

## Insects and Other Arthropods of Economic Importance in Indiana in 1986

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### Introduction

The 1986 crop season followed a relatively mild winter; only December was cooler than average. Precipitation was average or above except in December and January. April was rather dry, enabling growers to complete ground preparation and seeding especially of corn early. Wheat development was rapid; the early harvest of wheat made second-crop planting feasible in many central counties. Usually only southern Indiana counties have that option. August and the first weeks of September were rather dry. The drought can't have been severe, however, since the estimated yield as of October 1 of corn was 127 bushels per acre, that of soybeans was 39 and that of wheat 43 bu/A. And in spite of the frequent and sometimes heavy rains that came in late September and October, the corn harvest was being completed at a faster-than-average rate. The abundance and severity of stalk rots made an early harvest highly desirable. The soybean harvest on the other hand lagged.

An estimated 6,000,000 acres were planted to corn (1985: 6,300,000 acres), 4,300,000 acres to soybeans (1985:4,500,000) and 900,000 to wheat (1985:770,000 acres) (1 October estimate).

Soil preparation in 1986 for corn was effected 36% by moldboard plow, 53% by conservation tillage and 11% no-till. For soybeans the percentages (in the same order) were 44, 46 and 10%.

### Corn and Small Grains

The western corn rootworm (*Diabrotica virgifera virgifera*) is from year to year the most costly agricultural pest in Indiana because so many acres are treated routinely at planting time — normally 40% of all corn acreage. A survey conducted in July in 39 counties (usually 5 fields/county were visited and 10 widely separated plants were checked in each field) averaged 0.61 adults/plant, exactly the same as in 1985 and the 8 year average. Surveys of this type are only general indicators because timing is so important. There was a general consensus, however, among people who spend a lot of time in cornfields that this insect was at or below 1985 numbers. One researcher, Kurt SeEVERS, who made his second annual count of western corn rootworm adults on the shores of Lake Michigan noted a drop from nearly 900 per unit of measurement in 1985 to less than 200 in 1986. The reason for the large numbers on the shore is not well understood, however, and the data may reflect parameters other than population levels. In the July survey three districts averaged more than 1 beetle/plant: North Central with 1.15, C with 1.02 and SE (inadequately sampled) with 1.32. Only 1 county, Shelby, averaged more than 2. One Tippecanoe Co. field averaged 5.6 beetles/plant, the highest in the survey.

The first adult in a Tippecanoe Co. field regularly surveyed was collected on a yellow sticky trap in Tippecanoe Co. by 25 June, and trace numbers were encountered by 23 June from Sullivan Co. south to Spencer Co., and from there to Clark Co. in the SE district. Economic silk cutting was not observed.

The northern corn rootworm (*D. longicornis barberi*) was again at very low numbers, fewer than 0.08 adults/plant except in the NW district where they averaged 0.18/plant and in the C district, where they averaged 0.11/plant.

The European corn borer (*Ostrinia nubilalis*) under normal conditions is our second-most costly pest in Indiana corn. This year, by 17 June spring generation larvae in the

NC and NE districts were mostly in early instars with little midrib penetration. A week later in the SW and SC districts larvae were mostly late instars but no pupae were observed. Reports of economic numbers of either the spring or summer generation of larvae were few as well, so that what occurred in August came as somewhat of a surprise. Blacklight trap catches during the week from 23-29 August in Tippecanoe Co. were the largest ever recorded in a history of BL trapping dating back at least to 1964 — 7800 in one week. (The highest catch before this year's was 5390 collected in 1970 in Gibson Co.) Unfortunately this year only one BL trap was in operation, so data are limited. There were reports from other parts of the state of higher than usual numbers, and other states noted large flights of what were described variously as second generation or third generation flights. A third generation flight was postulated because that would have helped explain the larger than usual numbers. On the other hand the flight took place when the second generation flight normally takes place. Occasionally third generations do occur in southern Indiana and they are noted because there are early instars present during the fall corn insect survey in September and October; such larvae almost never reach maturity. The fall survey was to be dropped this year but because of the big flights a partial survey was conducted in which 3 (instead of 5) fields were visited in each of 3 (instead of 4) counties in each of the 12 corn borer districts. The state average in this survey was 143 large larvae/100 plants, exceeded only by the 1978 average of 200/100 plants.

The district with the highest average was in the northwest corner of the state which was represented by Newton, Jasper and LaPorte counties; 386 larvae/100 plants. This was expected since Jasper Co. (averaging 562 larvae/100 plants) is consistently a leader. The real surprise was the SE district which had the highest number in its history — 125 larvae/100 plants. The SE district — represented by Wayne, Rush and Decatur counties this year — has with parts of the SC district usually low numbers of larvae. The large August flight, incidentally, found little corn suitable for oviposition and was forced into such unusual crops as soybeans, snap beans, thick stemmed grasses, weeds and the like.

Black cutworm (*Agrotis ipsilon*) infestations were few, involving probably fewer than 1000 acres.

No attempt was made to estimate corn leaf aphid (*Rhopalosiphum maidis*) numbers, but there were few if any heavily infested fields in 1986.

Japanese beetles (*Popilia japonica*) were common in 1986 and were often seen on corn silks; no economic populations of adults were seen on corn, but larvae in damaging numbers were reported occasionally in corn fields where they fed on corn roots.

The 22nd annual survey of wheat conducted by the Agriculture Research Service of the USDA in cooperation with the Crop Improvement Association and the Entomology Department of Purdue University to detect Hessian fly (*Mayetiola destructor*) activity included 276 fields in 61 counties in Indiana. Hessian fly activity was less than usual. Mean percentage infestation for all cultivars was only 0.6, less than half last year's. During the past 5 years the rate has been as high as 5.5%. The mean number of puparia/100 stems was only 0.8, again the lowest in 5 years when all of the cultivars are included. The responses of wheat having some form of resistance (and which is commonly grown) follow. Cultivars having the H6 form of resistance were infested at the rate of 0.3% (209 fields surveyed), H5 was infested at the rate of 0.7% (20 fields surveyed), H3 = 2.8% (25 fields surveyed.) Only 15.2% of the fields visited were infested, half the average in the last 5 years. The only field having a percentage higher than 10% in 1986 was a Rush Co. field with a 30% infestation rate.

#### Forage Legumes and Soybeans

As much as 16% of the alfalfa stems showed evidence of feeding by 11 March in the SW district and a week later WC fields were showing feeding by the alfalfa weevil

(*Hypera postica*). By 24 March up to 44% of the alfalfa surveyed — averaging about 3cm — had tip feeding in the SW district. Up to 48 larvae/100 stems, up to 2nd instar, were present at that time. SC alfalfa still had low levels of tip feeding. A month later all WC fields had more than 50% with tip feeding and larval populations ranged from 1.4 to 3.5/stem. All the stems in a Vigo Co. field averaging 21cm showed tip feeding, averaged 3.5 larvae/stem. In that field and in the SW district, fields were silvering in spots — when damage is heavy the leaves become conspicuous in contrast with the green undergrowth. Alfalfa by this time was about 40cm tall and was beginning to bud. Probably half the fields in the WC and SW district should have been treated, although in some cases regrowth completely covered the damaged tips. There was little if any treating done in the SC district. A fungal pathogen, *Erynia* sp., which has been a factor during the last few years, was responsible for the weevil decline later.

Feeding was often evident on alfalfa in the northern districts and some scattered fields needed protection. There were also a number of fields in which the population of adults—the new adults—was so great that they seriously challenged the new growth and actually needed treatment.

More serious for the alfalfa growers in 1986 was the potato leafhopper (*Empoasca fabae*). One grower, seeing his stunted, yellowed alfalfa, blamed careless application of herbicide for the unusual color. Infestations this year tended to be severe, especially if the harvest was at all delayed. Probably all alfalfa in the state would have profited by treatment at least once.

The Mexican bean beetle (*Epilachna varivestis*) has for the third year in succession been absent from alfalfa fields. Adults prior to 1984 used alfalfa for food until soybeans were available but the hot, dry summer of 1983 virtually destroyed that pest. The species is however making a come-back, although isolated populations, not self-propagating, were observed in scattered locations on soybeans in the past 2 years. This year however there were isolated economic populations in Montgomery Co., according to reports, and conspicuous feeding was seen in fields next to State Road 47 southwest of Crawfordsville and in Parke Co. beside State Road 59 south of Guion even into Clay Co., often combined with feeding by the Japanese beetle. None of these infestations was economic.

Soybeans came through 1986 virtually unscathed by insects (except the infestations described above.) Soybean leafminer (*Odontota horni*) was seen in various NW counties but the infestations were light as also were the infestations by the green cloverworm (*Plathypena scabra*).

### Fruit Insects

Apples and peaches came through the winter in excellent shape: 90% of the apple buds and 79% of the peach buds were alive on the first of April. A cold period during April reduced that number to about 50% of the buds and/or fruit. Delicious varieties and Jonathans suffered most, particularly in the WC and C districts.

Five pheromone traps each for redbanded leafroller (*Argyrotaenia velutinana*), obliquebanded leafroller (*Choristoneura rosaceana*) and codling moth (*Cydia pomonella*) were operated in Tippecanoe Co. during the season. The 5 redbanded leafroller traps collected 653 adults during this season. The average catch over 10 years is 1109 (Range 321-2359); in only one season was the catch lower than this season. Obliquebanded leafroller traps collected 189. The 10 years average is 355 (Range 99-715: in only one season were fewer collected. The 5 codling moth traps collected 230 adults males, the third highest catch in 10 years which averaged 194 moths/season, ranged from 38-458.

The apple maggot (*Rhagoletis pomonella*) was reported still flying on 6 October in Grant Co. Apparently the activity of this species was extended over a long period of time this year, and those who stopped treating for the pest at the usual time occasionally had maggot-infested fruit, according to reports.

### Forests and Ornamentals

Virgil Knapp of the State Entomologist's office provided the following information on the gypsy moth (*Lymantria dispar*) in Indiana in 1986. Their extensive trapping program collected moths for the first time from the following counties: Clark, Crawford, Grant, Henry, Lawrence, Madison, Spencer, and Vanderburgh. These were all single moth catches. The largest catches were taken in Kosciusko Co., near the area mass trapped this year. Mass trapping has in the past been successful in containing potentially large populations, and now that the Kosciusko Co. population has been better defined it is hoped that massed trapping this area next year will effectively control it. There is also a population in Allen Co. that bears watching.

Virgil Knapp also provided a list of the top insect pests in connection with nursery inspections: 1. Japanese beetle. 2. Fall webworm (*Hyphantria cunea*) and oystershell scale (*Lepidosaphes ulmi*) (tie). 3. Pine scales (*Chionaspis heterophyllae*) and/or (*C. pinifoliae*). 4. Fletcher scale (*Lecanium fletcheri*). 5. Bronze birch borer (*Agrilus anxius*). 6. Zimmerman pine moth (*Dioryctria zimmermani*). 7. Honeysuckle aphid (*Hydaphis tartaricae*). 8. Honeylocust spider mite (*Eotetranychus multigituli*). 9. Maple bladdergall mite (*Vasates quadripes*) and black vine weevil (*Otiorhynchus sulcatus*) (tie). 10. Bagworm (*Thyridopteryx ephemeraeformis*).

### Insects of Man and Animals

For Medical Entomologist Dr. Michael Sinsko, who provided much of the following information, the big news among arthropods that attack man is the advent of a new mosquito species, *Aedes albopictus*. It was collected for the first time in Indiana by Vivie Dunn in Vanderburgh Co. It was later also collected in Indianapolis. The disjunct distribution is not unusual for this species since it gained access to this country in the water in imported used tire casings; hitch-hiking in this manner insures a disjunct distribution. Once present, it should have no difficulty in expanding its territories since it oviposits readily in all manner of man-made containers as well as such natural sites as tree holes. Dr. George Craig at Notre Dame is investigating its ability to survive our winters. A fierce nuisance, it is also a vector of several diseases.

Another unusual find this year: *Aedes aegypti* was collected in Columbus. It has usually been confined to the area south of the Ohio River, so its presence in Columbus would have attracted attention had it not been for *Aedes albopictus*.

Generally speaking, mosquitoes were less of a nuisance this year than in the past. Of the arthropod-borne diseases, by 10 November there had been 8 confirmed cases of LaCrosse encephalitis, none of either St. Louis or eastern equine encephalitis (although one horse died of the latter), a single possible case of Lyme disease and no reported cases of Rocky Mountain spotted fever.

Complaints of lice were fewer this year. This may be because there were fewer attacks but it may also be because victims are circumventing reporting agencies by home treatments using effective over-the-counter drugs. Flea complaints were also fewer than usual. Both John MacDonald, who works on them at Purdue, and Michael Sinsko agree that the baldfaced hornet was hard to find and that yellow jacket numbers were down as well.

For the past 6 years counts of horn flies (*Haematobia irritans*) and face flies (*Musca autumnalis*) have been made on a weekly basis on a herd of 10 mixed cattle on a farm in Warren Co. at about the same time of day. This year the counts of horn flies averaged 33.9 during the 13 weeks of the counts. The 5 year average is about 55/side. The highest count this year was the first made on 11 June, 129/side. Six weekly counts in Grant Co. averaged 33.9/side also.

Face fly averages in Warren Co. for 13 weeks were 14.5/face; the 5 year average

was 11. Six counts in Grant Co. averaged 15.3, and a 16 count series in Tippecanoe Co. averaged 11.2. Counts were made this year by Carl Wallin and the details of this and previous years were made available by Cheryl Vail.

#### Beneficial Insects

Larvae of the alfalfa weevil were reared in sufficient numbers and frequency to get an estimate of the rate of parasitism in three districts. In the WC district 15 samples were reared: 12% of the larvae were parasitized by *Bathyplectes anurus*, 2% by *B. curculionis*. In the SW district 25% were parasitized by *B. anurus*, 21% by *B. curculionis* in 15 samples. In the SC district 29% were parasitized by *B. anurus*, 19% by *B. curculionis* in 12 samples. Samples collected from other districts and later samples from these districts were invaded by *Erynia* sp. that destroyed so many larvae that the samples could not be used, assuming that parasitized larvae were more likely to die of disease than healthy larvae. Excluding the 21-28 May collections, a total of 4570 larvae was reared.

Since sticky trap surveys in corn fields were discontinued during the year and the corn insect damage survey has been greatly reduced, this year there are no red coccinellid counts comparable to those of previous years. The sudden eruption of the sevenspotted lady beetle (*Coccinella septempunctata*) (It was collected in 1985 in nearly 50 counties for the first time) called for further information on its subsequent progress and, as important, its effect on other red coccinellids. So from early March until early September a kind of running record of all coccinellids observed in the various crops was kept. *Colomegilla maculata* is still the most commonly observed lady beetle, having been observed 385 times. Next came the seven spotted lady beetle, seen 66 times. The convergent lady beetle (*Hippodamia convergens*) was seen 34 times, *Cycloneda sanguinea* 8 times, *Hippodamia parenthesis* 12 times and *Hippodamia tredecimpunctata* once.

By the end of the summer, incidentally, the seven spotted lady beetle had been collected in every Indiana county except 4: Carroll, Miami, Posey and Vanderburgh.

