

to purple style and purple plant colour are  $F_1$  hybrids and the 4 plants having characters of Anantagiri Coix are produced through apomixis, since the possibility of these being selfed progeny of the female parent was eliminated beyond doubt by careful emasculations. The occurrence of a large number of crossed plants in this experiment shows that the species (or at least the type, Anantagiri Coix, under investigation) is largely sexual in reproduction. However, apomixis also occurs although in low proportions (3.54%) and the species may therefore be termed as a facultative apomict.

The purple colour of style and purple plant colour appear to be dominant over white style and green plant colour, respectively. As the  $F_1$  plants exhibited only short hairs on the leaves, the condition of leaves having long hairs on the upper surface seems to be incompletely dominant over glabrous leaves. The  $F_1$  plants were selfed and also test crossed for further studies.

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## 2. Twins (?) in Coix aquatica.

Twins are of considerable interest because they offer a potential source for haploids. In Coix aquatica, three seeds have been found to give rise to twin plants out of a total of 3,681 germinating seeds in June, 1968 (0.0008%). These were transferred to pots and both the plants in each of these seeds were marked separately. One of the plants from one seed died early owing to mechanical injury. The remaining 5 plants grew to maturity and their meiotic study showed the following chromosome numbers and behaviour (see table at top of next page). The female parent of 68k-30A on cytological examination last year showed a chromosome number of  $2n=11$  with the same meiotic behaviour as that of 68k-30A-1. Six other plants of the open pollinated progeny of this same parent have shown chromosome numbers  $2n=10$  in three plants and  $2n=11$  in the other three.

In Coix, the use of the word "seed" is rather deceptive and usually refers to the structure enclosing the caryopsis, which is really the metamorphosed or indurated or hardened leaf sheath called variously

Culture No.	Twin No.	Chromosome No.	Meiotic behaviour
68k-78A	1	2n = 10	5 ii or an occasional chain of three
	2	2n = 10	5 ii
68k-39A	1	2n = 10	5 ii or an occasional ring of four
	2 (died early)	--	--
68k-30A	1	2n = 11	5 ii + 1 i
	2	2n = 10	5 ii

as capsular spathe, false fruit, shell, involucre etc. Since these are the actual materials sown and during germination, the plumule emerges through the mouth of the spathe, just as it pierces through the protective husk in rice, the word "seed" may be used loosely to designate this structure as long as the problems of twins and multiple seedlings are not involved. In discussions of such problems, however, the distinction between the seed proper and the protective sheath ought to be made. In Coix, each capsular spathe contains a fertile pistillate spikelet consisting of two florets, only one of which normally functions to produce a single seed or caryopsis while the other aborts. However, occasionally the second floret also seems to become functional and develops into a seed; thereby two seeds, instead of one, may be formed in one spathe in which case it is something like a fruit with more than one seed. When twin plants arise in such a low frequency it is not practicable to make a developmental study of the embryogeny and there is only a good deal of speculation about their origin. In the present study, since all the twins showed only a diploid chromosome number, they could have come from twin embryos of a single seed or from the two rarely formed seeds in a spathe. To find out how frequently two seeds occur in one spathe, a random sample of 2,200 normal, hard capsular spathes were crushed and examined. Of these, 10 had two seeds (0.0045%), 10 had no seed at all (0.0045%) and the rest had one seed in each (99.991%). The observed frequency of twin plants

(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