INTRODUCTION
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Tomato, \textit{(Lycopersicon esculentum} L), as a vegetable is the focus of a large agricultural industry. Essentially all the cultivated forms of the tomato belong to the \textit{Lycopersicon esculentum} species of the family \textit{Solanaceae}. The origin and the early events of domestication of this crop is obscure. One can be reasonably certain about three aspects. First, the cultivated tomato originated in the New world, since all related wild species of tomato are native to the Andean region encompassing parts of Chile, Colombia, Ecuador, Bolivia and Peru. Second the tomato had reached a fairly advanced stage of domestication before being taken to Europe. And third the most likely ancestor, the wild cherry tomato (\textit{L. esculentum} variety \textit{cerasiforme}) is spontaneous throughout tropical and subtropical areas.

For a number of reasons tomato has become a favorite subject for genetic studies. One reason is the great wealth of naturally occurring variability in the species. Other features of interest are the plant's high rate of self-pollination leading to the early expression of recessive mutations; the ease of controlled hybridization and the lack of gene duplication in the plant's genetic architecture. Breeders have extensively used various alien species in their breeding programs for the improvement of the crop. Most of the disease resistances present in modern cultivars have been derived from crosses between \textit{Lycopersicon esculentum} with other wild \textit{Lycopersicon} species. Further more, other useful traits such as high level of soluble solids, fruit characteristics and stress tolerances have been obtained from several different wild tomatoes (Rick \textit{et al.}, 1987). The relative ease by which fertile hybrids can be obtained by crossing tomato (as female parent) with species such as \textit{L. pimpinellifolium}, \textit{L. cheesmanii}, \textit{L. hirsutum} etc. facilitates the introgression of traits from these species into tomato (Rick, 1979; Taylor, 1986).

The large-scale productions of hybrid tomato cultivars are feasible because the flowers are of good size and easily manipulated for hybridization and because
the yield of seed per pollinated flower is high. The benefits that have accrued from such crosses include increased vigor, earlier ripening and the rapid development of combinations of desirable traits. F₁ hybrid cultivars now constitute 95 percent of the plantings for market tomato throughout the world including India. In India tomato is becoming the leading vegetable crop grown and emphasis being laid on hybrid tomatoes. Out of 72 million tons of vegetable production /year, tomato constitutes 6.8% (Yadav, 1998).

The cultivated tomato is adapted to extremely diverse climate ranging from the tropical south India to the humid sub tropic and tropics of North East India and the temperate Himalayas. The hills of N.E. Region offer great promise for its cultivation in summer when tomatoes are not grown anywhere in plains. Successful tomato breeding programs are being operated in many agricultural Universities and ICAR institutes notably ICAR Complex for NEH Region in Barapani. Studies carried out at ICAR Complex have revealed great prospect for its cultivation and improvement (Anonymous, 1992). And already identified certain parental lines which can be used for hybrid tomato production.

For a successful breeding program, evaluation of germplasm, testing of combining ability of inbred lines is one of the most important steps. Combining ability analysis, following the diallel technique, was frequently being used for testing the performance of lines in hybrid combination and also for characterizing the nature and magnitude of gene action involved in controlling a quantitative trait (Griffing, 1956). With these objectives, many workers have used this technique in the tomato improvement program (Kaloo et al., 1974; Rai et al., 1997).

Apart from conventional testing methods of inbred lines, the in vitro techniques (Biotechnology) can be of use for testing the progeny as well as parents. Tomato is accessible for regeneration in vitro. Stem, leaf and root explants have been cultured in vitro not only to study genotypic variability but also to raise somaclones, selection for biotic and abiotic stresses and distant hybridization
(Padmanabhan et al., 1974). Apart from these benefits *in vitro* traits like callus growth, shoot regeneration, etc. may assist in identification and selection of superior parents and hybrid combinations on the basis of GCA and SCA estimate (Frankanbergar, 1982).

Considering the importance of tomato as a crop, which is gaining popularity in NEH Region and India in general, an attempt has been made to explore the possibilities of its improvement and whether Bio-technological tools can play any role in its further improvement. As no systematic attempt has been made till date as revealed from published works in India to use biotechnology as tools in tomato improvement program and correlate it with conventional methods, an attempt has been made to assess its scope with the following objectives:

i. To study the genetic diversity available within Tomato germplasm.

ii. To select parents based on diversity studies, which could produce hybrids of value.

iii. To standardize techniques for callus culture and also to study genotypic differences in the regenerative capacity.

iv. To study the genotypic basis and gene action for the variation in bio-chemical and other parameters responsible for callusing and organogenesis.