International Journal of Innovative Research and Advanced Studies (IJIRAS)
Volume 4 Issue 1, January 2017

ISSN: 2394-4404

Cytological Studies In Hybrids Of Coix Aquatica & Coix Gigantea L.

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Abstract: ***Plants of the genus Coix with 3 different chromosome numbers were cytologically studied. These were 2n=10, 2n=14& 2n=15. C. aquatica with 2n=10was the original species. In due course of time it hybridized with C.gigantea (2n=20) and gave the hybrids 2n=14 & 2n=15.The hybrid 2n=14 showed 5 aquatica & 9 gigantea chromosomes and it was semifertile.But the hybrid 2n=15 showing 5 aquatica & 10 gigantea chromosomes was sterile.***

Keywords: C.aquatica, C.gigantea, hybrids, quadrivalents, intraspecific pairing, non-synchronous.

I. MATERIAL & METHODS

Species of *Coix* are maintained in the Botanical Garden of Dr. B.A.M.University, Aurangabad since 1975.Plants from this population were tagged & numbered. Single plant racemes were fixed in the fixative in separate bottles. They were screened cytologically & photographed. Seeds from selected individuals were collected separately for the next season to know their progeny.

II. INTRODUCTION

Coix is an oriental member of tribe Maydeae, family Poaceae. It is a widely distributed genus, growing wild & commonly known as 'Kavadya Gavat' or 'Ran Maka'. The seeds are used as food or for making porridge (Bor, 1960). It also has some medicinal uses.

Many natural aneuploids, hybrids and hybrid derivatives emerged in the population where C. aquatica and C. gigantea are growing together (Mashalkar1983, Deshpande1986, Naik1991). These species exhibit morphological and chromosomal plasticity to such a magnitude that it is difficult to differentiate them in the field. The extensive diversity within these species is mediated by the existence of cross pollination. Extensive cross pollination accounts for the enormous interpopulation variability. Some characters as well as chromosomes of these two species have gotten mixed with each others in such a way that it is difficult to distinguish them.

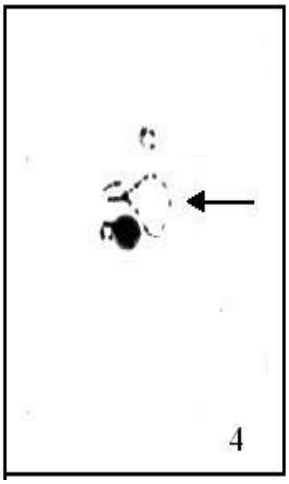
III. RESULT

Plants with 3 different chromosome numbers were cytologically screened and their meiotic behavior was studied in detail. These were 2n=10, 2n =14 and 2n=15. Of these 2n=10 (*C. aquatica*) was the original species.

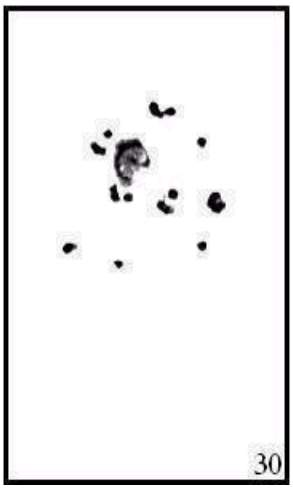
In the plants 2n=10, meiosis was fairly normal leading to fertile gametes. Sometimes PMCs showed quadrivalents or hexavalents which indicates involvement of chromosomes in translocation. At anaphase inversion bridges and fragment chromosomes were observed which led to formation of micronuclei, resulting in hypoploid or hyperploid gametes .In due course of time it hybridized with *C. gigantea* (2n=20) and gave the hybrids 2n=14 and 2n=15.

ISSN: 2394-4404

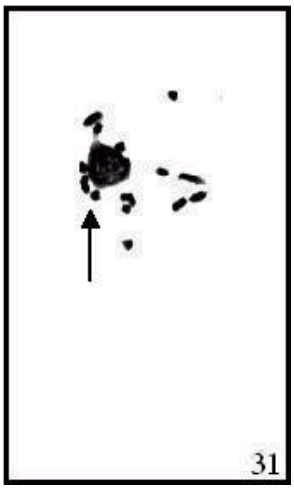
5ring bivalents



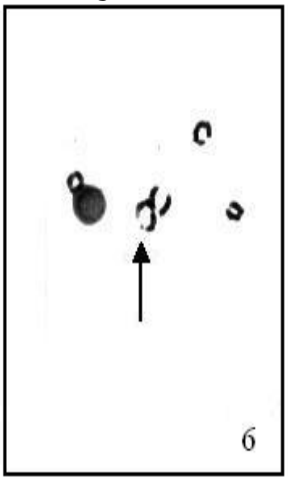
Interchange hexavalents



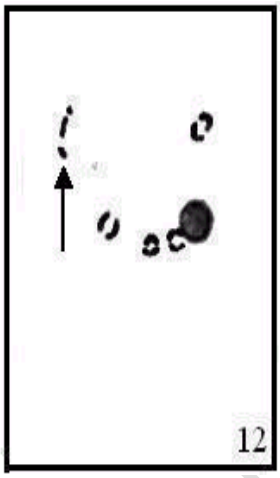
5II +4I(5A-G+4G)



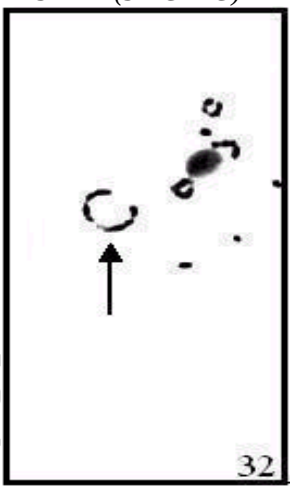
III+4II+3I(G-A-G+4A-G+3G)



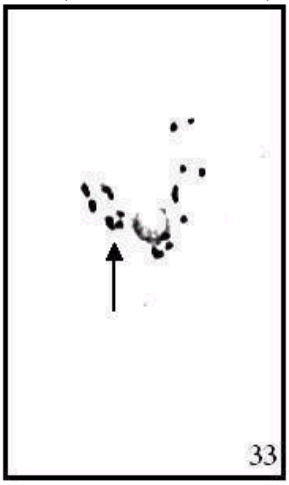
Interchange quadrivalents figure of 8



4ring bivalent & one bivalent with a break



IV+3II+4I(A-G-A-G+3A-G+4G)



III+2II+7I(G-A-G+2A-G+2A+5G)

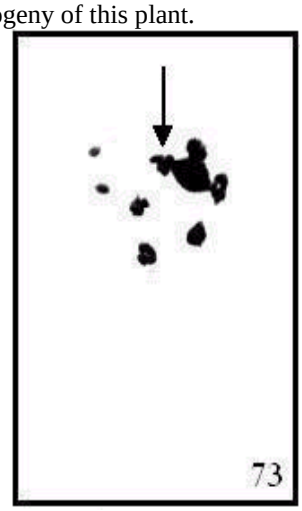
The hybrids 2n=14 had 5 *aquatica* and 9 *gigantea* chromosomes. Cytologically the 5 *aquatica* chromosomes paired with 5 large *gigantea* chromosomes to form 5 bivalents and left 4 smaller *gigantea* chromosomes as univalents. Quadrivalents and trivalents were seen along with bivalents and univalents at diakinesis.

Trivalents formation was very frequent with G-A-G pairing, but there was never intraspecific pairing. Anaphase I showed a varied number of laggards ranging from 1-10. The movement of univalents were non-synchronous resulting in pole to pole spread of chromosomes. The number and size of micronuclei were variable in the tetrads. Microspores comprising variable number of *aquatica* and *gigantea* chromosomes were thus produced.

The outcrossed progeny of this plant comprised of 2n=10, 2n=14, 2n=17, 2n=18, 2n=19 plants.

The hybrid 2n=15 had 5 *aquatica* and 10 *gigantea* chromosomes. Diakinesis configuration were very sticky. Trivalents, heteromorphic bivalents and univalents were seen. 1-5 laggards were recorded at anaphase I which sometimes spilt into chromatids. These later on appeared as micronuclei in the tetrads.

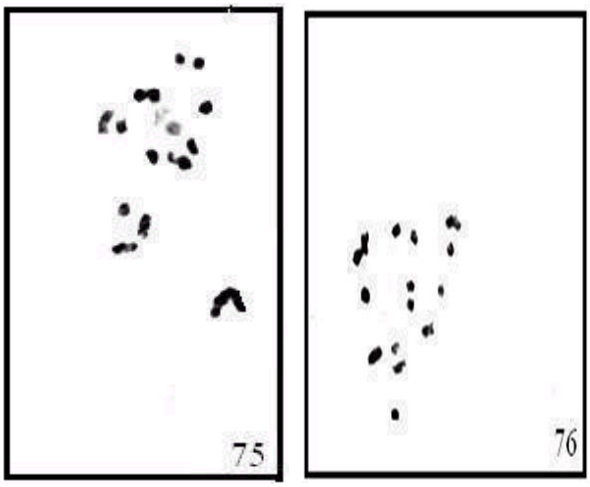
Mysteriously the plant was completely sterile, as all the seeds formed were chalky white and hence there was no progeny of this plant.



III+5II+2I

5II+5I

ISSN: 2394-4404



4II+7I *2II +11 I*

Hence when the plants with 3 different chromosome numbers were cytologically studied, it was found that the plant with 2n=14 had maximum number of progeny showing stability, suggesting that chromosomes of *C. aquatica* and *C.gigantea* show friendly gesture and can be complemented into different hybrids naturally.

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