Based on these results, the expected contribution of the $\underline{Adh_1}^S$ allele in 19 x 7 and 1 x 7 F_1 scutella is 25.3 and 39.0 percent, respectively. The actual values obtained in the F_1 hybrids (Table 1) are very similar to the above expected values.

ADH is active also in the mature pollen of maize. Only FF and SS isozyme bands are found in $\underline{Adh_1}^F/\underline{Adh_1}^S$ heterozygotes. This indicates that the ADH which is present in the mature pollen was formed after meiosis. When the percent activity contributed by the $\underline{Adh_1}^S$ allele was tested in pollen collected from the various F_1 plants (Table 1), the results were similar to those obtained for the scutellum in the first five crosses. However, in the cross 19 x 7 the results were markedly different. In the scutellum the relative contribution of the $\underline{Adh_1}^S$ allele was lower, while in the pollen it was higher than in the other crosses. The possibility of any deviation in the number of $\underline{Adh_1}^F$ and $\underline{Adh_1}^S$ pollen grains produced by this hybrid was ruled out by testing the F_2 generation. Among 220 F_2 seeds tested, the ratio of the $\underline{Adh_1}^F/\underline{Adh_1}^F$: $\underline{Adh_1}^F/\underline{Adh_1}^S$: $\underline{Adh_1}^S/\underline{Adh_1}^S$ was 51:113:56, respectively, which is in good agreement (P = .8 - .9) with the 1:2:1 ratio expected.

Unfortunately, the level of activity in the pollen of the parental lines has not been tested. Therefore, it is too early to hypothesize an explanation for the difference between the two tissues. Also, it is not known at the present whether the high activity of ADH in line 19 is controlled by the $\underline{Adh_r}$ gene.

Yoel Efron

2. Relative activity of $\underline{AP_1}$ controlled acid phosphatase isozymes in pollen of hybrids between inbred lines of maize differing in activity level.

Efron (Biochem. Genetics 5:33, 1971) presented evidence that the $\underline{AP_1}$ controlled acid phosphatase activity in maize is variable in different inbred lines. Five distinct groups of activity were found among 23 inbred lines tested.

Two major difficulties arise in the attempt to study the genetic control of the variation in specific enzyme activity: (1) the presence

of other phosphatases and (2) conventional biochemical methods do not distinguish between the activities contributed by each of the two parental genomes. Three alleles, $\underline{AP_1}^F$, $\underline{AP_1}^I$ and $\underline{AP_1}^S$, which specify acid phosphatase isozymes with fast, intermediate and slow migration rates have been described for the $\underline{AP_1}$ locus (Efron, Genetics 65:575, 1970). The above mentioned limitations were overcome in the present study by crossing two lines with known activity levels but having different $\underline{AP_1}$ alleles.

Seven homozygous $\underline{AP_1}^S/\underline{AP_1}^S$ inbred lines with different activity levels of acid phosphatase were crossed in almost all possible combinations with six homozygous $\underline{AP_1}^F/\underline{AP_1}^F$ inbred lines representing five groups of activity. All the F_1 hybrids were grown in the field; samples of the mature fresh pollen were collected from six different plants of each hybrid and stored at -20°C. Three different extracts from each pollen sample were electrophoresed separately by means of starch gel electrophoresis and stained specifically for acid phosphatase. Then, the intensity ratio of the color developed at the position of the $\underline{AP_1}^S$ and $\underline{AP_1}^F$ isozyme bands was compared visually in each gel by seven unbiased persons; the intensity of the $\underline{AP_1}^F$ band was used as a reference (activity value of 1.0). The average intensities of the $\underline{AP_1}^S$ bands in relation to the $\underline{AP_1}^F$ bands for the different F_1 hybrids are summarized below:

$\underline{AP_1}^S$ parental line	Group of activity#	K-4 1	CL-31A 2	B-53 3	B-57 3	Oh-7 4	B-50 5	$\underline{AP_1}^F$ parental line Group of activity#
N-6	1	3.48*	2.13	3.32*	2.23	2.61*	.55*	
B-55	1	3.66*	3.43	3.49	3.80	2.65	1.96	
B-56	2	3.00	2.30	3.00	--	3.30	1.00	
Hy	3	2.85*	--	2.80	2.12*	2.50	--	
E_1^S/E_1^S	3	2.02*	--	1.90*	1.91*	1.79*	.49*	
C-103	4	.51*	--	.59*	.57*	--	--	
M-14	4	2.16*	--	--	1.86*	1.30*	1.12	

#Group 1 = highest activity and Group 5 = lowest activity (Efron, Biochem. Genetics 5:33, 1971).

*Mean values of two reciprocal crosses.

Two general conclusions might be drawn from these results: (1) the intensity ratios of the $\underline{AP_1}^S$ and the $\underline{AP_1}^F$ bands in the pollen collected from the F_1 hybrids are not correlated with the activity levels of the parental lines and (2) equal intensity of the two isozyme bands (a value of about 1.0) was found only in three out of 33 crosses. The best explanation for these results may be based on the "Limited Factor" hypothesis for regulation of gene activity in higher organisms proposed by D. Schwartz (Genetics, in press). Schwartz proposed that the number of enzyme molecules which are synthesized in a certain tissue at a given time is controlled by the presence of a limited factor, its effect being on the gene level. He also showed that there is competition, and differences in competitive ability, between alleles for the limited factor.

Following this hypothesis, it is assumed that the parental inbred lines differ in the activity level of the $\underline{AP_1}$ controlled acid phosphatase since they have different amounts of the limited factor. Also, the $\underline{AP_1}$ alleles from different inbred lines may vary in their competitive ability for the limited factor. Thus, both N-6 and K-4 had high activity levels; however, in the cross N-6 x K-4 the $\underline{AP_1}^S$ allele contributed by N-6 was a much better competitor than the $\underline{AP_1}^F$ allele contributed by K-4. On the other hand, N-6 had a higher activity level than B-50, but in the N-6 x B-50 cross the $\underline{AP_1}^F$ band was more intense than the $\underline{AP_1}^S$ band. From this we concluded that the $\underline{AP_1}^F$ allele contributed by B-50 was a better competitor than the $\underline{AP_1}^S$ allele contributed by N-6.

Both the $\underline{AP_1}^F$ and $\underline{AP_1}^S$ alleles may vary in their competitive ability. Among the $\underline{AP_1}^S$ parents, B-55 and C-103 showed the highest and lowest competitive ability, respectively. Among the $\underline{AP_1}^F$ parental lines, B-50 was the best competitor while K-4 and B-53 had the lowest competitive ability.

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