

(0.0008%) in the June planting is, therefore, well within the frequency of the occurrence of double seeds in each spathe. Further, the distribution of chromosome numbers in twin plants 68k-30A-1 and 2 ($2n=11$ and $2n=10$, respectively) is comparable with that in the other progeny from the same parent. This evidence suggests that the occurrence of twin plants in C. aquatica is due to double seeds in one spathe rather than to twin embryos developing from the same seed, although the reported existence of the phenomenon of apomixis in C. aquatica (MNL 39:184, 1965; MNL 40:164, 1966) points to the possibility of the latter event also. It is likely, therefore, that the two plants arising from the same spathe have no closer relationship than each may have with any other plant coming from the same parent.

Two approaches to the problem of twins in Coix seem to be straightforward and likely to yield more direct evidence on the nature of twins.

(i) When two seedlings are found emerging from one spathe, break open the shell and determine if it contains two seeds. Some injury to the seed or seeds inside is inevitable in most cases while breaking open the spathe and it might not be possible to grow the seedlings further. In view of the risk involved and since the twins were spotted for the first time, no attempt was made to break open the shells in the present investigation.

(ii) If some of the spathes, at the time of flowering, are found to show two bifid styles, instead of the normal one, it indicates that the second floret, in the pistillate spikelet, is likely to function. Then such spathes may be harvested at maturity separately and some of them may be examined to see if they contain two seeds while the remaining ones are germinated to see if they produce twin plants with greater frequency than spathes with only one bifid style.

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3. Cytological study in a progeny of an open pollinated plant of Coix aquatica with a chromosome number of $2n = 12 + 1$ fragment.

In the 1967 plantings of Coix aquatica, among the progeny of a plant 66k-8-2, one plant 67k-I 8-2-2 showed a chromosome number of $2n = 12 + 1$ fragment. At meiosis the 12 chromosomes formed 6 bivalents and

the fragment associated itself with one of the bivalents. Frequently univalents varying from 2 to 4 were also observed. This plant was allowed to open pollinate in the field and its progeny was raised during June, 1968. Pollen mother cells of 58 plants of this progeny were examined for chromosome numbers. The observations are summarized in the table below. In each of the 58 plants, cytological material was collected from 5 different tillers in view of the chromosomal instability in plant 66k-8-2 recorded last year (MNL 42:2-3, 1968).

Chromosome No.	No. of plants	Percentage	Remarks
2n=10	9	15.53	Including one plant showing chromosomal instability.
2n=11	17	29.31	Including one plant showing suspected trisomic condition.
2n=11+1f*	1	1.72	Showing desynapsis.
2n=12	14	24.14	Including two plants showing suspected tetrasomic condition.
2n=13	15	25.86	Including two plants showing chromosomal instability with 2n=12 in some cells. In one of the plants when the number is 2n=13 regularly an association of 4 chromosomes of apparently equal size was observed. But in cells with 2n=12 only an association of 3 chromosomes of similar nature was found. This is suggestive of tetrasomic and trisomic condition in the respective cells.
2n=13+1f*	1	1.72	The fragment associated itself with the nucleolar bivalent. Tetrasomic condition also seems to be present. In some spikes 2n=13 was observed and in this case the fragment was missing.
Polyploid	<u>1</u>	<u>1.72</u>	3n(?)
	58	100.00	Total.

*fragment

Preliminary observations on meiosis showed the following general features. The fragment observed in the parent plant was found in a very

few plants in the progeny. Bridges, laggards, and irregular distribution at anaphase were common. A heteromorphic bivalent was found in many of the plants. Many plants frequently showed the occurrence of 2 to 4 univalents per cell and one plant was found to be desynaptic. In most of the progeny there were higher associations involving 3, 4 or more chromosomes. In plants with a regular diploid complement ($2n=10$) these higher associations may be taken as due to chromosomal interchanges. In cytological behaviour, the plants with the chromosome numbers of $2n=11$, 12 and 13 may be tentatively grouped into the following four categories.

(i) Those showing higher associations involving chromosomes of apparently equal size suggesting an aneuploid condition.

(ii) Those having higher associations involving chromosomes with discernible size differences indicating the presence of chromosomal interchanges.

(iii) Those having higher associations involving equal as well as unequal chromosomes indicating the presence of both aneuploidy and segmental interchanges.

(iv) Those in which the chromosome associations were strictly as bivalents with the odd chromosome, when present, remaining as a univalent.

Detailed meiotic studies are underway for a precise understanding of the nature of chromosomal associations in these plants.

The variability in chromosome number and behaviour occurring both within and between plants of the progeny arising from a single open pollinated individual shows that the genome in C. aquatica is highly plastic. Further, since all the chromosomal variants in the progeny are capable of survival and reproduction, the individual plants of a population have an adaptive ability that is significant in preserving and enlarging the cytogenetic diversity. Although morphological differences between plants carrying different chromosome numbers are not apparent, differences of a quantitative nature may exist, since Venkateswarlu and Chaganti (J. Cytol. Genet. 1:14-21, 1966) stated that at least a part of the high amount of variability in populations of C. aquatica, analyzed by them, was due to chromosomal variants.

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