

The great majority of chains of 4 at Dk lack a chiasma in 9S. At MI these chains are oriented so that the terminal members go to the same pole.

Unfortunately pollen abortion counts were not made on these 2 plants. The predicted abortion is 54% for the N 10/N 10 plants and 70% for the N 10/abn 10 plants. It is interesting to compare the ovule abortion on sib ears with and without abnormal 10 in the same and in related families.

<u>N 10/N 10 plants</u>	<u>No. ovules</u>	<u>% abortion</u>
22708-A	508	53.1
B	477	41.3
2	458	43.4
6	230	45.6
22703-10	485	50.7
19	556	60.6
A	376	50.5
B	328	51.2
22708-8	527	57.3
9	443	54.9
18	462	65.4
21	428	63.4
M	484	61.4
22703-1	349	70.8
22704-1	400	66.7
	N 10/N 10	N 10/abn 10
average % abortion	50.1	63.0

The lower seed set on ears from plants with abnormal 10 is presumably due to a higher frequency of open rings at metaphase I. These would lead to adjacent disjunction and aborted ovules. The almost complete absence of zigzag rings at metaphase I must be a consequence of the extreme shortness of the two arms, 6S and 9S, which makes it difficult for the necessary twist to occur.

It is evident that the abnormal chromosome 10 causes a striking increase in chiasma frequency which, in turn, alters the types of MI configurations. This is in agreement with the increase in genetic crossing over observed by Rhoades and Kikudome and also noted in these translocation heterozygotes. The fact that zigzag rings are more frequent in plants carrying abnormal 10 may indicate that the effect of this chromosome is to cause a greater flexibility of the chromonemata permitting the occurrence of more chiasmata, as well as zigzag rings.

-- Ellen Dempsey

15. A test for pseudoallelism at the  $A_2$  locus.

A mutant  $a_2$  allele ( $a_2^{BlMex}$ ) which was found by Rhoades in Black Mexican sweet corn is being tested for pseudoallelism with the standard  $a_2$  allele ( $a_2^{St}$ ). A cross of  $Gl\ 17\ a_2^{BlMex}\ Bm\ X$   
 $gl\ 17\ a_2^{St}\ bm$   
 $gl\ 17\ a_2^{St}\ bt\ \delta$  gave 10  $A_2$  seeds in an estimated population of 20,900. These plants were selfed and 8 proved to be contaminants while 2 arose by hetero-fertilization and had  $a_2$  embryos. A second cross was made in which markers to the right and left of  $a_2$  were available:

$$\frac{Gl_{17} a_2^{B1Mex} Bt V_2}{g_{17} a_2^{St} bt V_2} \quad y \quad y \quad X \quad \frac{g_{17} a_2^{St} bt Pr v_2}{y \delta}$$

The egg parents were detasselled and a block of tetraploid corn decreased chances of contaminating pollen grains on one side. Nine colored seeds were obtained (1  $\underline{A_2 Bt Y}$ , 5  $\underline{A_2 Bt y}$ , and 3  $\underline{A_2 bt y}$ ) in a total population of 179,500. These plants will be tested next summer.

-- Ellen Dempsey

16. The occurrence of  $pg_{11}$  and  $pg_{12}$  in various lines.

The lines listed below were crossed with a  $pg_{11} pg_{12} y wx$  stock and the  $F_1$ 's were selfed to test for the presence of one or the other of the duplicate factors. Five of the 8 lines are homozygous for one of the  $pg$  genes, four of them possessing  $pg_{11}$  on chromosome 6 and one having  $pg_{12}$  on chromosome 9. Apparently homozygosity for one member of the duplicate factor pair is common.

	Ratio in $F_2$	Homozygous for
Black Mexican . . . . .	15:1	
$a_2$ bt pr tester . . . . .	15:1	
M14 . . . . .	3:1	$pg_{11}$
Iowa B14 . . . . .	3:1	$pg_{11}$
Oh45 . . . . .	3:1	$pg_{11}$
$a_1$ sh <sub>2</sub> tester . . . . .	15:1	
Oh43 . . . . .	3:1	$pg_{11}$
KYS . . . . .	3:1	$pg_{12}$

-- Ellen Dempsey

17. A case of normal functioning of hyperploid pollen.

In previous work with plants carrying a normal 9 and a 9 with a piece of 3L transposed into the short arm between the Sh and Wx loci, the pollen grains with a normal 9 had a marked superiority in achieving fertilization over the grains with the transposed piece of 3L which were hyperploid for this segment when a normal chromosome 3 was present. The advantage of the euploid pollen varied in different crosses but there was always a marked difference in the percentage of functioning pollen between the two types of pollen. This past summer a different result was obtained when plants heterozygous for N9 Dp 9 and the C Sh Wx loci were used as the male parent on a c sh wx g<sub>15</sub> tester. When sister Dp9 N9 Df3 N3 and Dp9 N9 N3 N3 plants (see 1959 News Letter for description of this aberration) were used as the female parent in test crosses the results were in close agreement with those found in extensive previous experiments -- namely, a marked reduction in crossing over and an approximate 2:1 ratio of Dp9:N9 ovules from the Dp9 N9 Df3 N3 class and a 1:1 ratio of Dp9:N9 ovules from the Dp9 N9 N3 N3 plants. It is clear that the Dp9 chromosome was present. Wholly unexpected results were found in the reciprocal crosses where Dp9 N3 pollen was just as effective in fertilization as N9 N3 grains. It should be noted that the present experiment involved a tester strain which had not been used before and it is possible that the genotype of the female parent plays a significant role in pollen competition. A somewhat similar situation was reported by Singleton (1940 P.N.A.S.) who found that sp pollen from Sp sp heterozygotes functioned with a much higher percentage on certain female tester lines than on others. This summer a duplicate planting will be made and pollen from individual plants will be applied to a number of tester strains in order to ascertain if the nature of the egg parent influenced