



Journal of Biological Sciences

ISSN 1727-3048

science
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Environmental Effect on Growth and Yield of Tomato

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Abstract: The study was conducted to analyze the responses of two tomato varieties, BARI tomato-4 and BARI tomato-6 to different environments. The environment used in the experiment were no mulch or control (E_0), straw mulch (E_1), black polythene mulch (E_2), water hyacinth mulch (E_3) and am-ada leaf mulch (E_4). There were significant influences of different mulches on the growth and yield of tomato. The height of plant, number of leaves, number of main roots, length of roots, fresh and dry weight of roots, number of flower and fruit clusters, number of fruits per plant, weight of fruits and fruit yield per hectare were significantly higher under the environment provided by black polythene mulch. There were also variations in yield contributing characters between the varieties. BARI tomato-6 produced higher yield (55.16 t ha^{-1}) than BARI tomato-4 (51.8 t ha^{-1}). Among the variety-environment combinations the highest yield (61.18 t ha^{-1}) was produced by BARI tomato-6 under the environment of black polythene mulch. This combination also gave the best economic return ($\text{BCR} = 4.52$).

Key words: BARI tomato-4, BARI tomato-6, environment, mulch

INTRODUCTION

Tomato (*Lycopersicon esculentum* Mill.) belonging to the family Solanaceae is one of the most popular and quality vegetables in Bangladesh. It has a total production of 103,000 mt and an average yield of 6.72 t ha^{-1} ^[1], which is very low in comparison with that of other countries, namely, India (15.67 t ha^{-1}), Japan (52.82 t ha^{-1}) and USA (63.66 t ha^{-1}). One of the reasons for such low yield is lack of improved production technologies adopted by the growers in the country. During its growing season the existing environment plays an adverse effect on the growth and yield of this crop. Normally, the tomato is grown in Bangladesh during the months from September to April, when low rainfall and higher rate of evapotranspiration cause a severe loss of moisture from the soil. In tomato, water is the most important factor affecting directly on its yield. For successful production of this crop, about 285 mm water is required especially during flowering, fruit setting and enlargement stage^[2]. But irrigation facilities are not sufficient in all the regions of our country. Moreover,

many of the farmers cannot afford to expense for irrigation. Under this circumstances artificial manipulation of environments especially use of mulches could be an effective measure in conserving soil moisture and temperature. This will perhaps to be a good substitute of irrigation. Generally straw, rice husk, water hyacinth, crop residues or plastic mulch are used as artificial mulches in the production of horticultural crops^[3]. Mulching plays an important role in conserving soil moisture^[4].

It regulates the soil temperature, suppress the weed growth, saves labour cost^[5]. It also enhances the biological activity of soil fauna and thus increases soil fertility^[6]. Mulching has been reported to increase yield by creating favourable temperature and moisture regimes, in the different parts of the world^[7]. It has a unique character of reducing the maximum soil temperature and increasing the minimum temperature^[8].

The present study was thus designed to evaluate the effects of environments provided by different mulches on the growth and yield of BARI tomato-4 and BARI tomato-6.

MATERIALS AND METHODS

The field experiment was conducted at the Horticulture Farm, Bangladesh Agricultural University, Mymensingh from September 2001 to April 2002. The land was medium high with silt loam soil having pH 6.8. The experiment was set up in the Randomized Complete Block Design with three replications. The unit plots were 2.8×1.8 m in size, which accommodated 21 plants at a spacing of 60 cm between rows and 40 cm between pits. Seeds of BARI tomato-4 and BARI tomato-6 were collected from the Horticulture Research Centre, Bangladesh Agricultural research Institute, Gazipur. The treatments used in the experiment as environments were:

- E₁ = Straw mulch + No weeding
- E₂ = Black polythene mulch + No weeding
- E₃ = Water hyacinth mulch + No weeding
- E₄ = Am-ada leaf mulch + No weeding
- E₅ = Without mulch + weeding

Similar doses of manuring and fertilization were maintained in each plot in accordance with the recommendation of BARI^[9]. Harvesting was done during early ripe stage when they attained slightly red colour. Harvesting was started from 20 February and completed by 10 April 2002. Observations were made on the plant and root height, number of leaves at harvest and yield components from 5 randomly selected plants per plot. The collected data were analyzed statistically and means were compared by LSD.

RESULTS AND DISCUSSION

Plant height: A marked variation in plant height at final harvest was observed due to the influence of different mulching environments (Table 1). The highest plant height (104.52 cm) was observed with the plants grown under the environment provided by black polythene mulch which is followed by water hyacinth (E₃), leaves of am-ada (E₄), straw (E₁) mulches. Whilst the lowest plant height (93.85 cm) was under the control environment. The

polythene mulch showed statistically different results from other mulches. However water hyacinth showed similar results with leaves of am-ada and straw mulch. The effect of mulch might be accounted for conserving sufficient soil moisture providing water to the plants at different stages of growth and keeping the soil warm resulting increased height of plant. Gunadi and Suwanti^[10] and Buitellar^[11] also reported the similar opinion that mulching helps to increase the plant height.

Two varieties showed significant variation in plant height. The significant different plant height (135.44 and 101.08 cm) was noted from BARI tomato-6 and BARI tomato-4, respectively (Table 2). It may be due to the fact that, BARI tomato-6 absorbed enough water from soil, which encouraged more vegetative growth and rapid cell elongation leading to the highest length.

The interaction between mulching and variety had an insignificant influence on plant height. But their combined effect is highly significant (Table 3). At harvest, the maximum height of plant (145.90 cm) was recorded from the environment-variety combination of black polythene mulch and BARI tomato-6, which is statistically identical with the combination of water hyacinth and BARI tomato-6. Water hyacinth, leaves of am-ada and straw mulch showed the statistically identical result in combination with BARI tomato-6. The lowest plant height (92.13 cm) was found from the combination of no mulch and BARI tomato-4. Black polythene mulch possibly conserved sufficient soil moisture that encouraged more growth of BARI tomato-6 producing the tallest plant.

Soil temperature: The diurnal fluctuation of soil temperature at 5, 10 and 15 cm depth as influenced by mulches was measured at hourly interval from 7 am to 5 am on 6th March 2002. A remarkable variation of soil temperature was observed at different time of the day with respect to mulching (Fig. 1). Results showed that the low soil temperature in early morning hours gradually increased with the advancement of the day and it was highest at 2.00 pm in all the treatments. The temperature differences between mulched and control varied throughout the day. The highest temperature was

Table 1: Effects of different mulches on the growth and yield of tomato

Treatments	Plant height (cm)	No. of leaves per plant	No. of main roots per plant	Depth of root (cm)	Fresh weight of roots per plant (g)	Dry weight of roots per plant (g)	No. of fruits per plant	Wt. of individual fruit (g)	Wt. of fruits per plant (kg)
No mulch	93.85	38.46	7.75	17.37	4.03	0.93	10.93	80.38	1.35
Straw mulch	97.55	48.28	8.52	18.51	5.55	1.05	13.05	84.68	1.75
Black polythene mulch	104.52	56.23	9.87	22.74	7.82	2.24	15.67	88.81	2.18
Water hyacinth mulch	99.96	49.35	8.72	20.52	6.53	1.48	13.29	85.17	1.78
Leaf of am-ada mulch	98.50	45.55	8.36	19.13	5.99	1.16	13.39	84.78	1.78
LSD (0.05)	5.94	3.03	1.06	1.86	0.89	0.42	1.30	4.90	0.22
CV (%)	5.37	4.93	9.94	8.08	8.15	15.62	5.67	5.98	13.01

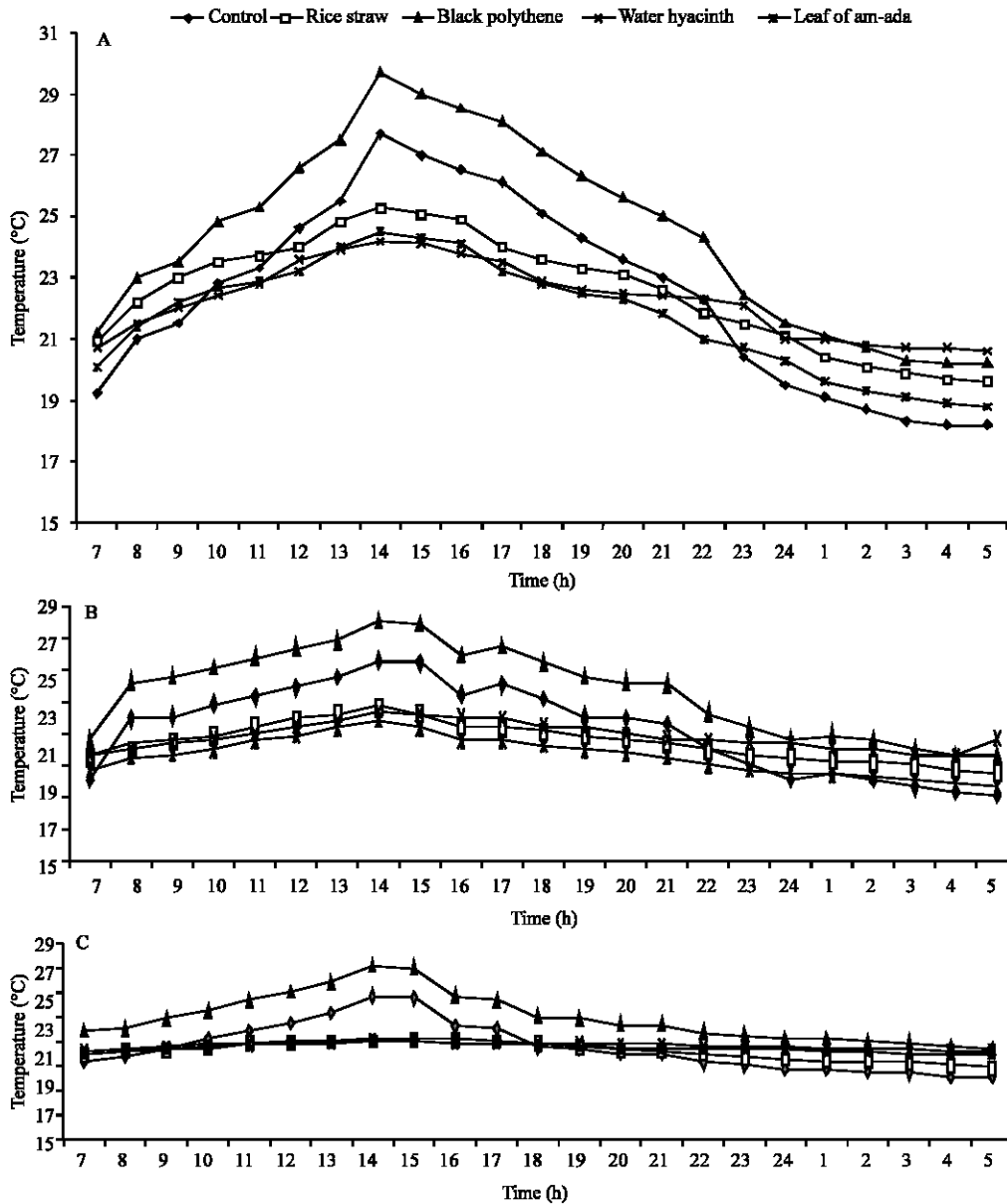


Fig. 1: Soil temperature pattern at (A) 5 cm depth, (B) 10 cm depth and (C) 15 cm depth with different mulches

observed at 5 cm depth under polythene mulch (32°C) followed by non-mulched (31°C), leaves of am-ada (27°C), straw (26°C) and water hyacinth (25.5°C). At 10 and 15 cm depth the highest temperature was observed under black polythene mulch 28.2 and 27.3°C, respectively at 2 pm

Mulches reduced the soil temperature at daytime because they reflected a considerable part of incidental solar radiation except polythene mulch. Moreover, their lower thermal conductivity prevented and decreased the amount of downward transmission of heat^[12] the other hand, temperature under mulched condition at nighttime

remained higher than the control, might be due to trapping of outgoing long wave radiation released by the soil.

Number of leaves per plant: Mulches exhibited highly significant variation in respect of the number of leaves. Black polythene mulch produced maximum number of leaves, which was statistically different from other environments. Water hyacinth, leaves of am-ada, black polythene mulch and straw mulch produced 49.35, 45.55, 56.23 and 48.28 numbers of leaves, respectively (Table 1) while non-mulch treatment gave the lowest number of leaf (38.46) due to greater plant height and favourable

Table 2: Main effects of varieties on the growth of tomato

Treatments	Average plant height (cm)	No. of leaves per plant	No. of main roots per plant at harvest	Depth of root at harvest (cm)	Fresh weight of root per plant (g)	Dry weight of roots per plant (g)	No. of flower clusters/ plant	No. of fruits per cluster	No. of fruits per plant	Wt. of individual fruit (g)	Wt. of fruits per plant (kg)
BARI tomato-4	101.08	58.88	10.83	19.80	10.11	2.60	13.78	4.24	36.31	46.44	1.67
BARI tomato-6	135.44	73.52	13.41	28.03	13.35	3.16	12.33	2.98	17.87	97.45	1.77
LSD (0.05)	4.60	2.34	0.83	1.44	0.69	0.32	0.62	0.31	1.30	1.31	0.17
LSD (0.01)	6.20	3.16	1.12	1.95	0.93	0.43	0.83	0.42	1.75	1.31	0.23
CV (%)	5.37	4.93	9.94	8.15	8.08	15.62	6.75	5.98	5.67	5.98	13.01

Table 3: Combined effects of environments and varieties on the growth and yield component of tomato

Variety × Environment	Parameters									
	Average plant height (cm)	No. of leaves per plant	No. of main roots per plant at harvest	Fresh weight of roots per plant (g)	Dry weight of roots per plant (g)	No. of fruits per cluster	No. of fruits per plant	Wt. of individual fruit (g)	Wt. of fruits per plant (kg)	
V ₁ E ₀	92.13	43.93	10.92	6.86	2.38	5.66	29.37	41.46	1.01	
V ₁ E ₁	101.49	55.20	10.50	9.20	2.49	4.17	36.71	46.73	1.72	
V ₁ E ₂	110.24	72.40	11.46	13.33	3.30	2.79	41.33	50.55	2.15	
V ₁ E ₃	100.06	61.70	10.91	10.71	2.65	4.27	37.11	46.50	1.73	
V ₁ E ₄	101.50	61.22	10.38	10.44	2.17	4.29	37.03	46.95	1.74	
V ₂ E ₀	125.43	55.70	12.32	10.65	2.02	3.32	16.03	93.36	1.50	
V ₂ E ₁	133.80	72.25	12.94	12.38	2.66	2.88	17.21	97.09	1.67	
V ₂ E ₂	145.90	85.35	14.82	16.28	4.55	2.79	20.33	100.90	2.20	
V ₂ E ₃	137.04	79.43	13.60	14.27	3.47	2.96	17.79	98.00	1.74	
V ₂ E ₄	135.03	74.88	13.35	13.04	3.08	2.97	18.01	97.89	1.76	
LSD (0.05)	10.77	5.49	1.94	1.62	0.75	2.36	2.348	8.88	0.40	
LSD (0.01)	14.95	7.62	2.69	2.24	1.05	3.27	3.259	12.32	0.05	
CV (%)	5.27	4.93	9.94	8.08	15.62	11.88	5.67	5.98	13.01	
Level of significance	**	**	**	**	**	**	**	**	**	

** = Significant at 5% level, V₁ = BARI tomato-4, V₂ = BARI tomato-6, E₀ = No mulch, E₁ = Straw, E₂ = Black polythene, E₃ = Water hyacinth, E₄ = Leaves of am-ada

temperature, pH and moisture conditions in the soil. This is in agreement with Calvert^[13]

Number of leaves per plant also showed significant variation due to varietal differences. The higher number of leaves (73.52) was produced by BARI tomato-6 than BARI tomato-4 (58.88) (Table 2).

The interaction between mulching and variety was found insignificant on the number of leaves per plant. But the combined effect between mulching and variety is highly significant. The maximum number (85.35) of leaves per plant was produced by the environment-variety combination of black polythene mulch (E₂) and BARI tomato-6 and the minimum (43.93) was produced by the combination of no-mulch (E₀) and BARI tomato-4 (Table 3).

Number of main roots per plant: The number of main roots per plant was significantly influenced by different treatments. It showed that the maximum number of roots (9.87) was produced when plants were mulched with black polythene (E₂), followed by water hyacinth (8.72), straw mulch (8.52) and leaves of am-ada (8.36) while the control treatment gave the minimum (7.75) number of main roots (Table 1). Polythene mulch showed statistically different from other environments. But in the remaining environments (mulches) plants gave statistically identical results. Agarwal and Rajat^[14] reported that higher number

of roots in barley was obtained with mulch. This may be due to the high soil moisture content and high temperature of the soil developed by the mulching environments.

The number of main roots per plant showed significant variation between the varieties. BARI tomato-6 produced higher number of main root (13.41) than BARI tomato-4 (10.83) (Table 2).

The interaction between mulching and variety was found insignificant on the number of roots per plant. However, the combined effect between mulching and variety on number of roots is highly significant. The highest number of roots (14.82) was obtained from the environment-variety combination of black polythene mulch with BARI tomato-6 and the lowest number of roots (10.92) was produced by the combination of no mulch with BARI tomato-4 (Table 3).

Depth of root: Significant variation was observed in root length among the different mulching environments. The highest root length (22.74 cm) was obtained with polythene mulch followed by water hyacinth (20.52 cm), leaves of am-ada (19.13 cm) and straw (18.51 cm) mulches. But the control environment (17.37 cm) gave the minimum root length (Table 1). This may be due to higher soil moisture level and less compact of soil in mulching environments, which help in rapid cell elongation leading

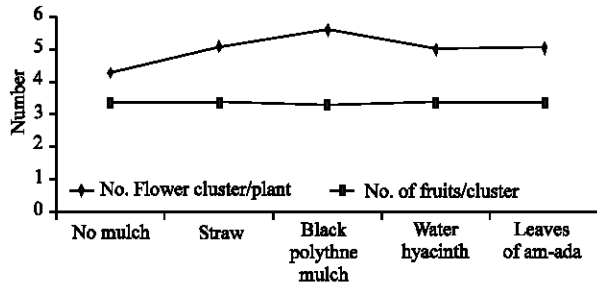


Fig. 2: Effect of mulches on the number of fruit cluster per plant and number of fruits per cluster

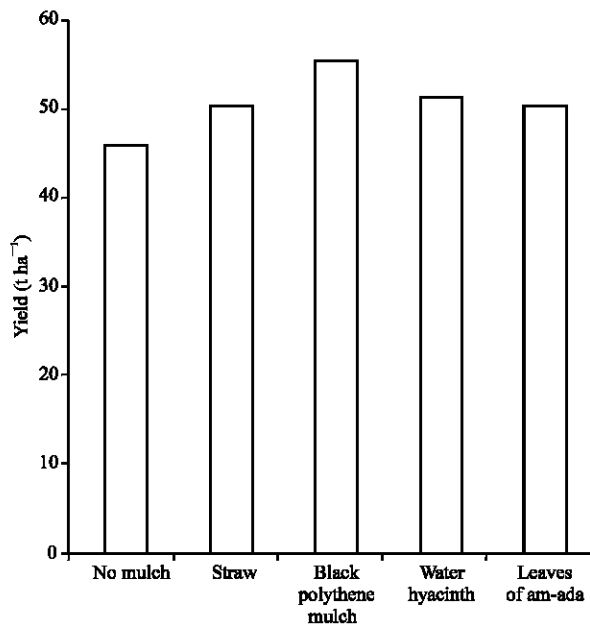


Fig. 3: Effect of mulches on the yield of tomato

to longer root. Pramanik^[15] also observed the highest root length in tomato plant under polythene mulch.

The effect of varieties on the length of root was highly significant. The root length was higher in BARI tomato-6 (28.03 cm) than BARI Tomato-4 (19.80 cm) (Table 2).

The interaction between mulching and variety had an insignificant influence on root length. But there is a distinctly significant variation in the length of root due to the combined effect of different mulching and variety. The maximum root length (32.11 cm) was obtained from the environment-variety combination of polythene mulch with BARI tomato-6 and the lowest root length (18.44 cm) from no mulch with BARI tomato-4 (Fig. 2). However, in respect of depth of roots per plant, BARI tomato-6 showed the best performance under all the mulching environments.

Fresh weight of roots per plant: A highly significant variation on the fresh weight of roots per plant was recorded due to the effects of mulches. Black polythene mulch produced heaviest root (7.82 g) and the lightest (4.03 g) was found in the control environment (Table 1). From this study it is evident that mulching influences the increase of fresh weight of roots. Knavel and Mohr^[16] recorded a greater root growth when the soil was covered with either black paper or black polythene.

The weight of fresh roots was also significantly affected by different varieties. Fresh weight of roots per plant of BARI tomato-6 (13.35 g) was higher (Table 2) than BARI tomato-4 (10.11 g).

There was insignificant interaction between mulching and variety on weight of roots per plant. But the combined effect between mulching and variety on fresh weight of roots per plant was highly significant. However, the highest weight of roots (16.28 g) was found from the environment-variety combination of polythene mulch with BARI tomato-6. On the other hand the lowest weight roots (6.86 g) was obtained from no mulch with BARI Tomto-4 (Table 3).

Dry weight of roots per plant: A highly significant difference was found in respect of dry weight of roots per plant. The black polythene mulching produced higher dry weight (2.24 g) followed by water hyacinth (1.48 g), leaves of am-ada (1.16 g) and straw (1.05 g). The minimum (0.43 g) dry weight of roots per plant was found under control environment (Table 1).

There were highly significant variations between the varieties on the dry root weight of tomato. BARI tomato-6 (3.16 g) produced higher dry root weight than that of BARI Tomato-4 (2.6 g) (Table 2).

The interaction between mulching and variety on dry weight of roots was insignificant. Whereas the combined effect between mulching and variety on the dry weight of roots per plant showed highly significant variation. The environment-variety combinations of black polythene mulch with BARI tomato-6 produced the highest and no-mulch with BARI tomato-4 showed the lowest (4.55 and 2.38 g) dry weight, respectively (Table 3).

Number of flower clusters per plant: A highly significant effect of mulches was observed in respect of flower clusters per plant. Black polythene mulch produced the highest (13.42) number of flower cluster per plant, whereas the lowest (11.04) was found from no mulched or control environment (Fig. 3). It is apparent from the result that the environment provided by black polythene mulch has increased the production of flower clusters per plant. This may be attributed to the enhanced vegetative growth as observed in the environment.

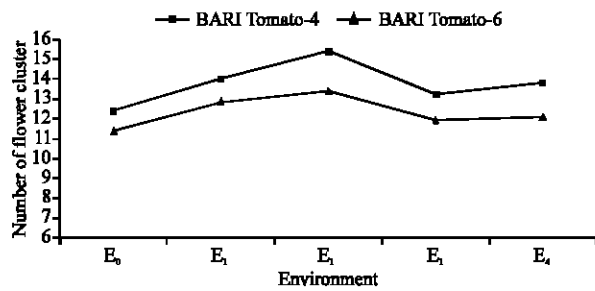


Fig. 4: Combined effects of environments and variety on the number of flower clusters per plant

Two varieties showed highly significant variation in respect of number of flower clusters per plant. The higher number of flower clusters (13.78) was obtained from BARI tomato-4 than the BARI tomato-6 (12.33) was observed from (Table 2).

The interaction effect between mulching and variety on number of flower clusters per plant was found to be insignificant. But in case of combined effects between mulching and variety on number of flower cluster per plant highly significant variation was observed. The highest number of flower clusters per plant was found from the combination of polythene mulch (E₂) with BARI tomato-4 and the lowest (10.42) was observed from no mulch (E₀) and BARI tomato-6 (Fig. 4).

Number of fruits per cluster: The differences in respect of number of fruits per cluster among the mulching treatments were highly significant. The maximum number of fruit (3.61) was produced by the plants having no-mulch (E₀). This is followed by leaves of am-ada (3.55), water hyacinth (3.53), straw (3.42) and the lowest (3.21) was by the black polythene mulch (Fig. 3). This happened possibly due to the adverse effect of high temperature produced in this environment.

Two varieties showed highly significant variation in respect of number of fruits per cluster. The higher number of fruits per cluster (4.24) was obtained from BARI tomato-4 than the BARI tomato-6 (2.98) (Table 2).

The interaction effect between mulching and variety on number of fruits per cluster showed highly significant variation and their combined effect was also highly significant (Table 3). However, the highest number of fruits per cluster was found from the environment-variety combination of no-mulch and BARI tomato-4 (5.66) and the lowest (2.79) was from black polythene mulch (E₂) with BARI tomato-6.

Number of fruits per plant: There was a significant influence of mulches on the number of fruit production

both per plant and per plot. It was revealed that maximum number of fruits (15.67) was obtained under the environment of black polythene mulch (E₂) followed by leaves of am-ada (13.39), Water hyacinth (13.29), Straw (13.05) and the lowest (10.93) was given by no-mulch environment (Table 1). It was possible that the number of fruits per plant was compensated by the production of maximum number of flower clusters per plant. Gonzalez *et al.*^[17] stated that plastic mulch enhances plant development, flowering and fruit numbers per plant of tomato compared with traditional or chemical weed control.

Two varieties showed highly significant variation in respect of number of fruits per plant. The number of fruits was higher (36.31) in BARI tomato-4 than (17.87) BARI tomato-6 (Table 2).

The interaction effect between mulching and variety on number of fruits was highly significant. The combined effect of environment and variety on number of fruits was also highly significant (Table 3). The highest number of fruits was found from the combination of black polythene mulch (E₂) and BARI tomato-4 (41.33) and the lowest (16.03) was observed from no mulch (E₀) and BARI tomato-6.

Weight of individual fruit: The different types of environments under different mulching treatments significantly influenced the weight of individual fruit. The heaviest fruit (88.81 g) was observed with the plants grown under black polythene mulch (E₂) followed by water hyacinth (85.17 g), leaves of am-ada (84.78 g) and straw (84.68 g) mulch. While the treatment without mulch (E₀) gave the lightest fruit (80.38 g). But polythene mulch showed statistically identical result with water hyacinth, leaves of am-ada and straw mulch (Table 1). Teasdale and Baki^[18] mentioned that the rate of fruit growth per unit leaf area was higher with black polythene mulch.

There was a highly significant variation on individual fruit weight between the varieties (Table 2). The heavier fruit was produced by BARI tomato-6 (97.45 g) than BARI tomato-4 (46.44 g).

The interaction between mulching and variety was found insignificant on the weight of individual fruit. But the combined effects between mulching and variety were highly significant on weight of individual fruit. The maximum weight of individual fruit (100.90 g) was recorded from the environment-variety combination of black polythene mulch (E₂) and BARI tomato-6 and the minimum (41.46 g) was produced by the combination of no-mulch (E₀) and BARI tomato-4 (Table 3).

Table 4: Cost and return in tomato production as influenced by environment and variety

Parameters	Variety×Environment									
	V ₁ E ₀	V ₁ E ₁	V ₁ E ₂	V ₁ E ₃	V ₁ E ₄	V ₂ E ₀	V ₂ E ₁	V ₂ E ₂	V ₂ E ₃	V ₂ E ₄
Total cost of production (Tk ha ⁻¹)	74658	78963	85835	78840	78963	76626	79578	88065	80009	80070
Yield of tomato (t ha ⁻¹)	45.44	50.79	57.66	52.56	51.86	50.97	53.94	61.18	54.98	54.72
Gross return (Tk ha ⁻¹)	295360	330135	374790	341640	337090	331305	350610	397670	357370	355680
Net return (Tk ha ⁻¹)	220701	251171	287954	262799	258126	254678	271031	309604	277360	275609
Benefit cost ratio	3.96	4.18	4.37	4.33	4.27	4.32	4.41	4.52	4.47	4.44

V₁ = BARI tomato-4, V₂ = BARI tomato-6, E₀ = No mulch, E₁ = Straw, E₂ = Black polythene, E₃ = Water hyacinth, E₄ = Leaves of am-ada

Weight of fruits per plant: A highly significant difference was found in respect of weight of fruits. It was showed (Table 1) that black polythene mulch (E₂) produced highest weight (2.18 kg) followed by water hyacinth and leaves of am-ada (1.78 kg) and straw (1.75 kg) while control treatment gave the lowest weight (1.35 kg). But the black polythene mulch was statistically different from all other treatments. On the other hand water hyacinth, leaves of am-ada and straw are statistically identical with each other.

The varieties of tomato significantly influenced the yield of fruits (Table 2). The higher yield of fruits (1.77 kg) was obtained from BARI tomato-6 than BARI tomato-4 (1.67 kg).

The interaction between mulching and variety was found insignificant on the weight of fruits. The highest weight of fruits was recorded from the combination of polythene mulch (E₂) with BARI tomato-6 (2.20 kg) and the lowest (1.01 kg) was observed with no mulch (E₀) and BARI tomato-4 (Table 3).

Economic analysis: The highest cost of production (88065.58 Tk ha⁻¹) and the highest gross return (Tk. 397670) was found from the treatment combination of black polythene mulch and BARI tomato-6. The lowest gross return (295360 Tk ha⁻¹) was obtained from the combination of no mulch and BARI tomato-4; due to different treatment combinations comprising different mulching and variety. The highest benefit cost ratio 4.52 was obtained from the combination of black polythene mulch (E₂) and BARI tomato-6 and the lowest (3.96) from the environment-variety combination of no mulch (E₀) and BARI tomato-4 (Table 4).

Fruit yield per hectare: The variation in tomato yield per plot and per hectare due to different mulching environments was found to be statistically significant. It was evident (Fig. 5) that the yield of tomato per hectare (58.08 t ha⁻¹) was highest under the black polythene mulch followed by leaves of am-ada mulch (52.96 t ha⁻¹), water hyacinth mulch (52.36 t ha⁻¹) and straw mulch (51.71 t ha⁻¹). While the treatment without mulch (E₀) gave the lowest yield per hectare (47.44 t ha⁻¹). The increased

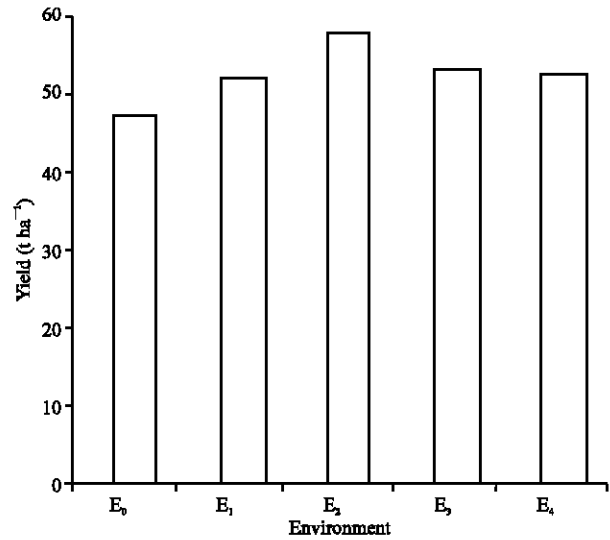


Fig. 5: Main effects of environments on the yield of tomato

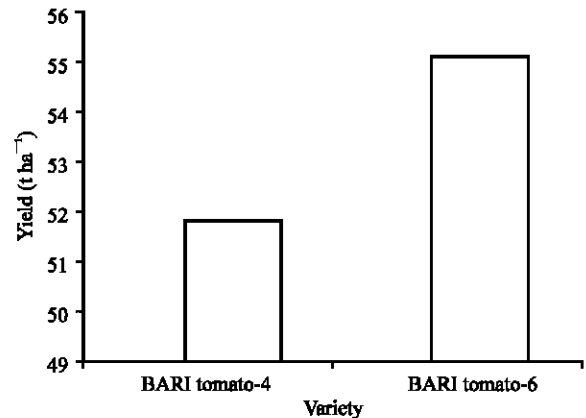


Fig. 6: Main effects of variety on the yield of tomato

yield produced by different types of mulching treatments may be due to maintenance of moisture in the soil, increased microbial activities, hydraulic conductivity etc and decreased fertilizers leaching, weed population. Under the environment of black polythene mulch, temperature of the soil was high and the weed was almost nil than other mulches resulting higher yield of tomato. The similar result was also mentioned by Monks *et al.*^[19], Kumar *et al.*^[20] and Biswas^[21].

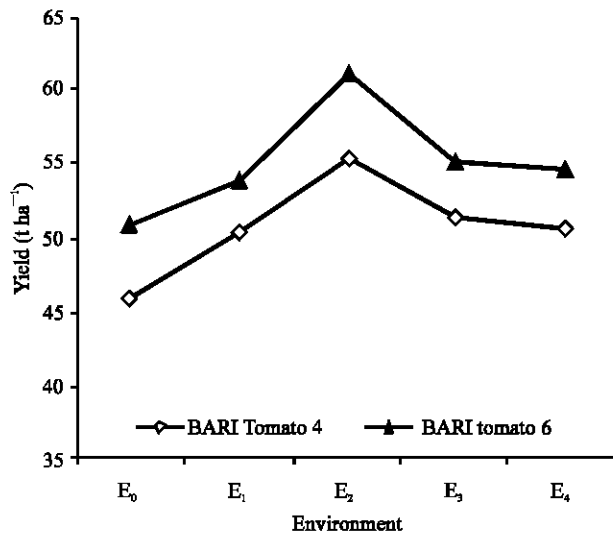


Fig. 7: Combined effects of environment and variety on the yield of tomato

The variation in tomato yield was also found to be significant between the varieties. The maximum yield per hectare (55.16 t ha^{-1}) was achieved from BARI tomato-6 and the minimum (51.66 t ha^{-1}) was from BARI tomato-4 (Fig. 6).

The combined effect between mulching and variety on tomato yield was found to be significant. The maximum yield per hectare (61.18 t ha^{-1}) was obtained from the treatment combination of black polythene mulch with BARI tomato-6, whereas it was the minimum (45.44 t ha^{-1}) with no mulch in BARI tomato-4 (Fig. 7). Mulching with black polythene conserved sufficient soil moisture and maintained higher temperature, which was responsible for increased plant height and number of leaves in BARI tomato-6, which ultimately increased yield.

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