found between a monosomic chromosome and the rest of the genome, this might indicate that illegitimate recombination is taking place between nonhomologously synapsed segments.

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2. The relative concentrations of different fatty acids in monosomic Zea mays embryos as determined by gas liquid chromatography analysis.*

Monosomes generated by the r-x_1 deficiency are being used to detect genes that have a dosage effect on the relative concentrations of the different fatty acids of Z. mays embryos. By comparing a monosome with its diploid sibling it is possible to evaluate one versus two doses of every gene on a given chromosome at the same time. Using this experimental approach, we previously demonstrated that genes or gene complexes that alter the total lipid content of maize embryos are located on chromosomes 2, 6, and 10. No such genes were detected on chromosome 8 (Plewa, 1971; Plewa and Weber, 1971); thus monosomy per se does not alter lipid content. The present study will determine the effect of monosomy on the proportions of different fatty acids composing the extractable lipid fraction of maize embryos. This paper discusses the procedure of the study.

Experimental kernels were obtained from a cross between a W22 inbred line carrying the r-x_1 deficiency and inbred Mangelsdorf's Multiple Chromosome Tester (bm_2; lg_1; a_1; su_1; pr; y_1; gl_1; j_1; wx; g_1). A scutellum sample of approximately 1.5 mg adjacent to the embryonic axis was removed from each F_1 kernel (r/r-x_1). Each scutellum sample was placed in a separate vial, coded, and stored at -22°C. The corresponding kernels were planted. The monosomic plants were detected at the seedling stage by expression of appropriate genetic markers and confirmed by cytological analysis. The scutellum samples from the monosomes and their control diploid siblings were subsequently prepared for gas liquid chromatography (GLC) analysis of the lipid fraction. The fatty acid extraction and methylation followed a modification of procedure 1 as described by Jellum (1970). The samples were analyzed using a Hewlett-Packard model

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5750 GLC with a 1/4 inch stainless steel column (10% EGSS-X 100/120 gas chromatography-Q: Applied Science Laboratories). The carrier gas was nitrogen and the column temperature was 190°C. The samples were kept under N_2 during lipid extraction and fatty acid methylation. The methylated fatty acid samples were stored under N_2 at -22°C.

Preliminary data from this approach are summarized in Table 1. The fatty acids detected were: palmitic (16:0), stearic (18:0), oleic (18:1), and linoleic (18:2). The fatty acid distribution of each embryo is expressed as the relative proportion of a specific fatty acid to the total fatty acid content of the sample. Since there were repeated diploid, monosome 8, and monosome 10 plants produced, an Analysis of Variance was conducted for each fatty acid fraction. Where rejection of the null hypothesis was indicated, the Fisher Least Significant Difference technique was employed to test specific differences.

Table 1. Average relative concentrations of fatty acids from *Zea mays* embryos

	Sample Number	Fatty Acids			
		Palmitic	Stearic	Oleic	Linoleic
2N Control	MP34-24	0.1661	0.0254	0.3378	0.4707
2N Control	MP34-33	0.1423	0.0223	0.3521	0.4833
2N Control	MP34-34	0.1571	0.0216	0.3357	0.4857
2N Control	MP34-35	0.1468	0.0207	0.3527	0.4798
2N Control	MP34-38	0.1544	0.0239	0.3397	0.4838
2N Control	MP34-45	0.1310	0.0379	0.3875	0.4436
2N Control	MP34-47	0.1596	0.0238	0.3464	0.4703
2N Control	MP34-54	0.1757	0.0199	0.3356	0.4689
2N Control	MP34-55	0.1281	0.0272	0.3647	0.4800
Aneuploids					
Monosome 2*	MP34-37	0.1467	0.0301	0.3945	0.4207
Monosome 7	MP34-16	0.1375	0.0120	0.3045	0.5460
Monosome 8	MP34-57	0.1999	0.0285	0.3303	0.4412
Monosome 8	MP34-62	0.2009	0.0203	0.3181	0.4608
Monosome 10	MP34-19	0.1108	0.0304	0.3578	0.5010
Monosome 10	MP34-8	0.1193	0.0255	0.3735	0.4814
Double Monosome 8-?	MP34-43	0.3968	0.0743	0.4404	0.0896

*0.0079 of this proportion is involved with an unidentified fatty acid; probably 12:0.

The statistics indicate that there is a significant difference ($\alpha = 0.05$) in the proportion of palmitic acid in both monosome 8 and monosome 10 samples as compared with the control. The data for the other fatty acids indicate no significant difference from the diploid control.

A double monosome plant, involving chromosome 8 and a presently unidentified chromosome, was produced and its fatty acid distribution differs remarkably from its diploid siblings (see MP34-43 in Table 1).

The data indicate that this approach merits further investigation and specific genes involved in fatty acid biosynthesis may be uncovered.

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1. Knob constitution and the rate of chromatin loss.

Previous experiments with K3 A Sh/ k3 a Sh plants, in which the knobbed chromosome was marked by A and the knobless by a, indicated that the knobbed chromosome was lost at the second microspore division more often than the knobless chromosome. Loss of the dominant Sh in a spore containing the a chromosome was attributed to a prior crossover between the A locus and the knob and it was concluded that the only chromosomes undergoing loss were K A noncrossovers or K a crossovers.