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:

$$\underset{18C^{\Delta 9}}{\text{Oleic}} \xrightarrow[\text{Lnl, lnl}]{} \underset{18C^{\Delta 9,12}}{\text{Linoleic}}$$

If 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 lnl/lnl, a ratio of approximately 25:61 is maintained. That is, if Lnl is present, net desaturation is lower, bringing about an accumulation of oleic acid, whereas in 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 Ht in the long arm of Chromosome 2.

In the 1963 Maize News Letter, the symbol Ht was proposed to designate the dominant gene in Inbred GE440 for chlorotic-lesion resistance to Helminthosporium turcicum. Data were reported showing that in plants heterozygous for Inversion 2a (2S.7; 2L.8), recombination between gl_2 and Ht was about 17 percent.

Testcross data involving v4 and Ch show that Ht is in the central region of the long arm of Chromosome 2:

$$\frac{v_4 \quad + \quad Ch}{+ \quad Ht \quad +} \; ♀ \quad X \quad v_4 \; + \; + \; ♂$$

Classes	Families 4019-20	4021-22	4023-24	4025-26	Total
(0) v + Ch	17	18	20	20	75
(0) + Ht +	21	25	22	19	87
(1) v Ht +	5	7	8	9	29
(1) + + Ch	11	6	8	8	33
(2) v + +	16	13	9	15	53
(2) + Ht Ch	14	17	7	12	50
(1,2)v Ht Ch	3	2	1	3	9
(1,2)+ + +	2	1	5	4	12
	89	89	80	90	348

Recombination:

v_4 - Ht	83/348 = 23.9%
Ht - Ch	124/348 = 35.6%
v_4 - Ch	165/348 = 47.4%

Order: v_4 - Ht - Ch

The linkage values above suggest that Ht may be fairly near the locus of w3. Crosses to determine the linkage relations and order of Ht, w3, and Ch will be grown next summer.

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