

## Estimation of heterosis for bacterial wilt resistance in tomato

H. VIRUPANNAVAR, P.R. DHARMATTI, K.H. YASHAVANT KUMAR AND AJJAPPA SOGALAD

Accepted : February, 2010

See end of the article for authors' affiliations

Correspondence to:

**H. VIRUPANNAVAR**

Department of Horticulture,  
College of Agriculture,  
University of Agricultural  
Sciences, DHARWAD  
(KARNATAKA) INDIA

### ABSTRACT

In tomato, the extent of heterosis for bacterial wilt resistance, yield and associated characters was studied during *Rabi* 2008, in a set of 40 hybrids produced from a line x tester mating design involving eight lines and five testers of diverse nature maintained in pure form in the vegetable block, Division of Horticulture, UAS, Dharwad, India. Appreciable amount of heterobeltosis and standard heterosis was noticed for majority of the traits studied. Among the 40 hybrids studied, most of the hybrids were significantly superior over commercial check in desirable direction for bacterial wilt and yield. DMT-6 x DMT-D, DMT-2 x IMP-B and DMT-5 x DMT-D were found to be superior over the commercial check for bacterial wilt and significantly superior for higher fruit yield per plant, average fruit weight, number of fruits per plant over commercial check Ruchi.

**Key words :** Line, Tester, Commercial check, Heterosis, Heterobeltosis, Bacterial wilt

Tomato (*Solanum lycopersicum* Mill.) is an important and widely grown solanaceous vegetable crop around the world and belongs to the family solanaceae. It is native of Peru. It ranks second only after potato. In many countries it is considered as "poor man's orange" because of its attractive appearance and nutritive value. Breeding for disease resistance has been one of the most important objectives of vegetable breeders in the last few years. Often, breeding for disease resistance has assumed greater importance than improvement for yield or quality. Host plant resistance, the most important disease control strategy is environmentally sound with low running costs. Crop protection must then rely on genetic resistance or disease avoidance. Among the diseases, bacterial wilt is rising to an alarming proportion in India and becoming a limiting factor for tomato cultivation. In fact, early infection leads to loss up to 100 per cent thus tomato cultivation is almost precluded.

Now, cultivation of tomato has become increasingly popular, since mid nineteenth century. So far efforts of many vegetable breeders from both public and private sector have resulted in spectacular improvement in yield and quality characters. As a result of these efforts, hundreds of new cultivars have been developed since 50 years to meet the diverse needs and varied situations and climates under which tomato is grown.

### MATERIALS AND METHODS

Five diverse cultivars with good horticultural traits (IMP-B, DMT-D, IMP-A, BFL-2, Arka Alok) but susceptible to bacterial wilt were crossed with eight parents (DMT-1, DMT-2, DMT-5, DMT-6, DMT-7, L-1,

L-14 and L-15) having resistance to bacterial wilt. The resulting 40 hybrids along with 13 parents were evaluated in randomized block design with two replications during *Rabi* 2008. Observations like TSS, pH, number of locule, pericarp thickness and lycopene content were recorded. Lycopene was estimated by using the method developed by Sadasivam and Manickam (1992). TSS using Hand refractometer (0-32°) and pH was recorded using a pH meter. Statistical analysis was carried out using the model of line x tester.

### RESULTS AND DISCUSSION

The analysis of variance for sixteen characters is presented in Table 1. It is clear from the table that all the entries comprising parents and hybrids showed significant differences for plant height, fruit cluster per plant, number of fruits per plant, average fruit weight, locules per fruit, fruit yield per plant, shelf life and bacterial wilt. Among the parents, testers exhibited significant differences for plant height, fruit cluster per plant, number of fruits per plant, average fruit weight, fruit yield per plant, shelf life and bacterial wilt while lines showed the significant differences for all characters exhibited in tester except for fruit cluster per plant.

Variance for parents vs. hybrids was significant for the characters *viz.*, plant height, cluster per plant, number of fruits per cluster, number of fruits per plant, average fruit weight, fruit yield per plant, shelf life and bacterial wilt. The contribution of lines and testers showed highly significant variation for plant height, number of clusters per plant, number of fruits per plant, average fruit weight, locules per fruit, fruit yield per plant, shelf life and bacterial