

INSECTS OF INDIANA FOR 1930¹J. J. DAVIS, Purdue University²

The unusual weather conditions last winter and during the past summer, which have had such an important bearing on the insect population, have been unprecedented in the experience of the writer. The severe cold of last January resulted in a high mortality of exposed insects such as scale insects. On the other hand there was a lessened mortality of those insects normally hibernating on or near the ground and protected by a blanket of snow. Thus a higher percentage of codling moth larvae survived the winter because most of the larvae which normally survive the winter are those on or near the soil surface and these were protected by the covering of snow. On the other hand stone fruits were appreciably weakened by the cold weather of the past winter and because of this weakened condition the shot hole borer (*Scolytus rugulosus*) found it possible to gain a good foothold and was responsible for considerable damage. The severe cold of January also

Table I. Comparative Monthly Weather Data for Indiana, 1930.

Month		Temperature		Precipitation		Number of Days		
		State Mean °F.	Departure from Normal °F.	State Average Inches	Departure from Normal Inches	Clear	Partly Cloudy	Cloudy
January	Normal	28.6		3.05		10	7	14
	1930	25.4	- 3.2	6.36	+ 3.31	10	5	16
February	Normal	29.6		2.54		9	7	12
	1930	40.6	+11.0	2.49	- 0.05	10	8	10
March	Normal	40.7		3.85		10	8	13
	1930	39.4	- 1.3	1.82	- 2.04	14	7	10
April	Normal	52.0		3.49		11	9	16
	1930	54.0	+ 2.0	2.55	- 0.94	14	8	8
May	Normal	62.2		4.01		12	10	9
	1930	63.6	+ 1.4	1.79	- 2.22	15	8	8
June	Normal	71.6		3.83		13	7	7
	1930	71.0	- 0.6	2.60	- 1.23	15	11	4
July	Normal	75.3		3.40		15	11	5
	1930	77.4	+ 2.1	1.78	- 1.62	21	8	2
August	Normal	73.3		3.31		15	10	6
	1930	74.4	+ 1.1	2.07	- 1.24	15	11	5
September	Normal	67.0		3.12		15	8	7
	1930	68.4	+ 1.4	3.62	+ 0.50	15	8	7
October	Normal	54.5		2.69		15	7	9
	1930	52.8	- 1.7	1.54	- 1.15	16	7	8
November	Normal	42.2		3.09		12	7	11
	1930	43.2	+ 1.0	1.98	- 1.11	13	4	13

Proc. Ind. Acad. Sci. 40: 307-320. (1930) 1931.

¹This is the sixth annual report on insects of Indiana, intended as an annual summary, and especially for use of future workers in the prediction of insect troubles.²The writer is indebted to the following for records and information contained in this report: F. H. Lathrop, C. M. Packard, W. P. Yetter, Jr., R. F. Sazama, R. H. Painter, W. B. Noble, G. G. Ainslie, Curtis Benton, F. E. Sheaffer, H. K. Ripsey, G. A. Ficht, G. E. Marshall and L. F. Steiner.

killed the fruit buds which eliminated the favorable host material for the late broods of the Oriental fruit worm and this condition was doubtless responsible for the scarcity of fruit worms late in the season although they had been abundant earlier in the season. Similarly the severe drought and heat affected different insects in various ways. These conditions destroyed many of the Hessian fly "flaxseeds" and greatly hindered the increase and spread of the European corn borer, although favoring the development and increase of such insects as the codling moth and chinch bug.

From January to September inclusive, there was an excess of 13.9°F. while the rainfall deficiency for the same period was 5.54 inches.

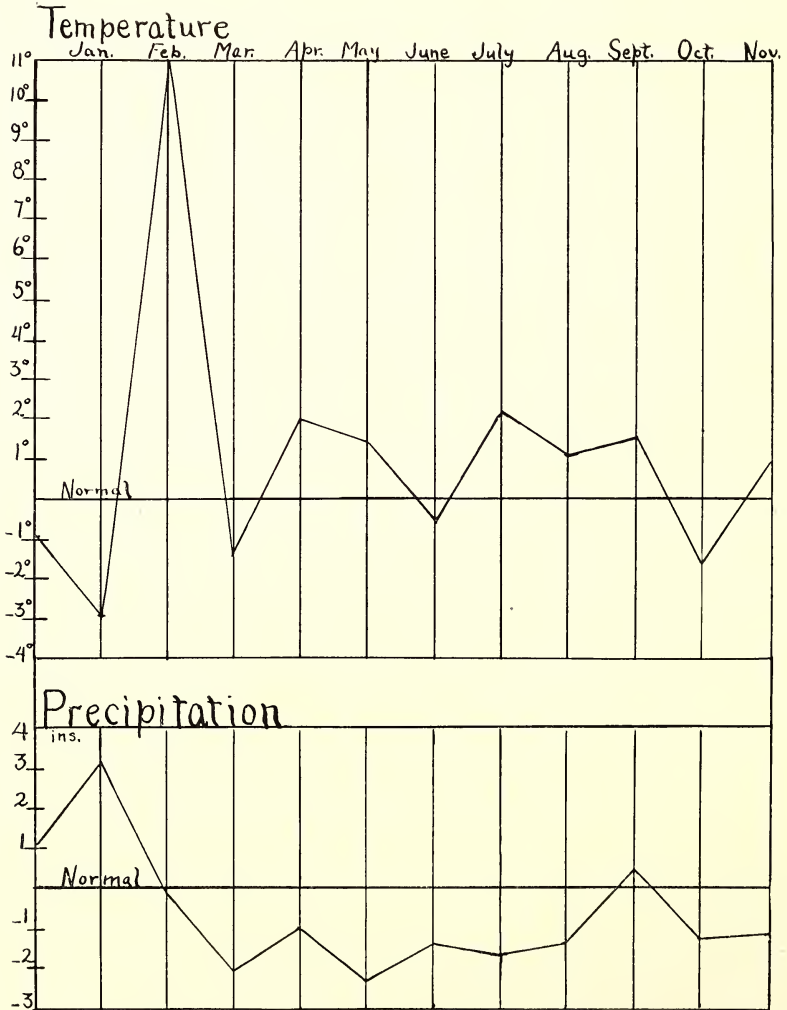


Fig. 1. Departures from normal temperatures and precipitation in Indiana for the year 1930 based on data in Climatological Data, issued monthly by the U. S. Weather Bureau

CEREAL AND FORAGE INSECTS

The common stalk borer (*Papaipema nitela* Gn.) was again common throughout the state. The first report was received May 19 and all larvae received during May and June were small. General field infestations rather than border infestations were more common than in recent years, which was probably due to grassy growths in the fields last fall when the moths were laying eggs. The pest was most conspicuous and destructive during June and July although continuing through August and into September. The first pupa was received September 2 and all material received after that date were in the pupal stage. Corn was the usual host and damage ranged from slight to 20 to 30 per cent of the crop. Other hosts reported included Delphinium, Iris, dahlia, golden glow, regal lily, Madonna lily, hollyhock, sweet william, pansy, oats, potatoes, tomatoes, and burdock. Localities included all sections of the state as follows: Anderson, Booneville, Brookville, Brazil, Cannelton, Chalmers, Chandler, Danville, Decatur, Dugger, Eaton, Elwood, Etna Green, Evansville, Fowler, Frankfort, Freelandville, Gary, Greencastle, Hammond, Idaville, Jeffersonville, Lafayette, LaPorte, Liberty, Lowell, Macy, Montpelier, Nappanee, Nashville, Newport, Otterbein, Oxford, Paoli, Plymouth, Princeton, Radnor, Rushville, St. Joe, Salem, Shelbyville, South Bend, Spencer, Stewartsville, Sunman, Tipton, Valparaiso, WilliamSPORT and Winamac.

The European corn borer (*Pyrausta nubilalis* Hbn.) entered Indiana in 1926, under conditions unusually favorable for its spread and increase. Since that year, and until 1930, the insect has spread at a normal rate and increased in abundance each year in the previously infested territory. However, in 1930, the spread was not great, nor the increase in older infested territory as much as would be normally anticipated. This was due entirely to the hot, dry weather conditions at critical stages in the life of the insect which shortened the life of the moths, prevented them from laying their maximum numbers of eggs, and lessened their flight, and later, the extreme conditions caused a high mortality of the larvae which had become established in the upper parts of the stalks. In spite of these adverse conditions the borer spread to 18 new townships and into three new counties and increased approximately 25 per cent in the older infested areas.

White grubs (*Lachnosterna* spp.) were destructively abundant in the northwestern quarter of the state, as anticipated. There is every indication of a continual spread southward. Considerable damage was reported from the following counties: Benton, Jasper, Clinton, St. Joseph, Elkhart, Newton, Lake, Adams, Warren, LaPorte, Jay and Fountain. The majority of inquiries referred to injury to corn although injury was also reported to oats, blue grass, pasture, golf greens, lawns, potato, timothy and strawberry. The drought conditions intensified injury in some cases. See also under Flower Garden Insects.

Northern corn rootworm adults (*Diabrotica longicornis* Say) reported as destructive to corn at Richmond August 23.

Corn seed maggot (*Hylemyia cilierrura* Rond.) damaged corn in the following counties: Shelby (May 10), Union (May 13), Howard (Kokomo) (May 23), Jasper (June 3); also soybeans in LaPorte County (June 3) and lima beans in Franklin County (June 3).

Billbugs (*Sphenophorus callosa* Oliv. and *S. zea* Walsh) were seriously injurious to corn in Carroll County (May 1), Wayne County (May 8), and Dearborn County (May 17). Those from Wayne and Carroll were *S. zea* and those from Dearborn, where they were attacking corn in the bottom lands, were *S-*

callosa. During June old injury was received from Hillsdale and Kempton, revealing damage earlier in the year, probably in May.

Webworms (*Crambus* sp.) were very abundant and destructive to corn over large areas in Floyd, Grant, Miami, Randolph, Tippecanoe, Union and Wayne counties May 11-17. Additional reports were received during the last of May and first half of June from Rushville, Middletown and Kempton.

Cutworms were rather general throughout the state. Specific records, received during the period April 29-May 26, as follows: Attacking corn at Muncie, Marion, Liberty, Lafayette and South Bend; garden plots at Indianapolis and Culver; and cabbage, tomato and carrots at Ft. Wayne and Remington.

Wireworms damaged corn at Delphi May 13 and reported very abundant in plowed ground at Indianapolis May 14 and Liberty Mills, May 20. Damaged corn at Kempton May 24. Damaged potatoes and cabbage at Muncie July 7.

Millipeds were reported attacking and damaging corn in Wayne County May 21. The record appears authentic although details were not received.

Corn root aphid (*Aphis maidi-radici* Forbes) damaged corn in Jasper County June 7; also during June it was reported generally abundant in Spencer County, one specific report referring to a 40-acre field which was plowed up and replanted; what was also the same species reported damaging melons at Morocco June 16.

Southern corn leaf beetle (*Myochrous denticollis* Say) was sent in from near Patriot (Switzerland County) where it destroyed 90 per cent or more of the corn in a large field. The beetles appeared and destroyed the corn between May 1 and 6, as many as 11 beetles per hill being found. The field had been in alfalfa and blue grass and had not been plowed for two years. It was plowed in February and planted early. The beetles fed mostly on the stem below ground.

Clover white grubs (*Colaspis brunnea* Fab.) damaged corn at Danville according to a report received June 16.

Corn earworm (*Heliothius obsoletus* Fab.) was more abundant than at any time since 1927. Reports of earworms attacking green tassels of corn came in from Nashville, Mt. Vernon, Booneville and Brookville during June 28-July 1. Later in the season (September and October) it became very conspicuous and destructive to both field and sweet corn throughout the state. At Mitchel a third grown larva was observed eating into an apple (Sept. 27). Early in October they were damaging recently dug sweet potatoes at Vineinnes, attacking the tubers as they set in baskets in the field. Serious losses to tomatoes were reported for Booneville, Mt. Vernon and Scottsburg October 13.

Grasshoppers were reported unusually abundant in early August in Vanderburgh and Posey counties; also at Monterey. Injury seemed to be largely to corn and clover according to G. G. Ainslie. *Melanophus differentialis* Thos. was apparently the predominating species although in some localities *M. femur-rubrum* DeG. was very abundant.

Fall army worm (*Laphygma frugiperda* S. & A.) made its appearance in conspicuous and destructive numbers in southern Indiana for the first time in several years. Definite reports were received from Tell City (Oct. 10), Cannelton (Oct. 11) and Corydon (Oct. 14). In all cases serious damage to rye, wheat, and barley were reported and in some cases the entire crops were destroyed.

Hessian fly (*Phytophaga destructor* Say) conditions are summarized by C. M. Packard, as follows: "Hessian fly infestations last spring were, in general, too light to affect yields, due to the lingering effects of the 1929 drouth and the not particularly favorable spring weather for fly increase. Occasional stubble fields

of the 1930 crop, especially in southern Indiana, contained sufficient fly to make considerable infestation possible in nearby fall sowings but the prolonged summer drouth was unfavorable to fly activity, growth of volunteer wheat, and early sowing, and fall infestations were therefore generally very light. The main fly emergence occurred about Sept. 24 to Oct. 4 throughout the state as a result of the general rains of Sept. 12 to 16. A portion of the flies remained unchanged in the stubble, however, and drouthy conditions in October were unfavorable to the establishment of this main fall brood, or further pupation and emergence of adults. During August and early September sufficient rain occurred in a few northern localities to cause the growth of volunteer wheat, much early sowing, and some fly emergence in early September. As a result considerable infestation of early sown and volunteer wheat is present in these localities."

The green-bug or spring grain aphid (*Toxoptera graminum* Rond.) was reported as responsible for the "utter failure of oats in Spencer County." We did not see specimens.

The joint worm (*Harmolita tritici* Fitch) was abundant at New Carlisle as evidenced by an abundance of stem galls in threshed wheat.

Clover bud worm (*Phytonomus nigrirostris* Fab.) was abundant and destructive to red clover in the vicinity of Lafayette, early in June.

Clover leaf weevil (*Hypera punctata* Fab.) damaged new clover field at Kempton, Apr. 24 and from Apr. 29-May 8 was conspicuously common throughout central Indiana, specific reports of damage to alfalfa and clover coming from Muncie, Windfall, Kokomo, and Lafayette.

VEGETABLE INSECTS

Cabbage worm (*Pontia rapae* L.). During the past four years there has been a noticeable increase in cabbage acreage, due to increased demand for cabbage by kraut factories. There has also been an increasing demand for information on the control of the cabbage worm. Reports of abundance were received from French Lick, Jasper, Lafayette, Monterey, Peru, Sheridan and Warsaw, most of the inquiries coming in during July, in most cases the worms being reported as a very serious pest.

Cabbage aphid (*Aphis brassicae* L.) was abundant and destructive to cabbage at Bourbon, New Carlisle, Pendleton, and Thorntown. Reports were received from May 18 to July 21.

Cabbage curculio (*Ceutorhynchus rapae* Gyll.) damaged 75 per cent of cabbage plants in a commercial seed bed at Vincennes, May 24, according to F. H. Lathrop.

Harlequin cabbage bug (*Murgantia histrionica* Hahn.) was reported destructively abundant to cabbage at Princetown, Aug. 11.

Cabbage snake (*Gordius* parasite) was reported occurring in a head of cabbage at Brookville, October 15.

Radish or cabbage maggot (*Hylemyia brassicae* Bouchè) was reported destructive to radish at Muncie, Russiaville and Sheridan and to cabbage at Cromwell. All reports came in between May 12 and 19.

Turnip aphid (*Aphis pseudobrassicae* Davis) is an increasing pest each year. One correspondent who has 20 or more acres of turnips in Marion County advises that hardly a turnip or Sutton radish was raised in his vicinity in the fall of 1929 because of these aphids. During 1930 definite reports of damage to turnips came from Indianapolis, Jasonville, Vincennes, and Warsaw.

Striped cucumber beetle (*Diabrotica vittata* Fab.) continues as an annual pest of melon and cucumber. Reports during the winter indicated serious damage in 1929 (not previously reported) at Rensselaer, Bristol, Williamsport and Goshen. At the two latter places the roots and lower stalks were damaged by the larvae. During 1930 reports of damage were received from Aurora, Bedford, Bristol, Bremen, Elwood, Evansville, Huntington, Lafayette, Ladoga, Michigantown, Summan, Terre Haute, Thorntown, Warsaw, and Wheatfield. The first report came from southern Indiana May 14 and continued until July 28.

Melon aphid (*Aphis gossypii* Glov.) damaged melons at Bedford, Fowler, Lafayette, Huntington, Veedersburg and Warsaw during July and early August.

Striped flea-beetles (*Systema taeniata* Say) damaged early tomatoes and tomato seedlings at Greencastle and Lafayette early in May. They also damaged tomatoes at Bloomfield and Crawfordsville early in June. Beans and corn were also damaged at Crawfordsville. Unidentified species injured potato at Warsaw, corn and egg plant at Columbia and tomato at Greenville.

Crickets (*Gryllidae*) were destructive to tomato fruits at Matthews August 29.

Green tomato worms (*Phlegothontius* sp.) were reported damaging potatoes at Leesburg (July 31) and at Monterey and Union Mills (Aug. 6 and 11).

Spotted cucumber beetle (*Diabrotica 12-punctata* Oliv.) was a pest of canning beans at Greenfield June 26 and damaged flowers, tomatoes and other garden crops at Rensselaer Aug. 14 and to corn at Ligonier Aug. 15. Larvae, supposedly of this species, injured beans at Frankfort in July. During late May and early June this species was more than usually abundant on cucumbers at Warsaw.

Potato tuber moth (*Phthorimaca operculella* Zell.) heavily infested potatoes received Aug. 26 from Ft. Wayne. The wholesale house which disposed of the potatoes advised us that they had been purchased from a dealer in Delaware and that the potatoes originated in Virginia. They added, "We have a customer in our city who purchased homegrown potatoes near New Haven, Indiana, that had the same infestation." We were unable to trace the reported Indiana infestation.

Colorado potato beetle (*Leptinotarsa decimlineata* Say) was more abundant than for several years. They were especially noticeable attacking both potatoes and eggplant, according to reports, at Bedford, Lafayette, Monterey and Warsaw.

Potato leaf-hopper (*Empoasca fabae* Harr.) was normally abundant and destructive at Elkhart, Fowler, Lafayette and Warsaw.

Variegated cutworm (*Peridroma margaritosa* Haw.) damaged foliage of tomato and flowers of calla and carnations in a greenhouse at Decatur, Mar. 31.

Tarnished plant bug (*Lygus pratensis* L.) caused considerable damage to potato at Columbia City, early in June.

Wireworms (*Elateridae*) damaged potato and cabbage at Muncie during June. Reports of damage to potatoes were also received from South Whitley

Blister beetles (*Epicauta* spp.) were apparently more abundant than for several years. The first report was received June 27 and reports continued to come in until Aug. 2. The first report of unusual abundance was received from Scottsburgh July 17, where tomatoes were being damaged by *E. vittata* Fab. Other reports were as follows: *Epicauta* spp. damaging clematis at Red Key, potatoes at Atlanta, Lafayette and Austin; *E. vittata* damaging tomatoes at Shelbyville, potatoes at Lafayette, Gosport, Greencastle, Lebanon, Indianapolis, and Dillsboro; *E. cinerea* Forst. damaged flowers at Liberty, and tomato and other garden vegetables at Spencer; *E. marginata* Fab. attacking potato, cabbage,

tomato and corn at Lafayette, Williamsport, Crawfordsville, Frankfort, Greencastle, Lebanon and Indianapolis; *E. pennsylvanica* De G. on potato, tomato, cabbage, dahlia and other garden plots at Greencastle, Lafayette, Lebanon, Indianapolis, Spencer, Ellettsville and Morgantown.

Strawberry leaf-roller (*Ancylis comptana* Frohl.) was more abundant than usual in 1930, reports of abundance and injury coming from Greencastle, Lafayette, Mill Creek and Terre Haute from May 14 to June 26.

Strawberry root worm (*Paria canella* Fab.) adults were conspicuous eating strawberry foliage at Tipton (May 14) and Danville (June 4).

White grubs (*Lachnosterna* spp.) damaged strawberries at Hudson according to a report received July 10.

Strawberry Crown borer (*Tyloclerema fragariae* Ril.) (fig. 2) was very destructive to strawberries at New Albany, according to F. E. Sheaffer. This insect is an annually increasing pest in the strawberry areas near New Albany.



Fig. 2. Typical injury by the strawberry crown borer. Note larvae and pupae in the excavated areas in the crowns of the plant.

Asparagus beetles (*Crioceris* sp.) were abundant and destructive at Hanna, Indianapolis, Plymouth, and Rossville.

Mint flea beetle (*Longitarsus waterhousei* Kutsch) is a new pest in Indiana and is a threatening pest of the mint industry. Reports of damage came from Cromwell, Millersburg, Topeka and Warsaw.

Mexican bean beetle (*Epilachna corrupta* Muls.) made its appearance early in June and was reported destructive from the following localities: Bedford, Crawfordsville, French Lick, Indianapolis, Plainfield, Paoli, Princeton, Spencer and Sunman.

Red spider (*Tetranychus telarius* L.) ruined a commercial crop of beans at Indianapolis in late July, and damaged melons at Orestes. This same pest was

destructive to elder at Frankfort, juniper at Elkhart, and to red maple at Sullivan during the same period.

Squash vine borer (*Melittia satyriniiformis* Hbn.) was destructive to squash at Battle Ground, Decatur, Lafayette, Leiter's Ford, and Warsaw, during the period May 11 to Aug. 10, also to cucumber at Indianapolis July 1.

Onion maggot (*Hylemyia antiqua* Meig.). For the second consecutive season this insect was not a major onion pest. Reports of its destructiveness were received the last of May and first of June from Corunna, Cromwell, Roll, Sheridan and Waterloo. H. K. Riley who is making a special study of this insect in the vicinity of Warsaw, gives the following notes: "On the whole onion maggot injury has been light. Considerable injury was done in a few fields between June 1 and 20. Maggots collected May 28, pupariated June 1 and adults began emerging June 20."

Onion thrips (*Thrips tabaci* Lind.) were abundant in a few localities in northern Indiana during June and July.

Garden slugs (*Limax* sp.) damaged cabbage and tomato at Sheridan during May and general garden plants at Muncie and Angola.

The mole cricket (*Gryllotalpa borealis* Burm.) destroyed most of the potatoes in a garden at New Chicago, eating holes in the tubers, according to a report received Dec. 8. This insect is not uncommon in some of the southern states, damaging underground tubers, especially potatoes, but is rarely a pest in Indiana.

Unidentified plant lice (*Aphididae*) were reported abundant on various garden plants, especially radish, turnip and lettuce from a number of points in the northern half of the state.

FRUIT INSECTS

Codling moth (*Carpocapsa pomonella* L.) was unusually prevalent and destructive in the southern half of Indiana during 1930, more so than any season since 1926. Larvae wintering in places subject to the low temperatures of January showed a mortality of 60 per cent or more, but on the ground, where they were protected with a covering of snow the mortality was probably less than normal. The hot, dry summer weather was ideal for maximum reproduction and number of generations, there being three full generations for the season. At Bedford the peak of moth emergence from overwintering larvae was May 23 according to Marshall. The larvae of the first brood were leaving the fruit June 10 at Bedford although according to Sazama they were leaving fruit June 4 or 5 at Vincennes. The peak of moth emergence at Bedford for the first brood was July 31, of the second brood Sept. 2 and the third brood larvae were hatching Sept. 10. The overlapping of generations and favorable weather conditions permitted egg laying and entry of larvae into fruit until the latter part of October.

Woolly apple aphid (*Eriosoma lanigerum* Haus.) was normally abundant throughout the state.

Apple aphids (apparently both *Aphis avenae* and *A. pomi*) were hatching at Mitchell, March 10, according to L. F. Steiner. Apparently hatching started the 8th or 9th. Apple buds were not showing green at the time and for a week thereafter many of the recently hatched young starved to death. During the season reports of abundance were received from scattered places. In general they were not serious pests the past season.

Egg punctures of the buffalo tree hopper (*Ceresa bubalus* Fab.) were abundant on a young pear tree at Waterloo in April.

An undetermined apple leaf-tier was reported seriously damaging a young apple orchard at Winamac May 14.

The lesser apple worm (*Laspeyresia prunivora* Walsh) was conspicuous in storage apples at Martinsville, during March.

An apple leaf-hopper (*Typhlocyba pomaria* McA., DeLong det.) was reported by G. E. Marshall as very abundant on apples at Bedford, June 1. Other leaf-hoppers (*T. obliqua* Say and others) were abundant during late September and October at Mitchell and Bedford when they caused considerable whitening of leaves and excrement spotting of fruit. F. H. Lathrop reports *T. obliqua* as exceedingly abundant at Vincennes and states under date of September 26 that it has been increasing since midsummer.

San Jose scale (*Aspidiotus perniciosus* Comst.). In spite of the high winter mortality, which was 90 per cent at Mitchell, according to counts made by L. F. Steiner February 19, this insect increased to threatening numbers in some orchards. According to R. F. Sazama the first crawlers were first noticed about June 1, approximately 10 days earlier than normal. Reports of abundance on peach and apple were reported from several scattered localities in the state.

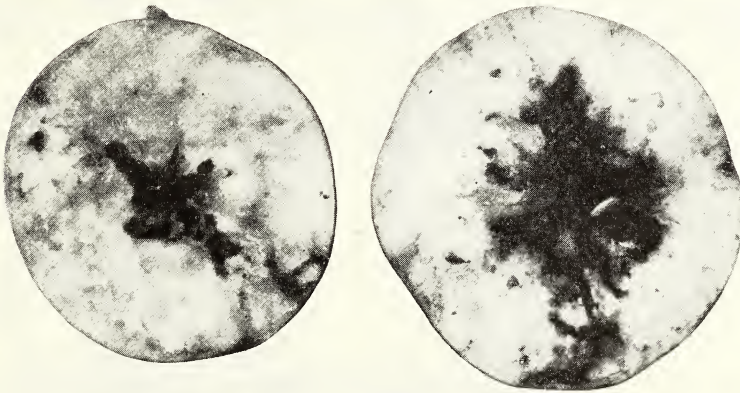


Fig. 3. Section of apple showing injury by the apple maggot, an important apple pest in the north tier of counties. Note larva in right half.

Scurfy scale (*Chionaspis furfura* Fitch) was reported abundant on apple at LaPorte in March.

Oriental fruit worm (*Laspeyresia molesta* Busck) was hindered in its increasing menace by the absence of peach fruit throughout the state. Contrary to anticipations it did not go over to apple in appreciable numbers, possibly due to difficulty in continuing in abundance on peach twigs until apples became susceptible to attack. There was a high winter mortality where the larval cocoons were exposed in locations above the snow line, in fact Steiner's studies showed almost a 100 per cent mortality.

Steiner found that 40 per cent of the overwintering worms on the ground had pupated by March 19 at Bedford and Vincennes, and two days later 75 per cent

on the ground and 60 per cent of the live worms on the trunk of the trees had pupated. The season was unusually early although the cold weather the last week in March checked the development of both plants and insects. During May the number of infested peach twigs was comparable to 1929. The flight of second brood moths began the week of June 1 to 7 at Vincennes, according to Sazama. During August the infestations dropped appreciably and it was difficult to find infested twigs except in young succulent orchards and no serious infestations developed in apples.

Peach tree borer (*Aegeria exitiosa* Say) was abundant in many localities, reports being received from Elkhart, Indianapolis, Ligonier, LaPorte, Martinsville, Michigan City, Tell City, Walkertown, and Warren.

Lesser peach tree borer (*Synanthedon pictipes* G. and R.) was reported very abundant on young peach trees at Angola, early last spring.

Peach-leaf blister mite (*Eriophyes pyri* Pag.) was destructive to pear at Ladoga, April 28.

Cherry slug (*Eriocampoides limacina* Retz.) reported abundant on cherry at Indianapolis June 11 and Aurora June 17. In general, however, not conspicuously destructive.

Plum curculio (*Conotrachelus nenuphar* Herbst) was normally abundant on apple in sections of southern Indiana. It was also reported serious on plum at Plymouth.

Shot-hole borer (*Scolytus rugulosus* Ratz.) began to show up in unusual abundance on peach at Mitchell and other points in southern Indiana the last of April. This abundance was due to the weakened condition of the trees resulting from severe cold weather in January and in some cases also to severe San Jose scale infestations. Reports of abundance of this insect were received almost continuously during May and June. Reports also showed damage to cherry at Ligonier and Warren, to plum at Noblesville and to stone fruits in general at Indianapolis and Ft. Wayne.

Grape aphid (*Illinoia viticola* Shim.) was common on grape at Lafayette and Crawfordsville during June.

Grape root worm (*Fidia viticida* Walsh) was destructive to grape at Warsaw in 1929 according to an early spring report.

Grape curculio (*Graponius inaequalis* Say) was destructive to grapes at Spencer in 1929 according to an early spring report.

Rose chafer (*Macrodactylus subspinosus* Fab.) has been abundant and destructive to grape and other crops at Chesterton for past three years according to a report received in March.

Gooseberry aphid (*Aphis houghtonensis* Troop) was destructive to gooseberry at Hope, Indianapolis and South Whitley in 1929, according to reports and specimens of injury received in February and March.

SHADE TREE AND SHRUB INSECTS

Norway maple aphid (*Periphyllus lyropicta* Kess.) was reported abundant on Norway maple at Bedford, Danville, Flora and Orleans, the last of June.

Woolly elm aphid (*Eriosoma lanigerum* Haus.) abundant on elm at Anderson the last of June.

Spiraea aphid (*Aphis spiraeicola* Patch) reported abundant at Clayton early in May. It was normally common in most sections of the state.

Elm cockscomb gall (*Colopha ulmicola* Fitch) was reported during June and July as common at Elwood, Fowler, Indianapolis, Liberty, Morgantown and Orleans.

Cottony maple scale (*Pulvinaria vitis* L.) continues to be the outstanding scale pest of shade trees. Reports during the season were received from Anderson, Bluffton, Cicero, Columbia City, Flora, Fowler, Hartford City, Indianapolis, Knightstown, Lafayette, Linton, Lizton, Marion, Morristown, Muncie, Noblesville, Pittsboro, Portland, Saratoga and Warren. Eggs were hatching at Lafayette, June 19.

Pine leaf scale (*Chionaspis pinifoliae* Fitch) was unusually abundant on pine at Portland.

Elm scurfy scale (*Chionaspis americana* Johns.) reported abundant on young elms at Portland in June.

Oyster Shell Scale (*Lepidosaphes ulmi* L.) abundant on ash and lilac at La-Grange, South Bend and Valparaiso.

Tulip tree scale (*Toumeyella liriodendri* Gmel.) abundant on tulip trees at Shoals in July.

Bagworm (*Thyridopteryx ephemeraeformis* Haw.) was reported abundant during the winter on apple, cherry, plum and evergreens at Brookville, Lyons, Pershing, Rockville and Worthington, with reports of injury in 1929. During 1930 reports of abundance were reported from Aurora, Brookville, Burns City, Jasper and Sullivan, where apple, red maple, gum, boxelder, and evergreens, including cedar, were attacked.

Carpenter worm (*Prionoxystus robiniae* Peck) damaged white oak at Tyner according to a report received the last of April.

Mottled willow and poplar borer (*Cryptorhynchus lapathi* L.) was destructive to willow at Bluffton and St. Joe during June.

Elm borer (*Saperda tridentata* Oliv.) was sent in from Spencer, November 17, with the report that a number of elm trees in that city were dying and all were infested with this borer.

Flat-headed borer (*Chrysobothris femorata* Oliv.) damaged maple, especially hard maple at Hartford City, Jeffersonville, Martinsville, and in Randolph County. Apple was also damaged in Randolph County and at New Richmond.

Red spider (*Tetranychus telarius* L.) was destructive to evergreens at Elwood, Indianapolis, New Albany, and Wabash, to blue spruce at Evansville, to arbor vitae at Greenwood, phlox at Michigan City, and beans at Greencastle. The first reports were received May 28 and continued until July 17.

Maple bladder gall mite (*Phyllocoptes quadripes* Shim.) was abundant on soft maple at Greenfield, Logansport, and Peru.

FLOWER GARDEN AND ORNAMENTAL GREENHOUSE INSECTS

Rose slugs (*Caliroa aethiops* Fab.) were common on rose at Bremen, Lafayette, and Morgantown during June.

Iris borer (*Macronoctua onusta* Grt.) was very destructive to iris at Lafayette during June, becoming first conspicuous early in the month.

Rose root worm (*Paria canella* Fab.) was abundant and destructive to greenhouse roses at Vincennes, according to a report received Oct. 14.

Common stalk borer (*Papaipema nitela* Gn.) was common on flowering plants throughout the state. For complete records see under cereal and forage crop insects.

The rose beetle or chafer (*Macrodactylus subspinosus* Fab.) was conspicuous in many sections of the state. The following specific records were received: Damaging grapes, peonies, spiraea and crab-apple at Terre Haute, May 31; rose, apple, asparagus and other fruits and vegetables at Hobart, June 11; corn, rose and plum foliage and fruit at Pierceton, June 17; grape, rose and peony at Macy, June 17; garden plants at Brimfield, June 14; killing chickens at Monterey, June 12; and attacking grapes and other fruits and responsible for death of over 100 chicks at Plymouth, June 19.

Thrips (species unknown) damaged various house plants at Angola during March.

Mealy bugs (*Pseudococcus* spp.) were destructive to house plants at Crown Point, Monticello and Valparaiso, and to chrysanthemum and other greenhouse plants at Churubusco, Evansville, New Albany, Richmond, and Valparaiso during October and November.

Root aphids (*Prociophilus erigeronensis* Thos.) damaged aster, dahlia and other flowering plants at Greenfield, Lafayette and Vincennes.

Golden glow aphid (*Macrosiphum rudbeckiae* Fitch) destructive to golden glow at Morgantown the last of June.

The variegated cutworm (*Peridroma margaritosa* Haw.) damaged foliage of tomato and flowers of calla and carnation in a greenhouse at Decatur the last of March.

White grubs (*Lachnosterna* spp.) were very serious pests in commercial plantings of gladioli at Goshen, according to F. E. Sheaffer.

Oyster shell scale (*Lepidosaphes ulmi* L.) generally abundant on lilac, ash, willow, and peony throughout northern half of state.

Ivy scale (*Chrysomphalus aonidium* L.) abundant on Boston ivy at LaPorte.

Fern scale (*Sassietia hemisphaerica* Targ.) a pest of house sword fern at Kokomo.

Oleander scale (*Aspidiotus hederæ* Vall.) was destructive to indoor English ivy at Laporte.

Fungus gnat maggots (*Sciara* sp.) reported injuring potted plants at Albion, during the past winter.

Red spider (*Tetranychus telarius* L.) injured house plants at Angola the past winter and reports indicate damage to quince at Shelbyville and evergreens at Hobart in 1929, but no definite reports of serious injury were received in 1930.

Cyclamen mite (*Tarsonemus pallidus* Banks) was destructive to greenhouse plants at Brownstown, Hobart and Portland. At the latter place cyclamen and mistletoe chrysanthemum were chiefly injured.

Bulb mite (*Rhizoglyphus hyacinthi* Boisd.) damaged lily bulbs at South Bend.

Sowbugs (*Isopoda*) damaged hotbed seedlings at Bedford last spring.

PESTS OF STORED PRODUCTS

Bean weevils (principally *Mylabris oblectus* Say) are generally distributed throughout the state and commonly destructive as evidenced by the many inquiries received. These have come from Alexandria, Bloomington, Columbus, Forest, Franklin, Galveston, Indianapolis, LaCrosse, Lafayette, New Carlisle, Sharpsville, Spencer, Swanington, Tipton, Van Buren, Wilkinson, Wolcottville, and Yorktown. In most cases, household beans were infested, although one report at LaCrosse referred to soy beans.

The cadelle (*Tenebroides mauritanicus* L.) damaged corn in storage at Richmond and wheat at Crawfordsville.

Angoumois grain moth (*Sitotroga cerealella* Oliv.) damaged exhibit grain at Lowell, and popcorn at Argos.

Indian meal moth (*Plodia interpunctella* Hbn.) abundant in sacked corn at Kentland.

Meal worm larvae (*Tenebrio* sp.) common in timothy seed at Portland.

Common granary weevil (*Sitophilus granaria* L.) destroyed seed corn at Anderson and wheat at Fowler.

Saw-toothed grain beetle (*Oryzaephilus surinamensis* L.) abundant in flour at Raub.

Reports of wheat infestations (grain beetles and weevils) reported from Anderson, Greencastle, Fowler, Mitchell, Bridgeport, Greentown, Lafayette and LaGrange.

Clover and timothy seed were infested with an unknown beetle at New Point. Farinaceous foods infested at Indianapolis.

Mediterranean flour moth (*Ephesia kuehniella* Zell.) infested hominy and other feeds at Lebanon and Madison.

HOUSEHOLD AND MISCELLANEOUS PESTS

One of the black flies (*Simulidae*) reported very abundant and troublesome to poultry at Cromwell the last of April.

Sheep tick (*Melophagus ovinus* L.) common at Alexandria in May.

Poultry lice (*Mallophaga*) conspicuously abundant at Williamsport early in May.

Common poultry mite (*Dermanyssus gallinae* DeG.) reported during January as abundant at Bunker Hill.

A cerambycid larva (determined by Craighead as *Eburia 4-geminata* Say.) was received from Wheatland May 9, with the information that it had issued from a one inch wooden bottom of a chair that had been in the possession of the correspondent for 33 years. The wood was supposed to be mahogany but perhaps only a hardwood with mahogany finish. Craighead advises us that the adult is attracted to light and is often caught inside houses and furthermore it may lay eggs on wood in the absence of bark so that the above record is not proof that the insect can live for the length of time indicated, in the larva stage.

Termites (*Reticulitermes flavipes* Koll.) were abundant in many sections of the state, serious infestations to buildings being reported from the following localities: Anderson, Crawfordsville, Evansville, Gas City, Greensburg, Indianapolis, Ladoga, Lafayette, Linden, Logansport, Martinsville, Richmond, Russellville, Shelbyville, Tell City, Terre Haute and Williamsport. Winged migrants were abundant during April.

Powder post beetles (*Lyctus* sp.) damaged old hickory furniture at several places in the state during May and woodwork at Pierceton.

The ash timber beetle (*Leperisinus aculeatus* Say, Snyder det.) received from Columbus, Sept. 23, where it was reported attacking cut ash logs to be used in the manufacture of implement handles.

White grubs (*Cyclocephala immaculata* Oliv.) damaged golf greens at Indianapolis during late September and October. ((See under Cereal and Forage Insects for records of *Lachnosterna* grub injury to lawns and golf greens.)

Bedbugs (*Cimex lectularius* L.) reported common at Bruceville, Lafayette, Mishawaka, Rockport, Van Buren and Winchester.

Mosquitoes reported very abundant at Indianapolis the last week in July.

Flies (species unknown) were reported unusually troublesome in poultry houses at Ligonier and North Manchester the last week in July.

Silverfish (*Lepisma saccharina* L.) reported abundant and infesting a medical clinic at Garrett in April.

Larder beetle (*Dermestes lardarius* L.) was reported seriously attacking cured meats at Shelbyville, April 11 and later in the season (Sept. 13) was very destructive to home-cured hams at Huntington.

Buffalo beetle (*Anthrenus scrophulariae* L.) was reported from Bloomington, Hammond and South Bend.

Carpet beetle (*Attagenus piceus* Oliv.) was destructive to woolens, rugs and mohair furniture at Indianapolis, Fort Wayne and Mishawaka.

Clothes moths (*Tinea pellionella* L.) reported from Indianapolis, Lafayette, LaGrange, LaPorte, Mitchell, Monon, and Newcastle. In most cases the infestation referred to mohair furniture.

Ants (Formicidae) are responsible for numerous inquiries from every section of the state every year, most of the complaints coming in the first half of the year. In some cases they are reported as house pests and in others as pests of lawns or golf greens. Localities reporting unusual numbers of ants are as follows: Anderson, Bloomington, Churubusco, Elwood, Evansville, Frankfort, Gary, Huntington, Kokomo, Indianapolis, Lafayette, Logansport, Lowell, Michigan City, Mishawaka, Michigantown, Rockville, Seymour, South Bend and Warsaw.

Crickets (*Gryllidae*) were troublesome in a home at Lafayette the last of August.

Slugs (?*Limax* sp.) were annoying in a basement at Washington during June.

Cockroaches (*Blattidae*) were common as usual, reports of abundance being received from Attica, Batesville, Knightstown, Crawfordsville, Frankfort, Indianapolis, Lafayette, Mt. Vernon, Muncie, Newburgh and Princeton.

Fleas (*Ctenocephalus canis* Curt.) reported in homes and farm buildings at Anderson, Brook, Decatur, Fort Wayne, Greensburg, Huntington, Lafayette, Ligonier, Monrovia, Needham, Pennville, and Whiteland.

Sowbugs (*Isopoda*) were reported very annoying in a home at Muncie during late fall.