

# Insects and Other Arthropods of Economic Importance in Indiana in 1959<sup>1</sup>

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Weather conditions in Indiana which influence insect occurrence and abundance were in sharp contrast to those experienced in 1957 and 1958. The spring months were near normal, characterized by plentiful rainfall and temperatures only slightly above the averages expected. Insect hatching and emergence responded normally to these early conditions. Early in July, drought conditions began to develop in central and northern Indiana and continued through August with accompanying high temperatures; humidity was high. September moisture conditions improved and most agricultural crops matured successfully although earlier than is customary. In general the climatic conditions favored most economically important insects in this region. One new pest, the cattle face fly, appeared in large numbers and is described below.

A review of the records and abundance of certain species follows:

## Field and Crop Insects

Corn earworm [*Heliothis zea* (Boddie)]. Tippecanoe County: According to light trap collections, corn earworm moths were about five times more numerous in 1959 than in 1958. From June 12 to September 20, 3,636 moths were collected at a single light trap as compared to 752 in 1958. The peak of collections in both years was during the week of September 4-10, 2,307 moths being collected during this period in 1959 and 368 in 1958. Sweet corn silking during the early part of September was very heavily attacked with 90% infested ears. Lawrence County: Moths were about 2½ times more abundant at light traps in 1959 than in 1958. However, only about one-tenth as many were collected in this county as in Tippecanoe. The current fall survey of field corn showed a 60% increase over 1958 with an average infestation of 28%. Heaviest infestations, ranging up to 71%, occurred in the southern tier of counties.

European corn borer [*Pyrausta nubilalis* (Hbn.)]. Tippecanoe County: The number of first generation moths caught at light traps was about the same in 1958 and 1959, but the infestation in early sweet corn was about twice as great in 1959 as in 1958. The August and September collections of moths were about twice as large in 1959 as in 1958. In 1958 there were two distinct periods of moth flight—May 30 to July 2 and July 31 to September 3. In 1959 there were three distinct periods of flight—May 24 to June 17, July 16 to August 13, and August 27 through September 30. These distinct periods of flight seem to indicate that there were three generations of the corn borer in Tippecanoe County this year. Lawrence County: There were about three times as many moths collected at light traps in 1958 as in 1959. In both years there seemed to be three generations per year. The 1959 fall survey showed a 50% increase in the average

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number of borers per 100 corn plants (65) although the per cent of plants remained constant with last year. Greatest infestation occurred in the north-central and northeast areas of Indiana where the maximum number of borers per infested plant was 2.7.

Armyworm [*Pseudaletia unipuncta* (Haw.)]. Moths were moderately abundant in late spring, but larval damage was very moderate. An abundance of grass at that season of the year probably prevented the development of an economic problem.

Fall armyworm [*Laphygma frugiperda* (J. E. Smith)] was of little economic importance in Indiana in 1959. Light trap catches were low and reports of field observations showed little or no infestation in field corn. Extremely late home garden sweet corn was severely infested in Tippecanoe County. The larvae worked in the whorl, destroying the bud.

Common stalk borer [*Papaipema nebris* (Guenee)]. These larvae caused damage to early corn, especially in fields along weedy fence rows. Their occurrence was general over southern, western and northern counties.

Cutworms—Several species were common in the spring with significant losses reported to corn and mint. The principal species on corn, the black cutworm, *Agrotis ypsilon* (Rott.), was reported from many sections of the state. Corn planted directly in newly plowed clover fields was the most seriously damaged. Control in early cultivated corn was relatively difficult.

Webworms [*Nomophila noctuella* (D. and S.)] on corn planted in fields following sod were reported as important economically from many areas of the state.

Wireworms—Because of a low point in the population cycles of these insects and because of the increased number of treated fields, wireworms were not important this season.

Thrips on corn—A severe infestation of thrips on late planted corn occurred in Clay County, Indiana in late May and early June. Visual counts on leaves of corn 8-12 inches tall averaged 75-150 insects per leaf. Infested corn lacked the glossy leaf appearance and was a grayish green color. Leaves were flaccid to the touch. Several hundred acres were treated, but locally heavy rains also reduced the populations and the corn plants made a normal recovery and outgrew the injury.

Corn rootworms—Beetles of both the northern [*Diabrotica longicornis* (Say)] and the southern [*D. undecimpunctata howardi* Barber] species were numerous during July and August. Some scattered reports were received on root injury to corn.

Corn leaf aphid [*Rhopalosiphum maidis* (Fitch.)]. Infestations were the heaviest recorded in recent years. Nubbins and barrenness were extensive with greatest losses in the northern tier of counties and through the north-central part of the state. Average aphid infestations in these regions ranged from 36-80%. From the north to south, the most northern fourth averaged 4.5% loss, the next fourth, 11.2%, followed by 3.3% with no measurable loss in the most extreme southern fourth.

Japanese beetle [*Popillia japonica* (Newm.)]. Although many new locations were found this past summer, populations in established areas were lower than for several years. In Newton County, adult beetles were

scarce on smartweeds in the area where they have been abundant in past years. Damage to soybeans was slight and probably of no economic importance. High temperatures during July and August and lack of soil moisture possibly reduced beetle activity, especially egg-laying of females. By October 1, most larvae were still in the first and second instar. New locations include Seymour, Montezuma, and Crawfordsville.

Sorghum webworm [*Celama sorghiella* (Riley)]. This insect was not as abundant in Indiana this year as compared with last year, due principally to better growing conditions and more uniform development of plants. One 40 acre field of late sorghum in Posey County averaged 80% of the heads infested with 5-6 larvae per head. Adults were collected in Daviess County in mid-September.

The corn earworm infested sorghum rather severely with evidence of damage in most of the heads examined in Knox County.

Tomato fruitworm [*Heliothis zea* (Boddie)]. This insect was locally severe about August 1 when tomatoes were ripening but before corn was in silk. As soon as silks appeared, infestation of tomatoes decreased markedly. Moths were present in sizable numbers through late summer but no serious infestation of tomatoes occurred.

The fruit fly [*Drosophila melanogaster* Meig.] in tomato fields ranged from extremely low populations about August 10 to extremely high populations by Labor Day, September 7. This period was characterized by high temperatures and high humidity.

Tobacco hornworm [*Protoparce sexta* (Johan.)] on tomato. Second generation populations of this insect were abnormally high in southeast and south-central Indiana. Parasitism by *Apanteles congregatus* (Say) ranged from 50-100 per cent.

Bean leaf beetle [*Cerotoma trifurcata* (Forst)]. Contrary to the trend in recent years, this insect did not increase on soybeans and was not considered economically important.

Cucumber beetles—The striped species [*Diabrotica vittata* (F.)] was common early in the season, but later the spotted beetle [*D. undecimpunctata howardi* Barber] became exceedingly abundant and destructive. The spotted beetle injured various cucurbits, green beans, soybeans, and many varieties of flowers.

Onion maggot [*Hylema antiqua* (Meig.)]. Infestations of this pest were very low in 1959. This is the usual condition in Indiana. Maggots resistant to chlorinated hydrocarbon insecticides occur only in Lake County.

Aphids on potatoes—Several potato growers reported aphids on their crops. The species involved were *Myzus persicae* (Sulz.) and *Macrosiphum solanifolii* (Ashm.).

Flea beetles on potatoes—These pests were abundant on potatoes this year and repeated applications of the proper insecticide were necessary to hold them in check. In two fields, even dieldrin failed to give the expected control.

Flea beetles on turnips—Larvae of the flea beetle (apparently *Systema blanda* Welsh.) caused heavy losses to turnips in late October in central Indiana.

Mint looper [*Rachiplusia ou* (Guerin)]. The population of this pest was quite low this summer. A few fields had some damage in mid-July, about a month later than normal.

Two-spotted mite [*Tetranychus telarius* (L.)]. This pest was serious on melons in southern Indiana in mid-July and was abundant on mint grown on lighter soils in early August. In late summer, it became abundant on many flowering plants.

Meadow spittlebug [*Philaenus leucophthalmus* (L.)]. The spittlebug was the most serious insect problem on alfalfa and clover in Indiana during the 1959 season. It is believed that the infestation was the heaviest ever observed in the state. Most serious infestations occurred in the eastern part of the state. In the area south of Richmond and east of Shelbyville extending to the Ohio River, the infestations were as high as 7.2 nymphs per clover stem. The total state loss was estimated at \$12,000,000.

Potato leafhopper [*Empoasca fabae* Harris] developed very heavy and severe infestations on the second cutting of alfalfa during the month of July. Losses were severe with considerable yellowing and stunting of the crop. In the case of potatoes, commercial growers had to repeat control operations at weekly intervals to contain the hoppers. Serious damage to garden beans was also observed.

Spotted alfalfa aphid [*Therioaphis maculata* (Buckton)] was found in Indiana for the first time in two years on September 22. Infestations were very low, although specimens were collected in the Wabash River bottom from Vincennes south and along the Ohio River extending from Mount Vernon east to Clark County. This insect, which has not succeeded in overwintering in Indiana, followed the same pattern of infestation as noted previously, that of moving up the Wabash and Ohio River valleys. Climatic conditions favored the re-entry of this insect into the state.

Clover head caterpillar [*Grapholitha interstinctana* (Clem.)] was again abundant on red clover in southeastern Indiana, particularly in Decatur, Rush and Shelby counties. Several other species of lepidopterous caterpillars were unusually abundant on legumes during the latter part of the summer in the southern third of the state. These were the green cloverworm [*Plathypena scabra* (F.)], the clover looper [*Caenurgina crassiuscula* (Haw.)], the garden webworm [*Loxostege similalis* (Guen.)], the alfalfa caterpillar [*Colias philodice eurytheme* Bdv.] and the corn earworm [*Heliothis zea* (Boddie)].

Plant bugs—Populations of the tarnished plant bug [*Lygus lineolaris* (P. de B.)], the rapid plant bug [*Adelphocoris rapidus* (Say)] and the alfalfa plant bug [*Adelphocoris lineolatus* (Goeze)] were widespread and quite abundant over the state.

Hessian fly [*Phytophaga destructor* (Say)]. Infestations by this insect have been low for several years but are now on the increase, particularly in the eastern part of the state. Farmers in the Delaware and Randolph County areas had some economic loss and experimental plots showed losses as high as 8–10 bushels of wheat per acre. Fall infestations in the same area were significant.

Clover leaf weevil [*Hypera punctata* (F.)], which is normally a problem on red clover and alfalfa in the early spring, was of much less significance in 1959.

Grasshoppers—These insects were non-economic to light in abundance throughout the state. Damage to crops occurred only in extremely localized areas. Principal species: *Melanoplus femur-rubrum* (De G.). Considerable damage occurred in some tomato fields with the additional factor of feeding scars being excellent oviposition sites for *Drosophila* spp.

#### Fruit Insects

Codling moth [*Carpocapsa pomonella* (L.)]. Populations of this insect were generally low during 1959.

Oriental fruit moth [*Grapholitha molesta* (Busck)] was present in low numbers, except for a few orchards in Knox County.

Apple maggot [*Rhagoletis pomonella* (Walsh)]. This insect emerged over a prolonged period and was present in large numbers in untreated orchards in the northern half of the state. Flies were trapped as far south as Orleans.

Rosy apple aphid [*Anuraphis roseus* Baker]. No major injury by this insect was observed during the year.

Apple aphid [*Aphis pomi* DeG.] was abundant in late March and during late May. The wet, cool weather caused troublesome populations in some orchards, especially those with young, non-bearing trees. During early June, several infestations around Vincennes needed control.

Forbes scale [*Aspidiotus forbesi* Johns.]. Infestations were generally light throughout the state with a few orchards showing high populations in mid-May.

Mite populations were high this year. Weather conditions, particularly during May and June, were ideal for mite build-ups and thorough control measures were needed to keep them down. European red mite [*Metatetranychus ulmi* (Koch)] was dominant until late June, but the two-spotted spider mite [*Tetranychus telarius* (L.)] became the more serious problem for most peach and apple growers from the first week of July on.

#### Tobacco Insects

Tobacco hornworm [*Protoparce sexta* (Johan.)]. Tippecanoe County: According to light trap records, there were about six times as many moths in 1959 as in 1958. There were two distinct generations in 1959 as compared to one in 1958. Damage to untreated tomatoes was severe in 1959 both from the viewpoint of fruit injury and defoliation. Lawrence County: According to light trap records, the first generation was twice as abundant in 1958 as in 1959. The second generation was slightly more abundant in 1959. Jefferson County: Injury to untreated fields of tobacco was about the same in 1959 as in 1958. However, the first generation injury was more severe in 1959 due to the plants being small at the time of infestation. Many growers whose fields were not protected by light traps had to apply insecticides once or twice during the season.

Tomato hornworm [*Protoparce quinquemaculata* (Haw.)]. Tippecanoe County: According to light trap catches, moths were about three times as abundant in 1959 as in 1958. Larvae were common in untreated tomato fields late in season but not as abundant as *P. sexta*. Lawrence County: First generation moths were about twice as abundant at light traps in 1958 as in 1959. Abundance of second generation moths was about

the same in the two years. Jefferson County: In 1959, as in other years, very few *P. quinquemaculata* larvae were found feeding on tobacco.

Tobacco flea beetle [*Epitrix hirtipennis* (Melsh.)] was not economically important this year.

#### Tree and Shrub Insects

The Zimmerman pine moth [*Dioryctria zimmermani* (Grote)] continues to be important in pine plantings with infestations in untreated areas as high as 30 per cent. This insect was discovered in white pine for the first time in Indiana (LaPorte County).

European pine shoot moth [*Rhyacionia buoliana* (Schiff.)] larvae were abundant throughout northern Indiana in May and early June. The most southern penetration of this insect in the state has now been recorded from DuBois County in Scotch pine.

Bagworms [*Thyridopteryx ephemeraeformis* (Haw.)] were not as common in 1959 as in the recent past, but they continued to be important in some areas on both evergreens and deciduous plants. The decrease is attributed to severe winter conditions.

The Mimosa webworm (*Homadaula albizziae* Clark) continues to spread throughout the state on honey locust trees. It was reported from Lake County, a point marking its farthest northward penetration in the state. The insect completely defoliated most honey locust trees in the southern part of the state in August and September.

The elm leaf beetle [*Galerucella zanthomelaena* (Schr.)] was exceptionally heavy on Chinese elms from Lafayette south. Many trees were completely brown as a result of larval feeding in August.

The Columbian timber beetle (*Corthylus columbianus* Hopk.) was found heavily infesting soft maple, oak and sycamore in the southwestern part of Indiana. The fungus associated with this ambrosia beetle stains the wood and ruins the trees for lumber. This is considered a serious economic situation.

A leafroller (*Tortrix pallorana* Rob.) was common in 2-3 year old pine plantations in northern Indiana. It frequently ruins Christmas trees for commercial production.

The smaller European elm bark beetle [*Scolytus multistriatus* (Marsh)], the common vector of Dutch elm disease, was noted almost continuously from May 20 to September 23, indicating an overlapping of generations.

Two galls, the succulent oak gall (*Andricus palustris* O. S.) and the oak wool sower (*Andricus seminator* Harr.), were unusually abundant on pin and white oaks respectively.

Two spittlebugs (*Clastoptera proteus nigricollis* Fitch and *Clastoptera obtusa* Say) were abundant on dogwood and ironwood trees in the Lafayette area in early June.

Fletcher's scale (*Lecanium fletcheri* Ckll.) was unusually abundant on yews, junipers and arbor vitae throughout the state.

Cottony maple scale [*Pulvinaria innumerabilis* (Rathv.)] occurred in unusual numbers on silver maples throughout the state.

Lecanium scales of several species were unusually abundant on hickory, oak and other shade and ornamental trees.

### Livestock Insects

House fly (*Musca domestica* L.). This insect continues as the primary insect pest of dairy barns and homes. Farms where sanitary procedures were not rigidly pursued had enormous populations of flies late in the season.

Horn fly [*Siphona irritans* (L.)] was present in moderate numbers throughout the summer on untreated cattle. Numbers ranging up to 2000 on bulls in early June.

Horse flies (*Tabanus atratus* Fab. and *T. sulcifrons* Marquart) were extremely abundant in the northeastern section of the state during the last two weeks in July and the first two weeks in August. Counts average 25 "strikes" per minute.

The "face fly" (*Musca autumnalis* De G.). This fly was reported for the first time in the midwest in Randolph County, Indiana, on June 3. The new pest spread rapidly and generally over the state and caused extreme harassment to cattle in the northern half of the state. It also entered houses in this area. The fly feeds on secretions of the nostrils and eyes of animals, causing severe eye irritation. It is anticipated that the adult will overwinter in houses and buildings.

### Pests of Men and Households

Cat flea [*Ctenocephalides felis* (Bouché)]. There were numerous inquiries concerning the control of this insect from various portions of the state. Many of the inquiries were accompanied by the comment that chlordane had been tried as a means of control and had been ineffective.

Subterranean termite [*Reticulitermes flavipes* (Kollar)]. Inquiries concerning this insect have been numerous. Most of these inquiries involve remedial measures, but there seems to be a slight increase in the interest of the general public concerning pre-construction treatment.

Ticks—The brown dog tick [*Rhipicephalus sanguineus* (Latr.)] was rather numerous early in the summer but was not quite so numerous after about the middle of July. This was also true of reports on the American dog tick [*Dermacentor variabilis* (Say)].

Black carpet beetle [*Attagenus piceus* (Olivier)]. Numerous larvae of this insect have been submitted during the year. A lesser number of *Anthrenus* spp. have been received.

The elm leaf beetle [*Galerucella xanthomelaena* (Schr.)] was quite troublesome as an occasional household invader during the fall.

Field crickets (*Nemobius* sp.) were very abundant in late July and throughout August and were the subject of numerous complaints. Motels especially were troubled by the nocturnal invasions of these insects.

Swallow bug (*Cimexopsis nyctalis* List). The first Indiana record of this insect was from Rush County this summer. This insect is a parasite of the chimney swift, *Chaetura pelagica* (Linnaeus), and although it very likely has been a part of the Indiana fauna for some time, it had not been reported previously.

German cockroach [*Blattella germanica* (L.)]. This structural pest continues to increase both in number and importance due primarily to its resistance to chlorinated hydrocarbon insecticides and associated changes in its habits.

Hover flies (*Syrphidae*) of several species were very annoying to persons in late summer.

#### Miscellaneous Insects

A variety of wood-boring insects, some of these usually considered to be uncommon and insignificant, were observed in some numbers.

A xiphydriid (*Xiphydria maculata* Say) was especially numerous and oviposition was heavy in storm-damaged limbs of silver maple and hackberry in the Lafayette area.

The pigeon tremex (*Tremex columba* L.) was more numerous than in past years, especially so at LaPorte, where it was observed on dead and dying sugar maple and American elm.

The hackberry engraver (*Scolytus muticus* Say) emerged in numbers from storm damaged hackberry at Lafayette.

The currant borer [*Ramosia tipuliformis* (Clerck)] killed every currant plant in a shipment received from a mail order house by a Lafayette resident. The infestation originated during or prior to shipment.

The bald-faced hornet [*Vespula maculata* (L.)] and a yellow-jacket [*Vespula maculifrons* (Buysson)] increased their nesting activities in residential areas and were the sources of numerous inquiries. One death, at Martinsville, was attributed to multiple stings.

Many inquiries were received concerning a large leafhopper [*Oncometopia undata* (Fabr.)] which occurred in numbers on many plants.

A fungus [*Entomophthora muscae* (Cohn) Fresenius] attacked a number of species of flies of different families resulting in quite spectacular assemblages of dead flies.

A millipede [*Pleuroloma butleri* (McNeill)] was reported cutting off soybeans at Elnora.

Mayflies occurred in such tremendous numbers in the Bedford area as to cause several highway accidents.

The insect situation in Indiana returned to what may be described as essentially normal due to a combination of hot, humid weather and adequate crop production.