

8. Spontaneous Trisomes for Knob-10 Chromosome.

Six triplo-10 plants were found among 11,424 seedlings carrying the heterozygous knob 10 chromosome (designated, K 10). In 33,599 plants homozygous for the knobless 10 chromosome (designated, k 10), the trisomes were absent. These six cases originated in $g R^g K/G r^r k$ and $G R^g k/g r^r K$ cultures which were tested for the possibility of crossing-over between the seed and plant color elements of the R^r locus (J. L. Hahn, unpublished). The trisomes were phenotypically R^r and thus were detected as presumed cross-over types. When the six R^r plants were backcrossed by an r^g tester stock, the expected ratio of $1 R^r/r^g: 1 r^g/r^g$ was not obtained but instead four classes were recovered, R^r , R^g , r^r and r^g . Cytological examination showed that each of the six R^r plants was trisomic for chromosome 10.

Since the trisomic frequency was high in the heterozygous K 10 cultures, it was suspected that the frequency might be greatly increased in the homozygous K 10 progeny. Among 806 seedlings examined from the cross of $G R^g K/ g r^r K \times g r^g k/g r^g k$, 10 R^r plants were found one of which died in the seedling stage and one gave a poor cytological specimen. The following cytological alterations for chromosome 10 were found so far in the eight remaining R^r plants:

Total No. sdgs.	No. of R^r	Isochromosomes	Trisomes			
			From Root Tips	From Pachytene	Died	Cyto.
806	10	2	2	4	1	1

A possible mechanism to account for the unexpectedly high frequency of trisomes in the presence of knob-10 is failure of terminalization of a chiasma at meiosis. It is noteworthy that three of the six trisomes from the heterozygous knob-10 series indicated crossing-over between R and G, the G locus being 14 units from R. In the homozygous knob-10 series, four of the eight R^r plants were crossovers for G. This does not exclude the possibility that crossing-over did not occur in the other cases since the stocks were not marked for the detection of crossovers proximal to G.