

similarity to opaque-2 or floury-2. Lysine content was determined by short column method on an automatic analyzer. All varieties were found to be similar to ordinary corns. (List and analytical data available on request).

D. E. Alexander

C. D. Elmore

4. Inheritance of palmitic acid.

A study of the level of palmitic acid was made during the summer of 1967. K6 (11.28% palmitic acid) and H51 (16.01% palmitic acid) inbreds were used to produce F_1 , F_2 , BC to K6 and BC to H51. All analyses were run on single kernels by G.L.C., 456 analyses in all.

The results of analysis of BC to K6, BC to H51 and F_2 were tested against a single gene hypothesis by Chi square. This was rejected as probability approached zero.

The data, when plotted in histograms, appeared to approach a normal distribution; portioning of variance by Mather's formulae yielded an additive genetic variance 2.4 times as large as the dominance genetic variance. Heritability was .83, suggesting that C16 is under direct gene control.

The F_2 generation of this cross is now being analyzed so that an estimate of the number of genes controlling palmitic acid can be made. Other populations are also being prepared for analysis to provide supporting evidence for a genetic model.

R. J. Swieringa

D. E. Alexander

5. Location of fl_2 .

(a) Preliminary crosses which included T 4-9g (4S.27; 9L.27) and T 4-9 5657 (4L.33; 9S.25) confirmed the location of fl_2 on Chromosome 4.

$$\frac{Wx}{wx} \text{ T } 4-9g \text{ } + \frac{fl_2}{+} \text{ } \times \text{ } wx \text{ } \rightarrow \text{ } 149 \frac{Wx}{+} \frac{Fl_2}{+} / 1304 = 11.42 \times 2 = \text{estimated } 22.8\% \text{ } wx-fl_2 \text{ recombination}$$

$$\frac{Wx}{wx} \text{ T } 4-9 \text{ } 5657 \text{ } + \frac{fl_2}{+} \text{ } \times \text{ } wx \text{ } \rightarrow \text{ } 32 \frac{Wx}{+} \frac{Fl_2}{+} / 371 = 8.6 \times 2 = \text{estimated } 17.2\% \text{ } wx-fl_2 \text{ recombination}$$

Ears from the above crosses were scored for percentage of non-waxy, non-floury kernels among the total (fl_2 fl_2 Fl_2 endosperms are usually floury in phenotype). Since these represent only one of the two recombinant types, the percentages thus obtained were doubled to arrive at an estimate of total $wx-fl_2$ recombination.

(b) $\underline{fl}_2 - \underline{su}_1$ recombination

$$\frac{\underline{fl}_2 +}{+ \underline{su}_1} \times \underline{su}_1$$

Parental		Recombinant		Total	% Recombination
$\underline{fl}_2 +$	$+ \underline{su}_1$	$\underline{fl}_2 \underline{su}_1$	$+ +$		
159	116	12	8	295	6.8

Kernels of the above cross were separated for the sugary trait at planting time. Resulting plants were pollinated by a homozygous \underline{fl}_2 source, and the harvested ears were classified for presence or absence of floury kernels.

(c) $\underline{la} - \underline{fl}_2 - \underline{su}_1$ recombination

$$\frac{+ \underline{fl}_2 +}{\underline{la} + \underline{su}_1} \times \underline{la} \underline{su}_1$$

		Families	
(P)	$+ \underline{fl}_2 +$	$\frac{67-(19-23)}{219}$	$\underline{la} - \underline{fl}_2 = 6/246 = 2.4\%$
(1)	$+ + \underline{su}_1$	5	$\underline{fl}_2 - \underline{su}_1 = 22/246 = 8.9\%$
(2)	$+ \underline{fl}_2 \underline{su}_1$	21	
(1,2)	$+ + +$	1	$\underline{la} - \underline{su}_1 = 26/246 = 10.6\%$
	Total	<u>246</u>	Order: $\underline{la} - \underline{fl}_2 - \underline{su}_1$

Kernels of the above cross were separated for the sugary trait at planting time. Non-lazy plants were pollinated by a homozygous \underline{fl}_2 source and harvested ears were classified for presence or absence of floury kernels.

(d) $\underline{Ga}_1 - \underline{fl}_2 - \underline{su}_1$ recombination

$$\frac{\underline{Ga}_1 \underline{su}_1}{\underline{su}_1} \times \frac{\underline{ga}_1 \underline{fl}_2 \underline{Su}_1}{\underline{Ga}_1 + \underline{su}_1}$$

(26% Su) (25% Su)

Region		<u>67-14</u>	<u>%</u>	<u>67-16</u>	<u>%</u>
1	$\underline{Ga} \underline{fl} \underline{Su}$	25	65.8	31	68.9
2	$\underline{Ga} + \underline{Su}$	<u>13</u>	<u>34.2</u>	<u>14</u>	<u>31.1</u>
1 + 2		38	100.0	45	100.0

Family 67-14 was planted from an ear with 26% non-sugary kernels (59Su: 168 su); family 67-16 was planted from an ear with 25% non-sugary kernels (59Su: 177 su). On the assumption that only Ga₁-carrying pollen functioned in these crosses, the percentage of non-sugary kernels measures Ga₁ - su₁ recombination. It is known, however, from previous work that in similar crosses, ga₁-carrying pollen may function with a frequency of perhaps 2 to 5%.

Both families above were planted with non-sugary kernels. All plants were pollinated by a homozygous fl₂ source, and ears were classified for presence or absence of floury kernels.

In each of the above crosses, about one-third of the assumed Ga₁ - su₁ recombination occurred in the fl₂ - su₁ segment. This yields an estimated value of about 8% recombination between fl₂ and su₁, which is in good agreement with the data in (b) and (c), above. In the absence of other information, these results could be interpreted as indicating either the gene order Ga₁ - fl₂ - su₁ or the order Ga₁ - su₁ - fl₂; in the latter instance, su₁ - fl₂ recombination would be about 30-35%. From the other data above, however, it is clear that the first gene order is correct.

Combined data indicate that fl₂ - su₁ recombination is about 8%. On the current linkage map of Chromosome 4, fl₂ might therefore be assigned tentatively to position 63. Incidentally, the la - su₁ recombination value of 10.6% in (c), above, is in good agreement with the current tentative assignment of la to position 60 on the genetic map:

<u>Ga</u> ₁	st Ts ₅	<u>la</u>	<u>fl</u> ₂	<u>sp</u> ₁	<u>su</u> ₁
35	(55) 56	(60)	(63)	66	71

E. B. Patterson

UNIVERSITY OF ILLINOIS
Urbana, Illinois
Departments of Agronomy and Plant Pathology

1. Linkage relations of Ht.

In previous reports in the Maize News Letter (1963, 1965), data were presented which indicated that the dominant gene, Ht (chlorotic-lesion resistance to Helminthosporium turcicum), is located in the central region of the long arm of Chromosome 2. Additional data have now been accumulated on its position relative to w₃, and on some linkage relations in stocks heterozygous or homozygous for Inversion 2a (2S.7; 2L.8).

(a) Position of Ht relative to w₃ in normal stocks

Progeny from the crosses indicated below were classified for Ht, and all plants were self-pollinated. The harvested ears were classified for Ch and seedling tested for segregation of v₄ and/or w₃.