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1. The effect of aneuploidy upon the chromosome number of succeeding generations in tetraploid maize.

Chromosome numbers were determined for individual plants in a population of tetraploid Argentine flint maize. Pollinations were made by bulked pollination in such a way that plants with 38 chromosomes were pollinated by bulked pollen from plants with 38 chromosomes, 39 chromosome plants by 39 chromosome pollen, etc.

The effect of parental chromosome number on the succeeding generation was determined by counting chromosomes in the root tips of seedlings resulting from the above procedure. The results are given in Table 1.

Table 1. Summary of chromosome numbers in the progenies of plants having several different chromosome numbers.

Parental chrom. no.	No. of parent plants	Progeny chromosome number 37	38	39	40	41	42	43	44	No. plts. ctd.	Av. no. chrom.
38	6	33.3%	16.7%	33.3%	16.7%	--	--	--	--	6	38.3
39	15	1.5%	20.6%	38.2%	35.3%	2.9%	1.5%	--	--	68	39.2
40	32	--	4.0%	10.7%	54.7%	21.3%	8.0%	1.3%	--	75	40.2
41	20	--	1.8%	7.3%	40.0%	23.3%	27.6%	--	--	55	40.7
42	15	--	--	4.9%	31.7%	24.4%	31.7%	4.9%	2.4%	41	41.1
43	3	--	2.5%	2.6%	10.5%	16.0%	34.2%	23.7%	10.5%	38	41.9

The t tests for skewness of the above distributions were as follows:

39 chrom. population t = +0.4931
40 chrom. population t = +0.6993
41 chrom. population t = -0.7651
42 chrom. population t = +0.5780
43 chrom. population t = -1.8410

None of these populations was significantly skewed, though the t value for the 43 chromosome population is near significance.

Next, all possible t tests were made to determine if average chromosome numbers of the progenies were significantly different from each other:

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39 vs. 40	t =	6.024**
39 vs. 41	t =	7.980**
39 vs. 42	t =	8.887**
39 vs. 43	t =	11.250**
40 vs. 41	t =	2.839**
40 vs. 42	t =	4.599**
40 vs. 43	t =	7.692**
41 vs. 42	t =	1.817
41 vs. 43	t =	4.800**
42 vs. 43	t =	2.819**

** = significant at 1% level

Since all comparisons between mean chromosome numbers were significant, or nearly significant, it can be concluded that parental chromosome number has a pronounced effect upon that of the following generation, and this factor must be considered in evaluating the causes of sterility in autotetraploids.

Since even the progenies of parents with extreme chromosome numbers did not contain individuals beyond the range of 37 to 44, it is logical to conclude that embryos or gametophytes having numbers (or potentially having numbers) beyond this range are non-viable. It is a necessary corollary that aneuploidy *per se* has an important effect upon seed set in 4n maize.

Donald L. Shaver

2. The effect of structural heterozygosity on the degree of preferential segregation in allotetraploids of Zea (4N Z. perennis x 4N Z. mays).

Polyploidy has undoubtedly played a major role in the speciation of the angiosperms, and has accounted for at least 30% of the extant forms. According to the most popular current theory, this course of evolution entails production of interracial (or wider) hybrids, doubling these to produce allotetraploids, and then (typically) the process of diploidization is completed by divergent genetic and structural modification of the newly combined genomes, until preferential pairing is essentially complete.

However, it does not appear that the actual effects of a defined structural modification on preferential segregation have been measured in an allotetraploid.

By means of genetically marked maize tetraploid stocks carrying Inversion 3a (obtained from Dr. G. G. Doyle), one can quantitate the effect of this structural rearrangement on segregation of the included linked markers a_1 - lg_2. These data are shown in Table 2.