

INSECTS OF INDIANA FOR 1927.

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The following account is a summary of the more important insect problems of the year, intended as a seasonal record and a basis for future work in predicting insect problems.

Weather Conditions. In general the month of January was normal, taking the state averages as a whole. However, in February the mean temperature was over nine degrees above normal with a normal rainfall. In March the rather high temperatures about the middle of the month brought the average temperature somewhat above normal and the month was in general rather mild with approximately normal precipitation. The temperature was about normal in April but there was an appreciable excess of rainfall. May was slightly below normal in temperature but noticeably above normal as regards precipitation. The excessive rainfall of April and May greatly interfered with farm

TABLE I. Comparative Monthly Weather Data for Indiana, 1927

MONTH	Temperature		Precipitation		Number of Days		
	State Mean	Departure From Normal	State Average	Departure From Normal	Clear	Partly Cloudy	Cloudy
	°F.	°F.	Ins.	Ins.			
January, 1927.....	28.6 27.9	4.6 -0.7	3.05 3.38	1.21 +0.33	10 9	7 8	14 14
February, 1927.....	29.6 38.8	4.1 +9.2	2.54 1.64	1.19 -0.90	9 9	7 8	12 11
March, 1927.....	40.7 44.0	3.9 +3.3	3.86 4.69	1.54 +0.83	10 10	8 8	13 13
April, 1927.....	52.0 52.5	2.1 +0.5	3.49 5.91	1.23 +2.42	11 8	9 9	10 13
May, 1927.....	62.2 61.1	2.6 -1.1	4.01 7.09	1.07 +3.08	12 8	10 11	9 12
June, 1927.....	71.6 66.9	2.2 -1.7	3.83 3.30	0.96 -0.53	13 15	10 8	7 7
July, 1927.....	75.3 74.0	1.7 -1.3	3.40 3.41	1.05 +0.01	15 16	11 11	5 4
August, 1927.....	73.3 67.4	1.7 -5.9	3.31 3.12	1.07 -0.19	15 16	10 8	6 7
September, 1927.....	67.0 70.6	2.6 +3.6	3.12 4.71	1.02 +1.59	15 16	8 8	7 6
October, 1927.....							

¹The writer is indebted to H. F. Dietz, B. A. Porter, R. F. Sazama, C. M. Packard, H. K. Riley, L. F. Steiner, and M. M. Justin for records.

operations, especially corn planting. The month of June was colder than normal and precipitation about normal, the cold weather interfering with the growth of corn. During July the temperature more nearly approached normal although still a little below and the rainfall was normal. August was much below normal for temperature, being cool almost the entire month. Precipitation in August was normal. The excessive temperature of September aided corn and permitted development which partly compensated for the cold summer. The late spring and cool season was reflected not only in plant growth but also in the development of insects. (See Table I and figures 1 and 2.)

Incorrect Insect Reports. Every year one or more insect pests, notorious for their damage elsewhere but not in Indiana, have received conspicuous mention in newspapers. Such reports are unfortunate. Insects suspected should always be submitted to an authority before newspaper publicity is given.

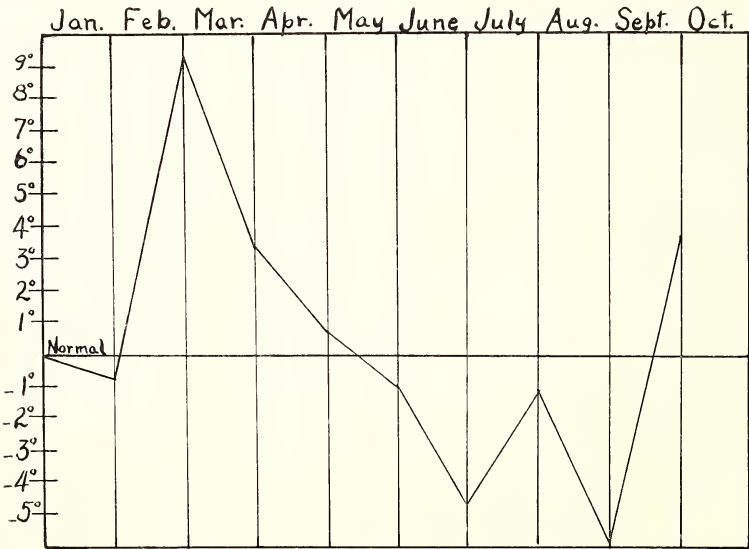


Fig. 1—Departures from normal temperatures in Indiana for the year 1927, based on data in Climatological Data, issued monthly by the U. S. Weather Bureau.

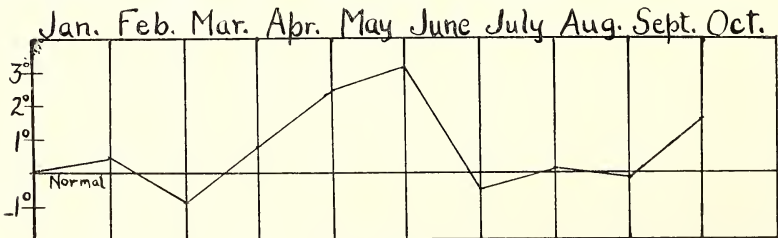


Fig. 2—Departures from normal precipitation in Indiana for the year 1927, based on data in Climatological Data, issued monthly by the U. S. Weather Bureau.

During the last season mistaken identification of insects has been more noticeable than usual, no doubt due to the publicity that has been given the European corn borer. Many insects were mistaken for the corn borer, the most conspicuous ones being the corn ear worm (*Heliothis obsoleta* Fab.), smartweed borer (*Pyrausta ainslei* Heim.), common stalk borer (*Papaipema nitela* Guen.), and parsnip webworm (*Depressaria heracliana* De G.) on wild parsnip. Ladybird beetles (Coccinellidae) were frequently suspected of doing damage which should have been attributed to aphids. In one case a widespread report of the occurrence of the brown-tail moth was circulated, and in this case the insect was none other than our common tussock moth caterpillar.

CEREAL AND FORAGE INSECTS.

Grasshoppers (*Melanoplus femur-rubrum* De G. and *M. differentialis* Thos.) which have been abundant and destructive the past few years reached their peak of abundance last year. In 1927 not a single report of damage was reported. This may have been due to the prevalence of its natural enemies (blister beetle larvae) and to the wet fall of 1926.

White grubs (*Lachnosterna* spp.) were the most destructive in Indiana for many years and increasing trouble may be anticipated three years hence. The outbreak was anticipated following an abundance of beetles in 1926. The grubs were more or less destructive throughout the northwestern quarter of the state and severe damage was reported from the following counties: Benton, Carroll, Dubois, Lake, Laporte, Marion, Marshall, Monroe, Putnam, Rush, St. Joseph and Warren. The principal damage occurred to corn and grass areas, especially golf greens. Potatoes and strawberries were also severely attacked in some cases. The State Statistician received reports of severe losses, amounting to one-half or three-fourths of the corn crop in some areas.

Wireworms (Elateridae) were less destructive than in 1926 according to reports. During January and February reports were received of damage the previous year to onions, potatoes and other crops. During the season only two authentic reports of injury were received—Columbus where wireworms damaged wheat early in the spring and to corn at Marion early in July.

Hessian fly (*Phytophaga destructor* Say) was not important the past year. C. M. Packard, in charge of Hessian fly investigations for the U. S. Department of Agriculture, has studied the situation throughout the state and reports as follows: The anticipated fly outbreak due to heavy volunteer wheat growth in the fall of 1926, did not materialize this spring, due to the prolonged cold, wet weather the past spring which hampered fly activity. Examinations in 42 representative fields throughout the state showed an average of 17 per cent infestation of culms, with a range of 0 per cent to 44 per cent. No serious damage resulted last spring.

Sufficient numbers developed last spring to menace the fall sowing but weather conditions again intervened and prevented any appreciable increase in fly abundance. The weather conditions responsible were

first, drouth which delayed emergence and later low temperature which also delayed emergence and as a result some of the spring puparia are passing the winter as such. Those which did emerge the past fall came out gradually and in comparatively small numbers. Light emergence and oviposition occurred at Lafayette early in September and during the period for Sept. 17 to 28. After a period of practical inactivity, another scattering issuance occurred between Oct. 3 and 20.

The great majority of "fly" in young wheat were still in the larval stage in late November. Although there was much early planting of wheat this fall, fly infestation on the whole has been very light, although occasional fields may be found in which upwards of 40 per cent of the plants are infested.

Chinch bug (*Blissus leucopterus* Say) was nowhere destructive in the state. The spring weather conditions were very unfavorable for the few bugs that passed the winter.

Army worm (*Cirphis unipuncta* Harv.) was unusually scarce in contrast to an abundance the year before. Only one authentic report was received and that from Crown Point, July 19, where they were attacking corn.

Fall army worm (*Laphygma frugiperda* S. & A.) was reported damaging corn at Aurora Sept. 16, this being the only report received.

European corn borer (*Pyrausta nubilalis* Hbn.) was first discovered in Indiana in 1926 and as reported in last year's records, six counties (39 townships) in the northeastern corner of the state being infested. The scouting work in 1927 revealed ten additional counties (90 townships) to be infested. Inasmuch as facilities did not permit scouting thoroughly to the limits of possible infestation in 1926, many of these supposed new infestations may have been 1926 infestations not discovered until 1927.

Intensive investigations are being made by state and federal agencies in an effort to secure effective and practical controls and to establish the parasites. To retard the rate of increase in the infested area and check the spread into the corn belt regions, an intensive campaign was made last spring to clean up the crop residues in which the borer passes the winter. This resulted in checking the rate of increase and demonstrated the value of cleaning up these residues. No other controls are as yet available. Aside from the extensive entomological research, which includes parasite introduction, the corn borer problem is being studied from the standpoint of agronomic practices.

The common stalk borer (*Papaipema nitela* Gn.) was noticeably more abundant and widespread than for many years, more than 150 inquiries with specimens for identification being received. The first few reports were received June 6 to 18 from the southern half of the state, injury being observed on potatoes, tomatoes and corn. Beginning with June 20, reports became numerous and from all parts of the state, corn being the chief host. Tomatoes were frequently attacked and occasionally reports were received of injury to potatoes, wheat, oats, popcorn, mint, dahlia, zinnia, aster, cosmos, hollyhock, and rhubarb. The reports continued to come in until after the middle of August although the majority were received between June 20 and July 31. The

corn borer situation was doubtless responsible for many of the reports received, but the accompanying map, (fig. 3) showing the range of injury distribution for 1926 and 1927 based on authentic reports received, indicates the greater abundance and distribution in 1927.

Corn flea beetle (*Chaetocnema pulicaria* Melsh.) destroyed 10 acres of corn at Brownstown in late June.

Corn webworm (*Crambus caliginosellus* Clem.), which was so abundant in 1926, was practically absent in 1927 and no reports of injury were received.

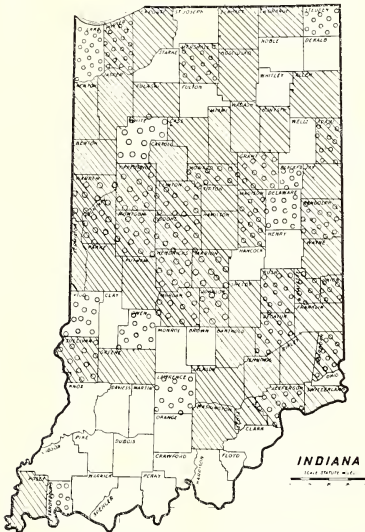


Fig. 3—Distribution of the common stalk borer in 1926 (circles) and in 1927 (diagonal lines) according to reports and observations.



Fig. 4—Distribution of southern corn root worm injuries during 1927.

Corn ear worm (*Heliothis obsoleta* Fab.) was reported on field corn, sweet and popcorn during the season June 25 to Sept. 17 from Aurora, Campbellsburg, Cicero, Evansville, Warsaw, Huntington, Indianapolis, Portland, Remington and Rushville. Damage to garden beans was reported from Indianapolis. In general was more widespread and destructive than any year since 1921.

Corn seed maggot (*Hylemyia cilicrura* Rond.) damaged planted cucumber seed at Plymouth, June 21.

Southern corn root worm (*Diabrotica 12-punctata* Fab.) was one of the most destructive corn insects in the state and more so than ever before so far as our own observations of the past 15 years record. First reports were received July 2 and continued throughout the month and they were especially numerous during the middle third of July. Reports read "20 acres practically ruined," "one-third to one-half of corn destroyed," "abundant and destructive throughout country," etc., indicating the seriousness of the outbreak which was no doubt largely the result

of the wet spring which was responsible for much weediness and the production of conditions ideal for the beetles to lay eggs. The accompanying map, (fig. 4) gives the distribution according to inquiries received. All records based on specimens excepting the Marshall County record.

The adult beetles were reported damaging young corn plants at Kitchel, June 18. The beetles were abundant and destructive at Shelbyville, July 30, by eating into the green pods of garden beans.

Cutworms (*Noctuidae*) were at least normally abundant. Reports of serious damage were received from 18 counties as indicated in figure 5. The records for Pulaski, Miami, Clinton, Delaware, Vigo, Morgan,



Fig. 5—Distribution of conspicuous cutworm outbreaks in 1927. Cross-hatched refer to *Agrotis ypsilon*. Other counties species unknown.



Fig. 6—Distribution of the Mexican bean beetle in 1927.

Gibson, Howard, Vanderburgh, and Warrick counties were accompanied by specimens, all proving to be the common greasy cutworm or overflow worm (*Agrotis ypsilon* Rott.). The first of these late season cutworm reports, all of which were apparently *A. ypsilon*, came from Kokomo, June 27, where 20 acres of corn were reported destroyed. The reports all came in the last of June and the first half of July and the outbreaks were doubtless the result of the excessive precipitation in April and May. For a number of years, this species has been a serious pest in the overflow land of Gibson, Posey, and Vanderburgh counties following late overflows of the Wabash and White rivers. Corn was the principal crop damaged although some reports referred to truck crops.

Leather jacket larvae (*Tipulidae*) damaged alfalfa near Goshen May 9. According to the county agricultural agent, a number of fields were seriously damaged. The field in which the greatest damage

occurred had been in alfalfa continuously for six years. There was also considerable blue grass scattered in the field. In this 12-acre field two to three acres were completely destroyed and the remainder more or less damaged. Last year, the same farmer experienced similar injury and plowed up two acres where damage was most severe. Larvae were found in large numbers about the crown of the plant and the roots, both being oftentimes girdled. The plants that had been dead for some time easily lifted from the soil.

Clover leaf weevil (*Hypera punctata* Fab.) reported damaging sweet clover at Saratoga and Portland May 19 and 20, respectively.

Green stink bug (*Acrosternum hilaris* Say) was abundant in some localities in Southern Indiana. In Bartholemew County there was good evidence that they were responsible for shriveling of soybean seeds in the pod.

Bean maggot (*Hylemyia ciliatula* Rond.) was apparently responsible for destruction of nine acres of soybeans at Portland late in June. Larvae supposed to be this species damaged cucumber plants at Plymouth, June 18.

Termites (*Reticulitermes flavipes* Kell.) were conspicuously abundant in field corn stalks at Richmond early in October. They were also found common in sweet corn stalks at Lafayette.

VEGETABLE INSECTS.

Mexican bean beetle (*Epilachna corrupta* Muls.) was very abundant and destructive in the southeastern quarter of the state. The accompanying map (fig. 6) gives the present known distribution in the state. No reports of injury have been received north of southern Hamilton County. Dietz reports the farthest north record at Ashley, Dekalb County.

Cabbage maggot (*Hylemyia brassicae* Bouche) damaged radishes at Sheridan early in June.

Cabbage worm (*Pontia rapae* L.) was normally abundant throughout the state.

Cabbage aphid (*Brevicoryne brassicae* L.) caused little trouble judging from general observations and reports received. The report of abundance and damage came from Terre Haute June 8.

Onion maggot (*Hylemyia antiqua* Meig.) damaged onions at Elkhart, Ashley, Hobart, Hamilton, Hammond and Warsaw, all in the north end of the state. Reports were received in June and early July.

Woolly bear caterpillar (*Diacrisia virginica* Fab.) damaged onions at Pleasant Lake July 13.

Blister beetles (*Epicauta* spp.) were about equally abundant as in 1926 and reports came in between June 20 to Sept. 1 from Anderson, Bridgeport, Cannelton, Columbus, Fort Branch, Goodland, Kempton, Lafayette and North Vernon. Dahlias and asters were the principal flower garden plants attacked. Many vegetable crops were infested, especially potato, egg plant, and swiss chard. We continue to get excellent control with sodium fluosilicate dust.

The variegated cutworm (*Peridroma magaritoza* Haw.) was common in many greenhouses. Especially noticeable was injury in late April and early May in a greenhouse at Indianapolis where they defoliated tomato plants and caused heavy loss by eating in heads of greenhouse cauliflower. Cutworms (probably *Euxoa* spp.) were generally troublesome in Northern Indiana in gardens during May and early June.

The potato flea beetle (*Epitrix cucumeris* Harr.) was abundant on potato at Nappanee June 22 and Dietz reports injury to potato at Paoli and to tomatoes throughout Marion County.

Potato leafhopper (*Empoasca mali* LeB.) was damaging potatoes at Berne during June.

Striped cucumber beetle (*Diabrotica vittata* Fab.) was destructive to cantaloupe, cucumbers, watermelons and squash in the following localities according to reports received: Terre Haute, Spencer, New-castle, Valparaiso, Goshen, Rockville, South Bend, Manchester, Roanoke, Franklin, and Rensselaer.

Melon aphid (*Aphis gossypii* Glov.) was apparently not as common as usual for only one report was received, this coming from Silver Lake June 26.

Rhubarb curculio (*Lixus concavus* Say) injured rhubarb at Rochester and Spencerville during May.

Pickle worm (*Diaphania nitidalis* Stoll) was destructive to cucumbers at Logansport, Madison and Princeton the last of August and early September.

Squash vine borer (*Melittia satyriniformis* Hon.) was destructive to squash at South Bend, Peru, Fort Wayne, and Manchester and to pumpkin at Muncie. All reports were received the last of July and early August.

Mole cricket (*Gryllotalpa borealis* Burm.) damaged potatoes early in September at Vincennes. This insect was also received from Francesville and Warsaw during September but not reported doing injury.

Tomato worms (*Phlegethontius quinque-maculata* Haw.) was destructive to tomato at Campbellsburg and Kingsburg the first half of August.

The potato flea beetle (*Epitrix cucumeris* Harr.) damaged tomato at Economy, June 7 and corn at Brownstown, July 5.

The striped flea beetle (*Phyllotreta sinuata* Steph.) reported damaging strawberry at Marion, June 22.

Blister beetles were common in many sections of the state, but not as abundant as in 1926 according to observations by both Dietz and the writer. The black blister beetle (*Epicauta pennsylvanica* DeG.) was most often reported. This species was injuring potatoes, tomatoes, dahlia and asters from July 29 to Sept. 1, at Columbus, North Vernon, Fort Branch, Goodland, Lafayette, Indianapolis, and Zionsville. The striped blister beetle (*E. vittata* Fab.) attacked eggplant at Anderson, June 20 and Dietz reports injury to tomatoes July 21 at Franklin. The margined blister beetle (*E. marginata* Fab.) damaged dahlia at Cannelton and Tell City, July 15, to flower garden plants at Lafayette the last of July and Dietz records injury to potato by this species at Kempton. Reports of injury to asters at Bridgeport, July 22, and to potatoes at

Kempton, July 27, but unaccompanied by specimens or descriptions to enable identification of species.

The greenhouse centipede (*Scutigera immaculata* Newp.) continues as a pest especially of greenhouse radish and lettuce, in many sections of the state. Each year the extent and range of infestation increases.

FRUIT INSECTS.

Codling moth (*Carpocapsa pomonella* L.) was serious as usual. Winter mortality was negligible. The first moths were observed at Bedford in May and L. F. Steiner observed the first eggs in that locality May 9, although none hatched until May 21 owing to cool, rainy weather. Porter observed the first larvae at Vincennes May 20. The cool weather caused the moths to issue over a longer period than usual and as a result there was no distinct period between hatching of the last first brood worms and the early second brood worms. While heavy losses occurred in some orchards, especially where the full quota of sprays was not applied, the season was unfavorable for the insect. During the emergence of the moths the cool evenings were not favorable for egg laying and the destruction of a large share of the crop by spring frosts was a factor which was unfavorable for optimum increase of the codling moth. Also, during the cool weather of August most of the worms went into hibernation, few of them pupating. As a result there were few pupae from which moths could emerge during late August and the first half of September, when conditions were favorable to the insect, and consequently the number of late worms was reduced to a minimum.

The apple maggot (*Rhagoletis pomonella* Walsh) was very destructive to apple at Bristol and other points in Elkhart County.

Plum curculio (*Conotrachelus nenuphar* Host.) was unusually severe according to Dietz who reports four to eight stings per apple near Indianapolis and 80 per cent of the cherries infested in Lawrence and Orange counties. Dietz says that from reports received, this insect is more abundant on cherries than it has been for several years. Our observations indicate normal abundance excepting where spray operations were incomplete or disregarded, in which cases heavy infestations occurred.

Peach tree borer (*Aegeria exitiosa* Say) was very abundant, largely due no doubt to the fact that some orchards received no treatment in the fall of 1926 because of unfavorable weather conditions. Such orchards were heavily infested.

San Jose Scale (*Aspidiotus perniciosus* Comst.) was somewhat more abundant than in 1926. Winter mortality, according to B. A. Porter, was 69 per cent on old neglected peach trees. It is thought the mortality would be lower in younger orchards. The first brood crawlers appeared at Vincennes about June 1. During the warm, dry weather of October in Southern Indiana the scale multiplied extremely rapidly.

The peach lecanium (*Eulecanium nigrofasciatum* Perg.) was reported abundant on peach at Mitchell during September.

Tarnished plant bug (*Lygus pratensis* L.) was very abundant in

Knox County and vicinity, according to B. A. Porter, and caused considerable damage by "cat-facing" peaches. Porter and Sazama found that certain other species of plant bugs also cause "cat-facing." H. F. Dietz reported tip injury to peach nursery stock at Burns City, Terre Haute, Vincennes and Washington, to flowering spikes of gladioli, causing malformed flowers, at Spencer and to dahlia flowers at Indianapolis and Zionsville. There was probably more damage to gladioli than recorded because most growers credited damage to dry or hot weather which likely was the plant bug injury. Other reports of injury to gladioli and dahlias came from Spencer, Goshen, Liberty, and Plymouth.

Green soldier bug (*Acrosternum hilaris* Say) was reported by Doctor Porter as injuring peach fruit at Vincennes during August. The nymphs were observed feeding on the fruit.

Apple aphids (*Aphis avenae*, *Aphis pomi* DeG., and *Anuraphis roseus* Baker) were comparatively scarce early in the season. At Bedford, April 10, stem mothers and a few young of *A. avenae* and an occasional stem mother of *A. roseus* were present on almost every apple cluster and likewise with every aphid colony was an egg or larva of the common syrphid, *Syrphus americana*. When the same orchard was visited May 2 and 20, respectively, scarcely an aphid remained. On the latter date an occasional cluster of *A. roseus* was observed and apparently the first winged individuals appeared that day. Beginning about June 1 the aphids began to reappear slowly and by June 24 aphids were abundant everywhere. *A. roseus* was spotted but *A. pomi* occurred in large numbers. They were especially destructive to young trees and small trees which had been top-worked following the severe blight damage of 1926. Apple nursery stock was also heavily infested by *A. pomi*.

Black cherry aphid (*Myzus cerasi* Fab.) reported abundant at Clermont, Danville, Greenwood, Indianapolis, Parker, and Pleasant Lake, all localities in center of state excepting the last, which is in the north-eastern corner. They were especially noticeable in June.

Rusty brown plum aphid (*Hysteroneura setriae* Thos.) was abundant on plum at Clermont, Fishers, Greenwood, Indianapolis and Marion.

Grape aphid (*Macrosiphum illinoisensis* Shimer) was reported conspicuously abundant from Terre Haute, June 24, our only report.

Currant aphid (*Myzus ribis* L.) was reported only twice during the season and from Greentown and Clermont. Dietz reports a scarcity of this aphid.

Woolly apple aphid (*Eriosoma lanigerum* Haus.) was unusually abundant on apple throughout the state, reports being received from the last of June to early in August. They were specially noticeable in orchards at breaks and cuts on the branches of small trees where injured earlier in the season by hail. According to Dietz the aerial form was found on apple nursery stock in every nursery in which apple stock was grown.

Apple leafhopper (*Empoasca mali* LeB. *fabae* Harv.) was very abundant and especially serious in southern Indiana to young trees and those top-worked because of blight damage in 1926. The injury was

most noticeable in June when aphids were abundant and in some cases were more responsible for injury than aphids.

Cherry slug (*Caliroa cerasi* L.) was reported only from Lincoln early in July. The last two years have been years of comparative freedom from this insect. Early defoliation by cherry leaf spot probably starved out any slugs which were present.

Rose chafer (*Macrodactylus subspinosus* Fab.) reported damaging rose and apple at Crown Point, June 18, and to grape at LaGrange, June 20. Not nearly as abundant as past few years.

Cotton caterpillar moth (*Alabama argillacea* Hbn.), which was so abundant in 1925 and 1926, was not once observed damaging fruit this year. One unverified report from Vincennes was received.

Yellow-necked apple caterpillar (*Datana ministra* Drury) was reported common on apple at Bargersville and Williamsport in July.

Cecropia moth caterpillar (*Samia cecropia* L.) stripped apple trees at Sheridan early in August.

Bagworms (*Thyridopteryx ephemeraeformis* Haw.) was common in the southern half of Indiana, defoliating or seriously attacking cedar, arborvitae, soft maple, white pine, juniper, willow, boxelder, spirea, tamarisk, dogwood, rose, and apple, especially young, unsprayed apple. The first report was received July 6 and the last August 13. Dietz reports it more abundant in nurseries than usual.

Lesser peach tree borer (*Synanthedon pictipes* G. & R.) was about normal as in 1925 and 1926.

Shot hole borer (*Eccoptogaster rugulosus* Ratz.) was not conspicuous. Some injury was noticeable to winter injured trees. Reports came to us from Indianapolis, Anderson, Columbus, Elwood and Goshen, most of them reporting damage to peach and cherry.

European red mite (*Paratetranychus pilosus* C. & F.) was recorded by Dietz from Indianapolis on apple, cherry, plum and peach.

Wavy-striped flea beetle (*Phyllotreta sinuata* Steph.) damaged strawberry at Marion, according to a report received June 20.

Thousand-legged worms (*Myriopoda*) were reported eating into the fruits of strawberry and causing appreciable loss at Princeton, May 18. Also similar reports from Monticello, June 28.

Strawberry leafroller (*Ancylis comptana* Frohl.) is common throughout the state. Dietz reported it as destructive at Bristol, Goshen, Logansport and Peru.

Strawberry crown borer (*Tygloderma fragariae* Riley) was very common and destructive in the Borden area in Clark County, according to Dietz. The wild host in this region was sterile strawberry or cinquefoil (*Potentilla* spp.). Isolated infestations were reported by inspectors from Bristol, Logansport and Peru, either in low-lying or creek bottom strawberry patches. Attacks by the borer in these localities were all followed by an invasion of the fungus, *Schlerotium* sp.

Strawberry slug (*Harpiphorus maculatus* Nort.) was reported early in June damaging strawberries at Albion and Shelby.

SHADE TREE AND SHRUB INSECTS.

Cottony maple scale (*Pulvinaria vitis* L.) was apparently about as abundant and destructive as in 1926 according to reports and observations. The following counties reported abundance of the insect: Adams, Blackford, Boone, Cass, Decatur, Delaware, Fayette, Grant, Hamilton, Hendricks, Henry, Howard, Huntington, Jasper, Jay, Madison, Marion, Miami, Morgan, Randolph, Rush, Shelby, Tippecanoe, Tipton, Union, Wayne, and Wells.

Scurfy elm scale (*Chionaspis americana* Johns.) continues common on American elm throughout the state and is undoubtedly harmful to young trees.

Oyster shell scale (*Lepidosaphes ulmi* L.) was normally abundant, correspondence and observations the past season recording it from all sections of the northern half of Indiana as destructive to peony, poplar, lilac, quaking aspen, soft maple and apple. The two-brooded light brown form began to hatch May 15 at Indianapolis according to Dietz. At Lafayette the first larvae of the one-brooded form were observed May 31 although the first ones probably hatched a day or two before. This species was hatching June 1-5 at Pennville according to Dietz, where the species was infesting bladdernut (*Staphylea trifolia*) and wafer ash (*Ptelia trifoliata*). Dietz also records this species on prickly ash (*Xanthoxylum americanum*). In a real estate addition near Indianapolis Dietz found 50 per cent of young soft maples infested, at least five per cent dead or dying because of this pest.

The Norway maple leafhopper (species unidentified) was reported by Dietz as causing decided dwarfing of very small (6 to 18 inch) Norway maples in nurseries at Indianapolis, Terre Haute and Evansville. Same species found on terminal growth of 6 to 8 foot trees in same nursery. It is these leafhoppers that make the growing of Norway maple from seed an impossibility in Indiana.

An unusual outbreak of the Norway maple aphid (*Periphyllus lyropicta* Kessler) occurred throughout the state. The honeydew was conspicuous and the premature drying and dropping of foliage was quite noticeable. The first report was received June 3 and scattering reports until about June 20 after which many inquiries were recorded up until after July 9. The following counties were represented in the authentic reports: Bartholomew, Cass, Dearborn, Decatur, Delaware, Elkhart, Fountain, Fulton, Grant, Hamilton, Howard, Johnson, Kosciusko, LaGrange, Madison, Marion, Randolph, Ripley, Rush, St. Joseph, Tippecanoe, Tipton, Wabash, Wayne, and Whitley. The writer drove from Lafayette, Indiana, to Monroe, Michigan, the last of June and in every town the presence of these aphids on hard and Norway maples was evident by the honey dew. In some places almost as conspicuous infestations of other species occurred. These included *Drepanosiphum acerifoliae* Thos. on soft maple, *Chaitophorus negundinis* Thos. on boxelder, *Callipterus ulmifoliae* Monl. on elm, and *Callipterus tiliae* on linden.

Spiraea aphid (*Aphis spiraeicola* Patch) was abundant during June on the young shoots of *Spiraea van Houttei* but not more than normally

abundant. The black sooty mold fungus growing on the honeydew dropped on the leaves was very conspicuous.

Snowball aphid (*Anuraphis viburnicola* Gill.) caused serious malformation of the terminal leaves of common snowball at many places in the state.

Woolly beech aphid (*Prociphilus imbricator* Fitch) was common at Noblesville and Carmel early in August.

The tussock moth caterpillar (*Hemerocampa leucostigma* S. and A.) began hatching at Lafayette, June 3, and caused partial or complete defoliation of soft maple and occasionally boxelder, elm, sycamore and wisteria from the following cities: Anderson, Decatur, Franklin, Greensburg, Indianapolis, Lafayette, Logansport, Milroy, Muncie, Plainfield, Shelbyville, Terre Haute, Washington, and Winchester. During March egg masses were reported abundant from Greenfield, Greentown, New Albany and Spencer, in addition to some of the localities where injury was later reported. The outbreak was not as great as anticipated based on abundance of egg masses last winter.

Poplar tent maker (*Melalopa inclusa* Hbn.) was very abundant on Carolina, Lombardy and Volga poplars at Terre Haute during July.

Catalpa caterpillar (*Ceratonia catalpae* Boisd.) scarce, being slightly more common than in 1926. Only two reports were received, namely Rockville and Springport.

Walnut caterpillar (*Datana integerrima* G. & R.) was very abundant and defoliated walnut and pecan trees at Vincennes according to Porter. It was also abundant the last of July at Bedford. Normally abundant over the state as a whole.

Poplar curculio (*Cryptorhynchus lapathi* L.) was reported very destructive to poplar at Williamsport in June and to willow at Marion, June 27. Dietz reported it as bad in the vicinity of Indianapolis on Lombardy poplar and pussy and weeping willow.

Flat-headed apple tree borer (*Chrysobothris femorata* Oliv.) was a serious pest of young hard maple trees at Lebanon, Newburgh, Huron, Huntington, and Indianapolis, the reports coming in during June, and early July.

Common twig girdler (*Oncideres cingulata* Say) was abundant at Waldron in late September and early October, cutting off branches of persimmon.

Ash tree borer (*Podosesia fraxini* Lug.) was destructive to ash trees at Greensburg, July 15 and at Arcadia, Aug. 31.

Common red spider (*Tetranychus telarius* L.) was reported unusually abundant on evergreens throughout the state according to Dietz. We received reports of injury to Norway spruce, red cedar, elm, and phlox from Goshen, Indianapolis, Lafayette, Marion, Pendleton and Richmond, most of the reports coming in during July.

Bladder maple gall mite (*Phyllocoptes quadripes* Shim.) was reported common on maple at Portland during the first half of June.

Imperial moth caterpillar (*Basilona imperialis* Drury) partially defoliated Norway maples at Princeton early in September.

Bagworms (*Thyridopteryx ephemeraeformis* Haw.) were common

on deciduous and coniferous trees in southern Indiana as reported on page 455.

Hickory horned devil (*Citheronia regalis* Fab.) was common on maple at Decatur in late September. Many specimens were sent in but as unrecognized possible pests rather than as known pests.

FLOWER GARDEN AND ORNAMENTAL GREENHOUSE INSECTS.

Iris borer (*Macronoctua onusta* Grt.) was reported from Bluffton, Greenwood, Goshen, Indianapolis, Lafayette and South Bend and was most destructive in city gardens, no serious trouble having been observed in open field plantings. According to Dietz the eggs began hatching April 15 at Indianapolis and because of cool weather continued through May. He observed the adult emergence in cages from Sept. 28 to Oct. 15, many being crippled because of dry conditions. Dietz observed the following hosts in 1927: *Pongoniris* spp. et var., *Iris pseudacorus*, *I. (Evansia) tectorum*, *I. versicolor*, *I. sibirica*, and *I. spuria*. *Iris graminia* not infested.

Chrysanthemum midge (*Diarthronomyia hypogaea* Coq.) was destructive in a Fort Wayne greenhouse in February and Dietz reports an outbreak at Washington and in northwestern Indiana.

Chrysanthemum leaf miner (*Phytomyza chrysanthemi* Kowarz) was damaging chrysanthemum at Rushville during September.

Bristly rose slug (*Cladius isomerus* Nort.) was common and destructive to garden roses in the vicinity of Indianapolis during June according to Dietz. Other rose slugs occurred commonly in all sections of the state.

Rose beetle (*Macrodactylus subspinosus* Fab.) damaged roses at Crown Point, June 18.

Rose leaf hopper (*Empoasa rosae* L.) was generally common.

Rose scale (*Aulacaspis rosae* Bouche) was reported on rose at Indianapolis.

Cyclamen mite (*Tarsonemus pallidus* Banks) was observed by Dietz in greenhouses at Columbus, Hartford City, Indianapolis, Kokomo, Richmond and Washington on the following hosts, listed in order of importance: Chrysanthemum, Chatelaine begonias, cyclamen, snapdragon, stevia, geranium, and annual larkspur. He found them for the first time out-of-doors this year, at Indianapolis, Richmond and Washington, on hardy larkspur. The light blue *Delphinium belladonna* was very susceptible and in hybrid strains the dark blues seem most susceptible.

The common bulb mite (*Rhizoglyphus hyacinthi* Boisd.) were observed injuring gladiolus bulbs at Mathews, Newcastle and Indianapolis by H. F. Dietz. He observes that the trouble at Mathews was due to storing bulbs in crates previously used for tulips and at the other two places it was due to planting gladioli following Dutch bulbs. Injury to Madonna lily was observed at Columbus, Indianapolis, and Spencer. This mite (Ewing det.) was abundant on bulbs of spider lily (*Ismene calathina*) received March 26 from Greenfield.

Aster woolly root aphid (*Prociphilus erigeronensis* Thos.) continues as a common pest of aster and other flower garden plants throughout

the state. Dietz found it common in a garden at Indianapolis. We have had inquiries from Attica, Coalmont, Lafayette, Leesburg, Madison and Montgomery. Most of the reports were received in July.

Nasturtium aphid (*Aphis rumicis* L.) was common at Universal the first of July. No other reports received in correspondence.

A wasp (*Chorion ichneumonaeum* L.) was reported as annoying digging burrows in flower gardens and lawns at Peru and Ft. Wayne early in August. At the latter place hydrangea plants were being killed.

Tarnished plant bug (*Lygus pratensis* L.) caused considerable loss to a dahlia grower at Spencer the middle of July. The grower reported that these bugs "sap the life from gladioli spikes just as the spikes appear above foliage. They work on spikes from then on to the blooming stage if the spike can hold out that long, which is impossible in most cases. Have seen 100 or more bugs on a single spike."

Common red spider (*Tetranychus telarius* L.) was frequently reported damaging phlox and other garden flowers in central Indiana during July.

Mealy bugs (*Pseudococcus* spp.) were common throughout the state on lemon trees, coleus, and fuschia.

PESTS OF STORED PRODUCTS.

Bean weevils (*Mylabris obtectus*. Say et ? spp.) were repeatedly reported as attacking stored garden beans, cowpeas and soybeans.

Angoumois grain moth (*Sitotroga cerealella* Oliv.) was damaging to stored sweet corn at Thorntown in May.

One of the flour mites (*Tyroglyphus* sp.) was reported by Dietz as heavily infesting the dust from the carrying belts in a large grain elevator at Beech Grove.

Powder post beetles (*Lyctus* sp.) were reported destructive to building timbers at Seymour, Hartford City, Nappanee, Columbus, Vevay and Albion, Russellville and also to spade handles.

HOUSEHOLD AND MISCELLANEOUS PESTS.

Clothes moths (*Tinea pellionella* L.), common carpet beetles or "buffalo bug" (*Anthrenus scrophulariae* L.) and the black carpet beetle (*Attagenus piceus* Oliv.) were reported frequently as damaging clothing, carpets and stuffed furniture. The cigarette beetle (*Lasioderma serricorne* Fab.) was also commonly reported infesting homes, having developed in the filling of stuffed furniture.

Silverfish (*Lepisma saccharina* L.) was common throughout the summer in apartment houses and other dwellings in Indianapolis according to H. F. Dietz. In apartment houses, according to Dietz the insects seemed to prefer the incinerator shutes and from this source invaded the apartments. Inquiries reporting damage to walls, and house furnishings, including rugs, drapes and doilies were received during June, July and August from Elnora, Nappanee, Lafayette and Monon.

Ants were annoying and destructive as usual throughout the state, especially in lawns and houses but occasionally in bee hives and attacking melon seed.

Crickets (*Gryllidae*) were reported sufficiently abundant to be annoying in a house at Lafayette in April.

Bedbugs (*Cimex lectularius* L.) were reported from all sections of the state. One report from Rockville noted their unusual prevalence in poultry houses.

Mosquitoes (*Culicidae*) were reported very abundant at Muncie and Indianapolis in June.

Saddle back caterpillar (*Sibine stimulae* Clem.) was reported the last of August and early September from Greensburg, Liberty and Westport. At the later place they were feeding on sycamore. In other cases it was reported because of its irritating hairs.

Cat and dog flea (*Ctenocephalus canis* Curt.) was normally abundant, many reports being received. Definite reports were received from Burnettsville, Crawfordsville, Culver, Evansville, Fountain City, Ft. Wayne, Gary, Indianapolis, Jeffersonville, Lafayette, Milford, Morocco, Mt. Vernon, Plainfield, Richmond, Tell City, and Troy. The infestations were in dwellings and especially in barns and other farm outbuildings. Two reports referred to lawn infestations.

Termites (*Reticulitermes flavipes* Koll.) were troublesome throughout the state as for the past several years. Reports included the following counties: Blackford, Cass, Clinton, Delaware, Grant, Hamilton, Lake, Laporte, Lawrence, Marion, Montgomery, Morgan, Noble, Putnam, Tippecanoe, Union, Vanderburgh and Wayne.

The feather mite (*Liponyssus silvarium* C. and F.) was abundant and destructive to poultry at Ft. Wayne and Oxford.