RAVI – HEAT TOLERANT TOMATO VARIETY

RANJANI PEIRIS[1] and G.KARIYAWASAM[2]
Horticultural Crops Research and Development Institute
Gannoruwa, Peradeniya

Tomato cultivation during dry season is less profitable because of low yields. High temperatures limit or prevent the production of tomatoes during dry seasons in high temperature areas in Sri Lanka. Temperatures greater than 34°/20°C (day/night) or a period of four hours at 40°C will cause blossom drop in most cultivars. Ovule viability, pollen viability, pollen production dehiscence and flower morphology (style elongation/stigma elongation) are affected by high temperatures resulting in reduction or prevention of fruit set.

Farmers in Dambulla, Matale, Anuradhapura and Polonnaruwa districts frequently experienced low or no fruit setting problem and reported to researches of the department of agriculture. Therefore, it was very essential to develop a heat tolerant tomato variety for these farmers. Research work carried out at HoRDI, Gannoruwa have provided a heat tolerant tomato variety named 'Ravi'.

Ravi is a selection from a segregating population of variety CL 5915-93D4-1-0-C-0. It shows moderate resistance to bacterial wilt disease (table 1). It shows rolling of leaves mechanism to minimize the evapotranspiration losses and thereby escapes from the adverse effects of heat.

1 Research Officer 2 Agricultural Instructor

Table 1: Reaction of tomato varieties to bacterial wilt.

Variety	Stem inoculation % disease Incidence	Severity	Root inoculation % disease Severity	Incidence
Ravi	40 (MR)	40 (MR)	40 (MR)	25 (R)
T 245	58.5 (MS)	58.5 (MS)	0 (HR)	0 (HR)
* Marglobe	98 (S)	98 (S)	100 (HS)	100 (HS)
** KWR	0 (HR)	0 (HR)	0 (HR)	0 (HR)

* Susceptible cheek variety
** Resistant check variety
MR - Moderately resistant
R - Resistant
HR - Highly resistant
S - Susceptible
MS - Moderately susceptible
HS - Highly susceptible
(Evaluation was done at the HoRDI pathology division)

$$\% \text{ Disease incidence} = \frac{\text{Number of wilted plants}}{\text{Total number of plants}} \times 100$$

$$\% \text{ Disease severity} = \frac{\text{Total score of wilted plants}}{5 \times \text{Total number of plants}} \times 100$$

Score:

0 - Highly resistant (0%)

1 - Resistant (1-25%)

2 - Moderately resistant (26-50%)

3 - Moderately susceptible (51-75%)

4 - Susceptible (76-99%)

5 - Highly Susceptible (100%)

The variety Ravi has been extensively tested in farmers fields in Anuradhapura, Ampara, Kandy and Matale districts. Variety Ravi performed better than T 245 variety in dry zone areas (table 2). The farmers in these areas prefer this variety much for its firmness, high yielding ability, cracking resistance and long shelf life period.

A study on flowering and fruit setting of varities Ravi and T 245 was carried out in the phytotron at plant genetic resources centre. Five plants from each variety, planted in pots were subjecte to day/night temperatures of 35^0 /22^{0}C. Flowering was observed in both varieties. However, fruit setting took place only in variety Ravi. This study also confirmed tha heat-tolerance of variety Ravi.

Fruit and plant characteristics of varieties Ravi and T 245 are presented in table 3 and 4. Ravi variety has good fruit quality characteristics like firmness, mild cracking and red fruit colour.

Table 3: Comparison of plant and fruit characteristics of varieties Ravi and T 245

Variety	Growth Type	Days to 50% flowering after transplanting	Plant high at 1st harvest (cm)	Fruit cracking	Firmness
Ravi	Determinate	28	43.5	very mild	Solid
T 245	Determinate	26	59.4	Medium	Medium

Table 4: Comparison of fruit quality characteristics of varieties Ravi and T 245

Variety	Av. Fruit Wt. (g)	Col-our	Int. flesh Colour	Fruit length (cm)	Middle circum ference (cm)	Fruit* shape	Locules	pH	Acidity % as citric acid	Brix value
Ravi	46.7	OR	OR	7.3	12.7	High round	2	4.0	0.4	3.6
T 245 (check)	78.0	O	O	16.5	18.4	Slightly flattened	3-6	3.8	0.9	5.0

O – Orange OR – Orange red

*See figure 1 on page 17

Table 2: Comparison of yield performances of varieties Ravi, Katugastota wilt resistant(KWR) and T 245 in varital adaptability testing trials (t/ha)

Season	Locations	AEZ	T 245	Ravi
Yala 94	ANURADHAPURA			
	Kunchikulama	DL_1	4.37	27.08
	Anduketiyawa	DL_1	14.50	24.16
	Nelubewa	DL_1	29.16	60.70
	AMPARA		KWR	
	Ihalagama	DL_2	5.6	15.25
	Dalakanda	DL_2	5.0	15.0
Maha 94/95	AMPARA		T 245	
	Medagama	DL_2	12.5	30.0
Yala 96	KANDY		T 245	
	Huluganga	WM_3	12.5	30.0
	MATALE		T 245	
	Palapatwela	IM	16.04	21.62
	Yatawatta	IM_3	6.55	4.99
	Pallepola	IM_3	5.63	9.75
	KEGALLE		T 245	
	Pinnawela	WL	1.36	NA
	Paragama	WL_2	3.50	NA
	Heriwaduna	WL_2	9.10	NA
Maha 96/97	KANDY		T 245	
	Teldeniya	IM_3	12.25	6.50
	Namadgala	IM_3	25.63	17.88
	Marassana	IM_3	9.13	12.00
	Pathiyagoda	IM_3	21.75	6.50
	MATALE			
	Dambulla	DL_1	22.25	28.76

NA - Not available AEZ - Agricultural ecological zone

Therefore, the variety Ravi, which possess moderate resistance to bacterial wilt disease, resistance to cracking, fruit firmness for better transport, high yield potential and heat tolerance, is very suitable and profitable for farmers who cultivate tomatoes in high temperature areas in Sri Lanka. Department of agriculture released variety Ravi (Accession number HT-B-1) in December 1999.

Figure1. Tomato fruit shapes