

4. A test for chromosomal interference in crossing over.

Nothing is known in maize about chromosomal interference in crossing over -- i.e., are crossovers in the different paired homologues independent events or does a crossover in one chromosome pair decrease or increase the probability of crossing over in another pair. This is a difficult problem to approach experimentally in maize because of the haploid number of ten chromosomes but some information was obtained from a study of the anaphase configurations in plants heterozygous for two paracentric inversions -- namely In 3a and In 7a. The acentric fragment produced by crossing over within the inversion loop of In 7a is distinctly larger than the acentric fragment from In 3a crossovers so the PMC can be scored with considerable accuracy for In 7a and In 3a bridges and fragments. The following anaphase I and early telophase data were obtained from plants heterozygous for the two inversions:

3a bridge and fragment	72 PMC	3a and 7a fragments	158
3a fragment	33	3a double and 7a single bridge	17
3a double bridge	2	7a double and 3a single bridge	19
7a bridge and fragment	2	3a double and 7a double bridge	1
7a fragment	72	no bridge or fragment	78
7a double bridge	13	2 bridges and 7a fragment	7
3a and 7a bridge and fragments	276		

In 7a: % single and 3-strand double exchanges = 78.0
% 4-strand doubles = 3.3

In 3a: % single and 3-strand double exchanges = 57.0
% 4-strand doubles = 2.0

Simultaneous single or 3-strand double exchanges in both inversion loops:

Expected % $57.0 \times 78.0 = 44.5$
Observed % = 44.4

Simultaneous 4-strand double exchanges in both inversion loops:

Expected % $3.3 \times 2.0 = .07\%$
Observed % = .10%

From the above data it may be concluded that crossing over in chromosome 7 does not influence crossing over in chromosome 3.

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