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## Evaluation of tomato (*Solanum Lycopersicum* L.) hybrids for plant growth, fruit yield and quality in Prayagraj agro climate condition

**Surendra Prasad and Vijay Bahadur**

### Abstract

An experiment on Tomato hybrids was carried out during December 2017 to April 2018 in Departmental Research Field of Department of Horticulture, Naini Agricultural Institute, Sam Higginbottom University of Agriculture, Technology and Sciences, Prayagraj (U.P.) India. The results of the present investigation, regarding the evaluation of tomato for plant growth, fruit yield and quality of Tomato Hybrids, have been discussed and interpreted in the light of previous research work done in India and abroad. The experiment was conducted in Randomized block design with 25 Hybrids of Tomato obtained from different sources, were each hybrids replicated thrice. From the present experiments it is found that the Hybrid H<sub>24</sub> (Arka Rakshak) followed by H<sub>7</sub> (VNR - 3348) and H<sub>23</sub> (Kashi Hemant) is found best in terms of growth and yield parameters of Tomato hybrids and in terms of quality parameters Hybrid H<sub>20</sub> (Excel - 204) is found best for most of the quality parameters, and lowest readings was recorded in Hybrid H<sub>4</sub> (Hybrid Taj), H<sub>14</sub> (Abhilash) and H<sub>16</sub> (NS - 585). H<sub>24</sub> (Arka Rakshak) also recorded maximum return/ha and Cost benefit ratio/ha. Hence the hybrids Arka Rakshak, VNR - 3348 and Kashi Hemant is recommended for cultivation in climatic condition of Prayagraj.

**Keywords:** Tomato, hybrids, growth, yield and quality

### Introduction

The present Experiment was conducted in Randomized Block Design (RBD) with 25 Hybrid varieties of Tomato with three replications in the Research field of Department of Horticulture, Sam Higginbottom University of Agriculture, Technology and Sciences, Prayagraj during December, 2017 to April, 2018. Total number of varieties were Twenty five.

**Table 3.4:** Details of Hybrids

S. No.	Symbol	Source of hybrid	Name of hybrid
1	H <sub>1</sub>	Bayer	Lht-Angel
2	H <sub>2</sub>	-	Lht-Anmol
3	H <sub>3</sub>	-	Lht-1486
4	H <sub>4</sub>	-	Hybrid Taj
5	H <sub>5</sub>	-	Sampurana
6	H <sub>6</sub>	-	Rakshak
7	H <sub>7</sub>	Vnr	Vnr-3348
8	H <sub>8</sub>	-	Nht-2802
9	H <sub>9</sub>	-	Bss-1004
10	H <sub>10</sub>	-	Chaitanya
11	H <sub>11</sub>	Indam	Indam-3001
12	H <sub>12</sub>	-	Rishabh
13	H <sub>13</sub>	-	To-3038
14	H <sub>14</sub>	-	Abhilash
15	H <sub>15</sub>	-	Lucky-939
16	H <sub>16</sub>	-	Ns-585
17	H <sub>17</sub>	Namdhari	Namdhari Seeds
18	H <sub>18</sub>	-	Ns-524
19	H <sub>19</sub>	-	Ns-5007
20	H <sub>20</sub>	Excel	Excel-204
21	H <sub>21</sub>	-	Roshan
22	H <sub>22</sub>	IIVR	Kashi Amrit
23	H <sub>23</sub>	-	Kashi Hemant
24	H <sub>24</sub>	IIHR	Arka Rakshak
25	H <sub>25</sub>	-	Arka Samrat

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### Climatic condition in the experimental site

The area of Prayagraj district comes under subtropical belt in the south east of Utter Pradesh, which experience extremely hot summer and fairly cold winter. The maximum temperature of the location reaches up to 46° C- 48° C and seldom falls as low as 4°C- 5°C. The relative humidity ranges between 20 to 94 %. The average rainfall in this area is around 1013.4 mm annually. However, occasional precipitation is also not uncommon during winter months.

### Results and discussion

The present investigation entitled “Evaluation of Tomato (*Solanum Lycopersicum* L.) Hybrids for plant growth, fruit yield and quality in Prayagraj agro climatic condition” was carried out during December, 2017 to April 2018 in Research Field of Department of Horticulture, Naini Agricultural Institute, Sam Higginbottom University of Agriculture, Technology and Sciences, Prayagraj (U.P.) India. The results of the present investigation, regarding evaluation of Tomato hybrids for plant growth, fruit yield and quality, have been discussed and interpreted in the light of previous research work done in India and abroad. The experiment was conducted in Randomized block design with 25 varieties, replicated thrice.

The results of the experiment are summarized below.

#### A. Growth Parameters

The maximum significant plant height at 120 DAS (55.373 cm) was recorded in Hybrid H<sub>7</sub> (VNR - 3348), followed by H<sub>17</sub> (Namdhari Seeds) with (54.393 cm) plant height and minimum plant height (45.033 cm) was recorded in hybrid H<sub>18</sub> (NS – 524).

The maximum significant plant Spread (cm<sup>2</sup>) at 120 DAS (5579.671 cm<sup>2</sup>) was found in hybrid H<sub>7</sub> (VNR - 3348), followed by H<sub>20</sub> (Excel - 204) with (5392.928 cm<sup>2</sup>) and minimum plant Spread cm<sup>2</sup> (4230.840 cm<sup>2</sup>) was recorded in hybrid H<sub>22</sub> (Kashi Amrit). The variability in plant height and Spread in different hybrids is due to the suitability of hybrids in climatic condition of Prayagraj and growth characters of hybrids of tomato, Variability in plant height and Plant spread at flowering and fruiting has also been obtained by Alam *et al.*, (2010)<sup>[1]</sup> from 115.9 cm to 139.5 cm, Ali *et al.*, (2012)<sup>[2]</sup> from 56.82 cm to 72.00 cm, Shankar *et al.*, (2013)<sup>[10]</sup> from 48.33 cm to 153.63 cm, Sharma *et al.*, (2013)<sup>[11]</sup> from 57.9 cm to 162.39 cm, Singh *et al.*, (2013)<sup>[12]</sup> 53.73 cm to 83.67 cm and Saleem *et al.*, (2013)<sup>[8]</sup> from 76 cm to 126 cm in hybrid tomatoes.

The maximum significant Number of Branches, at 30, 60, 90 and 120 days after transplanting (4.673, 7.707, 10.923 and 15.610) was found in hybrid H<sub>23</sub> (Kashi Hemant), followed by H<sub>20</sub> (Excel – 204) with (6.753, 7.790, 10.160 and 14.110) number of branches/plant and minimum Number of branches/plant (5.073, 6.007, 6.763 and 10.037) was recorded in hybrid H<sub>15</sub> (Lucky – 939). Variability in number of branches in tomato hybrids is due to the suitability of particular hybrids in agro climatic conditions and high growth characters of hybrids, similar findings also reported by Alam *et al.*, (2010)<sup>[1]</sup> from 4.3 to 6.7, Singh *et al.*, (2013)<sup>[12]</sup> from 15.29 to 24.2 and Shankar *et al.*, (2013)<sup>[10]</sup> from 5.33 to 10.60.

The maximum Number of Leaves, at 120 DAS (24.027) was found in hybrid H<sub>7</sub> (VNR - 3348), followed by H<sub>1</sub> (LHT Angel) with (23.383) number of leaves/plant and minimum Number of leaves/plant (17.443) was recorded in hybrid H<sub>11</sub> (INDAM - 3001).

The minimum Days to first flowering (30.043 days) was found in hybrid H<sub>24</sub> (Arka Rakshak), followed by H<sub>7</sub> (VNR – 3348) with (31.013 days) and maximum days to first flowering (45.780 days) was recorded in hybrid H<sub>16</sub> (NS – 585). Variability in days to first flowering is due to the earliness of the tomato hybrids; similar findings also reported by Ali *et al.*, (2012)<sup>[2]</sup> from 42.00 to 56.00 DAS, Shankar *et al.*, (2013)<sup>[10]</sup> from 28.00 to 37.00 DAT, Singh *et al.*, (2013)<sup>[12]</sup> from 49.88 to 53.92 DAS and Said *et al.*, (2014)<sup>[7]</sup> from 29 to 41 DAS in tomato.

The minimum Days to 50% flowering (35.510 days) was found in hybrid H<sub>24</sub> (Arka Rakshak), followed by H<sub>7</sub> (VNR – 3348) with (36.167 days) and maximum days to 50% flowering (50.647 days) was recorded in H<sub>16</sub> (NS – 585). Variability in days to 50% flowering is due to the earliness of the tomato hybrids; similar findings previously also reported by Ali *et al.*, (2012)<sup>[2]</sup> from 42.00 to 56.00 DAS, Shankar *et al.*, (2013)<sup>[10]</sup> from 28.00 to 37.00 DAT, Singh *et al.*, (2013)<sup>[12]</sup> from 49.88 to 53.92 DAS and Said *et al.*, (2014)<sup>[7]</sup> from 29 to 41 DAS in tomato.

The minimum Days to first Fruiting (42.220 days) was found in H<sub>24</sub> (Arka Rakshak), closely followed by H<sub>7</sub> (VNR – 3348) and H<sub>6</sub> (Rakshak) with (43.020 and 43.927 days) respectively and maximum days to first Fruiting (57.713 days) was recorded in H<sub>16</sub> (NS – 585). Variability in days to first fruiting of tomato hybrids is due to the early fruit settings and maturity of the tomato hybrids; similar findings previously also reported by Alam *et al.*, (2010)<sup>[1]</sup> from 89 to 99 DAT and Sharma *et al.*, (2013)<sup>[11]</sup> from 62 to 82 DAT in tomato hybrids.

#### B. Yield and Yield attributing Parameters

The maximum Fruit length (6.167 cm) was found in hybrid H<sub>8</sub> (NHT – 2802), followed by H<sub>19</sub> (NS – 5007) with (6.130 cm) and minimum fruit length (4.590 cm) was recorded in H<sub>2</sub> (LHT Anmol).

The maximum Fruit width (6.843 cm) was found in H<sub>23</sub> (Kashi Hemant), followed by H<sub>9</sub> (BSS – 1004) with (6.680 cm) and minimum fruit width (5.007 cm) was recorded in H<sub>5</sub> (Sampurna).

The maximum Fruit diameter (15.917 cm) was found in H<sub>24</sub> (Arka Rakshak), followed by H<sub>21</sub> (Roshan) with (14.803 cm) and minimum fruit diameter (11.913 cm) was recorded in H<sub>11</sub> (INDAM – 3001). Variability in fruit length, width and diameter of tomato hybrids is due to the different shapes and sizes of tomato hybrids; similar findings previously also reported by Ali *et al.*, (2012)<sup>[2]</sup> from 5.50 cm to 7.80 cm, Saleem *et al.*, (2013)<sup>[8]</sup> from 4.04 cm to 6.75 cm, Shankar *et al.*, (2013)<sup>[10]</sup> from 3.00 cm to 6.10 cm and Said *et al.*, (2014)<sup>[7]</sup> from 3.9 cm to 6.5 cm.

The maximum Number of Fruits/Cluster (6.107) was found in hybrid Arka Rakshak, followed by Roshan with (5.587) and minimum fruit/cluster (3.050) was recorded in hybrid Abhilash. Variability in number of fruit/cluster of Tomato hybrids is due to the maximum number of fruit set/plant in a particular tomato hybrids similar findings previously also reported by Kurain *et al.*, (2001)<sup>[6]</sup> from 2.4 to 5.0, Sekhar *et al.*, (2009)<sup>[9]</sup> from 2.70 to 4.00, Shankar *et al.*, (2013)<sup>[10]</sup> from 2.33 to 6.50 and Cheema *et al.*, (2013)<sup>[3]</sup> from 2.00 to 4.50 in hybrid tomatoes.

The maximum Number of Fruits/Plant (44.553) was found in H<sub>24</sub> (Arka Rakshak), followed by H<sub>7</sub> (VNR – 3348) with (42.477) and minimum fruit/plant (24.320) was recorded in H<sub>20</sub> (Excel – 204). Variability in Number of fruits/plant of tomato hybrids is due to the maximum fruit set%/plant of a

particular tomato hybrids and minimum fruit drop percent in different hybrids; similar findings previously also reported by Sekhar *et al.*, (2009)<sup>[9]</sup> who noted variability in number of fruits per plant from 27.00 to 73.53, Singh *et al.*, (2013)<sup>[12]</sup> from 20.89 to 22.50, Saleem *et al.*, (2013)<sup>[8]</sup> from 48 to 95 and Cheema *et al.*, (2013)<sup>[3]</sup> from 7.50 to 32.00 in tomato hybrids and/or genotypes.

The maximum Average fruit weight (111.823 g) was found in H<sub>8</sub> (NHT – 2802), followed by H<sub>24</sub> (Arka Rakshak) with (99.867 g) and minimum average fruit weight (51.180 g) was recorded in H<sub>4</sub> (Hybrid Taj). Variability in average fruit weight is due to the different fruit size of tomato hybrids; similar findings previously also reported by Sekhar *et al.*, (2009)<sup>[9]</sup> from 38.86 g to 67.14 g, Sharma *et al.*, (2013)<sup>[11]</sup> from 30.77 g to 77.80 g, Singh *et al.*, (2013)<sup>[12]</sup> from 65.00 g to 72.27 g, Cheema *et al.*, (2013)<sup>[3]</sup> from 30.00 g to 52.50 g, and Degade *et al.*, (2015)<sup>[4]</sup> from 16.80 g to 24.69 g in tomato hybrids. Said *et al.*, (2014)<sup>[7]</sup> from 23.0 g to 69.8 g in open pollinated tomato.

The maximum Yield/plant (3.010 kg) was found in hybrid H<sub>24</sub> (Arka Rakshak), followed by H<sub>7</sub> (VNR – 3348) with (2.817 Kg) and minimum Yield/plant (1.417 kg) was recorded in H<sub>14</sub> (Abhilash). Variability in fruit yield per plant in tomato hybrids is due to the maximum number fruit/plant and maximum average fruit weight of Tomato hybrids; similar findings previously also reported by Sharma *et al.*, (2013)<sup>[11]</sup> from 681.00 g to 1278.19 g, Singh *et al.*, (2013)<sup>[12]</sup> from 1000.36 g to 1000.63 g, Saleem *et al.*, (2013)<sup>[8]</sup> from 1000.93 g to 3000.72 g, Shankar *et al.*, (2013)<sup>[10]</sup> from 1000 g to 3000.90 g.

The maximum Yield/plot (15.060 kg) was found in H<sub>24</sub> (Arka Rakshak), followed by H<sub>7</sub> (VNR – 3348) with (13.923 Kg) and minimum Yield/plot (8.803 kg) was recorded in H<sub>10</sub> (Chaitanya). Variability in fruit yield per plot of tomato hybrids is due to the maximum fruit yield per plant of Tomato hybrid; similar findings previously also reported by Sharma *et al.*, (2013)<sup>[11]</sup> from 681.00 g to 1278.19 g, Singh *et al.*, (2013)<sup>[12]</sup> from 1000.36 g to 1000.63 g, Saleem *et al.*, (2013)<sup>[8]</sup> from 1000.93 g to 3000.72 g, Shankar *et al.*, (2013)<sup>[10]</sup> from 1000 g to 3000.90 g.

The maximum Yield t/ha (60.240 tonnes) was found in H<sub>24</sub> (Arka Rakshak), followed by H<sub>7</sub> (VNR – 3348) with (56.987 tonnes) and minimum Yield/ha (39.520 tonnes) was recorded in H<sub>14</sub> (Abhilash). Variability in fruit yield/ha in tomato hybrids is due to the maximum yield of tomato per plant and per hectare; similar findings previously also reported by Sharma *et al.*, (2013)<sup>[11]</sup> from 681.00 g to 1278.19 g, Singh *et al.*, (2013)<sup>[12]</sup> from 1000.36 g to 1000.63 g, Saleem *et al.*, (2013)<sup>[8]</sup> from 1000.93 g to 3000.72 g, Shankar *et al.*, (2013)<sup>[10]</sup> from 1000 g to 3000.90 g.

### C. Quality Traits

The maximum Total Soluble Solids (°Brix) (6.073 °Brix) was found in H<sub>20</sub> (Excel – 204), followed by H<sub>12</sub> (Rishabh) with (5.967 °Brix) and minimum Total Soluble Solids (3.913 °Brix) was recorded in H<sub>4</sub> (Hybrid Taj). Variability in Total Soluble Solids in different hybrids of tomato is previously also reported by Singh *et al.*, (2014).

The maximum Ascorbic acid (mg/100 g) (26.900 mg) was found in H<sub>20</sub> (Excel – 204), followed by H<sub>14</sub> (Abhilash) with (26.633 mg) and minimum Ascorbic acid (22.880 mg) was recorded in H<sub>1</sub> (LHT Angle).

The minimum Acidity (%) (0.740 %) was found in H<sub>24</sub> (Arka Rakshak), followed by H<sub>25</sub> (Arka Samrat) with (0.760 %) and maximum Acidity (1.040 %) was recorded in H<sub>4</sub> (Hybrid Taj).

The fruit shape index was recorded high in H<sub>10</sub> (Chaitanya) with (1.053) followed by H<sub>4</sub> (Hybrid taj) and H<sub>24</sub> (Arka Rakshak) with (1.023) and minimum fruit shape index (0.887) was recorded in H<sub>5</sub> (Sampurna).

### D. Economics

In terms of economics maximum Gross Return Rs. 481920.00, Net Return Rs. 390410.00 and Cost Benefit Ratio 1:5.26 was recorded in H<sub>24</sub> (Arka Rakshak) Followed by H<sub>7</sub> (VNR - 3348) with Gross Return Rs. 455896.00, Net Return Rs. 361386.00 and Cost Benefit Ratio 1:4.82 and minimum Gross Return Rs. 282344.00, Net Return Rs. 190034.00 and Cost Benefit Ratio 1:3.05 was recorded in H<sub>10</sub> (Chaitanya).

**Table 1:** Evaluation of Tomato Hybrids for Plant Height (cm), Plant Spread (cm<sup>2</sup>) and Number of Branches/plant in Agro-climatic condition of Prayagraj.

Hybrid Symbol	Hybrid Name	Plant Height (cm)				Plant Spread (cm <sup>2</sup> )				Number of Branches/plant			
		30 DAS	60 DAS	90 DAS	120 DAS	30 DAS	60 DAS	90 DAS	120 DAS	30 DAS	60 DAS	90 DAS	120 DAS
H <sub>1</sub>	LHT-ANGEL	35.58	38.40	46.85	49.39	2,228.74	3,875.14	4,179.99	4,790.69	5.70	6.72	7.13	11.36
H <sub>2</sub>	LHT-ANMOL	32.38	37.36	44.703	48.72	2,301.21	4,325.28	4,535.00	5,194.69	5.29	6.29	7.70	12.08
H <sub>3</sub>	LHT-1486	37.03	42.04	47.39	50.40	2,277.53	3,989.35	4,236.81	4,969.07	5.34	6.03	8.14	10.20
H <sub>4</sub>	HYBRID TAJ	35.18	45.64	49.71	52.74	2,282.26	3,957.17	4,177.99	4,928.52	5.70	6.70	7.30	11.32
H <sub>5</sub>	SAMPURANA	36.60	44.28	50.68	53.80	1,891.76	4,260.98	4,483.43	4,777.52	5.64	7.18	7.62	11.75
H <sub>6</sub>	RAKSHAK	38.71	42.70	49.44	51.29	1,970.90	4,282.97	4,699.58	5,515.07	7.01	7.47	7.89	12.35
H <sub>7</sub>	VNR-3348	40.09	43.50	48.51	55.37	2,415.61	4,830.33	5,129.27	5,579.67	6.60	7.03	8.26	12.97
H <sub>8</sub>	NHT-2802	40.47	45.70	48.42	53.47	2,092.80	4,093.85	4,389.70	5,109.79	5.27	6.74	8.74	10.68
H <sub>9</sub>	BSS-1004	38.42	46.33	49.05	52.67	2,393.40	4,171.83	4,415.46	5,164.80	5.70	7.17	9.63	11.39
H <sub>10</sub>	CHAITANYA	40.06	47.07	51.06	53.07	2,044.01	3,882.11	4,175.76	5,259.61	5.41	7.47	10.45	14.00
H <sub>11</sub>	INDAM-3001	39.83	42.37	46.70	50.34	2,113.96	3,946.56	4,262.76	4,995.80	5.36	6.08	7.82	11.30
H <sub>12</sub>	RISHABH	34.66	39.12	48.40	52.80	2,141.92	3,707.15	3,819.92	4,625.14	6.33	6.70	7.02	10.46
H <sub>13</sub>	TO-3038	35.98	43.66	50.29	52.36	1,921.70	3,622.74	3,736.69	4,372.70	4.93	5.32	5.74	12.82
H <sub>14</sub>	ABHILASH	36.66	42.75	50.12	53.56	2,226.73	4,082.11	4,193.11	4,903.42	5.40	7.33	7.86	12.10
H <sub>15</sub>	LUCKY-939	32.66	42.37	51.34	54.07	2,037.01	3,973.67	4,113.52	4,851.70	5.07	6.00	6.76	10.03
H <sub>16</sub>	NS-585	34.00	41.33	51.96	53.70	2,147.80	4,410.13	4,590.58	5,123.45	5.42	6.68	7.62	10.28
H <sub>17</sub>	NAMDHARI SEEDS	39.66	46.33	50.70	54.39	2,192.45	4,384.77	4,539.09	5,112.22	5.81	7.47	9.22	12.44
H <sub>18</sub>	NS-524	24.66	35.07	42.36	45.03	2,163.69	4,170.44	4,356.05	5,232.93	5.04	6.68	9.50	12.14
H <sub>19</sub>	NS-5007	33.00	39.65	45.06	49.70	2,041.48	4,105.02	4,393.68	4,763.90	4.70	6.33	10.06	11.67
H <sub>20</sub>	EXCEL-204	29.66	37.41	45.74	50.08	1,999.09	4,647.80	5,036.60	5,392.92	6.75	7.79	10.16	14.11
H <sub>21</sub>	ROSHAN	36.18	41.47	49.39	52.03	2,996.61	3,782.06	3,947.86	4,524.65	5.71	6.04	7.81	11.01

H <sub>22</sub>	KASHI AMRIT	32.03	39.31	45.72	46.80	2,110.71	3,827.96	3,925.94	4,230.84	5.36	6.36	9.66	11.76
H <sub>23</sub>	KASHI HEMANT	37.16	39.55	45.89	47.06	2,199.31	4,095.01	4,464.30	5,034.64	4.67	7.70	10.92	15.61
H <sub>24</sub>	ARKA RAKSHAK	33.22	40.70	48.26	50.54	2,220.96	4,025.26	4,282.12	5,070.22	4.63	6.39	8.83	13.20
H <sub>25</sub>	ARKA SAMRAT	39.42	42.05	48.70	49.70	2,217.53	4,353.03	4,432.68	5,207.55	6.96	8.08	9.06	11.32
F-Test		S	NS	NS	NS	NS	NS	NS	S	NS	NS	NS	NS
SE(d)		3.372	3.663	3.966	4.128	338.504	390.762	410.539	347.270	1.08	1.08	1.651	2.154
C.V.		11.558	10.720	10.065	9.851	18.972	11.638	11.583	8.525	23.69	19.53	23.961	22.097
C.D. at 5%		6.801	7.37	7.97	8.30	680.61	785.67	825.45	700.395	2.18	2.18	3.32	4.33

**Table 2:** Evaluation of Tomato Hybrids for Number of Leaves/plant, Days to first flowering, Days to 50% flowering, Days to first fruiting, Fruit length (cm), Fruit width (cm), Fruit diameter (cm) and Number of fruits/cluster in Agro-climatic condition of Prayagraj.

Hybrid Symbol	Hybrid Name	Number of Leaves/plant				Days to First Flowering	Days to 50% Flowering	Days to First Fruiting	Fruit length (cm)	Fruit width (cm)	Fruit diameter (cm)	Number of Fruit/Cluster
		30 DAS	60 DAS	90 DAS	120 DAS							
H <sub>1</sub>	LHT-ANGEL	14.20	15.65	17.42	23.38	42.95	48.34	55.13	5.35	6.15	13.40	4.38
H <sub>2</sub>	LHT-ANMOL	13.29	14.29	16.03	20.70	35.57	41.11	47.84	4.59	5.54	13.99	4.19
H <sub>3</sub>	LHT-1486	12.75	13.36	15.30	19.66	38.20	44.48	51.10	4.94	5.33	14.33	4.27
H <sub>4</sub>	HYBRID TAJ	13.64	14.37	16.96	21.19	33.35	38.48	45.53	5.28	5.68	13.62	4.45
H <sub>5</sub>	SAMPURANA	12.74	16.02	18.07	21.45	34.97	40.45	46.81	5.11	5.00	12.97	4.40
H <sub>6</sub>	RAKSHAK	15.98	16.08	17.43	22.72	36.94	41.88	43.92	5.51	5.84	13.09	4.08
H <sub>7</sub>	VNR-3348	16.60	17.66	18.73	24.02	31.01	36.16	43.02	5.56	6.37	14.73	5.47
H <sub>8</sub>	NHT-2802	13.41	14.12	16.21	18.34	32.27	39.02	46.20	6.16	6.21	12.89	4.85
H <sub>9</sub>	BSS-1004	16.07	18.38	19.34	21.07	33.48	38.80	45.38	5.48	6.68	12.70	4.82
H <sub>10</sub>	CHAITANYA	16.20	17.44	19.29	21.82	36.66	42.77	48.94	5.88	6.26	12.49	4.11
H <sub>11</sub>	INDAM-3001	12.66	13.79	15.37	17.44	35.35	41.36	48.02	5.06	5.96	11.91	5.17
H <sub>12</sub>	RISHABH	14.00	15.55	17.42	19.53	40.26	46.00	52.98	4.88	6.15	13.05	4.92
H <sub>13</sub>	TO-3038	13.00	13.94	14.83	19.06	40.32	46.60	52.49	5.01	5.98	12.34	3.73
H <sub>14</sub>	ABHILASH	13.70	15.00	16.88	21.21	40.48	45.86	54.29	5.47	6.19	14.32	3.05
H <sub>15</sub>	LUCKY-939	15.10	16.08	16.98	19.48	45.47	48.71	55.95	5.81	6.16	13.48	4.89
H <sub>16</sub>	NS-585	16.47	17.22	17.78	20.21	45.78	50.64	57.71	5.60	6.46	12.11	4.61
H <sub>17</sub>	NAMDHARI SEEDS	15.36	16.34	18.04	22.25	42.94	47.99	55.15	5.14	6.20	12.34	5.30
H <sub>18</sub>	NS-524	14.89	16.74	18.50	21.74	37.83	43.16	50.68	5.45	6.35	13.23	4.33
H <sub>19</sub>	NS-5007	13.56	15.36	17.88	22.14	39.71	44.73	52.36	6.13	6.62	14.03	3.89
H <sub>20</sub>	EXCEL-204	17.36	18.01	18.08	23.12	36.25	42.67	49.81	4.82	5.12	12.20	4.07
H <sub>21</sub>	ROSHAN	16.36	17.13	17.85	20.36	38.49	43.53	50.34	5.76	5.75	14.80	5.58
H <sub>22</sub>	KASHI AMRIT	12.64	14.29	14.88	20.94	35.43	40.46	47.49	5.24	5.23	13.45	3.88
H <sub>23</sub>	KASHI HEMANT	14.07	15.40	16.27	19.79	37.03	41.70	49.24	5.54	6.84	12.99	4.63
H <sub>24</sub>	ARKA RAKSHAK	14.34	15.36	18.43	22.75	30.04	35.51	42.22	5.86	6.00	15.91	6.10
H <sub>25</sub>	ARKA SAMRAT	18.64	19.14	19.59	23.08	38.97	43.90	49.97	4.92	6.01	12.94	4.68
F-Test		NS	NS	NS	NS	S	S	S	NS	NS	S	NS
SE(d)		2.230	2.315	2.424	2.314	1.537	1.801	1.843	0.717	0.745	0.959	0.783
C.V.		18.600	17.862	17.117	13.429	5.009	5.133	4.542	16.301	15.198	8.803	21.049
C.D. at 5%		4.48	4.65	4.87	4.65	3.101	3.632	3.718	1.44	1.50	1.933	1.57

**Table 3:** Evaluation of Tomato Hybrids for Number of fruit/plant, Average fruit weight (g), Yield/plant (kg), Fruit yield t/ha, Total Soluble Solids (°Brix), Ascorbic acid (mg/100 g), Acidity (%), Fruit shape index and Benefit cost ratio in Agro-climatic condition of Prayagraj.

Hybrid Symbol	Hybrid Name	Number of Fruit/Plant	Average Fruit weight (g)	Yield/Plant (kg)	Fruit Yield/Plot (kg)	Fruit Yield t/ha	Total Soluble Solids (°Brix)	Ascorbic Acid (mg/100 g)	Acidity (%)	Fruit shape index	Benefit cost ratio
H <sub>1</sub>	LHT-ANGEL	28.05	63.77	1.56	10.53	42.13	5.30	22.88	0.87	0.92	1:3.53
H <sub>2</sub>	LHT-ANMOL	27.30	89.41	1.92	10.65	42.61	4.87	24.44	0.84	0.94	1:3.63
H <sub>3</sub>	LHT-1486	29.11	79.15	2.29	11.92	47.70	5.24	24.92	0.82	0.94	1:4.10
H <sub>4</sub>	HYBRID TAJ	31.90	51.18	1.58	11.78	47.13	3.91	26.09	1.04	1.02	1:4.10
H <sub>5</sub>	SAMPURANA	28.74	53.34	1.90	10.72	42.99	5.56	25.33	0.81	0.88	1:3.39
H <sub>6</sub>	RAKSHAK	34.89	77.10	2.43	11.78	47.08	4.90	26.37	0.91	0.99	1:3.72
H <sub>7</sub>	VNR-3348	42.47	88.20	2.81	13.92	56.98	5.23	24.84	0.79	0.98	1:4.82
H <sub>8</sub>	NHT-2802	31.96	111.82	2.29	12.68	50.74	5.60	25.26	0.81	0.91	1:4.38
H <sub>9</sub>	BSS-1004	31.44	71.93	2.48	12.90	51.62	4.97	25.68	0.82	0.94	1:4.20
H <sub>10</sub>	CHAITANYA	29.30	66.83	2.50	8.80	35.29	5.53	23.34	0.87	1.05	1:3.05
H <sub>11</sub>	INDAM-3001	35.41	62.75	2.27	13.87	55.48	4.78	24.97	0.85	0.94	1:4.55
H <sub>12</sub>	RISHABH	30.96	82.27	1.90	10.65	42.62	5.96	25.71	0.91	1.00	1:3.37
H <sub>13</sub>	TO-3038	30.59	74.26	2.40	10.38	41.52	5.40	25.52	0.90	0.99	1:3.54
H <sub>14</sub>	ABHILASH	27.17	64.61	1.41	9.88	39.52	5.80	26.63	0.95	0.95	1:3.37

H <sub>15</sub>	LUCKY-939	30.70	67.20	1.42	12.91	51.64	5.57	25.86	0.93	0.99	1:4.15
H <sub>16</sub>	NS-585	33.02	67.08	1.80	12.78	51.13	5.26	23.54	0.87	1.00	1:4.20
H <sub>17</sub>	NAMDHARI SEEDS	37.13	86.90	2.65	12.81	51.26	5.23	24.50	0.80	1.01	1:4.18
H <sub>18</sub>	NS-524	28.76	85.89	2.68	11.27	45.09	5.13	25.23	0.78	0.98	1:3.86
H <sub>19</sub>	NS-5007	25.27	66.36	2.56	13.83	55.34	5.31	24.90	0.81	0.99	1:4.63
H <sub>20</sub>	EXCEL-204	24.32	63.60	2.49	9.97	39.89	6.07	26.90	0.79	0.96	1:3.28
H <sub>21</sub>	ROSHAN	33.88	76.12	2.35	9.33	37.33	5.81	26.05	0.85	0.91	1:3.11
H <sub>22</sub>	KASHI AMRIT	27.34	72.44	1.99	12.93	51.74	5.30	24.96	0.84	0.94	1:4.41
H <sub>23</sub>	KASHI HEMANT	29.34	96.92	2.71	14.24	55.69	5.66	25.66	0.87	0.97	1:4.79
H <sub>24</sub>	ARKA RAKSHAK	44.55	99.86	3.01	15.06	60.24	5.56	26.07	0.76	1.02	1:5.26
H <sub>25</sub>	ARKA SAMRAT	33.40	65.27	2.74	12.30	49.22	5.20	24.51	0.74	0.95	1:4.30
F-Test		S	S	S	S	S	S	NS	S	NS	
SE(d)		2.228	10.891	0.350	1.423	5.695	0.371	1.157	0.071	0.063	
C.V.		8.667	17.696	19.064	14.619	14.627	8.518	5.621	10.206	7.981	
C.D. at 5%		4.494	21.965	0.706	2.869	11.486	0.748	2.33	0.143	0.13	

### Conclusion

From the present experimental findings it is concluded that the Hybrid H<sub>24</sub> (Arka Rakshak) followed by H<sub>7</sub> (VNR - 3348) and H<sub>23</sub> (Kashi Hemant) is found best in terms of growth and yield parameters of Tomato hybrids and in terms of quality parameters Hybrid H<sub>20</sub> (Excel - 204) is found best for most of the quality parameters, and lowest readings was recorded in Hybrid H<sub>4</sub> (Hybrid Taj), H<sub>14</sub> (Abhilash) and H<sub>16</sub> (NS - 585). H<sub>24</sub> (Arka Rakshak) also recorded maximum return/ha and Cost benefit ratio/ha. Hence the hybrids Arka Rakshak, VNR – 3348 and Kashi Hemant is recommended for cultivation in climatic condition of Prayagraj.

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