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INHERITANCE OF SOME FRUIT QUALITY CHARACTERISTICS IN TOMATO

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ABSTRACT

Five intraspecific crosses were made between different *Lycopersicon esculentum* - germplasm, *i.e.*, CAL 951/88 X Yellow Pear, Yellow Pear X CAL 951/88, Yellow Pear X Edkawi, Super Marmand X Edkawi and Edkawi X Beaf Steak, in addition to one interspecific cross, *i.e.*, Edkawi (*L. esculentum*) X LA722 (*L. pimpinellifolium*), in order to study the inheritance of vitamin C content, total soluble solids (T.S.S) content, color, and shape of tomato fruits. The parental genotype LA722 (*L. pimpinellifolium*) proved to be a good source for genes controlling high vitamin C and T.S.S contents of tomato fruits. Partial dominance for high vitamin C and T.S.S content was detected. High broad sense heritability estimates were calculated for both vitamin C and T.S.S contents of tomato fruits. The minimum numbers of effective gene pairs controlling vitamin C and T.S.S contents were two and three gene pairs, respectively. The segregations in the F_2 populations indicated the involvement of two genes controlling fruit shape of tomato fruits. These two genes were given the symbols P and Ro. Complete dominance exists at one gene pair and partial dominance exists at the other. Either genes, when homozygous recessive is epistatic to the other. When both genes are homozygous recessive, the second is epistatic to the first. The results indicated also the involvement of a third gene which was given the symbol O. This gene acts as a modifying gene and seems to have only a recognizable effect on the round fruit shape, turning it to round oblate shape when this gene is homozygous or heterozygous dominant. The segregations for fruit color in the F_2 populations of the crosses between the parental genotypes with red and yellow fruit color, fitted the two gene pairs-segregation ratio 9 red: 3 orange: 4 yellow. These results indicated the involvement of two dominant genes whereas complete dominance exists at both gene pairs but one gene, when homozygous recessive, is epistatic to the other. The two gene pairs were given the symbols R and Y. The presence of the two dominant genes, *i.e.*, R – Y- will give red fruit color. When the second gene pairs is homozygous recessive, *i.e.*, R-yy, it will give the orange color, but when the first gene pairs is homozygous recessive, *i.e.*, rrY-, it will give the yellow color. When both gene pairs are homozygous recessive, the fruit color will be yellow.