Based on normal recombination values (15%) between su1 and gl4, the data indicate that glossy-4 is proximal to the breakpoint in inversions 4j, 4d and probably 4a. Glossy-4 is probably distal to the proximal breakpoint in inversion 4e, 4f and 4i. The recombination value between su-gl4 (6.31%) for inversion 4a is lower than expected. This may be the result of the proximal breakpoint reducing crossing-over in the su-gl4 region. Additional material will be analyzed to determine the frequency of the inversion in the crossover classes to obtain a more precise location of glossy-4 in relation to the inversions.

R. J. Lambert

4. Inheritance of linoleic acid in corn.

Gas-liquid chromatographic analyses were made on individual kernels of R84, Illinois High Oil, and the F1, F2 and backcross progenies. Oil was extracted with petroleum ether, esterified and then dissolved in approximately 1 ml petroleum ether. Three μl of the solution was injected into the chromatograph. All analyses were made on an Aerograph H1-F1 600 using the standard diethyleneglycol succinate-chromosorb W Column. A flame ionization detector was used.

The frequency distributions in the backcross populations strongly suggest monohybrid inheritance for oleic and linoleic acids, i.e., low linoleic is dominant to high, and low oleic is recessive to high. The F2 data were less convincing, although individual F2 ear analyses revealed that the ratio in only one ear out of six was quite deviate, presumably because Illinois High Oil was heterogeneous with respect to the alleles in the system. Segregation in only one of the six F2 ears is shown in Figure 1.

Table 1

Mean Linoleic and Oleic Acid Content of Individual Kernels of Parents, F1, F2 and Backcross Generations

<table>
<thead>
<tr>
<th>Population</th>
<th>Linoleic1</th>
<th>Oleic2</th>
<th>Sum</th>
</tr>
</thead>
<tbody>
<tr>
<td>R84 ♀</td>
<td>61.3</td>
<td>24.5</td>
<td>85.8</td>
</tr>
<tr>
<td>IHO ♀</td>
<td>48.8</td>
<td>35.3</td>
<td>84.1</td>
</tr>
<tr>
<td>F1 (R84 ♀)</td>
<td>52.2</td>
<td>31.3</td>
<td>83.5</td>
</tr>
<tr>
<td>F1 (IHO ♀)</td>
<td>47.6</td>
<td>36.1</td>
<td>83.7</td>
</tr>
<tr>
<td>BC R84</td>
<td>54.3</td>
<td>29.1</td>
<td>83.4</td>
</tr>
<tr>
<td>BC IHO</td>
<td>51.2</td>
<td>32.5</td>
<td>83.7</td>
</tr>
<tr>
<td>F2</td>
<td>51.5</td>
<td>32.3</td>
<td>83.8</td>
</tr>
</tbody>
</table>

1Standard deviation = ±1.32%
2Standard deviation = ±0.78%
Figure 1
Frequency distributions of linoleic and oleic acid content of individual kernels
In corn, Jellum and others, found a high negative correlation between oleic and linoleic acids. In our studies involving analysis of individual kernels, (1) low linoleic acid content was always associated with high oleic acid content and vice-versa, and (2) the genetic models for the control of amount of each acid are "mirror images". The data suggest that the two are closely related in the unsaturated fat bio-synthetic pathway.

It has already been suggested by others that oleic acid is the precursor of linoleic acid in higher plants. Our evidence supports this proposal, that is:

\[
\text{Oleic} \quad \frac{Lnl,\ lnl}{18C^49} \quad \text{Linoleic} \quad \frac{18C^49,12}
\]

If \textit{Lnl} is present, desaturation at the 12-13 position proceeds so that the oleic-linoleic pool maintains an approximate 35:49 ratio, whereas if the genotype is \textit{lnl/lnl}, a ratio of approximately 25:61 is maintained. That is, if \textit{Lnl} is present, net desaturation is lower, bringing about an accumulation of oleic acid, whereas in \textit{lnl/lnl} individuals, net desaturation is higher, thus increasing the linoleic pool and decreasing oleic.

Further genetic studies are underway, involving newly-discovered strains possessing 42 percent linoleic acid.

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1. Location of \textit{Ht} in the long arm of Chromosome 2.

In the 1963 Maize News Letter, the symbol \textit{Ht} was proposed to designate the dominant gene in Inbred GE440 for chlorotic-lesion resistance to \textit{Helminthosporium turcicum}. Data were reported showing that in plants heterozygous for Inversion 2a (2S.7; 2L.8), recombination between \textit{gl2} and \textit{Ht} was about 17 percent.