

Mexican, and Zapalote germ plasm. A fourth group of synthetics involved germ plasm from Stiff-Stalk Synthetic. Several lines from these synthetics have shown a high degree of tolerance to rootworm damage. The Zapalote synthetic lines appeared to be the most promising among these groups.

About 70 topcross lines from the Rockefeller-Mexican Program were evaluated for reaction to rootworm. These lines came from an area where many species of Diabrotica are indigenous. No clear-cut evidence of antibiosis was observed, but the lines did show tremendous vigor and some lines appeared to possess a rather high degree of tolerance to larval feeding.

A wide range of other material, including southern inbreds and synthetics, lines containing tassinte germ plasm, and many experimental hybrids, has been tested.

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1. Pollen tube growth in situ.

With cytological techniques, V. H. Rhoades has shown that the pollen germination-tube growth-fertilization sequence in maize is completed in less than 24 hours at 25°C. In our continuing studies on corn pollen biology, we have examined the initial stages of this sequence employing a different approach: limited pollination followed by sequential silk cutting, obtaining the number of kernels on a cob as the datum. The following treatment series have been performed.

The single cross, Oh51A^T x IoB8, and the assay techniques were described earlier (Walden and Everett, Crop Science 1 1961). Limited pollen was applied to a number of previously prepared 7-day old silk-brushes, a different set every two hours between 9 AM and 9 PM. Starting one hour after pollination and continuing at two hour intervals for 30 hours (excluding 1-6 AM) silks of different treatments were cut to the ear tip. The length of cut silks averaged 2 cm for all treatments. Presumably sperm nuclei which had passed the region of cut-off completed fertilization; thus kernel counts reflected the events measurable after silk cutting.

Such an assumption seems justified as there were silk-cut treatments which scored a kernel value equal to the control, the uncut treatment. Pollinations made prior to and including 2 PM showed the same effect:

About 85% of the sperm nuclei passed the point of cut-off in the interval between 5 and 7 hours post-pollination. About 10% were "precocious germinators", passing through prior to 5 hours and the residual were delayed.

Pollinations made after 2 PM demonstrated an increasing lag phase and a reduced slope to the growth curve, such that pollinations made at 8 PM failed to pass the cut-off point for 12 hours or more. Yet we repeatedly obtain maximum kernel counts in other experiments from pollinations made in late afternoon and early evening, indicating that fertilization is finally accomplished.

This study suggests:

1. On a typical summer day, during which pollination in the field is accomplished by noon, it is followed by rapid pollen germination and pollen tube growth; fertilization is completed within 24 hours, probably during the cool, damp hours of early morning.
2. Pollination delayed until late afternoon or evening results in good fertilization, but only after germination and/or initial pollen tube growth are delayed until the following late morning-afternoon growth period.

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2. Pollen longevity.

Storage between -5° and +5°C at a high humidity in aseptic cultures will retain a satisfactory number of pollen grains in a viable condition as measured by syngamy for 14 days. Such cultures will show a reduced