

FEEDING RESPONSE OF WESTERN CORN ROOTWORM ON SILKS
OF FIFTEEN GENETIC SOURCES OF CORN

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INTRODUCTION

The western corn rootworm, Diabrotica virgifera Lec., is one of the most damaging corn pests in the midwest. Since its initial description on corn in Colorado, it has moved eastward and is now a serious pest in South Dakota, Nebraska, Kansas, Missouri, Iowa, Illinois, Ohio and Wisconsin.

Although the larval stage is considered to be the most destructive, adult beetles may feed on all parts of the corn plant above the ground. High populations of adults may consume enough corn silk to interfere with pollination of the ears.

Rootworms can be controlled by crop rotation, but intensive farming practices and the high value of corn compared to other crops often make this control method impractical. The first reliable chemical control of rootworm larvae was obtained with soil applications of the chlorinated hydrocarbons, aldrin and heptachlor. In the early 1960's resistance to these chemicals was reported in several states in the midwest. Recently, the western corn rootworm larvae has been effectively controlled by soil applications of organophosphate and carbamate insecticides. No resistance has been reported to these insecticides.

Some research has been directed towards selection of lines of corn with root systems resistant to the larvae of the rootworm, but the attempts have been largely unsuccessful. Very little research has been done on selection of lines of corn with silks resistant to the feeding of the adult western corn rootworm beetle. Granados (1967) screened 356 lines of corn for differential damage to the silks by the feeding of adult corn rootworm beetles, and classified several of the lines as resistant. The objective of this work was to study more closely in the field and laboratory the silk resistance of the lines of corn selected

by Granados.

LITERATURE REVIEW

Biology

General life cycle. A good general description of the biology of the western corn rootworm can be found in Destructive and Useful Insects (Metcalf et al., 1962). There is one generation per year. In Nebraska, Ball (1957), found egg laying begins the second or third week in August, with most eggs being laid between August 20 and September 20. Most eggs go into a diapause lasting until June. After hatching, larvae move through the soil until they encounter corn roots (Tate and Bare, 1946). Larvae achieve full growth in July and pupate in the soil. Adults emerge from the soil in late July and August (Tate and Bare, 1946).

Egg stage. Eggs are deposited in the soil near the base of corn plants, with approximately 80 percent occurring in the upper six inches of soil (Ball, 1957). Patel and Apple (1967) found northern corn rootworm eggs were distributed in decreasing numbers at distances of four, eight, and ten inches from the base of corn plants with none in the middle of a 40-inch row.

Although most of the eggs require an exposure to cold temperatures before they hatch, a small percentage hatch without such exposure. In laboratory studies George and Ortman (1965) exposed eggs to a temperature of 4°C for varying periods of time and incubated them until hatching at 30°C. They found the period of egg incubation was reduced with longer exposures of up to 116 days. Most eggs hatch after surviving one winter, but Chiang (1965) demonstrated a small percentage of northern corn rootworm eggs (0.3%) hatched the second year after deposition.