

UNITED STATES DEPARTMENT OF AGRICULTURE
Northern Grain Insects Research Laboratory
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Corn rootworm studies have been in progress for two full seasons. Several inbred and single-cross lines have shown promise under moderate infestations of the western corn rootworm. Lines have been evaluated in field plots under natural infestations. A rating system of 1.0 to 5.0 was used for rating individual lines and for evaluating washed root systems for size, symmetry, feeding damage by larvae and root regeneration after damage. A rating of 1.0 was considered excellent and 5.0 was unacceptable for further study.

The following inbreds have maintained an average rating of 1.33 to 1.85 in all trials over a two-year period and are ranked in descending order: N38A, HD2187, SD10, C.I.38B, B55, Oh05, A251, Mo22, H51, Mol2, A297, and B57. Other lines that performed creditably with average ratings of 1.85 to 2.5 included H55, SD14, R168, A401, A265, Oh56A, and N25.

A limited number of single-crosses between the better inbreds, particularly with SD10, were tested one season (1964). Generally, the single-crosses involving select inbreds performed very well under rootworm infestation, and in addition, many of them were attractive agronomically. Some of the single-crosses with SD10 have been among the most promising in the trials.

Among the top three inbreds, only SD10 has been released. This action was taken in December, 1964. It was developed from a cross made in 1953 between B8 and Oh56A. During the process of development of SD10, selection was made for standability, plant type, and seed quality.

Several inbred lines developed by the Plant Pathology Department at South Dakota State University for resistance to root rots have performed very well under rootworm infestations. Many of the lines have contributed favorable root and stalk quality to a limited number of single crosses.

Other material of considerable interest include synthetic lines developed by Pioneer Hi-Bred Seed Company. The synthetics were made from corn belt inbreds and lines containing West Indian, Broad Base

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.