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Original Research Article

Impact of Spray of Micronurients on the Growth and Yield of Tomato cv. Pant Rituraj

Uma Kant Singh, Ashwini Choudhary*, Neeru Kumari and Manoj Kumar

RRS and MBAC, Agwanpur, Saharsa, BAU, Sabour, Bhagalpur, India
**Corresponding author*

A B S T R A C T

A field experiment was carried out to study the impact of spray of micronutrients viz. B, Cu, Fe, Mn, Mo, Zn on the growth and yield of tomato cv. Pant Rituraj in the farm, RRS, Agwanpur, Saharsa during the Rabi season of 2019- 2020. In this experiment it was observed that the micronutrients spray increased the plant height, number of branches per plant and number of leaves per plant. There was also increase in the fruit yield, NAR, RGR and CGR of tomato plant over control. It was also observed that the combined application of all the micronutrients viz. B, Cu, Fe, Mn, Mo and Zn produced the highest yield of 273.62q/ha which was 53.6% more than the control. The increase in the yield of tomato was observed on account of increased number of fruiting bunch per plant and total number of fruits per plant.

Keywords

Micronutrients, Growth, Control, Fruits, Yield

Introduction

In India tomato (*Lycopersicon esculentum*) has a wider coverage in comparison to other vegetables. It is one of the most popular and important vegetable crops. Tomatoes and tomato products are the major dietary source of the antioxidant lycopene, which has been linked to many health benefits, including reduced risk of heart disease and cancer. They are also a great source of vitamin C, potassium, folate, and vitamin K. Taking into consideration these aspects it is necessary to increase the yield of tomato. Micronutrients improve the chemical composition and general condition of vegetable crops. They act as catalyst in promoting plant metabolic processes involving cell wall development, respiration, photosynthesis, hormone synthesis and nitrogen fixation. Hence, the present study was conducted to find out the impact of micronutrient spray on the growth and yield of tomato (cv Pant Rituraj).

Materials and Methods

An experiment was conducted during Rabi 2019- 2020 at RRS farm, Agwanpur, Saharsa, Bihar to study the Impact of micronutrients spray viz. B, Cu, Fe, Mn, Mo, Zn on the growth and yield of tomato cv. Pant Rituraj. The field experiment was conducted on a total number of eight treatments including

control and three replications. In the Randomized Block Design the tomato plants were grown at a spacing of 60cm x 75cm. The dose of N:P:K was 120:80:100 Kg/ ha. Micronutrients treatments were done at 25th and 30th days after transplanting. Data on the growth, growth analysis parameters, yield and yield attributes were recorded and thereafter their statistical analysis was done.

Results and Discussion

The study revealed that the application of various micronutrients had a significant impact on the growth and growth analysis parameters viz. Plant height, number of branches per plant, leaves per plant, RGR, NAR, LAR and CGR as shown in Table 1.

Amongst all the treatments i.e. T_0 – T_7maximum plant height (62.29) was observed in the tomato plants treated with Fe 125 ppm (T_5), followed by T_4(Cu 125ppm) andT_7(combination of all the micronutrients).

The greater number of branches (7.47) was observed in plants treated with 125ppm Cu (T_4) followed by T_5 (Fe 125 ppm) and T_7 (combination of all micronutrients). The maximum number of compound leaves per plant (14.35) was observed in T_5 (Fe 125 ppm) followed by T_1 (B 125 ppm) and T_3 (Mo 75 ppm). These are undoubtedly more than control.

Form the table it can also be inferred that spray of individual micronutrients and their combination showed higher values of RGR, NAR, LAR and CGR over control. The maximum RGR was observed in treatment T_5 (Fe 125 ppm) followed by T_7 (combination of all micronutrients) and T_6 (Mn 125 ppm). Highest NAR (32.55) was observed in T_7 (combination of all micronutrients) followed by T_6 (Mn 125 ppm) and T_2 (Zn 125 ppm). The highest CGR was observed in treatment T_5 (Fe 125 ppm) followed by T_7 (combination of all micronutrients) and T_6 (Mn 125 ppm). The highest LAR was observed in control (T_0) due to low accumulation of dry matter.

The yield attributing characters of tomato are number of fruiting bunch/plant, number of fruits/bunch, number of fruits/plant and the fruit size. The application of various micronutrients alone or in combination significantly influenced the yield per plant, yield per plot and other yield attributes (Table 2). The highest number of fruiting bunch per plant (6.59) was observed in the treatment T_3 (Mo 75ppm) followed by T_6 and T_7.

The highest number of fruits per bunch (5.82) was observed in the treatment T_5 (Fe 125 ppm) followed by T_7 and T_6. The maximum number of fruits per plant (36.07) was observed in T_7 (combined application of micronutrients) followed by T_5 (Fe 125 ppm) and T_6 (Mn 125 ppm). Yield per plant, yield per plot and consequently the yield per hectare was the highest in T_7 (combined application of micronutrients) followed by T_5 (Fe 125 ppm) and T_3 (Mo 75 ppm). It was also observed that the micronutrients spray did not influence the shape index of fruits (ratio of length and breadth) significantly. The reason might be because the shape index of fruits is controlled by genotype.

Hence from the observations of this experiment it can be inferred that the micronutrients have a positive impact on the physiological and biochemical processes of tomato plant and hence augments the growth and yield.

They act as a catalyst in plant metabolism, protein synthesis, chloroplast development, synthesis and maintenance of nucleic acids which leads to better fruit retention in tomato. Micronutrients also help in better fruit set and their development.

Table.1 Impact of micronutrients spray on the growth and growth analysis parameters of tomato plant

Treatments	Plant height (cm)	Number of branches/plant	Compound leaves/plant	Growth analysis between 55-60 DAT			
				RGR (mg/g/day)	NAR (mg/dm^2/day)	LAR (cm^2/g)	CGR (g/m^2/day)
T_0- control	49.17	5.88	10.01	22.45	12.62	176.32	0.75
T_1-B (125ppm)	54.15	6.18	13.67	28.84	18.51	158.61	0.93
T_2-Zn (125ppm)	52.49	6.65	10.34	37.49	31.47	121.09	0.97
T_3-Mo (75ppm)	54.27	6.41	13.65	34.61	26.28	133.12	1.09
T_4-Cu(125ppm)	57.30	7.47	13.22	27.64	20.25	139.13	0.88
T_5-Fe (125ppm)	62.29	7.12	14.35	44.11	29.41	152.71	1.82
T_6-Mn(125ppm)	54.59	6.54	10.62	39.15	31.62	124.25	1.36
T_7-Combination of all	55.97	7.08	13.07	39.88	32.55	123.05	1.71
SEm+	2.177	0.397	0.998	2.437	1.985	6.306	0.061
C.D.(at 5%)	6.602	1.203	3.025	7.391	6.029	19.369	0.183

**RGR= Relative Growth Rate, NAR= Net Assimilation Rate, LAR= Leaf Area Ratio, CGR= Crop Growth Rate

Table.2 Impact of micronutrients spray on the yield and yield attributes of tomato plant

Treatments	Number of fruiting bunch/plant	Number of fruits/bunch	Number of fruits/plant	Shape index	Yield/plant (Kg)	Yield/plot (Kg)	Yield/ha (q)
T_0- control	5.37	3.62	19.47	1.235	0.66	12.81	177.77
T_1-B (125ppm)	5.98	4.34	25.95	1.269	0.75	14.64	203.49
T_2-Zn (125ppm)	5.42	4.57	24.64	1.204	0.77	15.22	211.32
T_3-Mo (75ppm)	6.59	4.62	30.52	1.171	0.90	18.19	252.72
T_4-Cu(125ppm)	5.94	3.95	23.38	1.174	0.65	12.77	177.55
T_5-Fe (125ppm)	6.07	5.82	35.27	1.185	0.97	19.52	271.27
T_6-Mn(125ppm)	6.43	5.15	32.91	1.164	0.92	18.12	251.37
T_7-Combination of all	6.32	5.71	36.07	1.201	0.98	19.71	273.62
SEm+	0.286	0.231	1.692	0.035	0.029	0.542	7.507
C.D.(at 5%)	0.868	0.701	5.123	NS	0.087	1.638	22.769

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