There was no significant difference in pollen size measurements of fresh pollen and pollen from anthers stored in 70% alcohol for 3 months and measured at fortnightly intervals. Plant-to-plant differences within the same inbred were not significant. There was no statistically significant difference in pollen size for samples collected from the same plant on subsequent days of shedding or from different branches of the same tassel. These results contradict an earlier report on pollen size in maize (Banerjee and Barghoorn, MNL 45:244-45). However, the influence of environmental factors on pollen size was confirmed in a study where 8 inbreds were grown in two locations and for two years in each location. Analysis of variance of the data showed that variations due to lines and years were significant at the 1% level and those due to location were significant at the 5% level. These suggest that pollen size in maize is controlled by both genotype and environment.

Crosses between large and small pollen inbreds were studied in F_1 and F_2. Within-plant variability in both generations was not significant, whereas plant-to-plant variability for pollen diameter was significant in F_2 but not in F_1. These results would suggest that the pollen grain size is determined by the genotype of the mother plant (sporophytic control) and not by the gene content of the haploid pollen nuclei (gametophytic control). Pollen size of the F_1 plants was not always intermediate between the two parents, but F_2 plants in general had smaller pollen diameter than in F_1. F_1's between small and large pollen parents, when backcrossed to small and large pollen parents, produced progeny with, respectively, smaller pollen and larger pollen than the F_1 plants.

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<u>Inheritance of pollen grain size in maize</u> — Two sets of diallel crosses were made from the two groups of inbred lines mentioned in the preceding report. The first set of 8x8 diallel included the inbred parents and the F_1's, grown in two locations with two replications. The second set of 9x9 diallel included parents, F_1 crosses and reciprocals, grown in only one location with two replications. Five random plants from each plot and 50 measurements for pollen size from each plant were taken for each entry.

Analysis of variance for general and specific combining ability indicated highly significant differences among the parents for both general and specific combining ability effects for both the locations in the 1st diallel. Similar results were obtained in the 2nd diallel. The analysis for the 2nd diallel is summarized in Table 1.

Table 1. Analysis of variance for pollen grain diameter.

Source	d.f.	m.s.
General combining ability	8	60.25**
Specific combining ability	36	10.39**
Reciprocal effects	36	3.55
Error	80	3.38

Homogeneity of Wr-Vr (nonsignificance of t^2 - B.I. Hayman, Genetics 39:789, 1954) indicated that an additive-dominance model with independent gene distribution was adequate to explain the data. Variance component analysis was, therefore, carried out. The components of variation are presented in Table 2, and some proportions of the components in Table 3.

Table 2. Components of variation for pollen diameter in maize.

Component	Estimate	Standard error
$\hat{D}$	27.98	0.98
$\hat{F}$	21.08	2.30
$\hat{H}_1$	11.74	2.18
$\hat{H}_2$	7.60	1.87
$\hat{h}_2$	115.74	1.25
$\hat{E}$	3.38	0.29

Table 3. Proportions of components of variation for pollen grain size.

Proportions	Estimate
$(H_1/D)^{1/2}$	0.64
$H_2/4H_1$	0.16
$[(4DH_1)^{1/2} + F]/[(4DH_1)^{1/2} - F]$	3.78
h_2/H_2	15.23
heritability (narrow)	0.51

The high level of significance of D, H_1, H_2 and h_2 indicates the operation of additive and dominant genes in respect to this character. Pollen size was highly sensitive to environmental variations, as E was significant. The overall degree of dominance was 0.64, indicating the operation of partial dominance in the expression of this trait. $H_2/4H_1$ suggested asymmetry of gene distribution for pollen size.

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