

4. Chromosome pairing in autopolyploid *Coix lachryma-jobi*.

Autopolyploidy was induced in *Coix lachryma-jobi* by the following method. Seedlings at a four to five leaf stage were root treated with 0.4% aqueous solution of colchicine for 24 hours. After the treatment roots were washed in tap water over several hours and the seedlings were transplanted and kept in the greenhouse till they recovered from the shock of the treatment. Of the 25 seedlings treated only four survived. Though all chromosome counts in squashes of pollen mother cells showed only the diploid number, the high percentage of seed sterility and the occurrence of some big sized seeds led us to suspect induction of sectorial polyploidy. From the seeds of these plants 13 plants were raised and one was more vigorous from the early seedling stage and showed gigas characters. A chromosome count of $n = 20$ in dividing pollen mother cells confirmed its tetraploid nature.

Chromosome pairing was studied in 40 nuclei at metaphase I. On the whole 212 quadrivalents, three trivalents, 369 bivalents and five univalents were observed. The mean frequency of chromosome pairing was observed to be 5.3^{IV}, 0.075^{III}, 7.5^{II} (ring type), 1.725^{II} (rod type), 0.125^I. Thus, on an average more than 50 per cent of the chromosomes of the complement regularly pair as quadrivalents. The number of quadrivalents varied from two to 10 per cell.

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1. Regulation of catechol oxidase.

Investigations on the genetic control of catechol oxidase in maize have revealed the existence of three distinct classes. Type A is designated as the constitutive form since in inbred lines of this class the enzyme is regularly synthesized in the plumule of the young seedling. Type B is classified as the inducible form. No active enzyme occurs in the seedlings; however, active enzyme is produced if the seeds are treated with maleic hydrazide prior to germination. Type C is the non-inducible form. The enzyme is not detected in either

control or maleic hydrazide treated seedlings. This pattern is reversed in the aerial roots. Type A plants which contain active enzyme in the untreated seedlings do not show the enzyme in the aerial roots while type B which does not contain active enzyme in the untreated seedlings forms enzyme in the aerial root. Type C is deficient in both seedlings and aerial roots. These preliminary studies suggest that plants of type C contain an inactive mutant form of the catechol oxidase gene while types A and B contain active genes. However, the A and B lines have different allelic forms which show differential activity in various tissues of the plant.

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