

NEW EVIDENCE INDICATES GREENBUG OVERWINTERS IN NORTH

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The greenbug, *Schizaphis graminum* (Rondani), is not a new pest. It has been responsible for injury to a number of grassy plants, including barley, oats, wheat, and sorghum, since it was first discovered in the U.S. in 1882. Significant damage occurs annually in Texas and Oklahoma and occasionally as far north as Minnesota. Perennial bluegrass is known to be a host of this aphid, but prior to 1970 the aphid rarely caused damage to turfgrasses. The reports of damage to Kentucky bluegrass in Illinois (WTT, October 1978) and recent occurrences in Indiana (Indianapolis), Missouri (St. Louis), and Kansas (Kansas City), indicate a new association with turfgrasses. This association suggests that a new biotype has evolved which prefers perennial bluegrass over other host plants

Life History Unknown

Despite the fact that the life history of the greenbug as a pest of grain plants is well known, its association with turfgrass has never been studied. A key question is how infestations originate on home lawns? One theory is that the annual spring influx of aphids from Texas or Oklahoma on southerly winds is the source. While it is known that greenbugs are carried north on such winds and probably do establish on home lawns, it seems at least highly unlikely that such migrants could reinfest the same Ohio homelawns year after year while others nearby are not infested.

A more plausible explanation is that some of the aphid population overwinters, probably in the egg stage. This theory is supported by two facts: (1) up to 8 egg-laying females per square foot were collected from infested lawns in Columbus, Dayton, Cincinnati, and Toledo, during October-December 1979; (2) greenbug nymphs (young aphids) were collected from some of these lawns April 1, 1980. Our ability to deal with this pest now and in the future requires that its life cycle on turfgrass be known. It will be studied in 1980.

Damage

The greenbug damages grasses in several ways. With piercing-sucking mouth parts, it pierces the grass blade and sucks out the sap of the phloem. This feeding by large numbers of aphids (4,000 per square foot quite common) seriously weakens plants. In addition, the greenbug secretes a salivary substance which it injects into the plant as it feeds. This substance (phytotoxin) causes the tissues to die, giving damaged plants a burnt-orange color. There is a strong possibility that the phytotoxin is translocated within the plant and may weaken the root system.

Greenbug damage to Kentucky bluegrass in Ohio was first reported by lawn care firms on a few home lawns in Dayton, Ohio in 1973. Infestations were seen in shaded areas under trees but were also noted in open locations. Infested bluegrass turned a characteristic yellow to burnt orange

color. If left uncontrolled, grass in infested areas was killed.

Since 1973, the incidence of infestation and damage from this aphid has increased steadily until it is presently considered a major pest of homelawns in Dayton, Cincinnati, and Columbus and certain areas of Toledo. Infestations now commonly occur in boulevards and turf islands in parking lots, with and without shaded areas. These areas and many homelawns become reinfested annually. Some have been infested as many as four years in succession.

Insecticide Resistance

Initially, a single liquid application of chlorpyrifos (Dursban®) or diazinon apparently gave acceptable control. However, in 1978, lawn care firms reported a resurgence of greenbug populations 2 to 3 weeks after applying chlorpyrifos or malathion at 1 lb AI/acre. Three and sometimes four applications were made to suppress the population and minimize damage. Despite these efforts, many home lawns were damaged so severely that replacement by resodding or reseeding was necessary.

The resurgence of populations after repeated applications of chlorpyrifos, diazinon or malathion strongly indicated resistance to these organophosphate (OP) insecticides had developed. Therefore, with this assumption, a "crash" program was initiated from July to November 1979 to test alternative insecticides. Funds provided by a few lawn care firms to help cover wages and travel expenses got the program started.

Tests on Home Lawns

Home lawns in Columbus and Dayton which had received liquid applications of either chlorpyrifos or diazinon during June or July, but were still heavily infested with greenbug, were used as test sites for two carefully selected test insecticides; acephate (Orthene®), a different OP; and pirimicarb (Pirimor®), a carbamate. Orthene is a systemic insecticide of known effectiveness against other species of aphids. Pirimor, a translaminar material (moves across the leaf but does not move through the plant) is known to kill aphids only, leaving other insects unaffected.

Working in a cooperative research effort, applications in Columbus and Worthington were made from a ChemLawn Corporation service truck at a volume of 4 gal. per 1,000 sq. ft. In Dayton, similar applications were made with Leisure Lawn Corporation equipment at one gal. per 1,000 sq. ft. All treatments were made by an experienced operator.

The greenbug population at each test site was sampled the day of treatment before application and at intervals thereafter. Four to eight circular samples of turf 3.75 inches in diameter by 3 inches

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deep were taken from areas on the test lawn with high numbers of greenbugs or those showing symptoms of damage. Each sample was placed in a Berlese funnel, a device with a 25 watt incandescent bulb which generates heat to drive the aphids out of the sample. Over a period of 24 hr the aphids were driven into a jar of 70% ethyl alcohol, and later counted under a microscope.

Since the number of turf samples taken was limited by practicality, later sampling consisted of taking 3 sets of 5 or 10 pendulum sweeps over the test area with a 15 inch diameter insect net. The aphids collected in the net were placed in 70% ethyl alcohol until counted.

Test Results

In all cases, Orthene 75 Tree & Ornamental Insecticide at 1 lb AI/Acre and Pirimor 50W at 0.5 and 0.25 lb AI/Acre gave excellent control for as long as 68 days after application. The thoroughness with which the initial treatment removed the aphids rather than what might at first appear to be long residual activity, is believed to be the primary reason for the long control obtained. Apparently, once thoroughly removed, winged migrants from other areas did not cause reinfestation. A word of caution, however, the tendency for reinfestation by migrants could increase in years when rain is scarce from July through September.

Using the data gained from these tests as the basis, a petition for 24(c) Special Local needs labeling (state label) to use these products **in Ohio only** was approved in 1979. **This labeling must be in possession of the user at the time of application.** Data from these tests are also presently being used to support similar labeling in other states where the greenbug has caused damage.

Application

The greenbug has already demonstrated the capability of developing resistance to OP insecticides, therefore, it would be wise to alternate between Orthene (an OP) and Pirimor (a carbamate) when treatment is necessary. This action should forestall the aphids developing resistance to Orthene for at least a few years.

Cooperation the Key

Obtaining the 24(c) label was accomplished as the result of a truly cooperative research effort between the Ohio Agricultural Research and Development Center, Mike Dietrick of ChemLawn Corporation Research Center, Milford Center, Ohio, and Doug Halterman of Leisure Lawn Corporation, Dayton, Ohio. Much credit also goes to Kevin Power, Technician, and "Harry's Angels", Abby, Debbie and Gayle, of the OARDC, who spent many hours counting thousands of aphids in the hundreds of samples taken. We are pleased that these two effective tools have been labeled for control of this pest and, at the same time, proud that "we," the OARDC and you, the lawn care industry, accomplished it working together.

WTT