

Cytology and fertility of hybrids between Mono V (5 B) Chinese Spring and *Secale cereale* L. and *Aegilops columnaris* ZHUK.

Juan-Ramon LACADENA

Department of Cytogenetics and Plant Breeding Estacion Experimental de Aula Dei, Zaragoza, Spain

In order to utilize the chromosome V (5 B) of *T. aestivum* as a mean to introduce into wheat the alien variation from its related species by meiotic recombination, crosses between a mono 5 B plant of Chinese Spring and rye ($2n=14$) and *Ae. columnaris* ZHUK. ($2n=28$) were made. Results are shown in Table 1.

The chromosome numbers of the progenies indicate the different transmission rates of chromosome 5 B through the female gamete in both crosses: 17.6 % and 50 % in crosses involving *Secale cereale* and *Ae. columnaris* respectively. According to meiotic observations, the plant with $2n=29$ chromosomes, found among the progeny of Mono 5 B Chinese Spring x rye, originated as a consequence of non-disjunction in a chromosome. Another cytological abnormality was found among the mono 5 B C. S. x *Ae. columnaris* progeny : a 35-chromosome hybrid had a very long chromosome in the somatic cells. Further meiotic observations showed the occurrence of inter-arm pairing, indicating that the long chromosome is an isochromosome. Hybrid fertility was studied in normal conditions and after being treated with an 0.15 % aqueous colchicine solution during 48 or 72 hours using Bell's technique. Results are shown in Table 2.

Percentages of fertility were calculated by considering each spikelet to have two florets. On comparing the results obtained with and without colchicine treatment, clear differences in fertility of the hybrids become apparent, probably due to the production of chimaeras in the individuals treated with the drug. Different behaviour as to fertility of the hybrids deficient or not for chromosome 5 B has been also observed, the lowest percentages of fertility corresponding to the deficient ones. Likewise, results seem to indicate a greater affinity between *T. aestivum* and *Ae. columnaris* than between *T. aestivum* and *Secale cereale*. The external appearance of hybrid seeds is fairly good, specially that of *Ae. columnaris* hybrids.

(Received June 29, 1966)

Table 1

Crosses	Florets pollinated	Seeds obtained		Chromosome numbers of progeny
		Total	Viable	
Mono 5 B C. S. × <i>Secale cereale</i>	60	51	20	14 plants with 2n=27 2 // // 2n=28 1 // // 2n=29 3 // without control
Mono 5 B C. S. × <i>Ae. columnaris</i>	20	15	14	7 plants with 2n=34 7 // // 2n=35

Table 2.

Material	2n	Colchicine treatment	Plants observed	Ears		Total number of florets	Seeds obtained	% seed setting
				sterile	partially fertile			
Mono 5 B Chinese Spring × <i>Secale cereale</i>	27	without	7	192	0	8,314	0	0
Mono 5 B Chinese Spring × <i>Secale cereale</i>	28	//	2	12	0	420	0	0
Mono 5 B Chinese Spring × <i>Secale cereale</i>	29	//	1	19	0	678	0	0
Mono 5 B Chinese Spring × <i>Ae. columnaris</i>	34	//	4	260	0	5,542	0	0
Mono 5 B Chinese Spring × <i>Ae. columnaris</i>	35	//	7	264	4	6,768	4	0.06
Mono 5 B Chinese Spring × <i>Secale cereale</i>	27	with	4	73	7	3,926	15	0.38
Mono 5 B Chinese Spring × <i>Ae. columnaris</i>	34	//	5	124	6	2,626	41	1.56
Mono 5 B Chinese Spring × <i>Ae. columnaris</i>	35	//	1	7	2	196	4	2.04