

## **Insects and Other Arthropods of Economic Importance in Indiana During 1982**

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### **Introduction**

Weather conditions in 1982 were nearly ideal for most crops in Indiana. Spring moisture conditions were such that planting proceeded at a sometimes record pace, and rains thereafter were generally timely and sufficient. The fact that for the first time in recorded history June was cooler than May seems not to have adversely affected crop production - which will probably be at record or near record levels. A cool June, a cold winter (February temperatures, for instance, averaged 7° F below normal in some parts of the state) and a record-breaking cold snap in April (3° F in Kentland) may in some instances have adversely affected the insects. Whatever the cause, disruptive insect activity was at average or less than average levels.

### **Corn and Small Grains**

A record 90% of the corn had been planted by 16 May, and a record 50% had emerged by that day. It grew at record speed, and by 11 July 20% had silked, another record. Even in the EC (East Central) and SE districts, which because of heavy soils are usually planted late, corn planting was completed almost as early as in the rest of the state. Nearly all was safe from frost by the time of the first freeze.

An estimated 40% of the corn was treated to prevent losses caused by the feeding of larvae of the western (*Diabrotica virgifera*) and northern (*D. longicornis*) corn rootworms, about as much in the southern as in the northern half of the state. At about \$10/acre, that's about \$25,000,000. Damage due to this insect was to some extent offset by the abundant moisture available to the plant, in untreated, infested fields. No economic silk feeding by adults was observed.

The 1st, first-instar, larva collected in Tippecanoe (WC) Co. was taken 28 May, the 1st second, by 8 June, thirds by 15 June and pupae by 29 June, in research plots regularly sampled. Adults were collected 25 June in Bartholomew (C) Co., and 30 June as far north as LaPorte (NW) Co. Adult westerns averaged 0.72/stalk statewide in an August survey, about double the 1981 population. Counties on the western side of the state averaged about 0.5/stalk, counties in the NC, C and SC districts averaged 0.65, and eastern counties 1.0, with the EC averaging 1.54, the highest in the state. Northern corn rootworm adults averaged 0.15/stalk statewide, ranged by district from 0.07 to 0.28/stalk.

A total of 17,366 adults of the two species was collected on 10 sticky traps in a Tippecanoe Co. treated cornfield between 11 June and 23 September, a figure comparable to those of 1977 and 1979, other high years. The ratio of western to northern: 79:21. Last year the ratio was 94:6.

The overwintering population (Fall, 1981) of European corn borer (*Ostrinia nubilalis*) larvae averaged 22.6/100 stalks, the lowest level in the years from 1961 to the present. By 4 May, in Daviess (SW) Co., pupation in above-ground corn stalks had begun. (In 1981 pupation in the same field was almost complete by 4 May.) The first BL (blacklight) trap catch in a Shelby (C) Co. trap of a spring

adult corn borer occurred 15 May, and catches of first generation moths peaked by 30 May at both ends of the state, when corn averaged 30 cm in height. Second generation moths peaked in numbers at the end of July in a Lawrence (SC) Co. BL trap, the first week in August in LaGrange (NE) Co., by which time about half the corn had reached the dough stage. The flight period as indicated by BL traps for second generation moths lasted through August in weather that in balance should have favored oviposition and establishment, but the insect was not able to increase its numbers through the two generations a great deal. By the time of the fall survey (September- early October) the state average for late instar larvae was only 30.5/100 stalks. (The 20-year average is 61.8.) The northern districts together with the C district had the highest averages, from 40-50 larvae/100 stalks. The highest single field average was 550 borers/100 stalks, in a Bartholomew (C) Co. field. Mechanical damage by larval feeding had resulted in only 0.2% ear loss by the time of the survey, down from 1.2% last year.

Corn leaf aphids (*Rhopalosiphum maidis*) or evidence of their once having been present were found on only 24% of the stalks in 300 fields surveyed in September-October, and 88% of those infestations were so light that they cannot have been responsible for yield losses. Infestations were most common in the northern 3 tiers of counties.

Ear tip feeding was minimal: of 7500 ears surveyed in September-October, only 0.7% had been damaged by birds, and 0.4% by fall armyworm (*Spodoptera frugiperda*) or corn earworm (*Heliothis zea*) larvae. The 14-year (1969-1982) average for birds is 4.5%, for larvae other than European corn borers is 3.9%. Only 6 larvae of each species were present at the time of the survey; the average is 65 corn earworms and 32 fall armyworms. Loss in each damaged ear was minor.

Leaf feeding and stem cutting insects included armyworms (*Pseudaletia unipuncta*), fall armyworms, black cutworms (*Agrotis ipsilon*), sod webworms (*Crambus* sp.) and common stalk borer (*Papaipema nebris*). All were minor in impact, most involved with fewer than 650 acres (of more than 6 million). Common stalk borers, normally damaging only at field edges, in one Warren (WC) Co. corn field were at economic levels through the whole wheat field that had been treated with herbicide prior to no-till corn planting. The sod webworms occurred in a corn field that had been in mint. Most armyworm problems were in no-till fields.

The oat bird-cherry aphid (*Rhopalosiphum padi*) was of little consequence in small grains this year, reaching a maximum only of 1/stem in SW district wheat, by mid-May. Early in July they were more likely to be present in whorls of corn than were corn leaf aphids. Later in the fall they were on the lower internodes, and 12.3% of the plants surveyed in September-October had colonies. Such infestations were by far more common in the northern half of the state than the southern.

A survey done cooperatively by the Agriculture Research Service of the USDA, The Indiana Crop Improvement Association and Purdue's Department of Entomology of 332 wheat fields in 52 counties noted an increase of Hessian fly (*Mayetiola destructor*) activity over that of 1981. This showed up in the mean percentage infestation rate (5.5%), the mean number of puparia/100 stems (7.4) and the percent of fields infested (63%), all higher than in 1981. These figures include all varieties of wheat. Wheats with the H<sub>6</sub> gene for resistance to the Hessian fly had infestation rates of less than 1.0%. The higher infestation rate was attributed to weather conditions optimal for emergence, and the presence of fly biotypes capable of attacking wheats with resistance attributable to other than H<sub>6</sub> genes.

The cereal leaf beetle (*Oulema melanopus*) was observed in a few wheat fields

in Harrison (SC) Co., at less than economic levels. Corn fields near the wheat received such large numbers of adults when the wheat ripened that damage to that crop was conspicuous. A field of oats in the same county was at or near treatment levels as well.

### Forage Legumes and Soybeans

The following data on the alfalfa weevil (*Hypera postica*) are from SC district alfalfa fields. By 7 April, when alfalfa ranged from 7-14 cm, only trace feeding was observed. By 7 May, in alfalfa averaging 32 cm, an average of 48% of the plants had feeding. A week later buds appeared, the larvae had apparently passed their peak in numbers and alfalfa was beginning to mask the older damage. Very few fields needed treatment, although it was difficult to reach that decision at the time.

Potato leafhopper (*Empoasca fabae*) on the other hand was an economic problem on most of the alfalfa in the state and on most of the cuttings but the first and probably the last, late fall cutting.

The first adult Mexican bean beetle (*Epilachna varivestis*) of the season was collected in Jefferson (SE) Co. from alfalfa on 27 April, the normal time for its appearance. Developmental data which follow are based on research fields in Clay and Owen (WC) counties: in counties north and east development was slower, in counties to the south and southeast, slightly faster. First eggs on soybeans: 4 June. Peak first generation egg population: 17 June. Peak new adults of the first generation: 24 July. Peak new adults of the second generation: first week in September. A partial third generation may have reached third instar but made no contribution to the overwintering population.

Although there were probably fields in all bean growing counties in which at least some losses were incurred, damage was concentrated in the WC district from Clay and Owen counties in the south as far north as Montgomery County. The latter county in the west and Randolph (EC) Co. in the east mark the northern boundaries of the beetle in soybean fields with but one exception this year. There were a few treated fields in Wabash (NC) Co. this year. Such isolated infestations were more common last year, and less severe; they seldom persist for more than 1 year. Numbers entering hibernacula this year should be large.

At least 100,000 acres were treated for the control of the Mexican bean beetle in 1982, at a cost of \$10/acre or more. Probably more than half of those acres needed treatment at the time the treatment was applied. There were also fields left untreated that suffered losses as a result; no estimate of the number of acres so affected is available.

The Mexican bean beetle was the only pest of consequence to soybeans in 1982.

### Ornamentals, Forest, Shade and Fruit Trees

Thomas Mouzin, who operated pheromone traps in the Vincennes area (Knox—SW—Co.), provided the following fruit tree insect data. Codling moth (*Cydia pomonella*), obliquebanded leafroller (*Choristoneura rosaceana*), oriental fruit moth (*Grapholitha molesta*) and lesser peachtree borer (*Synanthedon pictipes*) catches were all at average levels. Redbanded leafroller (*Argyrotaenia velutinana*) counts were at about half the seven year average.

### Beneficial Insects

Because adult alfalfa weevils were difficult to collect in numbers no estimate could be made of the rate of parasitization by *Microctonus aethioides*. Of the

4833 alfalfa weevil larvae collected in May and reared for parasite emergence, 51% were parasitized by either *Bathyplectes anurus* or *B. curculionis*. *B. anurus* was collected almost exclusively in the southern half of the state although it is known to exist as far north as the Michigan border. In the SC district it outnumbered *B. curculionis* by 6 to 1, in the SE by 19 to 1. On a statewide basis *anurus* accounted for 19%, *curculionis* for 32. Total percent parasitization, from west to east, in the northern districts was 62, 53 and 34; in the central: 40, 38 and 22; in the southern 64, 72 and 61.

Two attempts are made each year to estimate numbers of red coccinellids. Ten sticky traps in a treated field of continuous corn in Tippecanoe Co. collected 412 adult *Coleomegilla maculata* in the 105 days between 11 June and 23 September, the highest number in the 6 years that the traps have been used. The ratio between that species: *Hippodamia convergens*: *H. tredecimpunctata*: *Cycloneda sanguinea* was 75:10:1:14. This ratio has remained much the same except for 1977, when it was 27:65:3:5, and 1980, when it was 58:7:2:33.

A count is also made during the annual corn insect survey in Sep-Oct, of all coccinellids observed on 25 stalks in each of the 300 fields visited. In 1982 the count, in the same order as the above ratios, was 81, 11, 2, 1. The count (81) of *Coleomegilla maculata* was the lowest since 1977, has been as high as 276 (1981). This species was the most common in the NW corner of the state at the time of the survey.