

## Insects and Other Arthropods of Economic Importance in Indiana in 1985

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### Introduction

The winter preceding the 1985 cropping season started with a warmer than average November and December, and a cooler than average January and February. The four months all had days with maximum temperatures higher than 65 degrees Fahrenheit; January also had minimums for short periods of time from minus 19 to minus 29 degrees (depending on where in the state the thermometer was) to make up for those balmy days. February also had cold days—in fact between them the peach crop was destroyed. Snow cover was minimal, with the cover seldom lasting long.

Cropping season rainfall was uneven. In the northern half of the state, topsoil moisture was adequate to surplus until the end of April; it remained short through May and much of June and July. This made for early soil preparation and planting: 97% of the corn was planted by 26 May, 3 weeks ahead of normal. Some drought damage occurred especially on lighter soils, but it can't have been much if the October estimate of corn yield—124 bushels/acre—is any indication. The southern half of the state lagged behind in planting due to excessive rainfall which lasted until mid-June. Wheat ripened early; harvest was virtually completed by 14 July—2 weeks ahead of schedule—making possible double cropping in much of the central districts where it normally at best is risky.

In 1985 49% of the crop soils were prepared by moldboard plow, 43% by conservation tillage and 8% no-till. An estimated (1 Oct. estimate) 6,300,000 acres were planted in corn, 4,500,000 in soybeans, both up slightly from the previous year. Both corn and soybean (40 bushels/acre) yields estimates were above those of 1984.

Insect problems in field crops were generally fewer than in average years. And woollybears (Arctiidae), which were very numerous in 1984, were virtually absent in 1985.

(Weather and cropping information cited above were obtained from "Indiana Weekly Weather and Crops.")

### Corn and Small Grains

The western corn rootworm (*Diabrotica virgifera virgifera*) is Indiana's most costly pest of field crops in terms of crop protection since a relatively high percentage of the growers routinely use pesticides on their corn crop, and more corn is grown than any other crop in the state. It is estimated that 40% of the corn planted is treated, which this year was about 2,500,000 acres.

The insect developed more rapidly than usual this year. First instars were observed as early as 16 May in a Tippecanoe Co. field regularly surveyed for several years. The earliest take of first instars previous to this was 30 May. The same field yielded 2nd instars by 27 May and thirds on 3 June. The first adult collected in a bait trap appeared on 24 June, also early. The first sticky trap catch occurred between 25 June and 1 July. The total catch on 10 sticky traps in the same field was about 6,000, one-third the 1984 catch and half that of the previous 2 years. A state-wide survey between 15 July and 6 August put the average number of beetles/stalk at 0.61, exactly that of an 8 year average and nearly the same as 1984. The northwest corner of the state had the highest average—0.89/stalk. and the southwestern corner had the lowest—0.29. Complaints about silk clipping were few, and overall the amount of

goosenecking seemed no greater than last year. Nevertheless there were fields with damaging populations, especially in the NW district.

The northern corn rootworm (*Diabrotica longicornis barberi*) has been relegated to minor pest status, averaging in 1985 0.05 adults/stalk, its lowest average in 8 years.

The European corn borer (*Ostrinia nubilalis*) was probably the second most costly field crop pest, but an average of only 33.7% of the plants were infested this year and there was an average of only 50.8 larvae/100 plants at the time of the fall corn survey. The 25 year average is 61 larvae/100 stalks. What was unusual about this year's European corn borer population was its distribution. The southern fourth of the state had a higher population than the northern fourth, and the southwestern corner of the state averaged 148 larvae/100 plants, the highest in the state and nearly twice any others. Moth flights to black light traps were relatively light at all traps, never reaching 100/day and seldom reaching 50. The southernmost trap—in the southwest corner—recorded the most consistent flight, almost without interruption from 13 June when it was put into place until 23 August when it was turned off.

About half the larvae had pupated in Cass Co. by 6 May, by which time an adult was reported from the southern districts. By 15 May adults were sighted in Randolph Co., and egg masses were present in Warren Co. by 20 May.

Japanese beetles (*Popillia japonica*) were common in corn fields especially in the NW district, where they clustered on the silks. Frequently however they came too late to adversely influence pollination. Japanese beetle larvae were occasionally responsible for some damage to roots of corn.

An adult black cutworm (*Agrotis ipsilon*) was collected in a pheromone trap in Tippecanoe Co. by 11 April, and 8 more were taken from 14 to 16 April. Fifth instar larvae were reported by 8 May. About 500 acres were reported treated for this insect in Boone Co.; other reports involved few acres and scattered locations. It was probably about average in activity and involved fewer than 1000 acres all told.

Other pests reported as occasional were sod webworms, white grubs, birds (feeding on seed corn at field edges) and wire worms.

Corn leaf aphids (*Rhopalosiphum maidis*) were at normal levels this year, insignificant economically except in occasional drought stressed fields in the NW district.

Brown stink bugs of the genus *Euschistus* are being blamed for anomalies seldom noted before last year in Indiana corn fields. Symptoms include excessive tillering (so many "suckers" that the primary ear stalk is suppressed), severe stunting and malformed leaves. Several species are believed responsible; unfortunately the species also hybridize, making certain determination difficult. It is believed that the occurrence of this anomaly at this time is due to the growing use of no-till operations. In planting in narrow slits the soil does not always fill in around the seed. When the seed sprouts, therefore, it is possible for insects to reach parts that would normally be subterranean. Another factor which may be important is the amount of land idled by the government "payment in kind" program. Many of these idled acres were permitted to grow up in weeds and may have supported large numbers of these insects. The anomalies may have been present in years past but were so infrequent that they were not noted.

Surveys conducted jointly by the Indiana Crop Improvement Association, the Agriculture Research Service of the USDA and the Entomology Department of Purdue University of 458 wheat fields in 62 counties resulted in the following. Mean percent infestation by Hessian fly (*Mayetiola destructor*) for all varieties surveyed was 1.3, mean puparia/100 stems was 1.8 and 28% of the surveyed fields had at least some Hessian fly puparia. The percentage of fields with 10% or higher infestation rate was only 1.9 (it was 4.4 in 1984). Wheat with the H6 source of resistance, the most commonly planted wheat, had only a 0.5% infestation rate while wheat with no resistance

averaged 2.1% infested. Only 2 counties (Dubois and Hamilton) had fields with an infestation rate of 20% or more.

None of the common pests of wheat—the English grain aphid (*Sitobion avenae*), the bird-cherry oat aphid (*Rhopalosiphum padi*), and the armyworm (*Pseudaletia unipuncta*)—was a problem in 1985. Adult cereal leaf beetles (*Oulema melanopus*) were swept from small grains in Harrison Co. on 23 April in trace numbers only (1/10 sweeps) and trace numbers of larvae were present on 30 April. By 14 June summer generation adults were fleeing the ripening wheat to nearby corn fields, where they were seen at lower than usual numbers (36/100 stalks). The insect was not economic on either crop, of course.

### Forage Legumes and Soybeans

Alfalfa weevil (*Hypera postica*) larvae were somewhat more numerous this year than last. In the NW district about 30% of the growers should have treated their fields or harvested early. In addition adults were numerous enough in a few fields in the same district to significantly retard regrowth after the first cutting. Economic damage was the exception rather than the rule however. Single, scattered fields with silvering were seen in most districts, but aside from those, treatments would have been profitable in fewer than a fourth of the fields. The dry weather that plagued the NW district increased the damage there while the adequate or more than adequate moisture of the southern half of the state helped the alfalfa grower. One WC grower scalped his field after the first frost in the fall of 1984, growth this spring was retarded and his field was badly damaged by the weevil. This was seldom seen in the same district where alfalfa had normal growth. A number of SW district fields were damaged, while only occasional SC fields were. In a few SC fields a disease again greatly reduced the weevil population, but not until the larvae were fairly large. In the SW and SC districts by 1 May alfalfa averaged about 50 cm, with about 60% of the stems showing tip feeding. At that time about 15% of the stems were budding.

Alfalfa was treated for potato leafhopper (*Empoasca fabae*) in only about 20% of the fields in the NW district, and on only one cutting. Less was treated in the southern half of the state.

For the second year no adult Mexican bean beetles (*Epilachna varivestis*) were swept from alfalfa early in the spring. Alfalfa serves as a food source for the beetle until soybeans are available. The hot summer of 1983 dealt this insect such a blow that even at this late date there are few signs of their recovery. Adults were seen in only 4 or 5 soybean fields this year, and then only in trace numbers. Adults were seen by 7 June, eggs by 12 June in a Lawrence Co. field. Late instar larvae were present by 8 July in a Vigo Co. field. Second generation adults were fairly numerous in a field in Lawrence Co. shortly before leaf drop.

There were a few reports of damage to soybeans, primarily the edge rows, by the twospotted spider mite (*Tetranychus urticae*) in the areas most seriously affected by the drought—the northern third of the state.

Bean leaf beetles (*Cerotoma trifurcata*) were swept from alfalfa fields as early as 10 May, in numbers ranging from 1-15/100 sweeps, and emerging soybean plants generally had some bean leaf beetle feeding, but almost always at less than economic levels.

Japanese beetles were often numerous in soybean fields from the northern portions of the state as far south as Vigo Co. While feeding was often conspicuous, there were no instances of economic damage.

A soybean leafminer (*Odontota horni*) adult was seen on 8 May, larvae were present at least by 26 June and pupation had begun by 17 July. One field had about



10 adults/row foot on 7 August, but only on edge rows. The insect is common in only a few fields each year in the NW district and is seen in trace numbers only in the surrounding districts.

The soybean nodule feeder (*Rivellia quadrifasciata*), a platystomatid fly, was collected on 10 sticky traps in a Tippecanoe Co. corn field at the rate of 1165 adults in one week at peak catch—the week ending 15 July. Samples from all of the traps were examined to determine species composition and sex. All were of this species, and 80% were males. The catch dropped to 492 the next week, and was negligible thereafter.

### Vegetable Insects

There were no consistently damaging insects in gardens this year—at least there were few complaints from the general public—aside from the usual complaints about the squash vine borer (*Melittia satyriniformis*); adults, eggs and small larvae were present during the week ending 19 July.

### Fruit Insects

The USDA Fruit Laboratory in Vincennes, which for years has been providing trapping data on fruit moth activity, was closed down early in 1985. Thus there will be no figures on peach insects. Pheromone trapping results for Tippecanoe Co. follow. The year's total catch in 5 pheromone traps for each of the species will be compared with the catch of the previous 8 years. The codling moth (*Cydia pomonella*) catch of 213 moths is above the 190 moth average, is the third highest catch in 9 years when the catch ranged from 38 in 1977 to 458 in 1981. The redbanded leafroller (*Argyrotaenia velutinana*) catch of 1306, better than the 9 year average of 1143 and the third highest catch in a range from 321 in 1979 to 2359 in 1980. The obliquebanded leafroller (*Choristoneura rosaceana*) total was only 49, below the 9 year average of 81 and sixth in the 9 year totals which ranged from 22 to 187.

A leaf miner, (*Phyllonorycter* sp.) was collected in large numbers in a Tippecanoe Co. pheromone trap about 22 July and two days later in a LaPorte Co. trap there were similar numbers.

Early instars of the European red mite (*Panonychus ulmi*) were present in an Elkhart Co. orchard by 26 April. Plum curculios (*Conotrachelus nenuphar*) were obtained by jarring on 22 April in Tippecanoe Co.

### Insects of Forests and Ornamentals

Virgil Knapp of the office of the Indiana State Entomologist forwarded the following data on the gypsy moth (*Lymantria dispar*). In a combined state and federal effort, a total of 12,102 pheromone traps were put in place in Indiana in 1985. As a result 8 counties were added to the list of counties from which this pest has been collected: Jay, Jennings, Pike, Porter, Posey, Randolph, Steuben, and Wells. All had but single moths/trap catches except Porter and Steuben. Other counties with moth catches this year, counties from which moths had been collected in earlier years: Allen, Brown, Elkhart, Fulton, Hamilton, Kosciusko, Lagrange, LaPorte, Marion, St. Joseph, Washington, Wayne, Whitley—a total of 21 counties from which at least 1 moth was collected this year. Of these, Kosciusko Co. is this year's hot spot, with multiple catches in several traps. The control method of choice—mass trapping—which has been quite successful with populations of the size found in Indiana, will be used at the Kosciusko Co. site—a small woods near Lake Tippecanoe. It may be necessary also to trap at the Allen Co. site.

Virgil Knapp also forwarded the nursery inspectors' list of the insects most

commonly encountered this year during nursery inspections. First place is occupied by the Japanese beetle. Two scales—which cannot readily be separated using field equipment—share second place: the pine needle scale (*Chionaspis pinifoliae*) and the pine scale (*C. heterophyllae*). Third is the oystershell scale (*Lepidosaphes ulmi*). The fall webworm (*Hyphantria cunea*) is fourth, and the bronze birch borer (*Agrilus anxius*) is fifth. Fletcher scale (*Lecanium fletcheri*) is sixth and the maple bladdergall mite (*Vasates quadripes*), seventh. Three insects tie for eighth place: honeysuckle aphid (*Hydaphis tartaricae*), Taxus mealybug (*Dysmicoccus wistariae*) and the black vine weevil (*Otiorrhynchus sulcatus*). Ninth and tenth places go to the apple aphid (*Aphis pomi*) and the yellownecked caterpillar (*Datana ministra*).

### Insects of Man and Animals

Medical Entomologist Dr. Michael Sinsko, Indiana State Board of Health, who keeps track of those things, provided figures on the insects of health importance. By 31 October there had been reported 7 confirmed cases of La Crosse encephalitis, 4 of Rocky Mountain spotted fever and one of Lyme disease. There have been cases of Lyme disease before in Indiana, but the victims could reasonably have contracted it outside Indiana. And even in this instance, although the victim never left the state, there is the possibility that the vectoring tick may have come from out of state. Arboviral cases were fewer this year than last. The water deficit accumulated over the past years reduces ponding and thus harborage for mosquito vectors. Tick numbers on the other hand appeared to be near the average.

Lice, primarily head lice, remain at high levels, while scabies, which tend to be cyclic, are on the down grade.

Both Dr. Sinsko and the entomologists at Purdue University noted that complaints about the baldfaced hornet (*Dolichovespula maculata*) were up this year while complaints about yellowjackets of the genus *Vespula* were fewer.

Counts have been made for 5 years of horn flies (*Haematobia irritans*) and face flies (*Musca autumnalis*) on a farm in Warren Co., and the figures have been made available by Cheryl Vail. Horn flies this year averaged 55.6/side during the 14 weeks that counts were made: this was slightly above the 5 year average. The high average of 98.8 was in 1981, the low, 23.3, in 1983. Face flies this year averaged 11.1/face over the 14 weeks, which is average. Earlier averages ranged from a high of 17.4 in 1982 to a low of 8 in 1984.

Some early season biting records: *Aedes canadensis canadensis* by 16 April (Jackson Co.), *A. sticticus* by 22 April (Dubois Co.), *A. vexans* by 23 April in Jackson Co. and *A. trivittatus* on a dog in Tippecanoe Co. by 1 May, *Chrysops callidus* in Morgan Co. by 14 May, *C. niger* in Johnson Co. by the same date, and *C. pikei* in Dubois Co. by 20 May.

### Beneficial Insects

The Animal and Plant Health Inspection Service (APHIS) of the USDA divided 8,000 *Dibrachoides dynastes* among Fulton, Henry, LaPorte, Lawrence and Ripley Counties, and 1,200 *Microctonus colesi* among Bartholomew, Fulton and Henry Counties. These are parasitoids of the alfalfa weevil. *Microctonus aethiopoidea*, a parasitoid of the adult weevil, was released in trace (i.e. below minimum release requirements) numbers in Bartholomew and Henry Counties. *M. colesi* had been collected in Harrison Co. before any releases, and in LaPorte Co. In summary, *M. aethiopoidea*, *Bathyplectes anurus*, *B. curculionis*, and *Anaphes* (= *Patasson*) *luna* (an egg parasite) are established, *M. colesi* is present and *Tetrastichus incertus* and *D. dynastes* have been released but never recovered.

The alfalfa weevil larval parasites *Bathyplectes anurus* and *B. curculionis* together parasitized about 13% of the weevils of the northern two-thirds of the state, 27% of the SW, and 61% of the SC (too few were reared from the SE district to be considered in this context.) (A total of 3679 larvae was reared.) One of the reasons for the higher rate in the southern third of the state is the presence of *B. anurus* which accounts for much of the parasitism in the southern districts but is rather uncommon elsewhere. Parasitism by both species is down from that of last year.

Adult alfalfa weevils were taken in numbers great enough to test parasite rates (only overwintered adults were tested). A total of 330 adults was reared and 46% proved to be parasitized by *Microctonus aethiopoulos*, with the northern third more heavily parasitized than the rest of the state.

*Coleomegilla maculata*, the convergent lady beetle (*Hippodamia convergens*), the thirteenspotted lady beetle (*H. tredecimpunctata*) and *Cycloneda sanguinea*, relatively common red lady beetles, are counted each year as they come to the 10 yellow sticky traps in a Tippecanoe Co. corn field. The most common of these, *C. maculata*, was taken 424 times, down from last year. The ratio of the 4 species this year was 57:5:0:38. The same ratio among the red coccinellids seen during the annual corn insect damage survey was 87:10:0:3. Only 119 *C. maculata* were seen.

In both instances no mention has been made of the red coccinellid newcomer, *Coccinella septempunctata*, the sevenspotted lady beetle. It was first officially reported in 1984, from Harrison Co., but Dr. N. M. Downie recently reported having collected it as early as 1977 from Porter Co. This is probably the more likely advent of the insect as it was widely reported this year from all over the state, but especially from the northern half of the state, where it was often collected in numbers. Beside the Harrison Co. find in 1984, later in the same year it was collected from Shelby Co. In 1985 it has been reported from the following counties as of 31 October: Adams, Allen, Blackford, Boone, Brown, Cass, Clay, Clinton, Daviess, DeKalb, Delaware, Elkhart, Gibson, Grant, Hamilton, Hancock, Hendricks, Henry, Howard, Huntington, Jackson, Jay, Johnson, Knox, Kosciusko, LaGrange, Lake, LaPorte, Madison, Marion, Marshall, Morgan, Newton, Noble, Putnam, Randolph, St. Joseph, Starke, Steuben, Tippecanoe, Tipton, Wabash, Warren, Wayne, Wells, White, and Whitley. Together with earlier records from Harrison, Porter and Shelby counties, that's a total of 50 counties. The insect had previously been released in Michigan near Indiana's LaPorte Co., in Ohio near Wayne Co., and in Illinois near Warren Co., but it was never released in Indiana.