

CYTOGENETICAL STUDIES OF *ORYZA SATIVA* L. AND ITS RELATED SPECIES

6. Studies on the Colchicine Induced Auto-Octaploid⁽¹⁾

KWEI-CHI HO and H. W. LI⁽²⁾

(Received Feb. 5, 1964)

In the course of our research on the production of amphiploids from the different interspecific hybrids, colchicine was used in effecting these doublings by treatment of young shoots or the direct treatment of hybrid seeds. In treatments with F_1 seeds, a batch of seeds which was labeled as *O. australiensis* × *O. alta* was included. When the treated seeds reached maturity, spikes of different tillers were fixed for cytological examination. One of these tillers was found to be an auto-octaploid ($2n=96$), not the tetraploid ($2n=48$) as being found in other tillers. Later, several other tillers were also found to be with 96 chromosomes. Since this hybrid was labeled to be a cross of *O. australiensis* × *O. alta*, they ought to have EE and CCDD genomes respectively. However the pollen grains we found in the normal tillers were quite normal and their meiosis was also very regular indicating that it was not the cross as being labeled to start with. From detailed morphological study of the hybrid plants they looked very much like the plants without any contamination of *O. australiensis*. It seemed that the female plants used in this cross was not *O. australiensis* but rather a plant like *O. latifolia* with the same genome CCDD as the male parent.

As the authors were fully aware that this might be the first case ever being reported of a plant with 96 chromosomes in rice. So a detailed study of the first metaphase of meiosis was made and the result was tabulated in Table 1. In all, 50 pollen mother cells were studied. Tetravalents and bivalents were mostly encountered. However, in some cells pentavalents and trivalents as well as univalents were also found. The range of tetravalents found was 0-11; the mode was around 5-6; and the average was 5.14 per cell. This indicated that the induced tillers were auto-octaploid. Figure 1 showed 36 bivalents and 6 tetravalents in one cell.

⁽¹⁾ Paper No. 25 of the Scientific Journal Series, Institute of Botany, Academia Sinica. The study was supported partly by the National Council on Science Development. The authors are grateful to the able assistance of Mr. K. S. Tsai.

⁽²⁾ Assistant Research Fellow and Research Fellow respectively.

Table 1. *Chromosome association at MI in the auto-octaploid rice plants with genome constitution CCCD*

V	IV	III	II	I	Frequency	
	1		46		1	2
	1		44	4	1	
	2		43	22	1	1
	3		42		8	9
	3		41	2	1	
	4		40		6	7
	4		39	2	1	
	5		38		7	
	5	1	36	1	1	11
	5	1	35	3	3	
	6		36		8	
	6		35	2	1	11
1	6		33	1	1	
1	6		32	3	1	
	7		34		3	3
	8		32		2	2
	9		29	2	1	1
	10		28		2	2
	11		26		1	1
Total 2	25	2	1861	28		
Mean 0.04	5.14	0.08	37.22	0.56		50
Range 0-1	1-11	0-1	26-46	0-4		

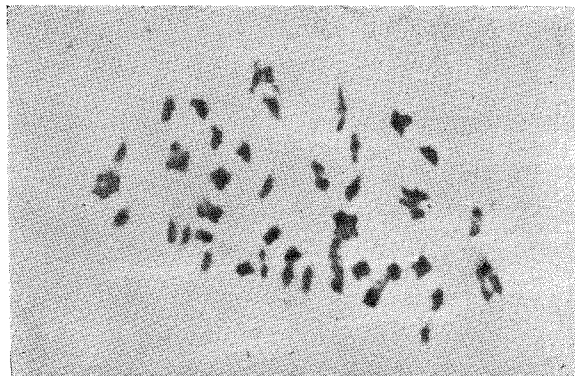


Fig. 1 Chromosome association in the auto-octaploid, with 36 bivalents and 6 tetravalents.

Oryza sativa L. 及其近緣種之細胞遺傳學研究

6. 秋水仙精誘致八倍體 (Auto-octaploid) 之研究

何 閏 綺 李 先 聞

以秋水仙精處理一堆標明為 *O. australiensis* × *O. alta* (EE 和 CCDD genome) 的種間雜種種子，發現其少數分藥花粉母細胞染色體數是 $2n=96$ ，而其他分藥則為 $2n=48$ 。詳細研究其形態，發現此雜種的母本是類似 *O. latifolia* 的種，其染色體組成也是 CCDD。

此具96條染色體的水稻，在減數分裂中期染色體配對多半是四價體和二價體。每一細胞含四價體數是0-11，型量為5和6。平均每一細胞有5.14個四價體。