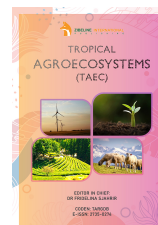


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RESEARCH ARTICLE

EFFECT OF PLANTING TIME AND VARIETY ON THE GROWTH AND YIELD OF TOMATO

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ABSTRACT

The experiment was conducted at the RARS, Jamalpur during rabi 2019-2020 to find out the suitable planting time and increase production and economic return. Tomato variety viz. V1 = BARI Tomato-14, V2 = Udyan were considered as factor A and five sowing dates viz. S1 = 25 August, S2 = 15 September, S3 = 05 October, S4 = 25 October, S5 = 15 November considered as factor B. The experiment was laid out in RCBD (Factorial) with three replications. The yield of tomato was significantly affected by different sowing dates and tomato varieties. Udyan and BARI Tomato-14 with 25 October combination and 05 October combination were suitable combinations for maximum yield of tomato. These combinations may be profitable in case of early growing, proper market price, seeds were available for planting, less infestation of virus and bacterial wilt.

KEYWORDS

Planting time, variety, growth yield and tomato.

1. INTRODUCTION

Tomato (*Lycopersicon esculentum* Mill.) is one of the most popular vegetables in Bangladesh, which is receiving increased of the growers and consumers and made its position within few of the highest cultivated vegetables. It is an essential component of human diet for the supply of vitamins, minerals and certain hormone precursors in addition to protein and energy (Boamah et al., 2010; Kallo, 1993). In Bangladesh, congenial atmosphere remains for tomato production during October to March. It is mainly grown in winter season. High temperature decreases flower production and /or to bud and flower drop (Anonymous, 2007). However, differences between varieties in fruit set under high temperature have been reported (FAO, 1990). Went assumed that fruit set was abundant only when night temperature was between 15°C and 20°C, which might oversimplify the issue (Went, 1984).

The importance of temperature in fruit set was clearly evident. Curme reported that fruit set in certain varieties with temperature as low (7.2°C) and with temperature as high (26.6°C) had created more flexible situation in respect of the variety temperature interactions (Curme, 1992; Schaible, 1990). Climate change is a major threat for crop production not only Bangladesh but also all over the world. In some areas of the country the night temperature falls even sometimes go below 5-6°C which results tremendous yield loss in tomato (Haque et al., 1999). By this time BARI and some seed company released a good number of tomato variety but their characteristics against tolerance to cold temperature injury has yet not been studied. Therefore, the present study was undertaken to find out the suitable planting time and variety on the growth and yield of tomato (Hossain et al., 1886; Mahmoud, 2005).

2. MATERIALS AND METHODS

The experiment was conducted at the research field of RARS, Jamalpur 24°56' north latitudes and 89°55' east longitudes. The site was of medium high land belonging to the agro-ecological zone Old Brahmaputra Floodplain under Agro-Ecological Zone 9. Annual average rainfall is 1549.45mm (Regional Research Report 2019-2020; Mohammed, 1995). Tomato variety viz. V1 = BARI Tomato-14, V2 = Udyan were considered as factor A and five sowing dates viz. S1 = 25 August, S2 = 15 September, S3 = 05 October, S4 = 25 October, S5 = 15 November considered as factor B. The experiment was laid out in RCBD (Factorial) with three replications (Omara, 1955). The unit plot size was 3m × 2m with the spacing of 60 cm × 40cm. Spacing between two plots and replications were 1m and 1m respectively.

Fertilizers were applied at the rate of 120-454-55-20-1.5-1 kg ha⁻¹ NPKSZnB as urea, triple super phosphate (TSP), muriate of potash (MOP), gypsum, Boron. All of P, S, Zn and B should be applied as basal during land preparation (Peyvast, 2001). N and K should be applied in two equal splits at 15 and 35 DAT as ring method under moist condition. Seedlings were transplanted on August 27, 2019 (1st transplant), September 22, 2019 (2nd transplant), October 06, 2019 (3rd transplant), October 28, 2019 (4th transplant) and November 17, 2019 (5th transplant) in rows. Weeding was done when necessary. Tomatoes were harvested from January 05, 2020 to March 03, 2020. Grain yield was calculated from the whole plot. Yield contributing characters were taken from 05 randomly selected plants from the middle rows of each plot (Sam and Iglesias, 1994). Data were analyzed with the help of a computer package program R and means were separated following LSD test at 5% level of significance.

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3. RESULTS AND DISCUSSION

3.1 Effect of tomato variety

Plant height were recorded at harvest are furnished in table 1. Highest (125cm) was registered under BARI Tomato-14 while Udyan was lowest (99.2 cm) at harvest may be cause of genetical character. The data regarding number of fruit per plant are furnished in table 1, significantly highest (82) from Udyan and lowest (50) from BARI Tomato-14. A perusal of data revealed that the two treatments showed their significant influence on weight of fruit per plant (Singh and Tripanthy, 1995). Significantly highest weight of fruit per plant (4243 gm) was recorded under Udyan while BARI Tomato-14 was lowest (2369 gm). The data regarding weight of single fruit weight were recorded at harvest are arranged in table 1. Significantly highest single fruit weight (99.76 gm) was recorded under BARI Tomato-14 while Udyan was lowest (62.93 gm) (Taha et al., 1984). An appraisal of data table 1 indicated that two varieties exerted their significant consequence on yield. Significantly highest yield (13.9 t/ha) was registered under variety Udyan while BARI Tomato-14 was recorded the lowest (10.4 t/ha).

3.2 Effect of sowing date

The data regarding number of fruit per plant are furnished in table 2, significantly highest (91) from 25 October sowing and lowest (20) from 25 August sowing because of heavy rainfall. A perusal of data revealed that the five sowing time showed their significant influence on weight of fruit per plant. Significantly highest weight of fruit per plant (5558 gm) was recorded under 25 October sowing while 25 August sowing was lowest (1211gm) less number of fruit per plant. A perusal of data revealed that different sowing dates showed their significant influence on percent (%) of virus infestation and bacterial wilt because of climatic condition such as rainfall, decreased and increased temperature of crop growing period. An appraisal of data table 2 indicated that different sowing time exerted their significant consequence on yield. Significantly highest yield (17.39 t/ha) was registered under 25 October sowing while 25 August sowing was recorded the lowest (2.1 t/ha).

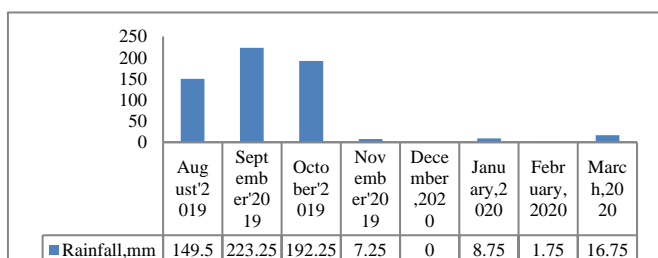


Figure 1: Monthly rainfall in crop growing period

3.3 Combined effect of sowing date and tomato genotypes

The data regarding number of fruit per plant are furnished in table 3, significantly highest (120) from Udyan × 25 October combination and lowest (14) from Udyan × 25 August combinations. A perusal of data revealed that different combinations showed their significant influence on weight of fruit per plant. Significantly highest weight of fruit per plant (6727 gm) was recorded under Udyan × 25 October combination while Udyan × 25 August combination was lowest (576gm). An appraisal of data table 3 indicated that different combinations exerted their significant consequence on yield. Significantly highest yield (19.88 t/ha) was registered under Udyan × 25 October combination and it was found statistically at par Udyan × 05 October combination (17.92 t/ha) while Udyan × 25 August was recorded the lowest (0.71t/ha).

Table 1: Effect of variety on the yield and yield contributing characters of tomato					
Variety	Plant height (cm)	Number of fruit/plant	Weight of fruit/plant (gm)	Single fruit weight (gm)	Yield (t/ha)
BARI Tomato-14	112.6	50	2369	99.76	10.4
Udyan	99.2	82	4243	62.93	13.9
LSD _{0.05}	6.94	23.5	20.28	6.44	1.54
CV (%)	8.54	11.92	1026	10.33	16.51

Table 2: Effect of sowing date on the yield and yield contributing characters of tomato					
Sowing time	Number of fruit/plant	Weight of fruit/plant (gm)	Virus infested (%)	Bacterial wilt (%)	Yield (t/ha)
25 August	20	1211	65	21	2.10
15 September	87	5295	42	20	14.28
05 October	85	5487	41	7	15.55
25 October	91	5558	37	2	17.39
15 November	48	3306	47	1	11.39
LSD _{0.05}	18.84	1026.1	12.3	8.38	2.43
CV (%)	23.45	20.3	21.73	68.2	16.51

Table 3: Combined effect of variety and sowing date on the yield and yield contributing characters of tomato			
Treatment	No. of fruit/plant	Weight of fruit/plant (gm)	Yield (t/ha)
BARI Tomato-14×25 August	26	1846	3.44
BARI Tomato-14×15 September	63	4920	13.39
BARI Tomato-14×05 October	68	5722	13.17
BARI Tomato-14×25 October	63	4390	14.89
BARI Tomato-14×15 November	32	2369	7.08
Udyan × 25 August	14	576	0.71
Udyan × 15 September	111	5671	15.18
Udyan × 05 October	101	5251	17.92
Udyan × 25 October	120	6727	19.88
Udyan × 15 November	64	4243	15.70
LSD _{0.05}	26.65	1451	3.44
CV (%)	23.46	20.28	16.51

4. CONCLUSION

From the study was observed that the yield of tomato was significantly affected by different sowing dates and tomato varieties. Udyan and BARI Tomato-14 with 25 October combination and 05 October combination were suitable combinations for maximum yield of tomato. These combinations may be profitable in case of early growing, proper market price, seeds were available for planting, less infestation of virus and bacterial wilt.

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