Rajasthan Agricultural University, Bikaner during rabi season of 2002-03 for standardization of nitrogen dose and row spacing for obtaining maximum yield and good quality produce, Statistically higher growth attributes, bulb yield and TSS content were observed at nitrogen application @ 150 kg ha^{-1} and row to row spacing 15 cm but bulb yield was higher at 10cm.

INTRODUCTION

Onion is a most versatile vegetable crop grown commercially throughout the country. Although the total area under this crop is quite high, the yield per unit area and quality are much lower in arid region because of several factors so farmers get lesser net returns. Increase yield and better quality of onion can be achieved by efficient use of nitrogenous fertilizers and standardizing the row spacing. Hence, the present investigation was undertaken to find out the effect of nitrogen and row spacing on growth, yield and quality of onion.

MATERIALS AND METHODS

The field experiment was undertaken at Research Farm, Rajasthan Agricultural University, Bikarner. The soil of experimental field was sandy loam with 8.20 pH, 0.09 percent organic carbon and 63.85 kg ha^{-1} available

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nitrogen. The experiment was comprised with 15 treatment combinations having five levels of nitrogen (0, 50, 100, 150 and 200 kg ha $^{-1}$) and three row to row spacing viz. 10, 15 and 20 cm. These were laid out under randomized block design and replicated thrice. The distance of plants with in row was 10 cm. The seedlings were transplanted as per treatment and plant protection measures and other cultural practices were followed as per need of the crop. Data on growth attributes, bulb yield and total soluble solids were recorded.

RESULTS AND DISCUSSION

Table shows that with increasing dose of nitrogen significantly increased the growth, yield and quality attributes. Nitrogen application upto 150 kg ha^{-1} significantly influenced the plant height (40.42 cm), length of leaves (27.41 cm) and fresh and dry weight of leaves (23.55 cm and 6.19 cm) could be due to better nutritional availability especially N in the root zone as well as in the plant system helps in formation of metabolically active compounds which were responsible for building up of new tissues results into more vegetative growth (Naidu et al., 2000). TSS content (10.62 ^{0}Brix) might be due to an application of nitrogen helps in photosynthetic activity of the plants leads to greater accumulation of food material for synthesis of more TSS content (Yadav, 2000). Bulb yield being a function priority of the cumulative effect of volume, diameter and weight of bulb, increased significantly by 228.20 q ha^{-1} (Yadav, 2002).

Table 1 : Response of nitrogen on growth, yield and quality of onion

Treatment	Plant height (cm)	Length of leaves (cm)	Fresh weight of leaves (g)	Dry weight of leaves (g)	TSS (OBrix)	Bulb yield (q ha-1)
Nitrogen levels (kg ha-1)						
0	31.06	18.16	15.32	4.08	10.35	161.65
50	34.81	21.00	19.02	5.14	10.46	207.67
100	37.66	24.50	21.27	5.74	10.52	216.96
150	40.42	27.41	23.55	6.19	10.62	228.20
200	40.59	28.20	24.58	6.34	10.63	231.08
CD at 5%	1.63	1.29	1.44	0.40	0.07	10.74
Row spacing (cm)						
10	35.73	21.79	18.22	4.68	10.44	220.46
15	35.40	24.44	21.74	5.79	10.55	212.30
20	37.60	25.33	22.27	6.03	10.56	194.59
CD at 5%	1.26	1.00	1.11	0.31	0.06	8.32

Table 1 shows that row spacing 15 cm significantly increase the plant height (37.40 cm), length of leaves (24.44 cm) and fresh and dry weight of leaves (21.74 g and 5.59 g) might be due to 15 cm row spacing facilitates lesser competition for space and availability of more light and nutrients to plants, leading to increase in growth attributes (Panda and Mohanty, 2001). TSS (10.55 ^{0}Brix) might be due to 15 cm row spacing increased the availability of nutrients, light and moisture to plant coupled with increased metabolic activity at the cellular level probably increased the nutrients especially nitrogen uptake and accumulation in plant parts this leads to more metabolic activities and greater translocation of nutrients to reproductive organs (bulb) of the crop (Kwon et al., 1995). Bulb yield (220.46 q ha^{-1}) was highest at 10 cm row spacing but good quality marketable yield was produced at 15 cm row spacing (212.30 q ha^{-1}) might be due to lesser competition for space and availability of more light and nutrients to plants resulting to large sized better quality bulbs (Sharma and Kaul, 2002).

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