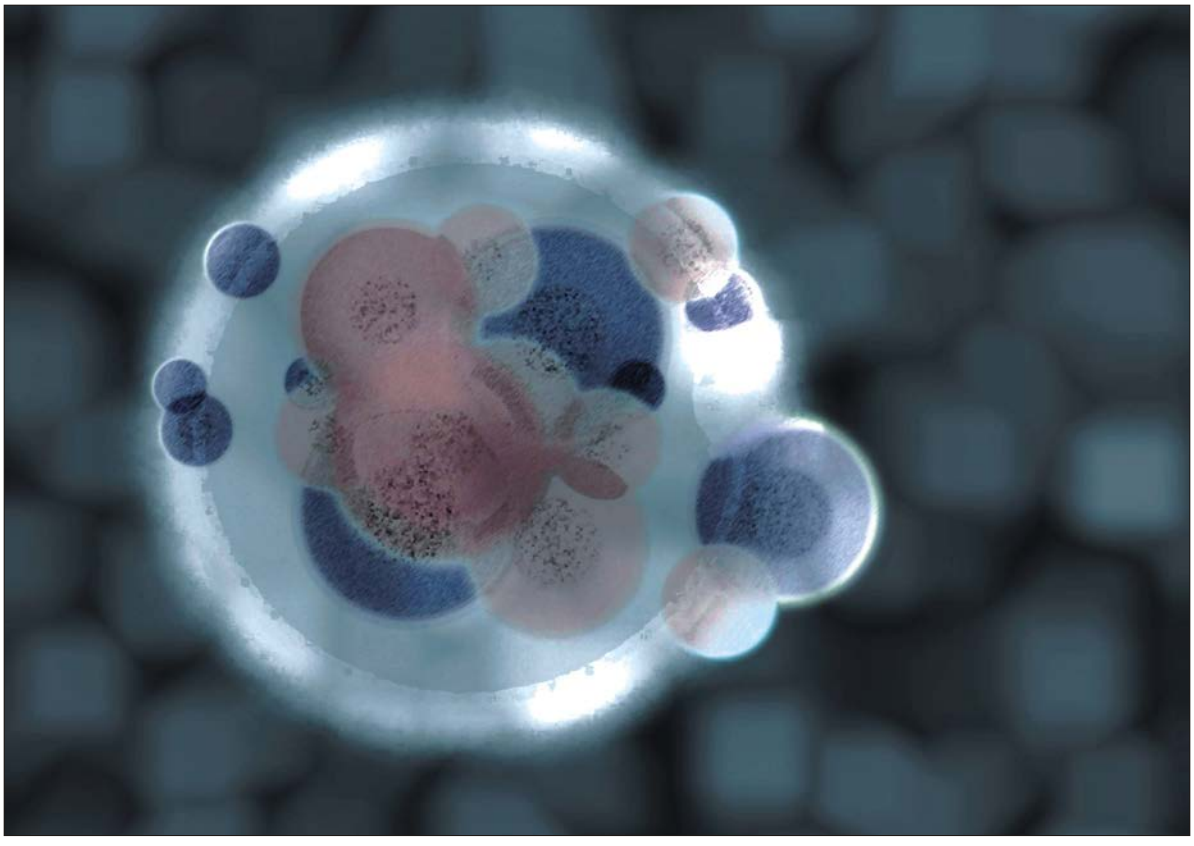

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Influence of Planting Time on the Extension of Picking Period of Four Tomato Varieties

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Abstract: An experiment was conducted to study, the effect of different planting date and variety on the extension of picking period of tomato at the Horticulture Farm, BAU, Mymensingh during 2000-2001. Yield and yield contributing characters were best in October 25 planting . The highest yield of tomato (86.40 t ha^{-1}) was obtained from October 25 planting, compared to the lowest (16.8 t ha^{-1}) from February 24 planting. The variety BARI Tomato 7 produced the highest yield (57.02 t ha^{-1}) and BARI Tomato 5 produced the lowest yield (51.38 t ha^{-1}). All the parameters showed decreasing response with delay in planting.

Key words: Influence, planting time, picking period, tomato varieties, yield

INTRODUCTION

Tomato (*Lycopersicon esculentum* Mill.) is one of the most popular and important vegetables in Bangladesh, It is cultivated in all parts of the country[1]. In Bangladesh, tomato is grown during the winter season. It is one of the vegetables of Bangladesh, which is receiving much attention of the growers and consumers. However, the yield of tomato in Bangladesh is not satisfactory enough in comparison with other tomato growing countries[2]. The average yield of tomato was 6.91 t ha^{-1}[3]. In Bangladesh, production of tomato in the late and early growing season is difficult due to the prevailing high temperature. High temperature condition before and after the short winter season inhibits fruit setting and its development. Recently BARI has developed some heat tolerant varieties which can be grown both in the winter and summer seasons. So, there prevails a scope of extending the picking period of tomato both in early and late season by selecting proper variety and proper date of planting. Considering the above situation, the present experiment was designed to extend the picking period of tomato in order to satisfy the consumers' need making the vegetable available for a longer period of the year.

MATERIALS AND METHODS

The present experiment was conducted at the Horticulture Farm of Bangladesh Agricultural University, Mymensingh during the period from 2000-2001. The seeds of four tomato varieties were used as planting materials. The varieties used were BARI Tomato-4, BARI Tomato-5, BARI Tomato-7 and BARI Tomato-8. The variety BARI Tomato-7 is indeterminate type and the rest 3 varieties are semi-indeterminate. The seeds were collected from the Horticulture Research Centre, Bangladesh Agricultural Research Institute (BARI), Joydebpur, Gazipur. Seedlings were raised in four 60x40 cm wooden box/trays. The trays were filled with loose friable and dried medium prepared by mixing equal amount of sand, soil and well rotten cowdung. For the later two plantings, seedlings were raised in four 3x1 m size seedbeds. Four grams of seeds were sown in each seedbed. The seeds were sown in the seedbeds (including trays) at three different dates, namely, 15 September, 15 November 2000 and 15 January 2001 for the 1st, 2nd and 3rd plantings, respectively. The seedlings were 40 days old in each date of transplanting. Three dates of transplanting were I) 25 October (T_1), ii) 25 December (T_2) and iii) 24 February (T_3) and four varieties of Tomato were I) BARI Tomato-8 (V_1), ii) BARI Tomato-7 (V_2), iii) BARI Tomato-4 (V_3) and iv) BARI Tomato-5 (V_4).

The experiment was laid out in the Randomized Complete Block Design with three replications. The experimental plot was divided into 36 unit plots, each of 2.4x1.2 m size, with a 60 cm spacing between the replications and 30 cm between the unit plots. Twelve pits were made in each plot in two rows maintaining a recommended spacing of 60x40 cm[4]. Manure and fertilizers were applied in the experimental field as per accordance with the recommendation of BARI[5]. Healthy and uniform sized 40 days old seedlings of all varieties were transplanted in the experimental plot as per treatment and design in the afternoon of 1-5 October, 25 December

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2000 and 24 February, 2001 for the first, second and third plantings, respectively. After transplanting of the seedlings, following intercultural operations were accomplished for better growth and development of the plants I) Gap filling, ii) Weeding and Mulching, iii) Staking and pruning, iv) Irrigation and v) Plant protection

Fruits were harvested at an interval of 5 days at the early ripe stage when they attained slightly red colour. The harvesting periods were from 221 January to 7 March 2001 for the 1st planting; 16 March to 20 April for the 2nd planting; and 30 April to 25 May for the 3rd planting. Ten plants were selected randomly from each plot for data collection. Data were recorded on Plant height, Foliage coverage, Days to first flowering, Number of flower clusters per plant, Number of flowers per cluster, Number of fruit cluster per plant, Number of fruits per cluster, Number of fruits per plant, Days to first harvesting, Days to last harvesting, Fruit picking period, Weight of individual fruit, Length of fruit, Diameter of fruit, Length-diameter ratio of fruit, Weight of fruits per plant and Yield of fruit per plot. The data in respect of yield and yield contributing characters were statistically analyzed to find out the statistical significance to the experimental results. The means for all treatments were calculated and analysis of variances for all the characters were performed by F-test. The significance of difference among the means was evaluated by Duncan's Multiple Range Test for interpretation of the results[6].

RESULTS AND DISCUSSION

Results of planting date on the yield components of tomato showed significant variation on all components of yield. The seedling transplanted on October 25 required the maximum time of flowering (41.14 days), seedlings transplanted on February 24 were the earliest in flowering (13.93 days). Days to first flowering were decreased with delay in planting due to the effect of temperature (Table 1) . The present result is in support of Hossain *et al.*[7]. October 25 planting produced maximum number of flower clusters per plant (14.53). This followed by December 25 and February 24 planting. October 25 planting gave the maximum number of flowers per cluster (4.92). this was chronologically followed by December 25 and February 24 planting. Earlier planting produced maximum number of flowers per cluster and this might have happened due to the influence of favourable temperature for flowering in case of early planting. The number flowers per cluster decreased gradually as the temperature increased later. October 25 planting produced the highest number of flowers per plant (71.44) followed by December 25 and February 24 planting. Early planting produced highest number of flowers per plant, it was probably due to the prevailing favourable temperature for flower initiation. The number of flowers per plant decreased gradually as the temperature increased in subsequent plantings. This result is almost similar to the findings of Hoque and Rahman[8]. October 25 planting produced maximum number (8.45) of fruit clusters per plant, which was followed by other plantings. The maximum number of fruit clusters per plant in the earlier planting occurred possibly due to the response of prevailing temperature. December 25 planting produced maximum fruits per cluster (3.92), which was statistically similar to October 25 planting. Generally, earlier planting should have produced maximum number of fruits per cluster, but it did not occur possibly due to the variable response of summer and winter varieties to different planting dates. October 25 planting produced the maximum number of fruits per plant (32.37), while the minimum (9.52) was produced by February 24 planting. The number of fruits per plant decreased gradually with delay in planting. The trend of result partially agreed with the findings of other researchers[8-10]. Results of Table 1 show that days required to first harvesting of the fruit was shortest (71.67 days) in February 24 planting, while October 25 planting took the longest time (94.25 days). Days to first trend of result were achieved due to a longer vegetative stage in case of early planting, The present result agrees with the report of BARI[11].

All components of yield were significantly influenced by the date of planting (Table 2). The days to last harvesting was found maximum (130.8 days) in October 25 planting, which was statistically different from other plantings. It was minimum (87.50 days) in February 24 planting. The days to last harvesting decreased gradually with delay in planting. October 25 planting produced the tallest plant (110.2-33 cm), which was statistically similar to December 25 (105.21 cm). Earlier planting produced taller plants than delayed planting. The present results are in agreement with the reports of Hoque and Rahman[8]. The longest picking period (35.83 days) was found in December 25 planting, while the shortest time (15.83 days) was found in February 24 planting. It was also observed that the crop duration as well as picking period decreased gradually with delay in planting. The individual fruit weight (79.21 g) obtained from October 25 planting was significantly higher than those of the remaining planting dates (December 25 and February 24 planting). The lower fruit weight (57.77 g) was found in February 24 planting (Table 2). Similar results were also reported by Hossain *et al.*[7] and BARI[11]. The length (5.52 cm) was

Table 1: Effect of date of planting on the yield components of tomato

Dates of planting	Days to 1st flowering	No. of flower clusters/plant	No. of flowers/ cluster	No. of flowers/ plant	No. of fruit clusters/plant	No. of fruits/cluster	Number of fruits/plant	Days to 1st harvest*
October 25	41.14a	14.53a	4.92a	71.44a	8.45a	3.88a	32.37a	94.25a
December 25	35.57b	12.13b	4.88a	58.40b	6.58b	3.92a	25.82b	85.75b
Febmary 24	13.93c	9.33c	3.22b	30.36	3.80c	2.28b	9.52c	71.67c

Table 2: Effect of date of planting on the yield components and yield of tomato

Dates of planting	Days to last harvest*	Plant height at last harvest (cm)	Fruit picking period (days)	Weight of individual fruit (g)	Length of fruit (cm)	Diameter of fmit (cm)	Weight of fruit/plant (kg)
October 25	130.08a	110.23a	35.83a	79.21a	5.52a	5.69a	2.04a
December 25	113.25b	105.21a	27.50b	66.49b	5.25a	5.37a	1.38b
Febmary 24	87.50c	78.47b	15.83c	57.77c	4.64b	4.60b	0.37c

Table 3: Effect of variety on the yield components of tomato

Varieties	Days to 1st flowering	No. of flower clusters/plant	No. of flowers/ cluster	No. of flowers/ plant	No. of fruit clusters/plant	No. of fruits/cluster	Number of fruits/plant	Days to 1st harvest*
BARI Tomato 8	31.38a	10.54b	3.93b	43.47b	5.30b	2.81b	15.76b	89.44a
BARI Tomato 7	32.59a	11.10b	3.47c	38.21c	5.34b	2.56b	15.31b	87.22b
BARI Tomato 4	28.72b	12.68a	5.09a	64.86a	7.12a	3.94a	28.77a	80.57c
BARI Tomato 5	28.16b	13.64a	4.88a	67.67a	7.36a	4.04a	30.43a	78.33d

Table 4: Effect of variety on the yield components and yield of tomato

Varieties	Days to last harvest	Plant height at last harvest (cm)	Fruit picking period (days)	Weight of individual fruit (g)	Length of fruit (cm)	Diameter of fmit (cm)	Weight of fruit/plant (kg)
BARI Tomato 8	111.67a	91.37b	22.22b	85.32b	5.97a	5.77b	1.23b
BARI Tomato 7	111.11a	113.40a	23.89b	98.95a	5.12b	6.50a	1.38a
BARI Tomato 4	109.44a	94.23b	28.89a	45.94c	4.71b	4.35c	1.23b
BARI Tomato 5	108.89a	92.88b	30.56a	41.09d	4.72b	4.27c	1.21b

Means bearing the common letter(s) in a column do not differ significantly at 5% level *From the date of transplanting

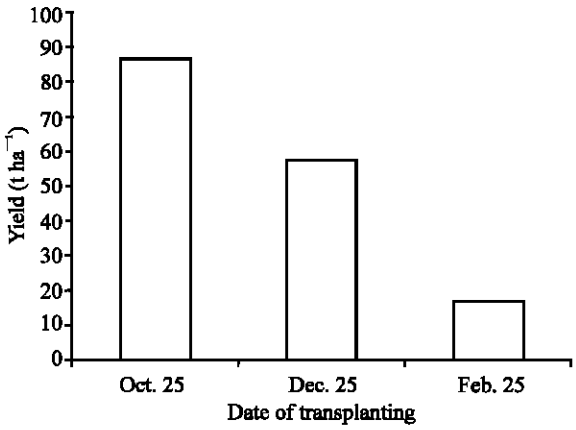

Fig. 1: Effect of planting time on the yield of tomato

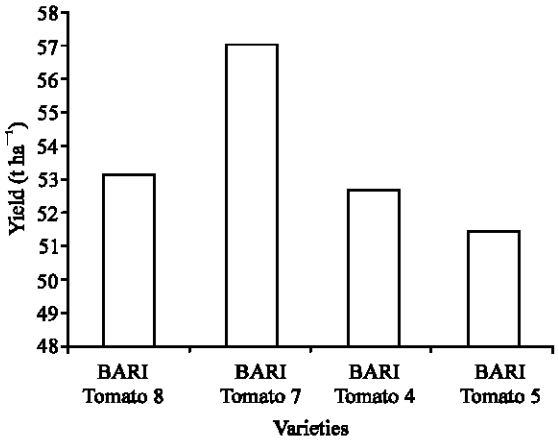

Fig. 2: Effect of variety on the yield of tomato

observed in October 25 planting, which was statistically identical to December 25 planting, while the fruit of minimum length (4.64 cm) was recorded from February 24. The maximum diameter of fruit (5.69 cm) was obtained from October 25 planting, which was statistically identical to December 25 planting. The minimum diameter (4.60 cm) was obtained from February 24 planting. October 25 planting produced the maximum yield of fruit per plant (2.04 kg) and the minimum (0.37 kg) was recorded In February 24 planting (Table 2). Similar results were also reported by Taleb[12]. The highest yield (86.40 t ha^{-1}) was obtained from October 25 planting and the lowest yield (16.89 t ha^{-1}) was found in February 24 planting (Fig. 1). The profound influence of time of planting on the yield of tomato has reported by Hossain *et al.*[7] and Rahman[8].

Results of variety on the yield components of tomato showed significant effect on all components of yield (Table 3). Delayed flowering (32.59 days) was found in BARI Tomato 7, which was statistically similar to BARI Tomato 8. Flowering was earliest (28.16 days) in BARI

Tomato 5, which was at par with BARI Tomato 4. This difference in flower initiation was due to its varietal characters. The variety BARI Tomato 5 gave the highest number of flower clusters per plant (13.64) and BARI Tomato 8 gave the lowest (10.54). The highest number of flowers per cluster (5.09) was produced by BARI Tomato 4. The minimum number of flowers per cluster (3.47) was recorded from BARI Tomato 7, The variety BARI Tomato 5 gave the maximum number of flowers per plant (67.67) and the lowest number (38.21) was recorded in BARI Tomato 7. This variation in number of flowers per plant was possibly due to its varietal characteristics. BARI Tomato 5 showed the maximum number of fruit clusters per plant (7.36) which was statistically similar to BARI Tomato 4. The minimum number of fruit cluster per plant (5.30) was produced from BARI Tomato 8, which was identical to that of BARI Tomato 7. The variety BARI Tomato 5 gave the maximum fruits per cluster (4.04), which was statistically similar to BARI Tomato 8. The maximum number of fruits per plant (30.43) was produced by BARI Tomato 5, which was statistically similar to BARI. Tomato 4. The minimum number of fruits per plant (15.3 1) was harvested from BARI Tomato 7, which was identical to BARI Tomato 8. The present finding corroborates with the reports of Hossain *et al.*[7]. The variety BARI Tomato 8 required the longest time (89.44 days) to first harvesting. The shortest time (78.33 days) was recorded from BARI Tomato 5.

Results of variety on the yield components and yield of tomato are presented in Table 4. All components of yield were significantly influenced by the variety. The days to last harvesting, were maximum (111.67) in BARI Tomato 8, which was statistically identical to other varieties. The variety BARI Tomato 7 had the highest plant height (113.40 cm) which was statistically different from other three varieties. The other varieties were statistically identical to each other. Varietal influence on plant height was also reported by Hossain *et al.*[7]. The longest picking period (30.56 days) was obtained from BARI Tomato 5. BARI Tomato 7 and 8 were statistically similar. The largest fruit (98.95 g) was obtained from BARI Tomato 7 and the lowest weight of individual fruit (41.09 g) was found from BARI Tomato 5. Varietal influence on individual fruit weight was also reported by Hossain *et al.*[7] and Meher *et al.*[10]. The length of fruit was maximum (5.97 cm) in the variety BARI Tomato 8 and minimum (4.71 cm) in BARI Tomato 4. The maximum diameter of fruit (6.50 cm) was recorded in BARI Tomato 7 and the minimum (4.27 cm) was recorded in BARI Tomato 5. The highest yield of fruit per plant (1.38 kg) was obtained from BARI 6. Tomato 7 (Table 4). The lowest fruit yield per plant (1.21 kg) was recorded from BARI Tomato 5. The highest yield (57.02 t ha^{-1}) was obtained from BARI Tomato 7 and lowest yield (51.38 t ha^{-1}) was recorded in BARI Tomato 5 (Fig. 2).

From the present study, it may be concluded that the highest yield of tomato was obtained from October 25 planting, compared to the lowest from February 24 planting. The variety BARI Tomato 7 produced the highest yield and BARI Tomato 5 produced the lowest yield. All the parameters showed decreasing response with delay in planting.

REFERENCES

1. Hoque, M.S., M.T. Islam and M. Rahman, 1999. Studies on the preservation of semi-concentrated tomato juice. Bangladesh J. Agril. Sci., 26: 37-43.
2. Aditya, T.L., L. Rahman, M. Shah-E-Alam and A.K. Ghosh, 1999. Correlation and path co-efficient analysis in tomato. Bangladesh J. Agril. Sci., 26: 119-122.
3. BBS., 2000. Monthly Statistical Bulletin, Bangladesh Bureau of Statistics, Statistics Division, Ministry of Planning, Govt. of the Peoples' Republic of Bangladesh, Dhaka, Bangladesh, pp: 55.
4. BARI., 2000. Krishi Projukti Hatboi (in Bengali). 2nd Edn. Bangladesh Agricultural Research Institute, Joydebpur, Gazipur, Bangladesh, pp: 318-322.
5. BARI., 1996. Summer Tomato (Booklet in Bengali). Horticulture Research Centre, Bangladesh Agricultural Research Institute. Joydebpur, Gazipur, Bangladesh, pp: 12.
6. Gomez, K.A. and A.A. Gomez, 1984. In Statistical Procedures for Agricultural Research, Intl. Rice Res. Inst., John Willy and Sons, New York, Chickester, Brisbane.Torento, Singapore.
7. Hossain, M.M., M.A. Karim, M.M. Hoque, M.M. Hoque and A.K.M.A. Hossain, 1986. Performance of some tomato lines planted at different dates. Bangladesh Hort., 14: 25-28.
8. Hoque, M.A.I. and M.M. Rahman, 1988. Performance of some promising tomato lines at different planting dates. Annual Report (1987-88) of the Vegetable Section, Division of Horticulture, Bangladesh Agricultural Research Institute, Joydebpur, Gazipur, Bangladesh, pp: 4-7.
9. BARI., 1989. Annual Report (11987-88). Bangladesh Agricultural Research Institute, Joydebpur, Gazipur, Bangladesh, pp: 4.
10. Meher, B.B., K.E. Lawande and V.R. Joshi, 1994. Effect of different varieties and planting seasons on seed yield and quality of tomato. J. Moharashtra Agric. Univ., 19: 393-395.
11. BARI., 1983. Annual Report (1979-82). Bangladesh Agricultural Research institute, Joydebpur, Gazipur, Bangladesh, pp: 1-2.
12. Taleb, M.A., 1994. Effect of planting time, 2,4-Dichlorophenoxy, acetic acid and kinetin on growth and yield of tomato. M.S. Thesis, BAU, Mymensingh, Bangladesh, pp: 124.