

Insects and Other Arthropods of Economic Importance in Indiana in 1984

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Introduction

The winter of 1983-1984 was harsh. In addition to depressed temperatures—a minus 29 degrees F. was recorded on 24 December in Hobart and the same temperature was recorded in English on 21 January—there was often little snow cover. This combination probably reduced alfalfa weevil and Mexican bean beetle populations, the latter already drastically reduced by high temperatures in the summer of 1983.

The spring was cool and wet. Planting began in the northern third of the state the first week in May but was delayed until the third week in the southern half. Early in June drought conditions prevailed over much of the state, lasting for much of the summer; such rains as occurred were usually light and localized. Fortunately the summer temperatures were moderate, preventing a recurrence of the damage the crops, especially corn, suffered in 1983.

Other factors affected this year's crops. According to Indiana Weekly Weather and Crops (which provided most of the weather information above) 41% of the corn ground and 46% of the soybean ground was prepared by plowing, 45% and 46% were conservation tillage, and 14% of the corn and 8% of the soybeans were planted no-till. An estimated 6,000,000 acres of corn and 4,200,000 acres of soybeans were planted.

Corn and Small Grains

The western corn rootworm (*Diabrotica virgifera*) is generally Indiana's most costly agricultural pest; an estimated 2,400,000 acres were treated in 1984 at a cost of \$24,000,000. As usual, not all of the treating was necessary and some untreated areas should have been. In 1983 the government, in an effort to reduce corn surpluses, offered growers grain if they reduced their corn acreages, the so-called payment-in-kind program. Forty percent of the acres normally planted to corn were taken out of production, incidentally reducing the acres producing corn rootworms. The average number of beetles/stalk, counted late July and early August in visits to 225 fields, was 0.97 in 1983; in 1984 the figure was 0.64, with district averages ranging from 0.43 to 0.87. Silk clipping rarely reached economic levels, if ever.

The first first-instar in a Tippecanoe Co. field regularly surveyed for this insect was collected on 8 June, not unusually late, and the first adult reported in the state was collected on 3 July in Parke Co., the normal date for its appearance.

Counts of the northern corn rootworm (*D. barberi*) averaged 0.07/stalk over the state, as determined by the survey described above.

The fall, 1983, corn survey put European corn borer (*Ostrinia nubilalis*) larvae at 84/100 stalks, the state average. Adults this year observed as early as 30 May in Knox Co., but were probably present earlier as second instar larvae were collected by 13 June in Jackson Co. The peak flight of the first generation moths to blacklight traps occurred before the middle of June, when corn averaged less than 15 inches. The second flight peaked the first 2 weeks of August, by which time most of the corn had silked. Flights were not large, at least by 1983 standards when daily catches in some traps exceeded 500 whereas this year's catches generally did not reach 300/week. The fall survey this year of 300 fields in 60 counties found the average number of live larvae to be 99/100 stalks, unevenly distributed. Most of the larger populations

were in the northern districts, which is normal, with 6 counties averaging more than 2 larvae/stalk. Only 1 county elsewhere—Jackson—averaged more than 2/stalk.

The disease crazy top was more common this year than in other years.

Minor pests in corn in 1984 were the following.

Corn leaf aphids (*Rhopalosiphum maidis*) did not build up to the high numbers expected with moisture stresses; they were present as usual but at non-economic numbers.

Billbugs (Undetermined) required treatment in a muck field of 90 acres in LaPorte Co.

Japanese beetles (*Popillia japonica*) were more common this year than last, and when that happens there are usually a few fields of corn that require treatment to prevent silk clipping. Most of this type of damage occurred in the NW and NC districts.

Black cutworm (*Agrotis ipsilon*) was infrequently reported from corn.

Grasshoppers (Several species) and yellow woollybears (*Diacrisia virginica*) were both more common than usual, and sometimes did conspicuous damage to corn at field edges either alone or in combination. The latter was occasionally responsible for serious silk clipping.

A survey of 385 certified seed fields in 62 counties in the spring of 1984 (conducted cooperatively by the Indiana Crop Improvement Association, the Agricultural Research Service of the USDA, and Purdue's Entomology Department) yielded the following data on the Hessian fly (*Mayetiola destructor*). The mean percent infested of all wheats surveyed—including wheats with no resistance to the fly—was 1.4; mean puparia/100 stems for the same set: 2. Both of these figures were increases over last year. The most commonly planted wheat with H6 resistance—Caldwell—was infested at the rate of only 0.6%; all cultivars with H6 resistance together averaged only 0.4% infested. Those with no sources of resistance averaged 7.2% infested.

The English grain aphid (*Sitobion avenae*) was common on small grains this year in the southern half of the state, far outnumbering the bird-cherry oat aphid (*Rhopalosiphum padi*). Neither was considered economic.

Cereal leaf beetle (*Oulema melanopus*) normally occurs in numbers only in Harrison Co. This year adults were first swept from alfalfa on 25 April, an egg was seen on barley on 1 May and early instars on 22 May, in trace numbers only, and only in Harrison Co.

Forage Legumes and Soybeans

Aside from occasional, and usually field-edge, feeding by grasshoppers and/or yellow woollybears, soybeans were relatively free from insect attack this year. Mexican bean beetle (*Epilachna varivestis*) adults are usually swept early from alfalfa. This year none was. Adults were rare, and immatures were seen only in a few fields in Jennings Co. in soybeans. Green cloverworms (*Plathypena scabra*) were often present, but only in trace numbers. Japanese beetles were sometimes numerous enough to do conspicuous but non-economic feeding not confined to the northern districts as silk feeding is. A soybean leafminer (*Odontota horni*) was present in trace numbers in soybeans in the NW district. Bean leaf beetles (*Cerotoma trifurcata*) were swept from alfalfa about mid-May at the rate of 40-60/100 sweeps in the WC district, and they were occasionally numerous in soybeans later. They were seldom at economic numbers in soybeans.

The alfalfa weevil (*Hypera postica*) was rarely a problem in alfalfa even in the southern third of the state. This was due both to good growth, enabling the plants to tolerate more feeding, and low numbers of larvae. At early bud stage (about 15 May) when alfalfa averaged 70 or more centimeters, larvae averaged fewer than 1.5/stem in the SW, 0.5/stem (as a result of disease) in the SC district. The cold, open winter may have reduced adult numbers, and it certainly destroyed all the fall-laid eggs.

Potato leafhopper (*Empoasca fabae*), usually the most serious pest of alfalfa in Indiana, was rarely a problem during 1984. One estimate places treated acreage at about 10% in the northern alfalfa-growing belt, much less in the southern. Only the third cutting was affected.

Eggs of the variegated cutworm (*Peridroma saucia*) were first observed on white plastic flags in alfalfa in Harrison Co. on 1 May. Since they hatched the next day they must have been deposited several days before. They were not there 7 days earlier. They have been collected as early as 7 April in the same field. The species occasionally builds up in alfalfa and is often a garden pest.

Vegetable Insects

Garden insects were generally at lower-than-usual levels in 1984. Exceptions follow. The European corn borer was a serious pest in sweet corn, in beans grown for processing and in green peppers. There was an instance of this species also in onion tops, which is rather unusual. The corn earworm (*Heliothis zea*) was a serious pest in late sweet corn as well as in tomatoes. A pheromone trap in Tippecanoe Co. at its peak caught 227 adults in 1 night.

Apparently it was a good year for the squash bug (*Anasa tristis*) and problems with squash vine borer (*Melittia satyriniformis*) have remained fairly constant.

Fruit Insects

All of the data on fruit tree insects, unless otherwise noted, are based on catches in 5 pheromone traps in Knox Co. operated by Thomas Mouzin of the USDA. The year's total catch is used to compare 1984 with previous years—not the best system but the best available.

Codling moth (*Cydia pomonella*) catches of 245 were half those of the 8-year mean (1976-1983) of 513, with weak peaks at the end of May and the end of August.

The 1984 total of 971 male redbanded leafroller (*Argyrotaenia velutinana*) was less than the 8-year average of 1429, with peaks in mid-April, mid- to end of June and mid-August.

The 1984 catch of 307 obliquebanded leafroller (*Choristoneura rosaceana*) was near the 7-year average of 316, with a peak at mid-June and a lesser at the end of September.

The catch of 220 leafminers (*Phyllonorycter* sp.) is double the 4-year average of 100. Knox Co. totals do not however reflect conditions occurring in the rest of the state. Economic or near economic infestations were seen in the NE counties of LaGrange and Adams, the EC counties of Wayne and Delaware, and the C district county of Madison. Adults in those counties were in flight the latter half of July.

Oriental fruit moth (*Grapholitha molesta*) catches of 1372 were somewhat smaller than the 8-year mean of 1748. Larger numbers flew at the end of May, most of July and at the end of August and the beginning of September.

This is only the fourth year that pheromones have been used in Knox Co. (rather than live females) to attract males of the lesser peachtree borers (*Synanthedon pictipes*). The 3-year average of 1849 was exceeded by this year's 2045. Peaks occurred in mid-June, mid-July and late August-early September.

The peachtree borer (*Synanthedon exitiosa*) catch of 289 exceeds the 5-year average of 191; there was a mid-July peak.

Trapping of San Jose scale (*Quadraspidotus perniciosus*) was begun in 1982 when 143 were collected. Half that many came in 1983. This year 1000-plus (too many to be counted accurately) came from 9-15 July, and 1066 were collected from 8-14 Oct. This year's total came to 3079.

Insects of Ornamental Trees and Shrubs

The ten insects most frequently seen by nursery inspectors during 1984—using data supplied by the office of the State Entomologist—are listed here. 1. Fall webworm, (*Hyphantria cunea*); 2. Japanese beetle; 3. Bronze birch borer, (*Agrilus anxius*); 4. Honeysuckle aphid, (*Hydaphis tartaricae*); 5. Fletcher scale; (*Lecanium fletcheri*); 6. Yellownecked caterpillar, (*Datana ministra*); 7. Maple bladder gall mite, (*Vasates quadripes*); 8. Oystershell scale, (*Lepidosaphes ulmi*); 9. Mimosa webworm, (*Homadula anisocentra*), and 10. Euonymus scale, (*Unaspis euonymi*).

In general, the State Entomologist noted that reports of both aphids and borers were nearly double those of 1983. Apparently, the cool wet spring brought forth enough new growth for the aphids to flourish. He attributed the increase of borers to the stresses on trees caused by the drought of 1983 and the harsh winters that bracketed it.

Man and Animals

The following generalizations were provided by Medical Entomologist Michael Sinsko, Indiana State Board of Health, and they reflect the situation as of 31 October. Mosquito activity at best was spotty, with total activity down again due to a paucity of breeding sites. There were no reported cases of St. Louis encephalitis, 11 cases of LaCross encephalitis (about average) and no cases of eastern equine encephalitis. There were 5 confirmed cases of Rocky Mountain spotted fever.

More difficult to categorize are several pest arthropods. Fleas, especially cat fleas (*Ctenocephalides felis*) had a good year. Head lice (*Pediculus humanus capitis*) were again common and scabies mites (*Sarcoptes scabiei* var. *hominis*) infestations seem to have reached a plateau. House fly activity is particularly difficult to estimate. Local conditions—the presence of a poultry operation for instance—may be a major nuisance in a year otherwise not noted for flies. Best estimates classify 1984 as an average year for house flies.

Judging from the number of complaints about them it must have been a good year for yellow jackets.

Cheryl Towell provided the following. Over the fly season this year, face flies (*Musca autumnalis*) averaged 7/face, about half the average during the last 2 years. Horn flies (*Haematobia irritans*) were about average at 28/side.

Beneficial Insects

Adult alfalfa weevils were difficult to obtain in large enough numbers to estimate accurately the amount of parasitization by *Microctonus aethiopoides*, our most common adult parasite. More than 2300 larvae were reared, however, to estimate the activity of *Bathyplectes anurus* and *B. curculionis*. On a district basis, the NC averaged 7%, the NE, 14 and the WC 8%, almost entirely by *B. curculionis*. *B. anurus* is known to be present all over the state; it is not known why it isn't more common at least in the WC district, which is surveyed frequently enough. The SW average totalled 44%, 19% due to *B. anurus*, 25% to *curculionis*. The SC average was 61%, 56% due to *anurus* and only 5% due to *curculionis*. The 28% due to *anurus* and 18% due to *curculionis* adds up to 46% parasitized in the SE district. Sampling was done on a weekly basis when larvae were present in sufficient numbers to be readily swept, especially in the WC, the SW and the SC districts. *B. anurus* is the more common under normal circumstances in the earliest samples, *curculionis* in the later. The SC is exceptional, and is probably due to the presence of disease. The fungus *Erynia* sp. especially in Harrison Co. during the last 4 or 5 years has decimated weevil larval populations, especially the last to hatch. In summary, the state average including both

species and all surveyed districts (the NW, C and EC districts were not surveyed) was 43.5%.

The red coccinellids collected on 10 sticky traps in a Tippecanoe Co. corn field are counted each year as a population estimate. The most commonly collected is *Coleomegilla maculata*; this year 538 were collected, the most ever collected, and that does not cover the hibernation flight which sometimes occurs (the corn was harvested too early to permit that count). The ratio of *Coleomegilla maculata*:*Hippodamia convergens*:*H. tredecimpunctata*:*Cycloneda sanguinea* this year was 84:9:0:7. The same ratio among the coccinellids observed during the fall corn insect survey was 96:4:0:0, based on seeing only 156 *C. maculata* on the 7500 stalks surveyed.

