INSECTS OF INDIANA FOR 1934

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The past season has been one of unusually abnormal weather, with high temperatures, drying winds, and low rainfall. A study of the accompanying table (Table I) will impress one with these abnormal conditions. The temperature was above normal each month from April to August, inclusive, while the precipitation was below normal during the winter and every month of the year until August. These conditions were less significant in the southwestern region of the state, where fairly good conditions for growing crops prevailed. The drought conditions occurring over the greater part of the state were favorable to the development of some insects and unfavorable to plant growth, this combination resulting in large losses. On the other hand it must be noted that these conditions were unfavorable to certain other insects, notably the European corn borer.

Field Crop Insects

The chinch bug (*Blissus leucopterus* Say) was unquestionably the outstanding insect pest of the year. The winter of 1933-34 was favorable for successful hibernation, and the localized outbreaks of 1933, augmented by notable spread from the heavily infested areas in Illinois, provided an abundance of bugs early in the season. With favorable weather from the time the bugs left their winter quarters, they increased to enormous numbers, becoming noticeably abundant in 50 counties in the northern two-thirds of the state, from Knox County on the western border, diagonally across the state to Randolph County on the eastern border. Recognizing the seriousness of the chinch bug menace in the central west from Kansas and Nebraska on the west to Ohio on the east, and the financial status of many of the farmers in this area, Congress appropriated $1,000,000.00 for the purchase of creosote for distribution to farmers for use in the construction of barriers to protect the corn crop. As a result we were able to provide demonstrations and secure creosote without cost to the farmers, without which huge losses would have resulted. During the initial stages of the campaign, two representatives of the Entomology Department of the Purdue University Agricultural Experiment Station and two additional entomologists, gave demonstrations in the 50 infested counties. A total of 111 demonstrations were conducted with a total attendance of 11,642, an average of 105 at each demonstration. A check later in the season showed that where farmers attended demonstrations and followed the recommendations, the bugs were well controlled and corn protected; but where farmers for some reason or another failed to follow prescribed methods of using creosote, the results were not so good. From the congressional appropriation, farmers of Indiana received 534,187 gallons of creosote.

TABLE I. Comparative Monthly Weather Data for Indiana, 1934

Month		Temperature State Mean °F	Temperature Departure from Normal °F	Precipitation State Average Inches	Precipitation Departure from Normal Inches	Number of days Clear	Partly Cloudy	Cloudy
1933 November	Normal	42.3		3.06		11	7	12
	1933	40.8	—1.5	1.13	—1.93	10	8	12
December	Normal	32.3		2.90		9	7	15
	1933	36.2	+3.9	2.26	—0.64	6	7	18
1934 January	Normal	29.1		3.10		10	7	14
	1934	34.4	+5.3	1.38	—1.72	9	6	16
February	Normal	30.4		2.43		9	7	12
	1934	24.6	—5.8	0.85	—1.58	11	8	9
March	Normal	40.4		3.73		10	8	13
	1934	36.8	—3.6	2.97	—0.76	12	9	10
April	Normal	51.9		3.51		11	9	10
	1934	52.0	—0.1	1.66	—1.85	13	9	8
May	Normal	62.2		4.00		12	10	9
	1934	66.4	+4.2	1.14	—2.86	20	7	4
June	Normal	71.5		3.81		14	10	6
	1934	77.5	+6.0	3.55	—0.26	15	12	3
July	Normal	75.5		3.34		16	10	5
	1934	80.6	+5.1	2.42	—0.92	18	10	3
August	Normal	73.2		3.36		15	10	6
	1934	74.2	+1.0	4.68	+1.29	13	12	6
September	Normal	67.2		3.41		15	8	7
	1934	66.7	—0.5	5.67	+2.26	11	10	9
October	Normal	54.7		2.74		15	7	9
	1934	56.8	+2.1	0.53	—2.21	20	7	4

This was insufficient to meet all the needs, but, through the cooperation of the Governor, we were able to secure an additional 145,924 gallons from the State-Federal Drought Relief Fund, which was ample for our needs. As a result 7,944 miles of creosote barrier were maintained at a cost for material of approximately $100,000.00 and corn at a value of $1,312,500.00 was saved which otherwise would have been destroyed by the insects had the creosote not been available. It was further estimated that corn and small grain to the value of $1,653,105.00 were destroyed by the bugs, not including the damage by the drought, and that perhaps half of this loss could have been prevented had all farmers using creosote followed directions and had the creosote been available 10 days earlier.

The prospects for 1935 are all in favor of the chinch bug. In spite of the downpour of rains in August the bugs are still abundant. The rains undoubtedly destroyed large numbers of the bugs, and the fact that they are now more abundant in winter quarters in most localities and more widely distributed than a year ago, can only be explained by the enormous numbers of the bugs at the time of the August rains, and that in spite of a high mortality, large numbers survived. We have every assurance that the bugs are more abundant than a year ago, with the exception of the northwestern corner of the state, and that we can expect 90 per cent of the bugs now in winter quarters to come through the winter safely. The only conditions which are likely to check the pests are driving rains, or continuous rainy weather for a longer period, during the last two weeks in May and the first three weeks in June.

The free distribution of creosote for chinch bug control, like the free distribution of poisoned bran bait to the farmers of the grasshopper infested regions west of the Mississippi River, is a departure from the prescribed routine of the federal government. Under the present economic conditions it seems to have been justifiable and productive of much good and to have strengthened the morale of farmers.

Hessian fly (*Phytophaga destructor* Say) was not conspicuous in the fall of 1933, and summer scouting in 1934 indicated that there was little infestation in Indiana, excepting in the east central counties, including Wells, Adams, Blackford, Jay, Madison, Delaware, and Randolph, where 30 per cent of the straws were infested. In general the Hessian fly is at a low ebb in Indiana with little prospect of an outbreak this fall or next spring unless weather conditions should be extremely favorable to fly activity.

The corn earworm (*Heliothis obsoleta* Fab.) was another corn pest which thrived during 1934. From June 27 until frost numerous reports were received from all sections of Indiana, indicating an abnormal abundance of earworms. The reports first came from southern Indiana but soon extended to the northernmost counties. Corn was the crop first reported as being attacked, but as the weeks rolled by numerous reports were received of injury to tomatoes, green peppers, and soybeans, later entering greenhouses and attacking the buds of geranium, chrysanthemums and other flowering plants. One report from LaPorte County told of serious injury to mint. This insect is a more or less regular pest of late market and canning corn, but only about every 10 years is it as serious and widespread as in 1934. Farmers of Indiana can do little to protect their crops inasmuch as the species seldom winters over in Indiana, excepting possibly in the extreme southern portions, which accounts for the fact that it is seldom observed until mid-season or later.

The two-lined grasshopper (*Melanoplus bivittatus* Say) was a serious pest of corn and soybeans in a large and important soybean area in Vanderburgh County. They were first reported July 21, at which time the nymphs were quite small. A personal investigation in July revealed the following facts: Grasshoppers originated in fields which were in soybeans last year; the infested area is land overflowed by the Ohio River each spring; this soybean stubble ground is not usually plowed before the last of April; grasshoppers have been annual pests

ever since soybeans became a major crop. From these and other observations it is believed that eggs are laid in soybean stubble.

The pea aphid (*Macrosiphum pisi* Kalt.) seriously damaged alfalfa in Greene County April 20. Other reports, evidently referring to this insect, were received from several other southern Indiana localities.

The grain aphid (*M. granarium* Kirb.) was abundant in the heads of wheat, the first two weeks in June in southern Indiana but ladybird beetles soon cleaned up the infestations.

Pale striped flea beetle (*Systena blanda* Melsh.) was unusually abundant and destructive to corn in the northern half of the state, the majority of reports coming in June 6 to 14. Destruction amounting to 30 to 50 per cent of corn was not uncommon, and occasionally the damage to the young corn plants was 100 per cent. In one instance 216 tomato plants were destroyed in a single night. Other plants attacked included soybean, Canada thistle, morning glory, and milkweed. Several other species of flea beetles were reported, the potato flea beetles (*Epitrix cucumeris* Harr.), eggplant flea beetle (*E. fuscula* Crotch), and striped cabbage flea beetle (*Phyllotreta vittata* Fab.) being the most important.

European corn borer (*Pyrausta nubilalis* Hub.) is less abundant than for several years. Of the last five years, three have been abnormal and decidedly unfavorable to corn borer increase. In spite of these unfavorable conditions, the borer has shown some increase each year until the present. The drought and high temperature at the time eggs were being laid resulted in the curling of the leaves which caused the egg clusters to "peel" off.

Only two definite reports of abundance of army worms (*Cirphis unipuncta* Haw.) were received, these coming from Dekalb County, July 21, and Warrick County, August 15, the latter in bottom land corn.

The stalk borer (*Papaipema nebris* Gn.) was probably less abundant than usual although several reports of damage were received. Reports of appreciable damage to oats at Rensselaer and to corn at Crawfordsville and Bloomfield were received the last of June. During July and early August injury to corn and tomatoes was recorded from scattering localities, and at Rockport dahlias were damaged.

The negro bug (*Thyreocoris pulicarius* Ger.) was abundant on corn in the bottom lands near Mt. Vernon, June 21. Injury by this insect was reported from Peru, July 12, but the crop attacked was not given.

One of the click beetles (*Drasterius elegans* Fab.), was received from several localities but was definitely reported as injuring crops in only one instance. In this case the report came from Greentown, June 30, and the beetles were said to be eating the corn stalks near the base "until the plants fall over."

The garden webworm (*Loxostege similalis* Gn.) was quite destructive to alfalfa from August 6 to 24, definite records of serious damage coming from Carroll, Clinton, Fulton, Jay, Morgan, and White counties.

White grubs (*Lachnosterna* spp.) damaged strawberries at Acton and perennials at Gary the last of September and early October. Apparently white grubs were also responsible for cutting off wheat plants at Greencastle and Columbus, the last of October and early November.

Green June beetle grubs (*Cotinis nitida* Linn.) were damaging lawns at New Albany, Corydon, and Terre Haute the latter half of August. Apparently the parasite (*Scolia dubia* Say) was very abundant as it was sent in from a number of southern Indiana localities.

Sod webworms (*Crambus* spp.) were less abundant than for the past several years although they were destructive to lawns and golf greens in several scattered localities.

Adults of *Chlorion ichneumoneum* L. were reported abundant at Shelbyville, October 16, nesting in and disfiguring lawns much as do ants.

Mint flea beetle (*Longitarsus menthaphagus* Gent.) was normally abundant, continuing as a major pest of mint in the northern part of the state.

Vegetable Insects

Mexican bean beetle (*Epilachna corrupta* Muls.) was abundant and destructive throughout the state, the first reports arriving the middle of June and continuing into October. In a number of localities the potato beetle killer (*Perillus bioculatus* Fab.) was commonly observed attacking the bean beetle larvae.

Red spider (*Tetranychus telarius* L.) was destructive to beans and sweet potatoes at Richmond the middle of June.

Striped cucumber beetle (*Diabrotica vittata* Fab.) and melon aphid (*Aphis gossypi* Glov.) were normally destructive to melon and cucumbers in many sections of the state from early June until early July. The aphid continued its abundance until the last of August.

Squash bug (*Anasa tristis* De G.) was abundant on squash and pumpkin in a few localities during the season.

Mole crickets (*Gryllotalpa borealis* Burm.) were reported damaging potatoes in low ground near Elkhart, June 4.

Tarnished plant bug (*Lygus pratensis* L.) damaged potatoes, especially blossoms, in northern Indiana the latter half of June and during July.

False chinch bug (*Nysius ericoe* Schil.) was abundant during the past season and reported from a variety of plants. At Winamac they were damaging potatoes July 5.

Gray blister beetle (*Epicauta cinerea* Forst.) was destructive to potatoes at DePauw, July 8.

Cabbage worms (*Pieris rapae* L.) were very abundant and destructive throughout the state from the last of June until September.

The Harlequin bug (*Murgantia histrionica* Hahn) was very destructive to cauliflower and cabbage from early July until early October. It was not uncommon as far north as Lafayette.

Cabbage aphid (*Aphis brassicae* L.) was normally abundant throughout Indiana.

The omnivorous aphid (*Myzus persicae* Sulz.) was abundant on tomato at Lafayette June 1.

Green tomato worm (*Protoparce quinquemaculata* Haw.) was normally abundant, reports of defoliation of plants having been received from the last of August until the middle of September.

Corn earworm (*Heliothis obsoleta* Fab.) was very destructive to tomato fruits as reported under corn insects.

Onion thrips (*Thrips tabaci* Lind.) was very abundant in northern Indiana the last of June and early July, but later seemed largely to disappear, with less injury than early observations would anticipate.

Rhubarb curculio (*Lixus concavus* Say) was reported damaging rhubarb in a number of southern Indiana localities the first half of June.

Fruit Insects

Codling moth (*Carpocapsa fomonella* L.) appeared in large numbers, the first moths four or five days earlier than in 1933. Three full broods and apparently a partial fourth developed in southern Indiana while two full broods and a partial third occurred in northern Indiana. The hot, dry conditions apparently somewhat checked increase during the latter half of the season in some sections, although in general it held its own and is overwintering in large numbers.

Oriental fruit worm (*Laspeyresia molesta* Busck) came out in large numbers; but because of failure of the peach crop in most sections of the state, they have apparently made little headway and are probably in fewer numbers than in 1933.

The Japanese beetle (*Popillia japonica* Newm.) was taken in government bait traps in Indianapolis for the first time. Seventeen beetles were taken, all in an area of less than 45 acres; and it is not unlikely this insect is now established in Indiana and will gradually increase as it has done in most localities where it has become established. The seriousness of this new introduction cannot be under-estimated.

Fruit-tree leaf-roller (*Archips argyrospila* Walk.) was reported very destructive to apple at St. Joe, May 24, this being the first report of abundance in Indiana during the past 12 or more years.

Half grown larvae of *Samia cecropia* L. was abundant feeding on plum foliage at Shelbyville, July 5.

Cherry slug (*Eriocampoides limacina* Retz.) defoliated cherry in northern Indiana early in August.

Rose chafer (*Macrodactylus subspinosus* Fab.) damaged peaches in the northern part of the state early in June, but in general was less abundant in Indiana than usual.

Buffalo tree-hopper (*Ceresa bubalus* Fab.) egg punctures were unusually abundant in apple twigs in northern Indiana the past winter.

Shot hole borer (*Scolytus rugulosus* Ratz.) was conspicuously abundant in the northern part of the state, especially on peach and cherry.

Flat-headed borer (*Chrysobothris femorata* Oliv.) was unusually abundant on apple as reported under shade tree insects.

The peach tree borer (*Aegeria exitiosa* Say) was present in normal abundance.

San Jose scale (*Aspidiotus perniciosus* Comst.) was normally abundant in most localities, although apparently increasing in importance in a few orchards.

Raspberry cane borer (*Oberea bimaculata* Oliv.) was reported from Fort Wayne, June 10, at which time the egg punctures were abundant in raspberry canes.

Grape leaf-hopper (*Erythroneura comes* Say) was very abundant and destructive through central Indiana during July and early August.

Grape leaf-folder (*Desmia funeralis* Hbn.) was reported abnormally abundant at Makey and Washington the last of August.

Shade Tree and Shrub Insects

Box-elder bug (*Leptocoris trivittatus* Say) was more abundant and widespread than any year of our records. This year it was reported from the extreme ends of the state, and there was not a week, and scarcely a day, that a report was not received. There appear to be two definite generations in central Indiana, the eggs from the second generation being laid the latter part of July. Observations corroborate those already reported, to the effect that the bugs breed on female or seed-bearing box-elders and avoid male trees. However, the insects where abnormally abundant seem to injure a variety of plants. Apparently in some instances the insect is destructive to the box-elder although most complaints arise because of their abnormal abundance or because they are annoying in the home.

Bagworms (*Thyridopteryx ephemeraeformis* Haw.) were abundant as far north as Lafayette, about as in 1933.

Catalpa caterpillers (*Ceratomia catalpae* Boisd.) defoliated catalpa trees in many southern Indiana localities.

Oyster shell scale (*Lepidosaphes ulmi* L.) was reported abundant in a few localities but in general perhaps less than usual.

European elm scale (*Gossyparia ulmi* L.) appeared in conspicuous abundance in several isolated localities.

A lecanium scale (probably *Lecanium fletcheri*) was abundant on arbor vitae at Pendleton in July.

Elm scurfy scale (*Chionaspis americana* John.) was normally abundant.

The linden aphid (*Longistigma longistigma* Mon.) was very abundant on pin oak at Evansville, May 31.

Cockscomb elm gall (*Colopha ulmicola* Mon.) was abundant throughout the northern half of Indiana the last of June.

Elm rosette (*Eriosoma lanigerum* Haus.) and elm leaf curl (*Schizoneura americana* Ril.) were reported from numerous localities in the state during June.

Sycamore lace bug (*Corythuca ciliata* Say) was abundant, as usual, at Lafayette in July.

Carpenter worm (*Prionoxystus robiniae* Peck) was received from Walkerton, June 1, at which time the moths were laying eggs.

Maple flat-headed borer (*Chrysobothris femorata* Oliv.) was definitely more abundant on both maple and apple than normal. The first reports were received in August and continued until November. All of the reports came from the northern half of the state.

Twig pruner (*Ellaphidiun villosum* Fab.), cutting oak twigs, was very abundant in several localities in northeastern Indiana, the reports having come in the last of June and early July.

Poplar borer (*Saperda calcarata* Say) was reported very abundant in a few localities in the northern half of the state.

Red spider (*Tetranychus telarius* L.) was normally abundant, reports of injury being received from southern, central, and northern Indiana to evergreens, moonflower vine, and beans.

Flowering Plants

Gladiolus thrips (*Taeniothrips gladioli* Moult.) is now quite generally distributed over Indiana and will probably be an annual pest of importance to gladiolus.

Red spider (*Tetranychus telarius* L.) has been reported as a serious pest in commercial dahlia gardens at Dublin for the past two seasons.

Wireworms *(Elateridae)* damaged dahlias at Hammond early in June.

The rose stem girdler (*Agrilus viridus fagi* Ratz), a pest recently imported into the United States from Europe, was reported in Rugosa roses at Fort Wayne, July 8, the correspondent stating that this pest was observed first, two years ago, on plants purchased from a Cleveland, Ohio, dealer. Later in the season the same insect was reported on Rugosa roses at Decatur and Muncie.

Hollyhock plant bug (*Melanotrichus althaeae* Huss.) damaged hollyhock at Muncie and Lafayette the last of June and during July.

Delphinium mite (*Tarsonemus pallidus* Banks) was reported abundant and destructive to delphiniums at Martinsville, May 18.

Alternanthera worm (*Hymenia perspectalis* Hbn.) appeared in abundance at Lafayette, defoliating alternanthera plantings during September.

Miscellaneous Pests

Termites (*Reticulitermes flavipes* Koll.) continue as very destructive pests of buildings throughout the state. In several instances they damaged chrysanthemum and geranium in greenhouses.

Powder post beetles (*Lyctus* sp.) have been repeatedly reported from all parts of Indiana as destructive to a variety of items, including wooden ice-box, log cabin, oak molding, and other interior woodwork of homes and timbers of barns.

The usual number of inquiries have been received relative to ants, fleas, bedbugs, house centipedes, cockroaches, silverfish, carpet beetles, clothes moths in clothing and furniture, and cigarette beetles in furniture.

Crickets were reported as annoying from several localities and were "amazingly abundant in a store at Petersburg in June."

The ham mite (*Tyroglyphus* sp.) was exceptionally abundant on meats in a store at Monon during June.

Chiggers (*Trombicula* sp.) were common throughout the state as annoying pests and were reported abundant in lawns in a number of localities the last half of July.

Brown dog tick (*Rhipicephalus sanguineus* Latr.) was reported from Indianapolis and Lafayette.

Grain beetles and weevils, and the bean weevil, were normally abundant.

A dermestid (*Trogoderma tarsale* Melsh. Back det.) was a pest in chocolate-coated farina at Warsaw during September.

Pest Mosquito Control Project

As a feature of the Civil Works Administration (CWA), pest mosquito control was recognized as a desirable project and was inaugurated in Indiana, December 15, 1933, with an allotment of 300 unskilled laborers and seven supervisors. Operations were conducted in Indianapolis, Fort Wayne, Noblesville, Greencastle, Terre Haute, Vincennes, and Bedford. The importance of the mosquito as an annoying pest and as a carrier of malaria in Indiana was recognized, but we had no previous surveys upon which to base plans for work. Fortunately, we were encouraged and assisted by city and county health officials, who were aware of conditions in their communities, and were able to organize in the cities noted. The cooperation received from the State Board of Health and the local health officers and engineers, enabled us to carry out a successful program.

In some cases the work included filling in of holes which were important breeding places for mosquitoes. Such was the case at Greencastle where old stone quarry dumps, just back of DePauw University, were filled in. In most cases the project was one dealing with proper ditching operations to eliminate sluggish ditches or back water sloughs. Not only did these projects provide useful work for unemployed and eliminated many important mosquito breeding places, but in addition they noticeably improved sanitary conditions and the appearance of ditches and their surroundings. The project aroused an appreciation of the value of such work as demonstrated by the fact that five of the projects were continued by local relief funds after the federal funds were exhausted February 15, 1934.