

Research Article

## Studies on per cent incidence and reaction of tomato cultivars to bacterial wilt

■ V. JANAKI\* AND T.B. PUTTURAJU

Department Horticulture, University of Agricultural Sciences, G.K.V.K., BENGALURU (KARNATAKA) INDIA

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\*Corresponding author:

### ABSTRACT

Thirty two  $F_1$  hybrids developed as a result of line x tester design involving eight lines and four testers were evaluated in RCBD with three replications during 2005-2006 for per cent incidence and reaction of tomato cultivars to bacterial wilt. Two parents (T1, T2) and three crosses among hybrids were superior to commercial check.

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### INTRODUCTION

Tomato is the world's largest grown vegetable crop known as protective food both because of its nutritive value and also because of its wide spread production. Tomato is rich source of minerals, vitamins and organic acid, essential amino acids and dietary fibres. The estimated area and production of tomato crop are about 3.50 lakh ha and 53 lakh tons (www.indiaagronet.com). Successful cultivation of tomato crop has been hindered due to numerous pests and devastating diseases. Chiefly of these, the Bacterial wilt caused by *Ralstonia solanacearum* (Yabuchii *et al.*, 1992) is difficult to control due to broad host range, wide spread distribution and vast genetic variability. Developing commercially acceptable tomato varieties and hybrids with good horticultural qualities and tolerance to bacterial wilt has been the objective of many breeding programmes. In view of this a study was conducted at Department of Horticulture, University of Agricultural Sciences, Bangalore during 2005-2006.

### MATERIALS AND METHODS

The experiment was carried out at the Department of Horticulture, University of Agricultural Sciences, Gandhi Krishi Vignana Kendra, Bangalore during 2005-2006. The experimental material consisted of  $F_1$  population of 32 crosses, developed by crossing 8 lines and 4 testers. The  $F_1$  population of 32 crosses were grown and assessed for per cent incidence

and reaction of tomato cultivars to bacterial wilt along with Commercial check and their parents. Spacing was maintained at 50 cm between the plants and 100 cm between the rows and plants were provided with simple staking. The number of plants affected by bacterial wilt was recorded at 15 days after transplanting, 5 days before flowering, 5 days after flowering, at fruiting and at harvest.

#### Scale:

- 0- No symptoms.
- 1- 1 to 2 lower leaves showing bronzing.
- 2- 2 to 3 leaves in a single branch drooping.
- 3- Partial wilting of 2-3 branches/plant.
- 4- All leaves drooping except the terminal leaves/branches.
- 5- Complete wilting of plant

#### Disease scoring:

|                    |                        |
|--------------------|------------------------|
| Wilt incidence (%) | Resistance level       |
| 0                  | Highly resistant       |
| 1-5                | Resistant              |
| 5-20               | Moderately resistant   |
| 21-51              | Moderately susceptible |
| >51                | Susceptible            |

### RESULTS AND DISCUSSION

Entries were evaluated under natural epiphytotic

conditions for incidence of bacterial wilt. The per cent incidence of bacterial wilt ranged from 12.00 (L2) to 100.00 (L5) among lines. In testers, it ranged from 0 (T1, T2) to 10 per cent (T4). Among crossed, it ranged from 6.00 per cent (L2 x T1) to 80.00 (L5 x T4). The parent and crosses which were resistant to the disease were T1, T2 among the parents L2xT2, L4 x T1 was superior to commercial check and the crosses L3 x T3 was on par with commercial check (Table 1). Soil bacterial population was recorded at the time of planting, mid season of the crop and at the end of the crop. The soil bacterial

**Table 1 : Per cent with incidence, level of tolerance and estimated for parents hybrids and commercial check in tomato**

| Entries          | Bacterial with incidence |                        | Estimated yield (T/ha) |
|------------------|--------------------------|------------------------|------------------------|
|                  | Per cent incidence (%)   | Disease section        |                        |
| Lines            | 32.0                     | Moderately susceptible | 31.20                  |
| L1:L-15          |                          |                        |                        |
| L2:Vybhav        | 12.0                     | Moderately resistant   | 39.20                  |
| L3:Hissaranmol   | 21.0                     | Moderately resistant   | 31.20                  |
| L4:PKM-1         | 22.8                     | Moderately resistant   | 32.60                  |
| L5:Pusa Ruby     | 100.0                    | Susceptible resistant  | 25.20                  |
| L6:Arka Vikas    | 42.0                     | Moderately susceptible | 36.00                  |
| L7:Arka Meghali  | 30.0                     | Moderately susceptible | 36.60                  |
| L8:Arka Saurabha | 38.0                     | Moderately susceptible | 36.60                  |
| Testers:         | 0                        | High resistant         | 37.80                  |
| T1:Arka Abha     |                          |                        |                        |
| T2:Arka Alok     | 0                        | High resistant         | 39.75                  |
| T3:Sankranthi    | 6.0                      | Moderately resistant   | 37.20                  |
| T4:Nandi         | 10.0                     | Moderately resistant   | 34.60                  |
| Hybrids          | 18.0                     | Moderately resistant   | 42.00                  |
| L1*T1            |                          |                        |                        |
| L1*T2            | 19.6                     | Moderately resistant   | 42.00                  |
| L1*T3            | 21.0                     | Moderately susceptible | 37.20                  |
| L1*T4            | 25.0                     | Moderately susceptible | 40.00                  |
| L2*T1            | 12.0                     | Moderately resistant   | 49.20                  |
| L2*T2            | 6.0                      | Moderately resistant   | 60.80                  |
| L2*T3            | 24.0                     | Moderately susceptible | 45.00                  |
| L2*T3            | 33.0                     | Moderately susceptible | 47.20                  |
| L3*T1            | 15.0                     | Moderately resistant   | 48.00                  |
| L3*T2            | 15.0                     | Moderately resistant   | 43.20                  |
| L3*T3            | 10.0                     | Moderately resistant   | 51.20                  |
| L3*T4            | 35.5                     | Moderately susceptible | 43.20                  |
| L4*T1            | 8.0                      | Moderately resistant   | 60.00                  |
| L4*T2            | 20.9                     | Moderately resistant   | 44.00                  |

Contd... Table 1

Table 1 contd...

|                                 |      |                        |       |
|---------------------------------|------|------------------------|-------|
| L4*T3                           | 43.0 | Moderately susceptible | 43.00 |
| L4*T4                           | 48.0 | Moderately susceptible | 40.00 |
| L5*T1                           | 35.0 | Moderately Resistant   | 40.60 |
| L5*T2                           | 48.0 | Moderately Resistant   | 39.20 |
| L5*T3                           | 75.0 | Moderately susceptible | 37.20 |
| L5*T4                           | 80.0 | Moderately susceptible | 36.68 |
| L6*T1                           | 23.0 | Moderately susceptible | 37.20 |
| L6*T2                           | 18.0 | Moderately resistant   | 40.60 |
| L6*T3                           | 48.2 | Moderately susceptible | 36.00 |
| L6*T4                           | 39.5 | Moderately susceptible | 34.30 |
| L7*T1                           | 18.0 | Moderately resistant   | 42.80 |
| L7*T2                           | 18.0 | Moderately resistant   | 42.60 |
| L7*T3                           | 48.2 | Moderately susceptible | 39.20 |
| L7*T4                           | 39.5 | Moderately susceptible | 37.20 |
| L8*T1                           | 17.5 | Moderately resistant   | 39.2  |
| L8*T2                           | 15.8 | Moderately resistant   | 36.6  |
| L8*T3                           | 36.0 | Moderately susceptible | 37.4  |
| L8*T4                           | 38.5 | Moderately susceptible | 35.2  |
| Commercial check-Arka Abhijith. | 8.0  | Resistant              | 48.6  |

population was recorded low at the time of planting  $3.00 \times 10^4$  and high at the end of the season  $5.00 \times 10^4$  cfu/g.. Abeygunawardena and Srivastava (1963) and Homsor *et al.* (1998) investigated resistance in tomato to bacterial wilt. Dhaliwal *et al.* (2003) used line x tester analysis for yield and processing attributes in tomato.

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