

The fact that crossover chromosomes are found in diploid eggs of as plants (which was first reported in 1947 by Rhoades, Genetics 32: 101) would be surprising if these eggs came from EMC's with only univalents. It seems likely, however, that EMC's containing both univalents and bivalents give rise to diploid eggs and therefore a certain amount of crossing over would be expected.

A calculation of the percent of crossover strands among the total strand population gives 12.9% C-Wx recombination in the coupling backcross and 9.9% C-Wx recombination in the repulsion backcross. The value for the Sh-Wx region in the coupling data in Table 1 is 21.4%. The last value is based on a small population of only 56 gametes, since triploid plants are more difficult to obtain than tetraploid ones. Using only the phenotypically Bt classes, a value of 14.2% is obtained for the Bt-Fr region in the chromosome 5 test. Most of these values are less than the standard values. Because of the unusual events which occur during formation of diploid gametes, it is difficult to predict the expected rate of exchanges. However, if some univalent chromosomes are present in the cell at the time of crossing over, a reduction in the recombination values would be expected.

#### 5. A duplicate factor ratio.

A chance segregation of pale green plants occurring in the F<sub>2</sub> of crosses between KYS and two tester stocks may represent another occurrence of the pg<sub>11</sub> pg<sub>12</sub> duplicate factors found by Rhoades. In F<sub>2</sub>'s segregating ws lg gl, 126 green: 12 pale green: 42 ws plants were found. This is close to the 15:1 ratio of green: pale green expected if duplicate factors are involved. It seems likely that KYS is homozygous for or carries either pg<sub>11</sub> or pg<sub>12</sub> while the second factor of the pair is carried in the ws lg gl tester stock as well as in a Rg lg a et stock.

#### 6. Further studies of KYS male sterility.

In the MNL 31: 81, mention was made of an aberrant F<sub>2</sub> from self pollination of Ms ms S s, which segregated male sterile plants. No male steriles (Ms ms s s) were expected since only S pollen functions in Ms ms S s heterozygotes. The Ms ms S s plant which was self pollinated came from a cross of as/KYS ♀ X KYS ♂ (Ms ms S s X ms ms s s). Two other Ms ms S s plants coming from the same cross (and the same ear) were selfed and gave no male steriles. Numerous other unrelated F<sub>2</sub>'s also gave only normal plants. The single aberrant population remains unexplained. Although as was segregating, asynaptic plants can easily be distinguished from the male steriles on the basis of ear sterility.

Thirteen genetic testers were checked for ms and s constitution. Nine were Ms Ms S S, two were ms ms S S, and two were Ms ms S S. Our stocks of Mangelsdorf tester are ms ms S S. Evidently the s allele is restricted in its occurrence, whereas the ms mutation is more widely distributed.

The S locus has been located on chromosome 2 at about 10 units beyond fl at position 78 (Prensky, MNL 31: 73). Data are given here which show linkage of S with B and ts.

	+:ws	+:gl	B:b	+:ts	Crossover percentages	
					<u>B-S</u>	<u>ts-S</u>
1. $\frac{Ms \ ws \ gl \ b \ S}{ms \ + \ + \ b \ s} \times \frac{Ms \ ws \ gl \ B \ S}{ms \ + \ + \ b \ s}$	66:22	62:26	64:24	---	27.3	---
2. $\frac{Ms \ ws \ gl \ B \ ts \ S}{ms \ + \ + \ b \ + \ s} (X)$	96:23	92:27	104:15	64:55	25	7.6
3. $\frac{Ms \ ws \ gl \ B \ ts \ S}{ms \ + \ + \ b \ + \ s} (X)$	92:38	92:38	116:14	69:55	21.5	11.3

Plants of  $\frac{ts \ S}{+ \ S}$  constitution produce two types of functional pollen--ts S and + S. The frequency of the latter type is the frequency of ts-S crossing over. The values obtained for the B-S and ts-S regions are in good agreement with Prensky's data and place the S locus close to the centromere of chromosome 2.

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7. The influence of abnormal chromosome 10 (K 10) on the recombination frequency between r and sr<sub>2</sub>.

Joachim and Burnham (MNL 29) reported that g-r-sr<sub>2</sub> appears to be the linear order of these genes on normal chromosome 10 (k 10). The recombination values obtained for the r-sr<sub>2</sub> region ranged from 21.4% to 31.0%. In MNL 30, Joachim confirmed the linear order and obtained recombination values ranging from 25.1% to 31.5%.

The experiment reported here was carried out to determine the effect of abnormal chromosome 10 (K 10) on the recombination frequency between r and sr<sub>2</sub>. The backcross data shown below were obtained for sib plants segregating for abnormal chromosome 10.

	(0)	(0)	(1)	(1)	(2)	(2)	(1-2)	(1-2)	$\Sigma$
	<u>g + +</u>	<u>+ r sr</u>	<u>g r sr</u>	<u>+ + +</u>	<u>g + sr</u>	<u>+ r +</u>	<u>+ + sr</u>	<u>g r +</u>	
$\frac{g + + \ K}{+ r \ sr \ k}$	564	196	33	87	3	5	0	0	888
$\frac{g + + \ k}{+ r \ sr \ k}$	235	233	47	54	159	154	9	5	896