

# Corn Talk News RESEARCH UPDATE



## THE SUDDEN AND DRAMATIC SHIFT OF THE WESTERN CORN ROOTWORM TO FIRST-YEAR CORN

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The primary means for managing the western corn rootworm (WCR), *Diabrotica virgifera* LeConte, over the past 20 years, has been through crop rotation.

More than 85 percent of the crop acreage in Indiana is now in a corn/soybean rotational system. Only about 12 percent is continuous corn.

Prior to the early 1970s, most of the acreage in the state was in continuous corn. Soil insecticides were applied as routine insurance treatments to protect corn roots from attack by corn rootworm larvae. During this time, more than two million acres were treated per year at a cost of well more than \$10 million per year.

As Indiana producers increased their acreage in rotation, many continued to treat their first-year corn (corn after soybeans), not understanding fully that soil insecticides were not needed for corn rootworm control.

By the late 1970s, most producers had been convinced that soil insecticides were not needed in first-year corn. Pro-

ducers were beginning to accept and adopt the pest management philosophy of managing pests only when they are a problem. This change resulted in a reduction in the amount of soil insecticides applied to Indiana farmland by 750,000 pounds of active ingredient per year. This not only resulted in significant savings to the producer, but also to the environment.

Approximately four years ago we received a few reports of rootworm larval feeding damage in first-year corn fields following soybeans in northwestern Indiana. Since WCR eggs are laid in late summer prior to hatch the next spring, the adults had to have moved into the soybeans to lay their eggs.

There were questions concerning the possibility of volunteer corn or some grassy-type weeds being present in these fields, thus making the fields attractive to the rootworm beetles. However, producers and agribusiness personnel associated with these fields saw little to no volunteer corn and/or weeds.

Each year since then, we have seen a similar situation develop, but only in a slightly greater number of fields. The trend continued and by 1995 hundreds of fields were reported as having the problem in northwestern Indiana, as well as a few other areas of the state.

It is difficult to say at this

point why this is happening. There is speculation that the beetle may be adapting to the corn/soybean rotational system. Perhaps the rootworm population is simply greater now and the adults are spreading out. They may be hedging their bets and laying their eggs in both corn and beans.

Maybe we are dealing with an insect that is genetically different from WCR found in areas where this has not been identified as a problem. It could be that the trend toward earlier planting of corn over the past 15 years and later rootworm hatch over the past four years is causing corn and rootworm development to get out of sync with each other.

The early maturing corn fields may not be as attractive to late emerging beetles, thus their movement to succulent, flowering soybeans.

The problem could also be associated with the trend to reduced tillage systems and narrow rows. Crop residue is not turned under in these fields and this may be providing a better environment for beetle survival and egg laying. In these fields, the corn residue remains on top of the ground for several years before it completely breaks down.

Perhaps volatiles given off by the decaying corn plants in soybean fields are attracting the beetles into these fields. There are any number of possibilities as to why this could be happening. Although extended diapause, a problem associated with northern corn rootworm, has been mentioned as another possible reason for WCR larvae being found in first-year corn, data to date from Illinois show that this is unlikely the cause.

Obviously producers, agribusiness personnel, and university staff are concerned about this development. This situation could put producers back on the treadmill of applying soil insecticides prophylactically in all corn fields. If this happens,

we will have lost much of what we have gained in managing this insect with alternatives to pesticides.

The chemical industry will undoubtedly target this new market. However, we know that for all first-year corn fields will require treatment. Perhaps a small percentage of fields will be affected, yet unless we obtain some answers and develop some guidelines, most fields could be treated.

The Clinton Administration has set a goal of 75 percent of all production acreage under pest management by the year 2000. If not properly addressed, this problem could make it more difficult for Indiana to reach this goal and could be a step backward for Indiana's pest management program.

The following are studies under way at Purdue to help us determine what is happening with this insect:

- Field study. Three sets of test fields have been identified for each of four counties in northwestern Indiana. Each set consists of a soybean and com-

panion corn field. For the three corn fields in each county, one represents early pollination, another mid pollination, and the third late pollination.

The three pollination periods are important to determine if the beetles stay in any of the fields for a longer time period due to the presence of pollen, their preferred food. Samples to determine rootworm beetle numbers have been taken in both corn and soybean fields to see how populations fluctuate over time. Whole plant observations have been made in corn, while sweep net samples and yellow sticky card-counts have been taken in soybeans.

In 1996, cooperating producers will treat approximately 1/4 of their 1995 soybean test fields, which will be rotated to corn in 1996, with a soil insecticide for WCR control. In July 1996, the root systems in both the treated and untreated areas will be evaluated for rootworm larval damage. At harvest, yields will be taken to determine if differences occur.

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## Year-Round Business

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narrow-row and grid corn planting becomes more widely used, Wolf figures equipment will evolve to suit producers' needs.

Like most farmers, Dan Wolf is quick to trade ideas on what has and has not worked and gleans tips from other producers whose successes he observes and admires. Along with keeping up on the latest trends from reading, Wolf says he gathers ideas visiting with others at supplier and production meetings, and, of course, while waiting in line to unload grain at the mill.

Getting a "heads up" on the field work through pre-planting applications is one practice that helps the Wolfs stay on schedule during plant-

ing season. A small amount of chemical is applied ahead of planting, spreading the workload and the cost, along with getting some effective, early weed control.

"We started that several years ago and we liked the results," said Wolf. "We also put some fertilizer out early, figuring we can generally depend on some April rains, while the cool weather holds down the nutrient volatility."

With field work season only a few weeks away, the Wolfs are finishing up equipment maintenance, finalizing planting plans and continually watching the markets. And as soon as the last piles of ice and snow disappear and the ground dries and warms, they'll roll out the planter to greet a new season of challenges and changes in the corn growing business.

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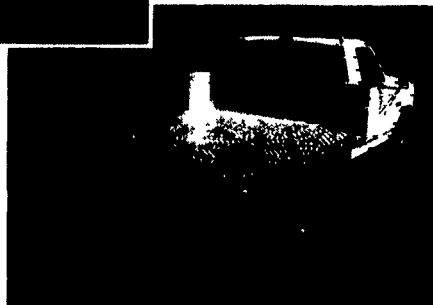
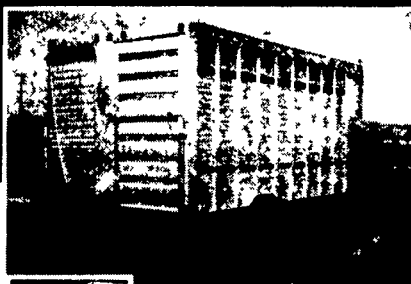
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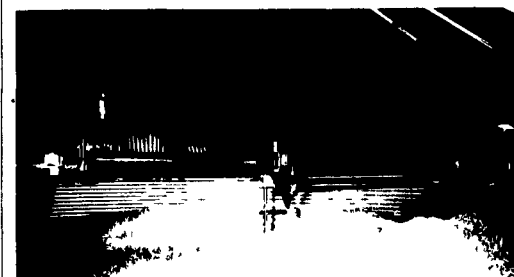
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