7. Absence of chromatin loss during embryo sac development in high-loss plants.

In our earlier papers, we stated that loss of knobbed A chromatin was restricted to the second microspore division and that it did not occur during development of the megaspore into the embryo sac. This statement was based on the failure to find kernels with colorless aleurone when plants from the high-loss strain with knobbed chromosomes 3 homozygous for the A_1 allele were used as the female parent in crosses with recessive a_1 pollen parents. The reciprocal cross gave as much as 20% colorless kernels in some cases. However, the lack of colorless kernels in the female cross cannot be taken as conclusive evidence that chromatin loss did not take place. The embryo sac has a more complicated life history than does the male gametophyte. Three instead of two mitoses occur and the mature female gametophyte is an 8-nucleated structure. One of the polar nuclei and the egg nucleus, which are sisters, come from the micropylar half of the embryo sac while the other polar nucleus is derived from the chalazal portion. The triploid endosperm arises from the fusion of a sperm with the two polar nuclei, one coming from the micropylar and the other from the chalazal end of the embryo sac. The frequency with which embryos and endosperms deficient for the A locus are expected following chromatin loss of the A allele at the first, second, and third megaspore mitoses is given below. It is assumed that the mechanism of loss, if loss does occur, is the same as in the second microspore division, where only one of the two chromatids is deficient.

Time of postulated loss in embryo sac development	Frequency of embryos deficient for A (%)	Frequency of endosperms deficient for A (%)
1st megaspore mitosis	50	0
2nd megaspore mitosis		
Loss in micropylar nucleus	50	0
Loss in chalazal nucleus	0	0
Coincident loss in both	50	25
3rd megaspore mitosis		
Loss in any one of the four nuclei	12.5	0
Loss in any two	25.0	4.2
Loss in any three	37.5	12.5
Loss in all four	50.0	25.0

In the above tabulation it is evident that chromatin elimination during embryo sac formation will lead to deficient endosperms much less frequently than to deficient embryos. In order to more accurately assess the occurrence of loss in the megaspore mitoses, crosses were made using plants of the high-loss line with knobbed chromosomes 3 carrying the dominant $\underline{Gl}_6$, $\underline{Lg}_2$, and $\underline{A}_1$ alleles as the female parent in crosses with gl lg a pollen. The recessive gl and lg alleles produce glossy and liguleless seedlings, respectively, when homozygous or hemizygous. These high-loss plants gave from 10-12 percent of A loss when used as the pollen parent but produced no kernels with colorless endosperm when used as the egg parent. In a population of over 4000 from crosses with high-loss plants as the female parent, all of the F_1 kernels were colored and no F_1 sporophytes were found exhibiting the recessive gl, lg, or a phenotypes expected following elimination of part or all of chromosome 3--i.e., there were no deficient embryos. Our conclusion that B-chromosome induced loss of knobbed A chromosomes is restricted to the second microspore division and does not take place during embryo sac development is confirmed by these more exacting tests.

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1. Intraspecies variation of ribosomal gene redundancy in *Zea mays*.

Ribosomal genes in eukaryotes are highly redundant. Considerable variation in the level of rDNA cistron redundancy among species has been reported but it seems to be generally accepted that intraspecies variability in redundancy level is small. Ribosomal DNA variation as a result of natural variation, mutation, deletions, or duplications has been reported for a few species (3, 6, 7, 9, 10).

While examining the question of rDNA arrangement at the nucleolar organizer region (NOR) and differential activity and competition of the