



PERFORMANCE OF TOMATO VARIETIES UNDER FOOTHILLS CONDITION OF NAGALAND

VIDYA BHATI AND S. P. KANAUIA*

Department of Horticulture, SASRD, Nagaland University, Medziphema (Nagaland)-797 106, India

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ABSTRACT

Keywords:

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Experiment was conducted during 2012-2013 to evaluate the performance of tomato varieties under foothills condition of Nagaland. Nine varieties viz., TODVAR-1, TODVAR-2, TODVAR-3, TODVAR-4, TODVAR-5, TODVAR-6, TODVAR-7, TODVAR-8 and H -86 (C) were evaluated for their growth, yield and quality characters in the experiment. The experiment was laid out under randomized block design with three replications. Results revealed that all the varieties exhibited significant variation in their performance in term of growth, yield and quality characters. Among the varieties, TODVAR-8 was found superior variety and recorded maximum plant height (64.75 cm), number of branches/plant (14.22), number of leaves/plant (47.81), fruit length (4.24 cm), fruit diameter (5.28 cm), number of fruits/plant (34.01), fresh weight of fruit (37.00 g), yield ha (46.62 tones), ascorbic acid content (52.73 mg/100 g) and total soluble solids (5.13° Brix).

INTRODUCTION

Tomato (*Lycopersicon esculentum* Mill.) belonging to family *Solanaceae* is one of the most important vegetable, widely grown throughout the World for supplying in the fresh market as well as for processing. In India, it is grown in an area of 8.65 lakh hectares with annual production of 165.26 lakh tones (IHD, 2011). Tomato is a highly adaptive and warm season crop and can be grown successfully in the plains as well as in the hills. Ripe tomato fruits are consumed fresh as salads and cooked also. Tomato is utilized in the preparation of range of processed products such as puree, paste, powder, ketchup, sauce, soup and canned whole fruit. Tomato is rich source of minerals and vitamins. Lycopene that impart red colour to the ripe tomato is reported to possess anti-oxidant property. Nagaland, like other North-Eastern states is bestowed with the agro-climatic condition, which is very suitable for tomato cultivation. Lack of proper knowledge about the cultivars best suited to the agro-climatic condition, the potential of tomato is not fully exploited. Before recommendation of any cultivars suitable for the region, it is pertinent to evaluate cultivars giving emphasis on the aspect of genotypic suitability and yield. Varietal performance of tomato varies from place to place due to the varied climatic conditions. Considering all the above mentioned facts, a pertinent need was felt to undertake an experiment on varietal performance of different cultivars of

tomato under foothills of Nagaland so as to ascertain and recommend, the cultivars best suited for the agro-climatic condition of the foothills of Nagaland.

MATERIALS AND METHODS

A field experiment was conducted during 2012 - 2013 at the Experimental Farm of SASRD, Medziphema campus, Nagaland University, Nagaland. The field is located at the altitude of 304.8 m above mean sea level with geographical location at 20° 45' 43" N latitude and 93° 53' 04" E longitudes. The soil of the experimental site was sandy loam having soil pH 4.4, organic carbon 1.60 % and available N, P and K content of 305.76, 17.00 and 225.25 kg/ha, respectively. The experiment was laid out in a RBD with three replications. Plot size measured 1.8 × 1.8 m and spacing was maintained at 60 × 45 cm. Nine varieties viz., TODVAR-1, TODVAR-2, TODVAR-3, TODVAR-4, TODVAR-5, TODVAR-6, TODVAR-7, TODVAR-8 and H -86 (C) were evaluated in the experiment. Seeds were sown in nursery on 13th August, 2012. Thirty days old uniform and healthy seedling were transplanted in the main field. FYM @ 20 t/ha and NPK @ 120:60:60 kg/ha was applied in the experimental plots. Observations were recorded on plant height, number of branches/plant, number of leaves/plant, fruit length, fruit diameter, number of fruits/plant, fresh weight of fruit, yield/ha, ascorbic acid content and total soluble solids (TSS).

*Corresponding author email: sp.kanaujia@yahoo.co.in

Harvesting started about 80 days after transplanting (DAT) when they were fully red. Fruits were hand-picked carefully at different intervals. Ascorbic acid content of fruit was determined by using 2, 6-Dichlorophenol indophenols visual titration method as given by A.O.A.C. (1984) expressed in mg/100 g. Total soluble solids (TSS) of fruit was estimated from freshly harvested fruits with a hand refractometer and expressed in degree Brix. The statistical analysis was carried out as per procedure given by Panse and Sukhatme (1978).

RESULTS AND DISCUSSION

Growth parameters

Performance of any crop in respect of growth, yield and quality are highly influenced by various factors like genetic constitution of variety, micro-climate of the area and crop management. Improvement in growth characters is considered to be a pre-requisite to increase the yield. The results obtained from the present investigation on growth parameters exhibited significant difference by the varieties (Table-1). Among the varieties, TODVAR-8 recorded maximum plant height (64.75 cm), number of branches/plant (14.22) and number of leaves/plant (47.81). The minimum plant height (50.08 cm), number of branches/plant (9.00) and number of leaves/plant (32.05) were recorded in variety H-86 (C). The wide variation in growth parameters of all the varieties might be due to their genetic makeup, which indirectly govern the morphology of the plant that have direct impact on formation of floral buds. Since all the varieties were grown under the same climatic condition. These results are in conformity with the finding of Swaroop and Suryanarayana (2005) and Ahmed *et al.* (2007).

Yield parameters

It is evident from the table-1 that there is significant difference in yield attributing characters among various varieties. All the varieties showed significant effect on fruit length and fruit diameter of tomato. Variety TODVAR-8 recorded maximum fruit length (4.24 cm) followed by 3.72 cm in variety TODVAR-4. Variety H-86(C) recorded minimum fruit length of 2.96 cm. The highest fruit diameter (5.28 cm) was recorded in variety TODVAR-8 followed by 4.80 cm in variety TODVAR-4. The lowest diameter (4.07 cm) was recorded in variety H-86 (C). Higher vegetative growth specially more number of branches and leaves might have helped in synthesis of greater amount of food material which were letter translocated into developing fruits resulting in increased fruit length and fruit diameter. Varieties were also differed significantly for number of fruit/plant. Variety TODVAR-8 recorded maximum number of fruit (34.01) followed by (30.67) in variety TODVAR-4. The minimum numbers of fruits/plant (16.58) were recorded by variety TODVAR-6. Fresh weight of fruit also varied significantly

among different varieties. The maximum fresh weight of fruit (37.00 g) was recorded in variety TODVAR-8 while variety H-86 (C) recorded minimum fresh weight of fruit (16.29 g). The higher numbers of fruits/plant might be due to better plant growth. It was revealed that yield per hectare profoundly affected by the varieties. Maximum yield ha (46.62 tones) was recorded in variety TODVAR-8 followed by variety TODVAR-1 which recorded 33.14 tones yield ha. Variety TODVAR was found significantly superior yield over other treatments. The minimum yield ha (12.41 tones) was recorded by variety H-86 (C). The higher yield might be due to corresponding response to increased yield attributing characters attained previously under this variety. These results are in conformity with the finding of Swaroop and Suryanarayana (2005) and Ahmed *et al.* (2007).

Quality parameters

Quality of tomato is usually evaluated by vitamin C and total soluble solids content of fruits. Data from table-1 revealed that all the varieties showed significant difference for vitamin-C and total soluble solids content of fruits. Highest values of vitamin C content (52.73 mg/100 g) was obtained in variety TODVAR-8 followed by 42.91 mg/100 g in variety TODVAR-2. The minimum content of vitamin-C (33.84 mg/100 g) was recorded in variety H-86 (C). Variety TODVAR-8 gave highest total soluble solids (5.13⁰ Brix) closely followed by 5.01⁰ Brix in variety TODVAR-2. The minimum total soluble solids (3.97⁰ Brix) recorded in variety H-86 (C). The difference among the varieties in regard to vitamin C and total soluble solids content of fruits might be due to the genetic constitution of the varieties. These results are in conformity with the finding of Swaroop and Suryanarayana (2005) and Ahmed *et al.* (2007).

CONCLUSION

It can be concluded from the experiment that among the varieties, TODVAR-8 was found superior variety in term of growth, yield and quality. Therefore, the variety TODVAR-8 is recommended for commercial cultivation of tomato under foothills condition of Nagaland.

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Table 1 Performance of tomato varieties for growth, yield and quality characters

Treatment	Plant height (cm)	No. of branches/plant	No. of leaves/plant	Fruit length (cm)	Fruit diameter (cm)	No. of fruit/plant	Fresh weight of fruit (g)	Yield tones/ha	Vitamin C (mg 100/ g)	TSS (^o Brix)
TODVAR-1	50.18	9.08	37.25	3.30	4.15	26.72	33.48	33.14	34.24	4.42
TODVAR-2	54.40	13.23	32.41	3.22	4.52	17.05	30.04	18.97	42.91	5.01
TODVAR-3	51.09	10.26	33.73	3.11	4.26	17.28	24.64	15.76	40.10	4.92
TODVAR-4	61.26	12.56	35.13	3.72	4.80	30.67	23.22	26.38	35.55	4.90
TODVAR-5	51.45	11.61	38.37	3.10	4.61	20.63	23.46	17.93	38.21	4.53
TODVAR-6	56.16	12.03	38.69	3.05	4.52	16.58	36.15	22.21	37.11	4.83
TODVAR-7	50.07	10.88	34.59	3.09	4.65	26.18	18.69	18.12	36.22	4.60
TODVAR-8	64.75	14.22	47.81	4.24	5.28	34.01	37.00	46.62	52.73	5.13
H- 86 (C)	50.08	9.00	32.05	2.96	4.07	20.57	16.29	12.41	33.84	3.97
SE(m)±	2.01	0.68	2.19	0.32	0.26	2.71	2.40	29.33	3.18	0.27
CD (P=0.05)	6.24	2.13	6.74	1.02	0.88	8.65	7.32	90.80	9.64	0.88

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