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# Studies on heterosis in root knot nematode (*Meloidogyne incognita*) resistant hybrids in tomato (*Lycopersicon esculentum* Mill.)

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## ABSTRACT

The present investigation was undertaken to study the heterosis for yield and yield components in tomato using twenty three hybrids which are highly resistant to root knot nematode (*Meloidogyne incognita*) involving eleven parents in Line x Tester fashion. It is possible to exploit hybrid vigour through heterosis breeding considering the behaviour of traits like number of fruits per plant and individual fruit weight, the two most important yield attributing traits. Heterosis was appreciable in all the twenty three hybrids, but it was more in the four hybrids *viz*., CLN 2026C x SL 120, CLN 2026E x SL 120, LE 812 x SL 120 and CLN 1464A x SL 120. These crosses can be selected for the exploitation of hybrid vigour and commercial utilization.

**Key words :** Heterosis, Tomato, Root knot nematode resistance, Yield.

In India, with increase in acreage under tomato cultivation, there has been an increase in production problems, one of which is the rise in plant parasitic nematode population in the soil. Plant parasitic nematodes especially root knot nematodes of the *Meloidogyne* spp. take a heavy toll of the crop. The problem however, has been circumvented to an extent, with the development of nematode resistant genotypes (Mahajan *et al.*, 1975 and Fatunla and Salu, 1977).

Hybrid vigour is a special genetic mechanism wherein the genotypes when brought together in a specific pattern express their ability to exhibit a dramatic shift in particular characters. Exploitation of hybrid vigour provides an efficient approach for the improvement of quantitative traits in crops like tomato. Hybrid varieties of tomato are popular among the growers due to their higher yielding potential along with better quality attributes. Considering the importance of tomato, it was decided to undertake further investigations with a view to determine the extent of heterosis manifested in this crop.

## MATERIALS AND METHODS

The present study was carried out at the College Orchard, Horticultural College and Research Institute, Tamil Nadu Agricultural University, Coimbatore. In the present investigation, eighty hybrids and their fourteen parents were evaluated in a Line x Tester fashion and based on the *per se* performance, twenty three hybrids were found to be highly resistant to root knot nematode.

These twenty three hybrids along with their eleven parents were selected and raised during June – October 2001 in a randomized block design with three replications. Twenty five plants were maintained in each replication. Thirty days old seedlings were planted at a spacing of 60 x 45 cm. All recommended package of practices were followed.

Observations were recorded on plant height, number of fruits per plant, individual fruit weight, yield per plant, pericarp thickness, total soluble solids (TSS), acidity, ascorbic acid and Lycopene. Statistical analysis was done on the mean values and the heterosis was determined as the increase or decrease in $F_1$ hybrids over the mid and best parents.

## RESULTS AND DISCUSSION

The mean performance of parents and crosses are presented in the Table 1. The per cent of heterosis estimated over mid and best parent for yield and other characters are given in the Table 2.

Wide genetic divergence between the inbred lines results in high heterosis in the hybrids. In the present study, considering the objective of development of $F_1$ hybrids with resistance to root knot nematode, though the parental lines may not have wide genetic diversity for different traits they were selected in such a way that they possess high or at least reasonable level of resistance, so that the hybrids developed do posses fairly high level of resistance.

Plant height an important trait by which growth and vigour of the plants are measured. The parent PT 4716A