

The manner in which the material was collected was such that it is not possible to know whether this variable situation exists between different branches of the same plant or between different spikes in the same branch.

The extra bivalent, occurring in plant no. 8-2, resembles the other chromosome pairs in the complement in staining intensity and length at diakinesis. In fact, it could not be identified from the rest at this stage. The presence of an extra chromosome pair and the formation of higher associations involving up to 4 chromosomes in a proportion of cells are suggestive of a tetrasomic condition. Since the higher associations comprised chromosomes that are not equal in size, and further, such associations were also observed even in spikes showing a chromosome number of  $n=5$ , a tetrasomic nature of pairing for the higher associations is overruled. Therefore, it is believed that the occurrence of the higher associations is due to chromosomal interchanges and that the extra chromosome pair is not involved in them. The occurrence of one or two nucleolar bivalents may be explained on the assumption, based on widespread existence of chromosomal interchanges in the karyotype of this species, that small portions of the nucleolus organizing region of the nucleolar chromosome were translocated to one of the non-nucleolar chromosomes. If the region involved is adequate enough for the function, two nucleolar bivalents may be found consistently. If not, one or sometimes two bivalents may be found associated with the nucleolus. If there is no such translocation, only one nucleolar bivalent may be found. The fragment observed in one of the cells of this plant could be of localized nature and of spontaneous occurrence. The differences observed in the formation of higher associations may be taken as related to the occurrence of chiasmata at appropriate places.

In plant no. 9-11, the extra univalent occurring in 6 of the 11 spikes studied did not pair with other chromosomes in the complement. It is as long and stains as much as other chromosomes and in this it resembles the extra bivalent in plant 8-2. Whether this univalent represents a single chromosome of the extra bivalent in 8-2 remains to be determined. The fact that the extra chromosome pair in 8-2 and the extra univalent in 9-11 did not show pairing affinities with other chromosomes in the complement and further, that they occur in some portions of the plant and are absent in the rest leads to the suggestion that these may be B-type chromosomes.

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## 2. Further cases of spontaneous chromosomal variation in job's tears (*Coix lachryma-jobi*).

A case of spontaneous chromosomal interchange in *C. lachryma-jobi* ( $n=10$ ) was reported earlier (MNL 39:184-185, 1965). Further studies on this species have revealed two plants showing two other types of spontaneous chromosomal variations, viz. a) trisomy and b) desynapsis.

(a) A plant with a chromosome number of  $2n=21$  was located. This showed at diakinesis and metaphase I nine bivalents and one trivalent. The trivalent is attached to the nucleolus. Since the third chromosome in the trivalent

was always found to be smaller than the other two chromosomes, it appears that the third one does not represent an entire homologous chromosome but only a large centric fragment of it. The plant is propagated vegetatively and cytological examination of the material from the suckers also showed the same trisomic condition. Seed set was good and from selfed seed of this plant, three plants were raised and checked cytologically. All the plants showed  $2n=20$  and regular bivalent formation.

(b) Cytological material collected in midsummer (May 1967) from a plant bearing all sterile seeds showed desynapsis. Univalents varied from 12 to 20 per cell at diakinesis and metaphase I. Other abnormalities associated with univalent formation, such as laggards at anaphase I and II and micronuclei, were common.

When the original culms of this plant were nearing their end by about July 1967, new suckers started coming up. Cytological examination of the material fixed in the rainy season (September 1967) from these suckers revealed regular meiosis with 10 bivalents at diakinesis and metaphase I. Seed setting was fairly good. It is therefore believed that the desynaptic behavior and the consequent seed sterility in the original culms were the result of the effect of high summer temperature.

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### 3. Cytological studies in the progeny of tetraploid plants of job's tears.

Three tetraploid plants ( $4n=40$ ) obtained by colchicine treatment in 1966 began flowering in September 1966 but seed set was poor during October 1966 to January-February 1967 (MNL 41:7, 1967). The vegetative suckers from these plants produced a good number of black spherical seeds in March-April 1967. From a sample of the seed collected from each of the three open pollinated tetraploids a large progeny was raised in June 1967. One hundred twenty-four out of 170 seeds sown have germinated (72.94%). Germination started in 9 or 10 days and continued till 45-60 days after sowing. These were transferred to the field in 4-5 weeks after germination. White chalky seeds produced on the same plants are usually sterile but a large number of these were also sown separately. One of them germinated and produced a healthy plant.

Pollen mother cells in 70 plants of the progeny were examined at diakinesis, metaphase I, and anaphase I for chromosome numbers. Even though tetraploids and diploids were growing side by side no triploids were obtained in the progeny. The table below shows the frequency and percentage of plants with different chromosome numbers met with in the progeny.