

30 1 Tomato—An Improved Strain Suited to Tamil Nadu

by

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Introduction: Tomato which ranks among the world's largest crops, though next only to potato and sweet potato in area and production, is grown in India only to a limited extent. According to Choudhury (1967), the area under tomato in India is estimated to be a little more than 36,000 ha. Tomato is grown in Tamil Nadu in an area of about 2,000 ha. The strains of tomato evolved in the Indian Agricultural Research Institute, New Delhi and non-descript local varieties have been so far grown in Tamil Nadu. On account of the importance of tomato as a protective food, and the possibility of its wide cultivation and lending itself for making a wide variety of preserved foods, it is necessary that strains suited to varying agro-climatic conditions are evolved and released for general cultivation. With this end in view, work was undertaken in the Vegetable Section of the Agricultural College and Research Institute, Coimbatore to evolve a strain of tomato which would surpass the existing strains under cultivation in the State, in both yield and quality.

Materials and Methods: A total number of 109 varieties were obtained from the Millets Specialist, Coimbatore. To this germplasm were added 136 varieties collected from world over and studied in detail. Purelines were isolated in a few varieties which showed segregation and the promising ones were included for further study along with others. Among them, three selections *viz.*, L.e. 49 (a pureline selection from a Kalyanpur variety), L.e. 58 (a pureline selection from variety Nemmara), and L.e. 66 (I.A.R.I. type—E.C. 6592) were finally selected as promising from the Main Strain Trial and further studied in Co-ordinated Yield Trials in various Agricultural Research Stations of the State and in Scattered Block Trials in different districts for three consecutive years from 1965, for their performance in comparison with local varieties. Yield, duration, earliness in bearing and resistance to pests and diseases were recorded. The yield data were subjected to statistical scrutiny. The quality of fruits was assessed both chemically and by organoleptic test.

Results and Discussion: The intensive breeding work carried out in the Vegetable Section at Coimbatore resulted in the isolation of a tomato strain (Selection number L.e. 49) which is far superior than the present cultivated varieties and out of 245 types of tomato tested in the Vegetable Section. Co-ordinated Yield Trials with this strain were conducted in the various Agricultural Research Stations of the State and in the Scattered Block Trials

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TABLE 1. Performance of Tomato Selections in Yield Trials at Agricultural Research Stations and Selected Districts

Particulars	Yield of fruits											
	L. e. 49 (CO 1)		L. e. 58		L. e. 66		Pusa Ruby		Meeruti		Local	
	kg/ha	% on local	kg/ha	% on local	kg/ha	% on local	kg/ha	% on local	kg/ha	% on local	kg/ha as %	
i) Seasonal trials												
1965 - Summer	37,790	143	30,472	122	25,809	103	29,689	119	—	—	25,169	100
Significant: S.E. 1,067	C.D. (P=0.05) 2,944		Conclusion: L. e. 49, L. e. 58, Pusa Ruby, L. e. 66, Local									
1966 - Monsoon	33,098	190	21,514	124	19,895	114	21,835	126	21,761	125	17,376	100
Significant: S.E. 1,551	C.D. (P=0.05) 4,819		Conclusion: L. e. 49, Pusa Ruby, Meeruti, L. e. 58, L. e. 66, Local									
1967 - Summer	50,080	146	38,859	112	39,323	114	44,188	129	40,259	126	39,293	100
Significant: S.E. 408	C.D. (P=0.05) 1,257		Conclusion: L. e. 49, Pusa Ruby, Meeruti, L. e. 66, Local, L. e. 58									
Mean	39,737	159	30,114	119	28,328	110	31,903	124	31,008	126	27,229	100
ii) District trials:*												
Ramanathapuram (4)	26,182	136	22,724	118	21,739	113	22,477	117	21,983	114	19,266	100
Coimbatore (5)	46,189	111	41,002	98	39,273	94	40,261	96	42,484	102	41,743	100
Tiruchirapalli (5)	40,755	109	37,544	101	36,309	97	37,297	100	39,026	105	37,297	100
South Arcot (4)	33,098	116	29,393	103	26,182	91	27,417	96	30,134	105	28,652	100
Madurai (5)	43,472	109	38,038	94	37,297	94	41,002	96	36,803	92	40,014	100
Salem (4)	39,273	107	34,827	95	36,309	99	37,050	101	36,062	98	36,556	100
Chingleput (4)	39,767	108	37,297	101	36,062	98	36,309	99	37,544	102	36,803	100
Over all mean (32)	38,796	122	33,118	104	31,816	100	33,506	106	34,474	109	31,800	100
Significant: S.E. 990	C.D. (P=0.05) 2974		Conclusion: L. e. 49, Meeruti, Pusa Ruby, L. e. 58, L. e. 66, Local									
Earliness index (Bartlett's)	0.6073		0.5812		0.5159		0.5540		0.5482		0.5459	

* Figures in bracket refer to the number of trials in each district

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in the district of Coimbatore, Salem, Tiruchirapalli, Mathurai, Ramanathapuram, South Arcot, North Arcot and Chingleput during the period from 1965-67. In the yield trials that were conducted in the Agricultural Research Stations, L.e. 49 recorded higher yields than the local, the increase ranging from 43 to 90% with a mean of 46.0% (*vide* Table 1). In the district trials also, L.e. 49 gave increased yields over the local ranging from 7 to 36% with a mean of 22.0%. The new strain was also early as assessed by Bartlett's earliness index (Table 1).

In the chemical analysis, L.e. 49 compared well with other locally grown tomatoes (Table 2). Regarding shape, size, colour and taste, the new strain scored over others (Table 3).

TABLE 2. Results of the Organoleptic Tests (Mean of 15 subjects)

Particulars	Total marks	Marks obtained by				Local
		L.e. 49 (CO. 1)	L.e. 58	L.e. 66	Pusa Ruby	
Colour	10	5.34	4.20	5.56	4.86	4.92
Shape	10	9.06	6.00	6.72	6.24	6.64
Size	10	7.26	6.24	8.00	6.24	6.00
Taste :						
a) Before cooking	20	12.34	11.64	13.82	11.52	11.60
b) After cooking	20	13.74	12.84	10.90	12.00	12.32
Seed content	20	13.00	12.34	13.08	9.26	9.16
Other remarks	10	5.66	4.46	6.54	4.60	4.00
Total	100	66.40	57.92	64.62	54.72	54.64

TABLE 3. Results of Chemical analysis

Particulars	L.e. 49 (CO1)	L.e. 58	L.e. 66	Pusa Ruby	Local
Original moisture	94.91	94.91	94.98	93.85	94.10
Ash %	9.482	8.467	9.258	9.550	9.849
Crude Protein %	23.66	24.28	25.24	30.33	28.65
Total P ₂ O ₅ %	0.889	0.873	0.781	0.910	1.063
Total K ₂ O %	6.29	4.99	5.68	6.81	7.38
Total CaO %	0.202	0.189	0.179	0.158	0.172
Fe ₂ O ₃ %	1.355	1.537	1.603	1.003	1.088
Vitamin 'C' (g)/100 g of fruit	0.0175	0.0177	0.016	0.0282	0.0245
Acidity in terms of Tartaric acid	0.69	0.51	0.54	0.81	0.78
Glucose (g/100 g of fruit)	2.743	2.777	3.57	3.125	3.011

Remarks : Results of ash, crude protein, P₂O₅, K₂O, CaO and Fe₂O₃ are expressed on moisture free basis. Others are on fresh samples. (Report of the Agricultural Chemist and Associate Professor of Soil Science, Coimbatore-3)

The plant of L.e. 49 is dwarf, having semi-spreading habit with dark green foliage. The fruits are round and smooth with tendency to remain in the plant even after full maturity. The colour of the fruit is pale green when

unripe and capsicum red when fully ripe. While ripening, the pale green changes into yellow and then to capsicum red which is more pronounced in this strain. The average size of the fruit is 7.36 cm × 6.25 cm. The fruits are borne in clusters of 6 to 8 fruits. Each fruit weighs about 125 g *i.e.*, 8 good fruits make one kilogram. The mean seed content is low with 0.18% to the total fruit weight *i.e.*, approximately six fruits are required to produce 1 gram of seed. The fruit is mildly acidic with medium flesh content. The fruit is also nutritious and tasty. The fruit is suitable as salad vegetable and also for cooking and making fruit products. The fruit and plant characters of CO 1 tomato are given below:

<i>Habit</i>	: Dwarf and semi-spreading
<i>Leaf characters</i>	: Normal, dark green with less foliage
<i>Fruit characters</i>	
Shape	: Round and smooth
Size	: 7.36 cm × 6.25 cm
Unripe colour	: Pale green
Ripe colour	: Capsicum Red
Number of fruits/cluster	: 6 to 8
Number of fruits/kg	: 8
Percentage of seed content of total fruit weight	: 0.18 %
Number of fruits required to produce 1 gm seed	: 6.33
<i>Yield particulars</i>	
Number of fruits/plant	: 50 to 55
Weight of fruits/plant (kg)	: 3.5 to 4
Mean yield (kg/ha)	: 37,780
<i>Duration</i>	
No. of days taken from sowing	
to first flowering	: 51
to first harvest	: 92
from seed to seed	: 135

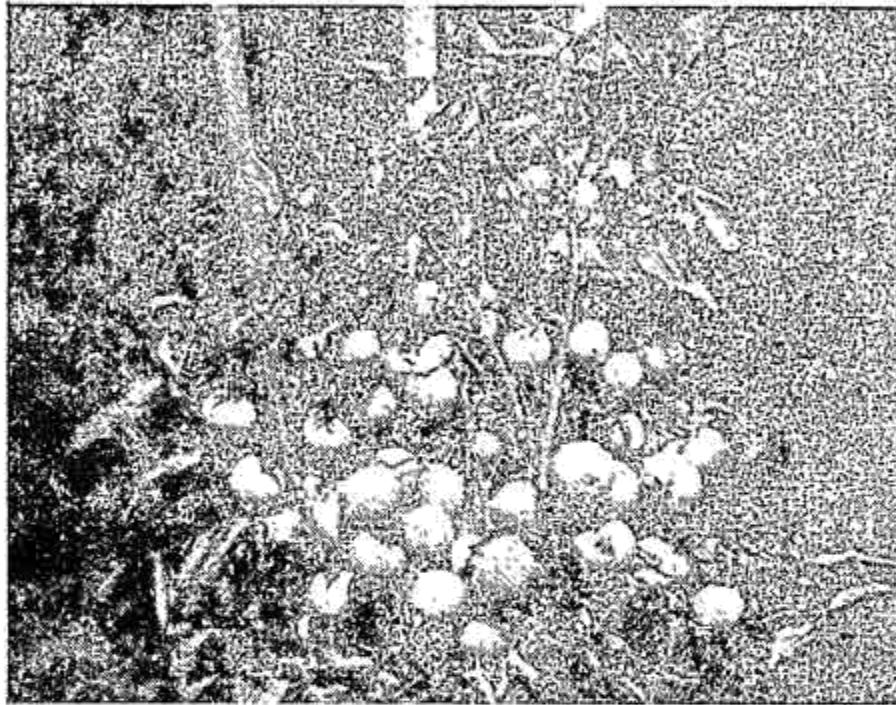
The plant starts flowering in 51 days and comes to harvest in 92 days after sowing. The harvest continues for a period of 43 days. Thus, the total crop period is only 135 days. The short harvest period is a desirable factor in economising irrigation, plant protection and watch over the crop. The early removal of the crop enables cultivation of other crops in rotation.

The plant being dwarf and semi-spreading does not demand staking. (*vide plate*). Further, as the plant occupies less space, it lends itself for closer spacing which is an advantage in exploiting maximum out-put per acre. Each plant bears, on an average, 55 fruits (\pm 8 fruits) weighing about 4 kg.

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It yields from 35,790 kg to 50,880 kg of fruits with mean yield of 38,796 kg/ha. The yield is 34% higher than the local. Shanmughasundaram and Venkataraman (1964) have also reported an yield of 37,050 kg of fruit/ha in the initial stages of trial. Selection L. e. 49 tomato is less susceptible to *Alternaria* and fruit boring caterpillar (*Heliothes armigera*). On account of its high yield and better quality of fruits coupled with desirable plant characters, the selection L. e. 49 has been released as "CO 1 tomato" for cultivation in Tamil Nadu.

A PLANT OF CO 1 TOMATO



According to Naik (1958) the average yield of tomato in South India is 8991 to 11,233 kg/ha. CO 1 tomato yielding on an average 38,796 kg of fruits/ha is thus to be considered a real improvement benefiting the grower and contributing to the national health and prosperity.

Summary and Conclusion: The intensive breeding work done in the Vegetable Section of Agricultural College and Research Institute, Coimbatore has resulted in the evolution of a superior strain in tomato which surpassed the present cultivated varieties in Tamil Nadu, both in yield and quality. This new strain, named as CO 1 tomato, is a boon to the vegetable growers on account of its high yield and better quality bringing more monetary return, and nutritionally it is expected to improve the dietary standard of the country.

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