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Introduction

Tomato (*Solanum lycopersicon* L.) is one of the most widely cultivated vegetable crops in Africa and all over the world. World tomato production in 2001 was about 103 million tons of fresh fruits on an estimated 3.9 million hectares of land. Hence, is ranked at the top of all fruits and vegetables as a source of vitamins and minerals in the U.S. It plays a major role in human nutrition, as an excellent source of phosphorus, iron, and vitamins A, B and C. It is relatively a short duration crop and gives a high yield, and it is economically attractive and the area under cultivation is increasing. It is a tropical day neutral plant and predominantly self-pollinated, but a certain percentage of cross pollination occurs.

High genetic variation in tomato for plant height, number of days to fruit set, number of fruit per cluster, number of clusters per plant, number of fruits per plant, fruit weight per plant and fruit yield per plant has been studied. The high genetic differences observed in the traits offer an opportunity for indirect selection for yield in tomatoes. Thus, genetic improvement of cultivated tomato for yield and quality can normally be achieved through selection of genotypes with desirable traits that may exist in nature or by hybridization. Plants vary in mating systems from completely outcrossing to completely inbreeding (selfing).

Tomato is an annual plant which can reach a height of over two meters. Reports show that tomato plants with mean plant heights of 121.36 cm will enhance optimum productivity. Hence, height is among characters with high heritability as reported, by which can be used as selection criteria for fruit yield. Number of fruits per plant had been reported and ranged as follows: 27.33 to 64.67, 14 to 65 , 8.08 to 41.56 . Mean fruit number per plant had been reported to be 19.65, 43.09 and 33.20 by. Average fruit weight ranges had also been reported by different scholars as follows 36.33 to 71.07g, 16.13 to 95.7g, 29.83 to 92.67g.

There appears to be significant genetic variation for these traits in tomatoes. This is important because the breakthrough in crop improvement depends on the magnitude of

genetic variability. Yield components have been used in analysing and identifying sources of variation in yield, and these can be exploited in the improvement of cultivars to give higher yields. The breakthrough of any crop improvement programme depends on the presence of genetic differences and extent to which the desirable trait is heritable. This phenomenon in breeding materials had been emphasized by Falconer in 1960, in order to exercise critical selection pressure.

Heritability in broad sense is the heritable variation which was estimated as a ratio of genotypic variance to the phenotypic variance and expressed as a percentage. The heritability percentage was scored as low (0-30%), moderate (30 – 60%) and high (60% and above) as stated by Robinson et al. in 1949. High heritability has been reported in tomatoes by different workers in the following yield components: Plant height, Number of fruits per cluster, Number of fruits per plant, Average fruit weight, Total fruit yield per plant. High heritability reported by these workers clearly indicates the improvement of these traits in tomatoes can be obtained through simple selection.

Other scholars had reported moderate to high heritability in tomato yield components. This has been reported in the following components: number of fruits per plant, average fruit weight and fruit yield. According to Sivaprasad in 2008, moderate to high heritability of these traits suggest that the environmental factors also play a key role in the expression of these traits. Hence, improvement of fruit yield with the complement of its component traits should not be based on simple selection but also on progeny tests. Low to moderate heritability observed for fruits per cluster is an indication of the influence of genotype by environment interaction in the expression of this trait.

The yield potential of tomato has been reported to range from 60 to 100 tons per hectare. Cramer and Wehner in 1998 said a method that could be used to improve productivity would be that of indirect selection for traits that show high correlation coefficient with yield and at the same time possess high heritability. These traits are often referred to as yield components. These traits in tomatoes include: number of whole fruits per plant, number of

branches per plant, number of nodes per branch, number of pistillate flowers, number of fruits per node and marketable or early yield. According to Lungu in 1978, the consideration of yield components in selection is based on the assumption that a strong correlation exists among yield and its components and that these component traits have higher heritability than yield itself.

The aims of tomato breeding have been to increase yield and other important traits as well as removing other constraints/barriers which reduce yield. Yield increase is based on the elimination of limits to yields as well as direct selection for yield per se. Yield is a product of a number of components. It is a product of traits like number of plants per unit area, weight of single fruit and plant height. The degree of association of these components to yield and among themselves is of considerable importance to crop breeders. Correlation analysis is an important tool in statistical analysis. Correlation between two variables is to evaluate the degree of association between two variables.

The correlation can be negative or positive. Both negative and positive correlation coefficients are important in plant breeding as the two show the strength of association between any two characters under study. Selection can be done based on the relationship of plant characters which can be used to improve plant yield. Correlation is important as it has been reported by. In breeding work, knowledge of characters interrelationship among themselves is essential if selection for immediate improvement of the characters for the most part is effective. In tomato, positive correlation of component traits with fruit yield had been reported as follows: Plant height with fruit yield per plant; Number of fruits per plant with fruit yield per plant and; Average fruit weight with fruit yield per plant.

Yield is a complex unit associated with a number of components traits. It is the chief concern of the plant breeders globally and is the ultimate factor on which selection programmes are to be envisaged. All changes in yield must be accompanied by changes in one or more traits, and this does not need to be expressed by changes in yield. This is due to varying degrees of positive and negative correlation that exist between yield and its components. Tomato

flowers had been reported to grow up to 2 cm in diameter. Flowers are borne in inflorescences of between four to twelve flowers. Its six petals are yellow and up to 1cm in length. Marimbe in 1995 reported that the maturity period of tomato varieties differs. The period varies from 83 to 89 days. The crop reaches 50 percent maturity at 66 to 71 days. Maturity period of Espresso (semi determinate) and Sixpack (determinate) had been reported to be 80 days after transplanting, and it was also reported that the first harvest is possible 45 to 55 days after flowering, or 90 to 120 days after sowing.

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