

RESEARCH PAPER

Evaluation of resistance for early blight caused by *Alternaria solani* (Ellis and Martin) Sorauer in tomato

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A trial was conducted during *Rabi* season 2011-2012 under field conditions for phenotyping of germplasm under natural conditions that have been developed for resistance against early blight of tomato caused by *Alternaria solani*. Field studies showed significant variation among all tested germplasm lines with respect to early blight disease assessment. Under field conditions the natural disease severity was scored on a five-point scale (0-5). The per cent disease index (PDI) and area under disease progress curve (AUDPC) value were calculated on the basis of data recorded. The mean AUDPC value in resistant (206 lines); moderately resistant (223 lines); moderately susceptible (129 lines) and susceptible (143 lines) tomato lines ranged between 102.00 to 447.25; 447.26 to 792.50; 792.51 to 1137.75 and 1137.76 to 1483.00, respectively.

Key words : *Alternaria solani*, Tomato, Natural inoculums, Phenotyping, Resistant, AUDPC

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INTRODUCTION

Vegetable crops have an important place in the agricultural economy of India. Tomato (*Lycopersicon esculentum* Mill, n = 12) belongs to the family Solanaceae and is one of the most remunerable and widely grown vegetables in the world. Tomato cultivation has become more popular since mid nineteenth century because of its varied climatic adaptability and high nutritive value. Tomato is being exported in the form of whole fruits, paste and in canned form to West Asian countries, U.K. Canada and USA (Anonymous, 2012).

Early blight (EB) is the major disease symptom caused by the fungus *Alternaria solani* (Ellis and Martin) Sorauer. This disease, which in severe cases can lead to

complete defoliation, is most damaging on tomato [*Solanum lycopersicum* L. (Peralta *et al.*, 2005) syn. *L. esculentum* Mill.] in regions with heavy rainfall, high humidity and fairly high temperatures (24-29°C). Epidemics can also occur in semiarid climates where frequent and prolonged nightly dews occur (Rotem and Reichert, 1964). Apart from the leaf symptoms that are known as EB, *A. solani* causes other symptoms on tomato which are less economically important, including collar rot (basal stem lesions at the seedling stage), stem lesions in the adult plant stage and fruit rot (Walker, 1952). Yield losses upto 79 per cent due to EB damage were reported from Canada, India, USA and Nigeria (Basu, 1974; Datar and Mayee, 1981; Sherf and MacNab, 1986

and Gwary and Nahunnaro, 1998).

The development of resistant variety is an important component of integrated disease management (IDM) strategies. Resistant cultivars are potentially the most economical control measure as they can extend the fungicide spray intervals while maintaining control of the disease (Madden *et al.*, 1978; Shtienberg *et al.*, 1995 and Keinath *et al.*, 1996). Classical quantitative genetic analyses have provided estimates of the number of quantitative trait loci (QTLs) for early blight resistance, average gene action and heritability which provided the prospects for progress in breeding programmes based on phenotypic selection (Nash and Gardner, 1988; Maiero *et al.*, 1990a and b).

Most genetic studies on the inheritance of EB resistance using different sources of resistance (*S. lycopersicum*, *S. habrochaites* and *S. pimpinellifolium*) arrived at the same conclusions that the resistance is a quantitative trait that is controlled polygenically. The estimated minimum number of controlling factors is two (Barksdale and stoner, 1977) or three (Nash and Gardner, 1988). The EB resistance genes in C1943 and 71B2 are recessive and not allelic (Barksdale and Stoner, 1977; Maiero *et al.*, 1989). The line 87B187, derived from *S. habrochaites* PI 390662, shared common resistance genes with NCEBR-2, although this line was developed via C1943 from a *S. lycopersicum* source (Maiero *et al.*, 1990a).

Most of the available resistance sources are not in practical use owing to several unacceptable qualitative and quantitative attributes. It is also not easy to transfer resistant characteristics to a cultivated variety. However, a few commercial cultivars with a moderate but useful degree of resistance have been released like Manapal (Walter *et al.*, 1961), Meltine and Nemato (Vakalounakis 1983).

RESEARCH METHODOLOGY

The seeds of 701 tomato germplasm lines were collected from IIVR, Varanasi. Some germplasm lines have determinate growth habit and remaining lines have indeterminate growth habit. Fifty per cent flowering, fruit setting and senescence stages were recorded of all 701 germplasm lines.

Details of field experiment:

The details of layout plan are given as follows: Total

701 tomato germplasm lines was taken with Randomized Block Design (RBD). Each germplasm line was taken with ten plants.

Raising of nursery:

Seed of 701 tomato germplasm lines were taken for growing in nursery. The mixture of soil, sand and FYM were taken in nursery and seeds were sown. After sowing the beds were covered with a thin film of water thereafter light and frequent irrigation were given at a regular interval in order to maintain sufficient moisture in nursery plots for good growth of seedlings. The tomato seedlings were ready for transplanting after 30 days of seeding. Seedling were uprooted carefully from the beds and transplanted in the field condition.

Disease assessment :

The naturally infected tomato plants were regularly examined for appearance of early blight symptoms starting from next day of transplanting. The data of early blight were recorded on five different dates at 15 days intervals *i.e.* 15, 30, 45, 60 and 75 days after transplanting (DAT). Early blight severity on each sprayed plants was recorded on a scale of 0 to 5 (Vakalounakis, 1983).

Table A : Description of disease scale (0-5)

Sr. No.	0-5 Scale	Per cent leaf area infected
1.	0	No infection
2.	1	10
3.	2	11-25
4.	3	26-50
5.	4	51-75
6.	5	> 75

$$PDI = \frac{\text{Sum of all ratings} \times 100}{\text{Total no. of observations} \times \text{Maximum rating scale}}$$

Per cent disease index (PDI) was worked out by using formula given by Wheeler (1969).

The host plant reaction was classified based on area under disease progress curve. Area under disease progress curve (AUDPC) was calculated as per Shaner and Finney *et al.* (1977) and Johnson and Wilcoxson (1982).

$$AUDPC = \sum_{i=1}^{p-1} \{[(X_{i+1} + X_i)/2] * (t_{i+1} - t_i)\}$$

where;

– X_i is the disease index expressed as a proportion at the i^{th} observation.

- t_i is the time (days after planting) at the i^{th} observations.
- And n is the total number of observations.

Statistical analysis:

The experiment was laid out in Randomize Block Design (RBD) with five replications in field condition. The values of data obtained from the field were subjected to following statistical analysis.

- Analysis of variance (ANOVA)
- DNMRT analysis by SAS.

RESEARCH FINDINGS AND ANALYSIS

Natural screening of 701 germplasm lines of tomato has been done for resistance to early blight caused by *A. solani* under field conditions. The 50 per cent flowering, fruit setting and senescences stages were also recorded.

Area under disease progress curve (AUPDC) :

In field conditions with natural inoculums the AUPDC value were calculated on the basis of PDI value. All the germplasm lines were grouped in four categories (Resistant, moderately resistant, moderately susceptible and susceptible) on the basis of AUDPC value. Out of 701 germplasm lines to find out two hundred six resistance lines ranged from 102.00 to 447.25; two hundred twenty three moderately resistance lines ranged from 447.26 to 792.50; one hundred twenty nine moderately susceptible lines ranged from 792.51 to 1137.75 and one hundred forty three susceptible lines ranged from 1137.76 to 1483.00 were recorded in the year of 2011-2012.

Maximum AUDPC value (1483.00) was recorded in germplasm line PS-1, which was pointed in susceptible (S) group with flowering time 21 days after transplanting, fruit setting time 9 days after flowering and senescences stage 20 days after fruit setting (Table 1). The minimum AUDPC value (102.00) was recorded in germplasm line BT-10, which was pointed in resistant (R) group with flowering time 21 days after transplanting, fruit setting time 13 days after flowering and senescences stage 30 days after fruit setting. Over all of 701 germplasm lines the AUDPC range has been recorded between 102.00 to 1483.00 in natural screening under field condition.

Flowering, fruit setting and senescence stage:

Flowering time were recorded between 17 to 48 day after transplanting of all germplasm lines; fruit setting time was observed between 8 to 15 day after flowering

of all germplasm lines and senescences stage was also recorded between 17 to 35 day after fruit setting of all germplasm lines. Minimum time for flowering 17 day after transplanting was observed in indeterminate line EC-620501 and maximum time for flowering 48 day after transplanting was observed in determinate line DARL-66. Minimum time for fruit setting 8 day after flowering were observed in indeterminate line G-4-2 and determinate line PB- Kesari and maximum time for fruit setting 16 day after flowering was observed in determinate line DVRT-14. Minimum time for senescences 16 day after fruit setting was observed in indeterminate line TLS-30 and maximum time for senescences 35 day after fruit setting was observed in determinate ArkaAlok.

Main difficulty in breeding tomatoes for early blight resistance has been the screening process. Field evaluation has been the principal procedure and one that has resulted in reliable information. Field screening, has limitations, as it depends on the presence of proper environmental conditions such as humidity, temperature and the pathogen inoculums. Furthermore, field screening can often be carried out only once a year. Such limitations would restrict breeding progress (Foolad *et al.*, 2000). Various methods have been used to evaluate tomato RILs for disease resistance under field conditions (Barksdale, 1971). In the present study, AUDPC value was used to evaluate and compare tomato germplasm lines to each other (Table 1). The advantages of field screening include the ability to grow large populations, evaluating plants under natural conditions and recording disease progress throughout the entire life cycle of the plant. When screening large-size populations, it may be sufficient to conduct only a single evaluation (Foolad *et al.*, 2000). The procedures described in this paper should make it possible to avoid highly susceptible varieties and result should in selections with high degrees of resistance.

Conclusion:

This method is more attractive for large scale screening. Natural screening was a best method for early blight resistant in tomato, it was also a better way for primary screening in tomato for further study with artificial inoculums. Natural inoculums in field evaluation was found to be useful for screening tomatoes for EB resistance, so it may be employed to facilitate EB resistance breeding. The AUDPC value of germplasm lines in field condition was observed in a better way as

Table 1: Plant growth type, 50 per cent flowering days after transplanting, fruit setting after flowering, senescence days after fruit setting, AUDPC and host reaction of 701 germplasm lines of tomato

Sr. No.	Name of lines	PGT *	DF *	DFS *	DSS *	AUDPC *	HR *	Sr. No.	Name of lines	PGT *	DF *	DFS*	DSS *	AUDPC *	HR *
1.	971384	D	30	12	29	520.20	MR	352.	EC- 620573	ID	37	14	23	1285.20	S
2.	Ajeet T-2	D	31	15	29	1479.00	S	353.	EC- 620533	D	24	12	26	1300.50	S
3.	971753	D	32	14	25	642.60	MR	354.	EC- 620534	ID	34	10	24	688.50	MR
4.	Angoorlata	ID	30	11	23	122.40	R	355.	EC- 620536	ID	34	9	23	1040.40	MS
5.	ArkaAlok	D	30	12	35	183.60	R	356.	EC- 620517	ID	33	9	25	1479.00	S
6.	971754	ID	29	12	34	224.40	R	357.	EC- 620516	ID	32	15	29	688.50	MR
7.	Azad T-5	ID	22	12	21	224.40	R	358.	EC- 620523	ID	25	14	25	1300.50	S
8.	Ageta-32	ID	23	14	19	122.40	R	359.	EC- 620514	D	24	15	23	438.60	R
9.	BT-10	ID	21	13	30	102.00	R	360.	EC- 620535	ID	39	15	23	550.80	MR
10.	B-9-2	ID	40	10	30	112.20	R	361.	EC- 620570	ID	34	13	24	244.80	R
11.	B-10-2	ID	23	9	26	183.60	R	362.	EC- 621667-B	ID	28	13	19	918.00	MS
12.	ArkaSaurabh	D	24	12	21	1479.00	S	363.	EC- 620569	ID	38	12	20	1208.70	S
13.	ArkaMeghali	D	33	13	32	438.60	R	364.	EC- 620568	ID	40	14	20	550.80	MR
14.	B-7-1	ID	39	10	27	1234.20	S	365.	EC- 620559	ID	39	12	24	688.50	MR
15.	B-7-2	ID	36	9	30	326.40	R	366.	EC- 620558	ID	38	15	22	504.90	MR
16.	ArkaVikas	D	19	12	31	1479.00	S	367.	EC- 620560	ID	28	14	27	275.40	R
17.	Azad T-6	D	28	11	32	1193.40	S	368.	EC- 620552	ID	32	11	21	1448.40	S
18.	Azad T-5	ID	24	11	27	1269.90	S	369.	EC- 620561	ID	37	12	25	1479.00	S
19.	B-9-3	D	31	11	34	346.80	R	370.	EC- 620574	ID	34	12	21	688.50	MR
20.	BT-121	D	32	11	29	377.40	R	371.	EC- 620565	ID	38	12	22	994.50	MS
21.	B-4-1	ID	36	14	29	550.80	MR	372.	EC- 620554	ID	39	11	20	346.80	R
22.	BT-120	D	31	12	25	132.60	R	373.	F-2-4	ID	28	10	28	1009.80	MS
23.	BT-11	ID	36	10	23	173.40	R	374.	EC- 620505	ID	41	10	23	1132.20	MS
24.	Bhilai-2	D	34	9	35	122.40	R	375.	EC- 620507	ID	36	9	23	382.50	R
25.	B-5-1	ID	28	9	34	122.40	R	376.	EC- 620462	ID	32	12	26	1479.00	S
26.	Avinash-2-2-1	ID	30	15	21	1142.40	S	377.	EC- 620478	ID	33	13	27	688.50	MR
27.	ArkaAbka	ID	31	14	19	571.20	MR	378.	EC- 620481	ID	33	10	25	612.00	MR
28.	B-9-1	D	40	15	30	693.60	MR	379.	EC- 620492	ID	30	9	27	688.50	MR
29.	C-2-2	D	37	15	30	887.40	MS	380.	EC- 620491	ID	24	12	21	887.40	MS
30.	C-14-1	D	43	13	26	1254.60	S	381.	EC- 620597	D	32	11	22	1479.00	S
31.	C-2-3	D	40	13	21	887.40	MS	382.	EC- 620598	D	34	11	24	688.50	MR
32.	C-3-2	ID	37	12	32	1116.90	MS	383.	EC- 620555	ID	25	11	19	1361.70	S
33.	C-6-3	ID	41	14	27	887.40	MS	384.	EC- 620540	ID	35	11	23	902.70	MS
34.	C-20-2	D	40	12	30	326.40	R	385.	EC- 620548	ID	23	14	20	1361.70	S
35.	C-22-1	ID	37	15	31	887.40	MS	386.	EC- 620510	ID	32	12	26	1448.40	S
36.	C-20-1	D	43	14	32	1142.40	S	387.	EC- 620509	ID	35	10	21	1422.90	S
37.	C-15-1	ID	35	11	27	918.00	MS	388.	EC- 620511	ID	43	9	22	550.80	MR
38.	C-2-1	D	28	12	34	459.00	MR	389.	EC- 620508	ID	33	9	25	561.00	MR

Table 1: Contd.....

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39.	C-14-2	ID	35	12	24	260.10	R	390.	EC- 620575	ID	33	15	22	443.70	R
40.	C-10-3	ID	38	12	17	550.80	MR	391.	EC- 620512	ID	41	14	17	326.40	R
41.	BTH-9	ID	42	11	19	1264.80	S	392.	EC- 620551	ID	42	11	18	1208.70	S
42.	C-1-1	ID	43	10	24	1254.60	S	393.	EC- 620544	ID	35	11	30	688.50	MR
43.	C-11-4	ID	28	10	24	255.00	R	394.	EC- 620648	ID	31	13	27	1361.70	S
44.	C-21-1	ID	40	9	28	663.00	MR	395.	EC- 620563	ID	39	13	26	571.20	MR
45.	C-12-2	D	34	12	21	1071.00	MS	396.	EC- 620567	ID	37	12	27	1392.30	S
46.	C-3-3	D	40	13	20	663.00	MR	397.	EC- 620442	ID	35	14	23	1331.10	S
47.	C-12-1	D	37	10	26	1468.80	S	398.	EC- 625651	ID	30	12	24	224.40	R
48.	C-5-2	D	40	9	23	1254.60	S	399.	EC- 620495	ID	36	9	30	1208.70	S
49.	C-10-1	ID	37	12	32	234.60	R	400.	EC- 620488	ID	31	9	30	1392.30	S
50.	C-10-4	ID	40	11	29	214.20	R	401.	EC- 620500	ID	25	13	18	688.50	MR
51.	C-10-2	ID	41	11	31	1254.60	S	402.	EC- 620486	ID	26	10	28	1448.40	S
52.	C-11-1	ID	32	11	30	1254.60	S	403.	EC- 620504	ID	23	9	20	688.50	MR
53.	C-11-3	D	39	11	27	550.80	MR	404.	EC- 620553	ID	34	12	28	1479.00	S
54.	BT-1-36	D	35	14	33	448.80	MR	405.	EC- 620501	ID	17	13	31	688.50	MR
55.	C-11-2	ID	27	12	27	459.00	MR	406.	EC- 620549	ID	35	10	33	1269.90	S
56.	C-13-1	ID	35	10	27	1479.00	S	407.	EC- 620556	D	34	9	28	1392.30	S
57.	C-19-1	ID	31	9	18	1366.80	S	408.	EC- 620541	ID	33	12	26	1468.80	S
58.	C-1-4	ID	42	9	29	132.60	R	409.	EC- 620545	D	33	11	26	132.60	R
59.	C-4-1	D	38	15	23	132.60	R	410.	EC- 625665	ID	37	8	24	1142.40	S
60.	C-6-2	D	28	14	28	275.40	R	411.	EC- 625657	ID	37	9	32	734.40	MR
61.	C-7-1	D	38	15	23	224.40	R	412.	F-2-2	ID	32	11	25	214.20	R
62.	CLN - 2116	D	43	11	26	1234.20	S	413.	EC- 625642	ID	41	14	17	1208.70	S
63.	CLN-2011	ID	38	13	30	255.00	R	414.	EC- 624077	ID	36	12	31	224.40	R
64.	CLN-2366	D	40	13	20	438.60	R	415.	EC- 625644	ID	31	12	20	1132.20	MS
65.	C-7-2	ID	36	12	22	1234.20	S	416.	EC- 625652	ID	32	15	30	234.60	R
66.	C-9-1	ID	36	14	26	214.20	R	417.	EC- 63531	ID	34	14	20	688.50	MR
67.	C-8-1	D	36	12	29	1234.20	S	418.	EC- 6004	ID	24	11	20	612.00	MR
68.	C-9-2	ID	41	9	28	214.20	R	419.	EC- 6486	ID	37	12	22	504.90	MR
69.	CHART-4	ID	39	9	30	438.60	R	420.	EC- 625645	ID	40	12	22	306.00	R
70.	CH-155	ID	28	13	26	132.60	R	421.	EC- 625643	ID	39	12	27	459.00	MR
71.	CLN-2026-C	D	28	10	26	1132.20	MS	422.	EC- 9046	ID	34	14	24	688.50	MR
72.	C-8-2	D	40	9	32	326.40	R	423.	F-1-1	ID	24	13	24	663.00	MR
73.	CGT	ID	36	12	21	346.80	R	424.	F-5020	ID	25	10	20	877.20	MS
74.	DCT-2	ID	36	13	28	530.40	MR	425.	EC-2822	D	35	9	29	663.00	MR
75.	D-7-1	D	35	10	17	244.80	R	426.	EC-8591	ID	18	12	32	561.00	MR
76.	Shrubby	ID	23	9	24	244.80	R	427.	EC-625660	ID	36	13	32	1040.40	MS
77.	D-5-2	ID	37	12	19	459.00	MR	428.	F-3-1	D	23	10	26	688.50	MR
78.	D-7-2	D	35	11	18	1346.40	S	429.	EC-625647	ID	37	9	19	1422.90	S
79.	DMT-1	D	46	8	18	663.00	MR	430.	EC-625-486	ID	19	12	18	367.20	R
80.	D-1-2	D	43	9	18	1234.20	S	431.	EC-7912	ID	31	11	21	1101.60	MS

Table 1 : Contd.....

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81.	D-2-2	ID	30	11	30	663.00	MR	432.	EC-625653	D	32	11	21	561.00	MR
82.	D-1-1	D	35	14	22	326.40	R	433.	F-1-2	ID	23	11	20	1300.50	S
83.	D-2-1	ID	35	12	19	438.60	R	434.	EC-625658	ID	35	11	20	321.30	R
84.	D-2-3	D	35	10	23	1234.20	S	435.	EC-6792	ID	34	14	20	1116.90	MS
85.	D-2-1-1	D	36	9	22	326.40	R	436.	F-9-2	ID	37	12	33	561.00	MR
86.	C-26-1	D	23	9	18	1224.00	S	437.	F-8-2	ID	42	10	27	428.40	R
87.	C-14-4-2	ID	37	15	20	469.20	MR	438.	Flora date	ID	40	9	27	459.00	MR
88.	D-3-1	ID	38	14	19	550.80	MR	439.	FLA-7421	ID	31	9	27	673.20	MR
89.	D-3-2	D	20	15	18	550.80	MR	440.	G-1-1	ID	38	15	20	183.60	R
90.	DARL-66	D	48	15	17	1132.20	MS	441.	G-2-2	D	40	14	18	1366.80	S
91.	D-5-1	D	27	13	25	346.80	R	442.	F-8-4	ID	31	15	23	326.40	R
92.	D-2-2-1	D	39	13	24	326.40	R	443.	G-1-2	ID	33	15	32	561.00	MR
93.	EC-13904	D	35	12	25	306.00	R	444.	F-7-3	ID	31	13	33	510.00	MR
94.	EC-538156	ID	26	14	19	1147.50	S	445.	F-9-1	ID	37	13	21	1366.80	S
95.	EC-12692	D	39	12	21	1234.20	S	446.	G-2-1	ID	39	12	21	550.80	MR
96.	EC-126902	ID	35	15	23	214.20	R	447.	F-4-1	ID	31	14	28	1458.60	S
97.	EC-15127	ID	35	14	26	234.60	R	448.	EC-62-5659	ID	32	12	30	1458.60	S
98.	EC-3526	D	42	11	24	326.40	R	449.	Feb.-02	D	38	15	20	336.60	R
99.	EC-539450	D	25	12	23	1244.40	S	450.	F-8-5	ID	33	14	29	1458.60	S
100.	EC-141887	ID	38	12	25	234.60	R	451.	FLA-7171	ID	28	11	19	112.20	R
101.	EC-13736	ID	35	12	29	1132.20	MS	452.	F-6022	ID	30	12	22	688.50	MR
102.	EC-10304	ID	39	14	25	214.20	R	453.	F-7012	ID	31	12	25	1479.00	S
103.	EC-135580	ID	25	13	23	566.10	MR	454.	F-7028	ID	32	12	22	112.20	R
104.	E-4-3	D	40	10	23	265.20	R	455.	F-6-4	ID	33	11	30	571.20	MR
105.	E-2-1	ID	40	9	24	438.60	R	456.	F-6-3	ID	33	10	27	795.60	MS
106.	DT-10	ID	35	12	19	428.40	R	457.	F-7-1	ID	39	10	27	688.50	MR
107.	E-8-1	ID	39	13	20	1234.20	S	458.	F-6050-1	ID	29	9	24	1479.00	S
108.	DVRT-2	ID	27	10	20	234.60	R	459.	F-7-4	ID	26	12	24	1458.60	S
109.	EC-3527828	ID	24	9	24	1479.00	S	460.	F-8-2	ID	36	13	29	214.20	R
110.	EC-14078	ID	39	12	22	1264.80	S	461.	G-2-3	ID	37	10	28	612.00	MR
111.	E-6-2	D	38	11	27	561.00	MR	462.	F-6-1	ID	38	9	32	224.40	R
112.	E-4-1	ID	27	11	21	1275.00	S	463.	G-3-1	ID	37	12	17	719.10	MR
113.	E-2-2	ID	36	11	25	540.60	MR	464.	G-4-1	ID	33	11	22	428.40	R
114.	E-3-1	D	35	11	21	1244.40	S	465.	F-8-1	ID	31	11	20	459.00	MR
115.	E-5-1	D	40	14	22	459.00	MR	466.	F-6059	ID	37	11	24	571.20	MR
116.	E-6-1	D	39	12	20	142.80	R	467.	JT-3	ID	31	11	27	703.80	MR
117.	E-1-1	ID	36	10	28	591.60	MR	468.	Indam-2105-4	ID	33	14	26	214.20	R
118.	EC-35293	ID	39	9	23	1162.80	S	469.	IC-427006	ID	31	12	28	224.40	R
119.	E-4-2	D	40	9	23	530.40	MR	470.	IC-373378	ID	33	10	27	459.00	MR
120.	EC-31761	ID	35	15	26	459.00	MR	471.	F-6-2	ID	32	9	23	994.50	MS
121.	EC-317-6	ID	35	14	27	408.00	R	472.	Feb.- 04	ID	33	9	22	290.70	R

Table 1 : Countd.....

Table 1 : Countd.....

122.	EC- 2977	ID	39	15	25	459.00	MR	473.	F-7-2	ID	23	15	28	535.50	MR
123.	EC- 1914	D	26	15	27	591.60	MR	474.	F-7025	ID	33	14	26	703.80	MR
124.	EC- 299335	ID	31	13	21	550.80	MR	475.	G-4-4	ID	36	15	29	428.40	R
125.	EC- 27995	ID	42	12	22	530.40	MR	476.	G-5-3	ID	37	11	20	408.00	R
126.	EC- 168290	D	30	15	24	1448.40	S	477.	G-5-2	ID	36	13	27	367.20	R
127.	EC- 322634	ID	36	14	19	510.00	MR	478.	HATH-8	ID	33	13	18	489.60	MR
128.	EC- 326106	D	25	11	23	520.20	MR	479.	HATH-T-4	ID	34	12	21	1142.40	S
129.	EC- 35322	D	27	12	20	428.40	R	480.	GT-1	ID	38	14	33	183.60	R
130.	EC- 326146	ID	37	12	26	214.20	R	481.	GT-12	ID	37	12	34	397.80	R
131.	EC- 381554	D	35	12	21	244.80	R	482.	G-4-3	ID	36	9	21	122.40	R
132.	EC- 339066	D	38	14	22	459.00	MR	483.	H-2-2	ID	33	9	30	459.00	MR
133.	EC- 32933	ID	37	13	25	510.00	MR	484.	H-1-4	ID	39	13	22	214.20	R
134.	EC- 339057-A	D	39	10	22	693.60	MR	485.	G-5-1	ID	28	10	31	265.20	R
135.	EC- 16788	ID	35	9	17	816.00	MS	486.	G-4-5	ID	38	9	21	326.40	R
136.	EC- 2517	D	35	12	18	1101.60	MS	487.	G-5-4	D	39	12	26	775.20	MR
137.	EC- 164660	ID	35	13	30	867.00	MS	488.	G-7-1	ID	35	13	30	1009.80	MS
138.	EC- 251649	ID	35	10	27	550.80	MR	489.	GT-2	ID	33	10	20	459.00	MR
139.	EC- 2798	ID	38	9	26	591.60	MR	490.	G-6-3	ID	38	9	34	438.60	R
140.	EC- 501574	ID	46	12	27	693.60	MR	491.	H-1-1	ID	35	12	30	775.20	MR
141.	EC- 27251	ID	39	11	23	999.60	MS	492.	G-7-2	ID	36	11	32	775.20	MR
142.	EC- 170047	ID	40	11	24	1009.80	MS	493.	G-4-2	ID	36	8	21	673.20	MR
143.	EC- 29914	ID	35	11	30	428.40	R	494.	G-6-1	ID	35	9	24	734.40	MR
144.	EC- 273966	ID	23	11	30	122.40	R	495.	H-88-78-2	ID	43	11	27	142.80	R
145.	EC- 25265	ID	39	14	18	142.80	R	496.	H-1-3	D	37	14	26	122.40	R
146.	EC- 501580	ID	20	12	28	428.40	R	497.	H-1-2	ID	33	12	28	224.40	R
147.	EC- 50075	D	35	10	20	122.40	R	498.	H-88-78-1	D	33	10	30	224.40	R
148.	EC- 501577	ID	42	9	28	428.40	R	499.	H-2-1	ID	33	9	30	1009.80	MS
149.	EC- 381263	ID	39	9	31	1448.40	S	500.	H-3-1	ID	33	9	29	795.60	MS
150.	EC- 501583	ID	41	15	33	285.60	R	501.	H-88-78-5	ID	32	15	27	897.60	MS
151.	EC- 501575	ID	40	14	28	418.20	R	502.	H-24	ID	35	14	19	489.60	MR
152.	EC- 362933	D	35	15	26	255.00	R	503.	H-23	ID	33	15	23	887.40	MS
153.	EC- 362942	ID	38	15	26	550.80	MR	504.	IC-447708	ID	32	15	24	382.50	R
154.	EC- 177371	ID	26	13	24	357.00	R	505.	LH-301-SPS	ID	19	13	32	1009.80	MS
155.	EC- 366899	ID	38	13	32	357.00	R	506.	IC-439542	ID	35	13	32	224.40	R
156.	EC- 362941	ID	27	12	25	550.80	MR	507.	Kajla bulk	ID	33	12	30	244.80	R
157.	EC- 368883	ID	40	14	17	408.00	R	508.	I-4-4	ID	32	14	31	448.80	MR
158.	EC- 362948	ID	26	12	31	510.00	MR	509.	Indam-2102-1-7	ID	33	12	28	306.00	R
159.	EC- 251881	D	25	15	20	591.60	MR	510.	I-1-4	ID	38	15	26	581.40	MR
160.	EC- 2791	ID	21	14	30	612.00	MR	511.	I-1-2	ID	36	14	25	663.00	MR
161.	EC- 241446	D	40	11	20	663.00	MR	512.	I-4-3	ID	37	11	20	642.60	MR
162.	EC- 52077	ID	40	12	20	234.60	R	513.	I-4-2	ID	40	12	32	1009.80	MS

Table 1 : Countd.....

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163.	EC- 520046	D	35	12	22	1142.40	S	514.	HATH-8	ID	41	12	26	1009.80	MS
164.	EC- 520053	ID	35	12	22	1254.60	S	515.	I-4-8	ID	35	12	22	999.60	MS
165.	EC- 501576	ID	31	11	27	1479.00	S	516.	HisarArun	ID	38	14	23	571.20	MR
166.	EC- 501061	ID	36	10	24	1208.70	S	517.	I-181	ID	33	13	35	775.20	MR
167.	EC- 521038	ID	35	10	24	1025.10	MS	518.	I-2-1	ID	39	10	34	887.40	MS
168.	EC- 521068	ID	35	9	20	122.40	R	519.	I-2-2	D	37	9	21	244.80	R
169.	EC- 501582	ID	42	12	29	1122.00	MS	520.	I-1-1	ID	36	12	19	504.90	MR
170.	EC- 520075	ID	35	13	32	1315.80	S	521.	IC-469517	ID	35	13	30	1479.00	S
171.	EC- 521071	ID	23	10	32	775.20	MR	522.	HisarLalit	ID	33	10	30	963.90	MS
172.	EC- 521039	D	26	9	26	907.80	MS	523.	I-1-3	ID	32	9	26	663.00	MR
173.	EC- 521047	ID	38	12	19	1132.20	S	524.	KashiHemant	ID	26	12	21	1178.10	S
174.	EC- 521055	ID	39	11	18	877.20	MS	525.	KashiVishesh	ID	35	11	32	1269.90	S
175.	EC- 521056	ID	28	11	21	805.80	MS	526.	KS-16	ID	36	11	27	897.60	MS
176.	EC- 521069	ID	39	11	21	346.80	R	527.	Kasmiriya	ID	19	11	30	999.60	MS
177.	EC- 526139	ID	25	11	20	214.20	R	528.	LA-3997	ID	35	11	31	1009.80	MS
178.	EC- 520059	ID	23	14	20	326.40	R	529.	LA-3957	ID	33	14	32	688.50	MR
179.	EC- 546727	ID	22	12	20	810.90	MS	530.	Kal. type-1	ID	32	12	27	907.80	MS
180.	EC- 538444	D	22	10	33	765.00	MR	531.	LA-3772	ID	33	10	34	907.80	MS
181.	EC- 538455	ID	26	9	27	816.00	MS	532.	NDTVR-60	ID	39	9	29	413.10	R
182.	EC- 538439	ID	22	9	27	1132.20	MS	533.	NDT-4	ID	39	9	29	897.60	MS
183.	EC- 538156	ID	40	15	27	1254.60	S	534.	Indam-2103-6	ID	33	15	25	183.60	R
184.	EC- 568940	ID	26	14	20	346.80	R	535.	IC-469626	ID	21	14	23	663.00	MR
185.	EC- 538440	ID	27	15	18	535.50	MR	536.	Indam-2103-1-1	ID	38	15	35	887.40	MS
186.	EC- 531805	D	22	11	23	428.40	R	537.	IIHR-2202	ID	39	15	34	979.20	MS
187.	EC- 538146	ID	26	13	32	224.40	R	538.	IIHR-1	ID	33	13	21	1025.10	MS
188.	EC- 538419	ID	24	13	33	1300.50	S	539.	Indam-2103-6-4	ID	32	12	19	795.60	MS
189.	EC- 538405	D	20	12	21	1377.00	S	540.	IC-469603	ID	33	15	30	887.40	MS
190.	EC- 538380	ID	35	14	21	122.40	R	541.	Indam-2103-1-1	ID	38	14	30	867.00	MS
191.	EC- 538411	D	21	12	28	596.70	MR	542.	Indam-2102	ID	26	11	26	867.00	MS
192.	EC- 538423	D	21	9	30	566.10	MR	543.	NDTVR-73	ID	39	12	21	663.00	MR
193.	EC- 538148	ID	28	9	20	214.20	R	544.	NDT-8	D	39	12	32	663.00	MR
194.	EC- 538373	ID	38	13	29	224.40	R	545.	I-4-5	D	33	12	27	260.10	R
195.	EC- 529080	ID	38	10	19	183.60	R	546.	NF-21-5B-8	ID	35	14	30	683.40	MR
196.	EC- 531803	ID	39	9	22	443.70	R	547.	Indam-2103	ID	33	13	31	785.40	MS
197.	EC- 560340	ID	19	12	25	627.30	MR	548.	NDT-3	ID	32	10	32	1009.80	MS
198.	EC- 531801	D	35	13	22	1392.30	S	549.	N-2-1	D	33	9	27	933.30	MS
199.	EC- 529085	ID	35	10	30	1025.10	MS	550.	M-4-2	D	33	12	34	887.40	MS
200.	EC- 529083	ID	27	9	27	550.80	MR	551.	M-4-3	ID	32	13	24	535.50	MR
201.	EC- 528374	D	25	12	27	198.90	R	552.	Nandhi	D	32	10	17	566.10	MR
202.	EC- 538422	ID	26	11	24	571.20	MR	553.	N-2-3	ID	36	9	19	673.20	MR
203.	EC- 528362	ID	27	8	24	693.60	MR	554.	N-2-2	D	33	12	24	550.80	MR

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204.	EC- 528365	ID	27	9	29	1458.60	S	555.	M-4-1	D	34	11	24	663.00	MR
205.	EC- 520061	ID	37	11	28	122.40	R	556.	NDT-1	ID	33	11	28	673.20	MR
206.	EC- 538155	D	35	14	32	428.40	R	557.	M-3-2	D	33	11	21	1448.40	S
207.	EC- 552141	ID	28	12	17	244.80	R	558.	M-3-1	D	40	11	20	887.40	MS
208.	EC- 620380	D	35	12	22	550.80	MR	559.	M-2-3	D	27	14	26	688.50	MR
209.	EC- 620377	D	35	15	20	558.45	MR	560.	MUKTI	ID	26	12	23	688.50	MR
210.	EC- 620378	ID	38	14	24	326.40	R	561.	M-1-4	D	33	10	32	775.20	MR
211.	EC- 620381	ID	35	11	27	540.60	MR	562.	M-2-4	ID	31	9	29	887.40	MS
212.	EC- 620383	ID	35	12	26	887.40	MS	563.	M-1-1	D	33	9	31	989.40	MS
213.	EC- 620379	ID	35	12	28	1239.30	S	564.	M-1-3	D	33	15	30	1009.80	MS
214.	EC- 620-03	ID	26	12	27	234.60	R	565.	M-1-2	ID	36	14	27	887.40	MS
215.	EC- 620-3	ID	24	14	23	581.40	MR	566.	Bulk-Sel-7-6	ID	38	15	33	775.20	MR
216.	EC- 568943	ID	35	13	22	214.20	R	567.	DVRT-20	ID	32	15	27	775.20	MR
217.	EC- 578422	ID	37	10	28	438.60	R	568.	WIR-13706	ID	31	13	27	571.20	MR
218.	EC- 620361	ID	39	9	26	418.20	R	569.	WIR-13717	D	31	13	18	469.20	MR
219.	EC- 610092	ID	26	12	29	367.20	R	570.	EC-538380	D	32	12	29	652.80	MR
220.	EC- 538408	ID	37	13	20	244.80	R	571.	EC-538381	D	36	14	23	540.60	MR
221.	EC- 57442	ID	35	10	27	520.20	MR	572.	VRT-32-1	D	35	12	28	540.60	MR
222.	EC- 570019	ID	37	9	18	1438.20	S	573.	WIR-4360	D	35	15	23	1458.60	S
223.	EC- 620385	D	26	12	21	1387.20	S	574.	WIR-3928	ID	26	14	26	663.00	MR
224.	EC- 605696	D	34	11	33	234.60	R	575.	EC-1161-4-2-1	ID	25	11	30	785.40	MR
225.	EC- 5863	ID	34	11	34	438.60	R	576.	WIR-3996	ID	26	12	20	897.60	MS
226.	EC- 5888	ID	37	11	21	234.60	R	577.	WIR-4361	D	21	12	22	999.60	MS
227.	EC- 620374	ID	37	11	30	775.20	MS	578.	DT-10	D	33	12	26	1458.60	S
228.	EC- 620365	ID	22	14	22	1458.60	S	579.	PDVR-14	D	29	11	29	214.20	R
229.	EC- 560262	D	25	12	31	775.20	MS	580.	LB-292	D	25	10	28	1152.60	S
230.	EC- 620363	D	23	10	21	652.80	MR	581.	F-1150-P-60	ID	27	10	30	1009.80	MS
231.	EC- 605694	D	24	9	26	438.60	R	582.	PDT-3-1	ID	26	9	26	887.40	MS
232.	EC- 620-1	ID	24	9	30	122.40	R	583.	EC-521082	ID	24	12	26	897.60	MS
233.	EC- 620376	ID	24	15	20	142.80	R	584.	EC-520044	ID	26	13	32	1162.80	S
234.	EC- 620371	ID	23	14	34	122.40	R	585.	H-86	ID	32	10	21	1173.00	S
235.	EC- 620369	ID	21	15	30	382.50	R	586.	EC-520074	ID	33	9	28	887.40	MS
236.	EC- 620370	ID	24	15	32	688.50	MR	587.	49-C-3	ID	34	12	17	856.80	MS
237.	EC- 620375	ID	24	13	21	887.40	MS	588.	LB-283	ID	33	11	24	663.00	MR
238.	EC- 620368	ID	18	13	24	367.20	R	589.	50-A-2	ID	34	11	19	785.40	MR
239.	EC- 620367	D	19	12	27	459.00	MR	590.	152-B-1	ID	25	11	18	1009.80	MS
240.	EC- 620373	ID	34	14	26	382.50	R	591.	LB-209	ID	23	11	18	1009.80	MS
241.	EC- 620-2	ID	38	12	28	316.20	R	592.	105-A-4	ID	34	14	18	887.40	MS
242.	EC- 605695	ID	24	15	30	550.80	MR	593.	LB-286	ID	34	12	30	775.20	MR
243.	EC- 620386	D	23	14	30	489.60	MR	594.	155-B-1	ID	37	10	22	663.00	MR
244.	EC- 620395	ID	38	11	29	122.40	R	595.	110-1	ID	36	9	19	663.00	MR
245.	EC- 538138	ID	39	12	27	122.40	R	596.	156-1	ID	32	9	23	1346.40	S

Table 1 : Countd.....

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246.	EC- 620366	ID	29	12	19	321.30	R	597.	40-A-1	D	32	15	22	1346.40	S
247.	EC- 620404	ID	23	12	23	1086.30	MS	598.	71-1	D	28	14	18	703.80	MR
248.	EC- 620415	ID	26	11	24	428.40	R	599.	49-B-1	D	21	15	20	897.60	MS
249.	EC- 620403	ID	25	10	32	652.80	MR	600.	175-B-1	D	23	11	19	897.60	MS
250.	EC- 620410	ID	28	10	32	535.50	MR	601.	27-D	D	23	13	18	887.40	MS
251.	EC- 6202041	D	24	9	30	122.40	R	602.	28-Feb	D	32	13	17	1152.60	S
252.	EC- 620398	D	30	12	31	413.10	R	603.	142-A-3	ID	33	12	25	1132.20	MS
253.	EC- 620393	ID	27	13	28	765.00	MR	604.	55-A-2	ID	35	14	24	1244.40	S
254.	EC- 620409	ID	26	10	26	1315.80	S	605.	69-B-1	ID	37	12	25	112.20	R
255.	EC- 620402	ID	24	9	25	887.40	MS	606.	61-4	ID	42	9	19	234.60	R
256.	EC- 620412	D	34	12	20	397.80	R	607.	125-2	D	41	9	21	887.40	MS
257.	EC- 620397	ID	28	11	32	290.70	R	608.	59-B-2	D	26	13	23	775.20	MR
258.	EC- 570018	ID	24	11	26	999.60	MS	609.	59-B-3	D	33	10	26	887.40	MS
259.	EC- 620416	ID	35	11	22	1346.40	S	610.	174-A-1	D	35	9	24	775.20	MR
260.	EC- 620401	D	37	11	23	1009.80	MS	611.	140-1	ID	35	12	23	683.40	MR
261.	EC- 620400	ID	38	14	35	214.20	R	612.	138-3	ID	36	13	25	683.40	MR
262.	EC- 620391	ID	23	12	34	1178.10	S	613.	136-1	ID	35	10	29	1009.80	MS
263.	EC- 620396	ID	35	10	21	775.20	MR	614.	28-4.	ID	41	9	25	948.60	MS
264.	EC- 620408	ID	26	9	19	693.60	MR	615.	PDT-3-1	D	31	12	23	306.00	R
265.	EC- 620407	ID	35	9	30	351.90	R	616.	PB-Chuhara	D	32	11	23	1458.60	S
266.	EC- 620390	ID	25	15	30	535.50	MR	617.	PB- Kesari	D	32	8	24	688.50	MR
267.	EC- 620411	ID	35	14	26	663.00	MR	618.	Parul	D	31	9	19	1239.30	S
268.	EC- 620406	ID	37	15	21	229.50	R	619.	PBC-2010	D	32	11	20	550.80	MR
269.	EC- 620405	ID	36	11	32	550.80	MR	620.	Pant T-3	D	25	14	20	367.20	R
270.	EC- 620413	D	38	13	27	122.40	R	621.	Pant T-5	ID	26	12	24	688.50	MR
271.	EC- 620387	ID	39	13	30	122.40	R	622.	Pusa Hybrid-2	D	29	12	22	688.50	MR
272.	EC- 570028	D	35	12	31	867.00	MS	623.	Punjab Upma	D	31	15	27	688.50	MR
273.	EC- 620455	D	27	14	32	1479.00	S	624.	Pusa Hybrid-2	D	30	14	21	688.50	MR
274.	EC- 620446	D	40	12	27	887.40	MS	625.	PT-11	ID	32	11	25	897.60	MS
275.	EC- 620431	ID	40	9	34	877.20	MS	626.	Prestige	ID	31	12	21	688.50	MR
276.	EC- 620453	D	35	9	29	663.00	MR	627.	Punjab BB-2	ID	30	12	22	775.20	MR
277.	EC- 620456	ID	36	13	29	550.80	MR	628.	Pusa Hybrid -4	D	32	12	20	1208.70	S
278.	EC- 620427	ID	26	10	25	571.20	MR	629.	Pusa Gaurav	D	31	14	28	688.50	MR
279.	EC- 620443	ID	39	9	23	775.20	MR	630.	PDT-3-1-1	D	32	13	23	627.30	MR
280.	EC- 620428	ID	37	12	35	504.90	MR	631.	Punjab B-1	D	38	10	23	1183.20	S
281.	EC- 620442	ID	35	13	34	688.50	MR	632.	S-Laima	D	31	9	26	1208.70	S
282.	EC- 620439	D	25	10	21	1458.60	S	633.	UtkalPallavi	D	31	12	27	1055.70	MS
283.	EC- 620458	ID	35	9	19	765.00	MR	634.	S. Gola	D	31	13	25	948.60	MS
284.	EC- 620459	D	36	12	30	1479.00	S	635.	Sel.-18	D	34	10	27	673.20	MR
285.	EC- 620414	ID	43	11	30	214.20	R	636.	S. Sampada	D	30	11	21	775.20	MR
286.	EC- 620-4	ID	42	8	26	224.40	R	637.	SB-15	ID	27	12	22	673.20	MR

Table 1 : Countd.....

Table 1 : Countd.....

287.	EC- 620422	ID	39	9	21	474.30	MR	638.	VRT-2	ID	31	11	24	877.20	MS
288.	EC- 620440	ID	35	11	32	581.40	MR	639.	X-33	D	32	11	19	867.00	MS
289.	EC- 620430	ID	38	14	27	1269.90	S	640.	EC-620550	D	31	11	23	382.50	R
290.	EC- 620434	ID	36	12	30	459.00	MR	641.	ST-4	D	32	11	20	719.10	MR
291.	EC- 620438	D	37	10	31	459.00	MR	642.	Swarna Naveen	D	32	14	26	448.80	R
292.	EC- 620452	D	38	9	32	428.40	R	643.	SwarnaVaibhav	D	19	12	21	459.00	MR
293.	EC- 620421	ID	39	9	27	550.80	MR	644.	SwarnaLalima	D	25	10	22	887.40	MS
294.	EC- 620441	ID	35	15	34	214.20	R	645.	Sioux	D	32	9	25	877.20	MS
295.	EC- 620419	ID	38	14	24	673.20	MR	646.	Roma	ID	31	9	22	897.60	MS
296.	EC- 620429	ID	37	15	17	224.40	R	647.	Sel.-12	ID	31	15	17	897.60	MS
297.	EC- 570028	ID	35	15	19	198.90	R	648.	C-22-2	ID	30	14	18	1147.50	S
298.	EC- 620385	ID	31	13	24	214.20	R	649.	SwarnaSamridi	ID	32	15	30	183.60	R
299.	EC- 620417	ID	35	13	24	1193.40	S	650.	EC-620354	D	32	15	27	1451.30	S
300.	EC- 620444	D	37	12	28	122.40	R	651.	Sankranti	D	33	13	26	346.80	R
301.	EC- 620448	ID	36	14	21	153.00	R	652.	WIR-13706	ID	33	13	27	1468.80	S
302.	EC- 620045	ID	37	12	20	1208.70	S	653.	PT-20-1	ID	32	12	23	550.80	MR
303.	EC- 620447	ID	35	15	26	346.80	R	654.	Utkal Raja	ID	33	14	24	260.10	R
304.	EC- 620449	ID	37	14	23	367.20	R	655.	BT-20-2-1	ID	31	12	30	581.40	MR
305.	EC- 620445	ID	32	11	32	1479.00	S	656.	DVRT-12	D	32	15	30	438.60	R
306.	EC- 620424	ID	24	12	29	1448.40	S	657.	Type Y-1	D	31	14	18	438.60	R
307.	EC- 620437	ID	39	12	31	367.20	R	658.	UtkalPragyan	D	33	11	28	224.40	R
308.	EC- 620432	ID	29	12	30	224.40	R	659.	TLS-27	D	26	12	20	933.30	MS
309.	EC- 620437	ID	40	14	27	1479.00	S	660.	EC-168283	D	33	12	28	448.80	MR
310.	EC- 620426	ID	35	13	33	428.40	R	661.	VRT-32-1	D	33	12	31	571.20	MR
311.	EC- 620573	ID	34	10	27	1147.50	S	662.	WIR-3957	ID	33	11	33	504.90	MR
312.	EC- 620447	ID	40	9	27	428.40	R	663.	WIR-13708	ID	26	10	28	897.60	MS
313.	EC- 620476	ID	39	12	18	1285.20	S	664.	U-301	ID	23	10	26	688.50	MR
314.	EC- 620467	D	39	13	29	1448.40	S	665.	T-1-1	ID	35	9	26	887.40	MS
315.	EC- 620468	D	40	10	23	877.20	MS	666.	TLBR-6	ID	34	12	24	918.00	MS
316.	EC- 620463	ID	39	9	28	785.40	MR	667.	UtkalUrvashi	ID	34	13	32	999.60	MS
317.	EC- 620464	ID	37	12	23	642.60	MR	668.	TLC-1	ID	33	10	25	963.90	MS
318.	EC- 620470	ID	25	11	26	397.80	R	669.	TLS-30	ID	32	9	16	877.20	MS
319.	EC- 620469	D	36	11	30	663.00	MR	670.	TLBR-3	D	33	12	31	877.20	MS
320.	EC- 620465	ID	39	11	20	1387.20	S	671.	TLH-17	D	33	11	20	933.30	MS
321.	EC- 620494	ID	23	11	22	994.50	MS	672.	BL-120	ID	27	11	30	571.20	MR
322.	EC- 620471	ID	39	14	26	994.50	MS	673.	F-2-1	ID	36	11	20	663.00	MR
323.	EC- 620484	ID	34	12	29	627.30	MR	674.	EC-501576	D	32	11	20	663.00	MR
324.	EC- 620498	ID	38	10	28	550.80	MR	675.	EC-528372	D	32	14	22	571.20	MR
325.	EC- 620529	ID	38	9	30	1086.30	MS	676.	H-88-78-3	D	32	12	22	438.60	R
326.	EC- 620532	ID	39	9	26	550.80	MR	677.	EC-6552-1	D	29	10	27	550.80	MR

Table 1: Countd.....

Table 1 : Contd.....

327.	EC- 620518	ID	38	15	26	1422.90	S	678.	CO-3	D	32	9	24	1458.60	S
328.	EC- 620493	ID	40	14	32	1466.60	S	679.	H-88-74-4	D	29	9	24	448.80	MR
329.	EC- 620480	D	34	15	21	1479.00	S	680.	DVRT-14	D	33	16	20	443.70	R
330.	EC- 620478	ID	38	15	28	550.80	MR	681.	EC-570018	D	33	14	29	805.80	MS
331.	EC- 620485	ID	38	13	17	688.50	MR	682.	F-7025	D	23	15	32	1009.80	MS
332.	EC- 620460	ID	38	12	24	1239.30	S	683.	Pusa Ruby	D	25	11	32	1142.40	S
333.	EC- 620-5	ID	34	15	19	336.60	R	684.	Pusa - 120	D	23	13	26	1458.60	S
334.	EC- 620463	ID	39	14	18	688.50	MR	685.	EC- 570028	D	24	13	19	1331.10	S
335.	EC- 620474	D	39	11	18	1147.50	S	686.	M-1-2	D	18	12	18	1142.40	S
336.	EC- 620466	ID	37	12	18	326.40	R	687.	SwarnaGola	D	19	14	21	214.20	R
337.	EC- 620531	ID	39	12	30	688.50	MR	688.	EC-620545	ID	22	12	21	275.40	R
338.	EC- 620539	ID	34	12	22	1454.20	S	689.	PS-1	ID	21	9	20	1483.00	S
339.	EC- 620527	ID	39	14	19	214.20	R	690.	CHART-4	ID	21	9	20	571.20	MR
340.	EC- 620521	ID	38	13	23	1208.70	S	691.	BL-1207	ID	23	13	20	550.80	MR
341.	EC- 620522	ID	39	10	22	224.40	R	692.	PDT-3-1	ID	25	10	33	1142.40	S
342.	EC- 620519	ID	38	9	18	520.20	MR	693.	UtkalPallavi	ID	22	9	27	1254.60	S
343.	EC- 620525	ID	37	12	20	775.20	MR	694.	Prestige	ID	22	12	27	1234.20	S
344.	EC- 620515	ID	38	13	19	459.00	MR	695.	EC-538138	D	23	13	27	489.60	MR
345.	EC- 620530	ID	39	10	18	1448.40	S	696.	Money Maker	D	23	10	20	326.40	R
346.	EC- 620502	ID	35	9	17	428.40	R	697.	Utkal Raja	D	27	9	18	326.40	R
347.	EC- 620520	ID	38	12	25	907.80	MS	698.	EC-620366	D	26	12	23	1234.20	S
348.	EC- 620513	ID	34	11	24	1009.80	MS	699.	EC-120573	ID	18	11	32	663.00	MR
349.	EC- 620564	ID	34	11	25	397.80	R	700.	EC-620385	D	18	12	33	397.80	R
350.	EC- 620571	D	39	11	19	550.80	MR	701.	I-4-5	D	25	9	21	489.60	MR
351.	EC- 620538	ID	34	11	21	1448.40	S		Maximum (PS-1)	ID	21	8	20	1483.00	S
									Minimum (BT-10)	ID	21	13	30	102.00	R
									C.V. %					19.293	
									LSD					345.25	

PGT=Plant growth type; DF=Days of flowering; DFS= Days of fruit setting (After flowering); DSS= Days of senescence stage (After fruit setting); AUDPC= Area under disease progressive curve; HR=Host reaction

Table 2: Categorization of germplasm lines on the basis of AUDPC value

Disease reaction	Field conditions	
	AUDPC range	No. of core lines
Resistant	102.00 - 447.25	206
Moderately resistant	447.26 - 792.50	223
Moderately susceptible	792.51 - 1137.75	129
Susceptible	1137.76 -1483.00	143

per the host and plant reaction. Less man power, cost and equipments were required in natural screening as per compared to artificial screening for early blight resistance in tomato.

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