alternatives, similar tests will be conducted with additional monosomes 8 and other monosomes this coming summer.

A relaxation of recombination inhibition might be of tremendous economic importance since an increase in recombination would permit breaking up of linkage groups and allow more variability in the plants.

David F. Weber

2. The use of monosomy to detect genes for lipid biosynthesis in Zea mays.*

Monosomes generated by the $\underline{r}_{x-1}$ deficiency are being used in a study to detect major genes or gene complexes for lipid biosynthesis in Zea mays embryos. This paper describes the procedure of study. In monosomes generated by the $\underline{r}_{x-1}$ deficiency, there is a non-correspondence between the chromosome numbers of the embryo and endosperm, thus monosome generation must take place in the post-meiotic megaspore divisions of the embryo sac. In other words, a monosomic embryo is not accompanied by monosomic endosperm.

The line carrying the $\underline{r}_{x-1}$ deficiency in this study has been maintained in inbred W22 for many generations. $\underline{R}/\underline{r}_{x-1}$ heterozygotes in inbred W22 were crossed by a second inbred, Mangelsdorf's multiple chromosome tester ($\underline{bm}_2$; $\underline{lg}_1$; $\underline{a}_1$; $\underline{su}_1$; $\underline{pr}$; $\underline{y}_1$; $\underline{gl}_1$; $\underline{j}_1$; $\underline{wx}$; $\underline{g}_1$). The F_1 kernels carrying the $\underline{r}_{x-1}$ deficiency were dried until the water content of the kernel was below 4.5 per cent. The lipid content of each kernel was determined with wide line nuclear magnetic resonance spectroscopy. The NMR analysis was conducted as described by Alexander et al. (1967, J. Am. Oil Chem. Soc. 44:555-558). Although the chromosome number of the endosperm and embryo do not correspond, this would not alter the results because virtually all of the free lipid is concentrated in the embryo of the kernel (Brunson, Earle, and Curtis, 1948, Agron. J. 40:180-185).

Over 2,300 kernels have been scanned individually with the NMR to date. Since it is impossible to detect monosomic kernels, all of the kernels had to be scanned by the NMR and then planted. The monosomic

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individuals (about 11 per cent of the r_{x-1} heterozygotes) were detected at the seedling stage by appropriate genetic markers. Lipid content of at least 11 plants monosomic for each of 5 different chromosomes (monosomes 2, 6, 7, 8, and 10) were compared with their diploid sibs. If a gene or gene complex exists on a specific chromosome that is involved in lipid biosynthesis, and if this gene exhibits dosage effects, then one would find a lowering of lipid content in a specific monosome.

Kernels monosomic for chromosomes 2 or 6 have a lower free lipid content than their diploid sibs, whereas those monosomic for chromosomes 7 or 8 appear similar to their diploid sibs. Thus, it appears that major lipid biosynthetic genes or gene complexes which have a dosage effect are located on chromosomes 2 and 6.

Alternatively, Manglesdorf's tester might carry recessive genes on chromosomes 2 and 6 for decreased lipid biosynthesis which were uncovered in the respective monosomes. This alternative would seem unlikely since the authors are not aware of any single recessive gene which has a substantial effect on lipid content in the corn kernel. Tests are in progress to determine if this possibility has credence.

The decrease in lipid content might be due to two factors, the specific monosomes may have a lower concentration of lipids than their diploid sibs or monosomy might induce a smaller embryo size. To distinguish between these two alternatives, it was necessary to measure embryo volumes in the monosomes and diploid sibs. Since the reduction in lipid content in monosome 2 is not accompanied by a corresponding decrease in embryo size, it appears that the difference is due to lipid concentration. Similar measurements are not available for monosome 6.

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