Insects and Other Arthropods of Economic Importance in Indiana During 1965

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The bioclimate during the growing season of 1965 was such that two distinct groups of insects were favored at different times. From May until mid-July, dry conditions prevailed and pests such as chinch bugs, potato leafhoppers, armyworms and flea beetles were of economic importance. The period from late July through September was cooler and wetter than normal and insects such as vinegar flies (*Drosophila* spp.) and stable flies increased to economic, and in the case of the stable fly, very annoying levels.

Temperatures were generally cooler than normal in Indiana from January through August of 1965 ("normal" being the 30 year average from 1931 through 1960). May was the only month that was warmer than normal, and temperatures averaged 4.6° F to 6.4° F higher than usual throughout the state.

Precipitation fluctuated a great deal more throughout the state than the temperature did during 1965. Precipitation was generally normal to above normal during January, February, April, July, August and September. Areas of Indiana receiving less precipitation in the above months were the southern one-third during January, and the east central sector and northern one-third during July. Sub-normal precipitation occurred throughout Indiana during March, May and June.

The month of May was particularly interesting in that it combined temperatures of 4.6° to 6.4° F above normal with precipitation that was 0.89 inches below normal in north central Indiana and from 1.27 to 2.71 inches below normal throughout the rest of the state. This combination of high temperatures and low precipitation made for rapid moisture loss which was reflected in the build up of "dry year" insects.

Cereal, Forage and Vegetable Insects

Alfalfa plant bug (*Adelphocoris lineolatus* (Goeze)) populations were unusually abundant in alfalfa throughout the 1965 growing season in Indiana. Mixed populations of nymphs and adults reached densities ranging from 8 to 18 per sweep in the southern one-half of the state during the last two weeks of May. On July 9, densities reached 4-12 per sweep, and on July 30, densities averaged 5-7 per sweep in the southern areas of the state. In the northern areas of the state, alfalfa plant bug populations were not as heavy as in the south and peak densities of 3 to 10 per sweep were reached during the last two weeks of July.

Alfalfa weevil (*Hypera postica* (Gyll.)) populations reached economic densities for the first time since it was discovered in Indiana in 1964.

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The alfalfa weevil extended its range to include twenty-six new counties during 1965 (Posey, Pike, Daviess, Sullivan, Greene, Clay, Owen, Martin, Crawford, Orange, Lawrence, Morgan, Johnson, Bartholomew, Jackson, Washington, Floyd, Clark, Scott, Jennings, Decatur, Shelby, Rush, Franklin, Ripley and Dearborn). Of these twenty-six counties, only Floyd County had economic infestations. Indiana now has a total of thirty-six counties in which the alfalfa weevil is present. It is interesting to note that in 1964 the alfalfa weevil in no case exceeded one adult or larval specimen per 500 sweeps with a 15 inch net. Population densities in 1965 were much higher (1 to 10 per 100 sweeps) in the twenty-six newly infested counties. In 1964 it was anticipated that moderate to severe damage to first growth alfalfa would occur in 1966 in those counties adjacent to the Ohio River. This prediction was based upon data other states (Ohio, Maryland, West Virginia, etc.) had obtained. Since the alfalfa weevil reached economic densities in areas of Harrison and Floyd Counties and approached economic levels in Posey, Gibson, Washington and Clark Counties in 1965, it would appear that this pest is becoming established in extreme southern Indiana more rapidly than expected. The alternative explanation is that the alfalfa weevil invaded Indiana prior to 1964 and is developing similar to the way it has in other states.

Armyworm (*Pseudaletia unipuncta* (Haw.)) infestations caused considerable damage to small grains in southern Indiana during May and early June. Larval populations as high as 2/sq. ft. were found in wheat and barley in areas of Washington, Dubois, Gibson and Knox Counties. Scattered economic infestations were also present in seedling corn throughout the above areas during May and early June. In the northern one-third of the state, scattered reports of damaging armyworm infestations in small grains were received during the latter half of June.

A billbug (*Sphenophorus* sp.) No reports of economic damage were received concerning this insect. It was apparently at the lowest population levels in the last three years.

Black cutworm (*Agrotis ipsilon* (Hufnagel)) populations reached economic levels in localized areas throughout central Indiana during the first two weeks of June, 1965. The largest single infestation occurred in Tippecanoe County where one, forty acre corn field had to be replanted and an adjacent one hundred acres of corn treated with insecticide. In general, infestations were more widely distributed in central Indiana during 1965 than they have been for the past few years.

Blister beetle (*Epicauta* spp.) adults were common in alfalfa during the middle of June, but were of no economic importance.

Cabbage maggot (*Hylema brassicae* (Bouché)) infestations caused serious losses to radishes and turnips in commercial plantings in Howard County during June of 1965. A 25 percent loss in a commercial planting of early cabbage was also reported from Howard County.

The cereal leaf beetle (*Oulema melanopus* (L.)) extended its range in Indiana to Benton, Warren, Tippecanoe, Hancock, Henry, Wayne, Delaware, Clinton and Randolph Counties in 1965. However, the New Carlisle area of St. Joseph and LaPorte Counties remained the only site where heavy populations were present. This was also the case in 1964. Activity

of overwintering adults was delayed approximately two weeks in 1965 when compared with the previous two years. No activity was observed until April 16, 1965. The first egg of the season was found on April 30 on wheat at New Carlisle. Heavy movement of adults from wheat to oats occurred in LaPorte and St. Joseph counties during the week of May 9-15. Peak egg hatch on wheat occurred May 21-23, and in oats, peak hatch occurred June 7-10. Larval populations averaged as high as 3 to 4 per stem in some oat fields around New Carlisle during mid June. Pupation in oats reached the 90% point around May 25 in LaPorte and St. Joseph counties, and peak adult emergence had occurred by July 16. By July 23, 75-80% of the summer adults from oats had gone into aestivation, and all activity had ceased by August 6, 1965.

Two new cereal leaf beetle parasites were released at three sites in the New Carlisle area during 1965. The two parasites, *Tersilocus* sp. and *Hyposoter* sp. were introduced from southern Europe. A total of three parasites of the cereal leaf beetle have now been introduced into northern Indiana.

Chinch bug (*Blissus leucopterus* (Say)) populations reached economic proportions for the first time in three years in northwestern Indiana during 1964. From June 20 through July 16, 1965, heavy chinch bug infestations in corn and wheat (mostly corn) occurred in Jay, Blackford, Delaware, Wells, Adams, Allen and Wabash counties in eastern Indiana and in Lake, Newton, Jasper, Benton and Warren counties in western Indiana. The infestations in the western counties were individually more severe than those in the eastern counties, but the infestations in the eastern areas were more extensive. The chinch bug outbreak in the east central area of Indiana was reported to be the most severe in fifteen years.

Precipitation data from east central Indiana for May, June and July of 1965 shows a deficit of 2.17, 2.74, and 1.17 inches respectively. In the northwest sector of the state precipitation was 1.42 inches below normal during May and 2.35 inches below normal in June. Coupled with the dry conditions that were present in east central and northwestern Indiana were temperatures of 6.4°F above normal during May in the east central area, and 5.6°F above normal in the northwestern area. From the above data it is apparent that chinch bug conditions were optimum for an outbreak during the spring and early summer of 1965.

The clover root curculio (*Sitona hispidula* (Fabr.)) has not been included in this report for a number of years, but the abundance of this insect in alfalfa throughout Indiana during 1965 warrants mentioning at this time.

Adults were extremely abundant in litter of alfalfa fields in Floyd and Harrison counties during mid June. In early September adults averaged two per sweep in alfalfa throughout the northern one-third of the state. The larvae feed on the roots of alfalfa and clover, so the damage caused by this insect is difficult to assess. This is especially true since the major symptom of clover root curculio infestation is wilting of the plants, a condition also associated with plant bugs, aphids, spittlebug and leafhopper feeding.

Injury caused by this insect is most severe in newly planted alfalfa and clover fields during seasons of drought conditions.

Corn earworm (*Heliothis zea* (Boddie)) infestations were slightly higher during 1965 than during 1964. The fall corn insect survey revealed that, on a statewide basis, 11.6 percent of corn plants sampled were infested in 1965 compared to 9.4 percent in 1964 and 2.0 percent in 1963. Infestations in 1965 were still well below those of 1962 which showed a 17.6 percent infestation on a statewide basis. The heaviest infestations occurred in south-south-central (18.8%), south-southeast (19.3%) and south central (9.1%) Indiana. Corn earworm (tomato fruitworm) populations were again light on tomatoes in the commercial growing areas.

Corn flea beetle (*Chaetocnema pulicaria* Melsheimer) populations were much heavier during 1965 than they have been for several years. In late May controls were required in many areas of southern Indiana where adults ranged from 2-11 per plant. In east central Indiana late planted corn was attacked and fields in areas of Jay County had to be replanted. Populations of 10-15 adults per plant were common in the east central area. Populations of flea beetles in the rest of central and northern Indiana were generally light to medium during 1965.

Corn leaf aphid (*Rhopalosiphum maidis* (Fitch)) populations began to build up on corn the first week of July in the southern one-quarter of the state during 1965. By July 23, populations had reached peak densities in the southernmost counties, and infestations were beginning to increase in the northern three-quarters of Indiana. On a statewide basis during 1965, 7.4 percent of the corn plants sampled were severely infested (7.9 percent in 1964), while 23.5 percent had moderate infestations (20.6 percent in 1964) and 34.5 percent had light infestations (37.0 percent in 1964). Maximum infestations occurred in the northern three-quarters of the state where an average of 74 percent of the corn plants sampled were infested. The southern one-quarter had an infestation of 36 percent.

European corn borer (*Ostrinia nubilalis* (Hubner)) densities were noticeably lower during 1965 than in 1964. Indiana averaged 37.5 corn borers per one hundred plants in 1965 (59.6 per one hundred plants in 1964) on a statewide basis, and 25.8 percent of the plants sampled during 1965 were infested. The south-southwest region had the highest percent infested plants (45%) and the greatest number of borers per one hundred plants (62) during 1965. During 1964, this same area had 95.7 borers per one hundred plants. In general, corn borer populations during 1965 were very similar to those of 1963 which had 35.7 borers per one hundred plants on a statewide basis and a yield loss of 1.1 percent. During 1965 the yield loss was 1.1 percent also and there were 34.5 borers per one hundred plants as already stated.

Fall armyworm (*Spodoptera frugiperda* (J. E. Smith)) populations were again very light during 1965. This is the fourth consecutive year that this insect has been at non-economic levels.

Grasshoppers (*Melanoplus femurrubrum* (DeG.), *Melanoplus differentialis* (Thos.) etc.) were not economically important in Indiana

during 1965, and no reports of infestations requiring control measures were received. Populations built up somewhat in the east central and southeast districts during the first three weeks in June, but they never exceeded 2 nymphs or adults per square foot. No adult survey was conducted by Purdue entomologists during the late summer or fall of 1965.

Harlequin bug (*Murgantia histrionica* (Hahn)) was reported severely infesting broccoli in the Corydon area of Harrison County during mid July, 1965.

Hessian fly (*Mayetiola destructor* (Say)) field populations of Race B capable of infesting Monon, Redcoat and Reed have increased in size and virulence over last year. Samples from 381 certified wheat fields showed 82 percent of the Monon fields to be infested, 92 percent of the Reed fields, and 83 percent of the Redcoat fields. Knox 62, a variety resistant to Race B populations, had only 12 percent of the fields infested. While the number of Hessian fly infested resistant wheat fields has increased over last year, the average infestation for resistant varieties is still low. The average percent infestation for Monon was 8.3, Reed 11.3, Redcoat 10.6 and Knox 62 0.6.

Knox 62 still retains its resistance in the field, but is expected to become infested in the future if it is grown over large areas, and Race C or Race D individuals capable of developing on this variety increase in number.

Wheats resistant to all known races of Hessian fly will be released to farmers in the near future.

Losses to fall cabbage from the imported cabbage worm (*Picris rapae* (L.)) were moderate, while cabbage looper (*Trichoplusia ni* (Hubner)) populations were lower during 1965 than they have been for the past few years.

Japanese beetle (*Popillia japonica* Newman) was found in Jennings and Jefferson Counties for the first time during 1965. In Jeffersonville (Clark County) and Washington (Daviess County), Japanese beetles were taken for the first time in three years. The only agricultural infestations were again reported in the Ade area of Newton County, where corn and soybeans were damaged. Adult emergence began the first week of July and reached economic levels around July 16.

Meadow spittlebug (*Philaenus spumarius* (L.)) nymphal populations were unsually heavy in the central and eastern portions of the southern one-quarter of Indiana during May of 1965. Densities of 1-2 nymphs per alfalfa stem were present in many parts of the above areas during mid May, and adult counts of 8-12 per sweep occurred the week ending June 4, 1965. By June 11, the adults had dispersed in the southernmost areas of the state. Migration back into 4-6 inch pre-bloom alfalfa was well underway September 3, when adults averaged 3 per sweep in the southeast district. In mature, post-bloom alfalfa in this same area, adults averaged 2 per 10 sweeps on September 3. In central and northern Indiana, nymphal spittlebug populations averaged 2 to 4 per 10 stems the last week of May. By June 18 adults averaged 2 per 10 sweeps on alfalfa in central and northcentral areas of Indiana, while in the extreme

northeastern area of the state, adults averaged as high as 40-80 per sweep.

Northern corn rootworm (*Diabrotica longicornis* (Say)) damage occurred throughout the state during 1965. Losses were perhaps no greater than in recent years, but more farmers were recognizing the problem. Adult emergence began the week of July 10-16 in the southern one-half of the state, and by July 23 adult densities had increased to 1-2 per silk with some corn fields in southeastern and east central Indiana having as many as 10-15 adults per silk. Scattered adult infestations were being reported from all parts of the state by July 30, and adults feeding on the tips or the corn ears were observed in many areas of west central and central Indiana the week ending August 6. The severe windstorms which occurred during late August in northern Indiana caused heavy lodging in infested fields.

Pale-striped flea beetle (*Systena taenita* (Melsh.)) populations averaged 4-8 per sweep in alfalfa during mid June, 1965 in Floyd and Harrison Counties. In Dubois and Greene Counties during the same period, populations averaged 2 per sweep, while further north in Clay, Owen and Morgan Counties, populations averaged 2 per 10 sweeps in alfalfa. These insects were also present on corn and soybeans in the above areas in mid June.

Pea aphid (*Acyrthosiphon pisum* (Harris)) infestations were first observed on alfalfa in southwestern Indiana the week ending April 10, 1965. By April 24 they ranged 9 to 35 per sweep in the southern one-quarter of the state, and had increased to scattered economic densities of up to 80 per sweep by May first. On May 8, populations had declined to 20 to 40 per sweep in the southern sections, and by May 23, pea aphid densities were down to a level of 5 to 20 per sweep in the southern two-thirds of the state. In the northern one-third of Indiana, pea aphid populations averaged 6 per sweep on alfalfa by May 29. Due to the dry conditions which existed throughout the state during May and June, aphid populations were at a seasons low on June 18 and averaged 3 to 8 per sweep on a state-wide basis. These figures were based upon samples taken from alfalfa fields that had not yet been cut the first time. Populations began to increase as cool temperatures and increased rainfall in July and August promoted lush alfalfa growth throughout the state. Densities of 20 to 40 per sweep were common during mid August in the southern one-third of Indiana, while in the northern one-third of the state, populations were in the range of 10 to 40 per sweep by September 10.

Potato leafhopper (*Empoasca fabae* (Harris)) adults were first found for the 1965 growing season in the southwest and south central areas of Indiana the week ending May 23. Populations increased slowly throughout the state until on June 18, adults and nymphs together averaged 2-5 per sweep on a statewide basis. For the rest of the season adults and nymphs averaged 2-4 per sweep on alfalfa in the southern one-half of the state and were not economically important. In central Indiana, the highest leafhopper densities occurred the last week of June and the first week of July when population in the east central area averaged 6 per sweep and population in the west central area averaged

5-8 per sweep. Economic infestations of potato leafhopper in Indiana were again most general in the northern one-third of the state. From July 16 through July 30, populations averaged as high as 16 leafhoppers per sweep in many alfalfa fields throughout the area. Yellowing was obvious in many fields during the last two weeks of July. The below normal temperatures of June and July were instrumental in preventing more serious losses from this insect, since rainfall in the northern one-third of Indiana during May, June and July ranged 2.4 to 4.2 inches below normal. The above normal precipitation of August and September, plus continued sub-normal temperatures promoted lush third growth alfalfa in the northern one-third of Indiana, and potato leafhopper populations declined to sub-economic levels for the remainder of the season.

Potato tuberworm (*Phthorimaea operculella* (Zeller)) was found in a Vigo County greenhouse infesting ripening tomatoes during April, 1965. In October, the larvae of this insect were again reported from the same greenhouse. Another infestation was reported during October in stored potatoes in Vigo County. These reports are of interest since this potato pest has been very rare in Indiana.

Sod webworms (*Crambus* spp.) infestations in corn plantings following sod caused 10-30 percent loss of corn plants during late May, 1965 in areas of Washington, Clinton and Decatur Counties.

Southern corn rootworm (*Diabrotica undecimpunctata howardi* Barber) adults were common on many crops durnig 1965 throughout Indiana. Scattered adult infestations in Boone County the first week of June caused some portions of corn fields to be replanted. These were the only economic infestations reported during 1965. Adult populations reached their peak densities (based upon black light trap collections) the week of July 17-23, when trap catches ranged from 25 to 505 on a statewide basis.

The soybean cyst nematode (*Hetrodera glycines Ichinohe*) survey was again conducted by the Division of Entomology, Department of Natural Resources in the southwestern section of Indiana. The results were negative.

The stalk borer (*Papaipema nebris* (Guenee)) was again common in Indiana during 1965. In late July, one Jefferson County cornfield had a general infestation of 25 percent. This is somewhat unusual because this insect is normally found only in the border rows.

Tobacco flea beetle (*Epitrix hirtipennis* (Melsheimer)) was unusually abundant throughout the southern tobacco growing areas of Indiana during 1965. Up to 8 adults per leaf were common on young transplants during the last two weeks of June, and treatment was warranted in many fields. By early August, tobacco throughout southern Indiana was infested with populations of 20-30 adults per plant, and feeding injury was apparent.

Tomato and tobacco hornworms (*Protoparce quinquemaculata* (Haw.) and *P. sexta* (Johan.)) were light during 1965. The highest light trap catches of these two insects occurred the week of August 21-27 in Greene County where a combined total of 105 adults were trapped, in Parke County where 106 adults were caught and in Jackson

County where 93 hornworm adults were captured. In general, populations in the northern one-third of the state were at trace numbers, while populations in the southern two-thirds of Indiana were light and very little if any economic damage resulted during 1965.

Vinegar flies (*Drosophila* spp.) were very abundant from late August until the middle of September throughout the state. Weather conditions were ideal for the buildup of this insect on tomatoes. The substantial rains and below normal temperatures that occurred during August and September produced a heavy, early tomato crop and lush weed growth. Many tomatoes rotted in the fields because processors couldn't handle the volume, and the rotting tomatoes provided excellent breeding and food material which contributed significantly to the *Drosophila* buildup.

Serious wireworm (*Melanotus* spp.) losses have been reported for several years from Decatur County, but during 1965, damage to young corn plants was slight. A report of an economic infestation in corn was received from Montgomery County during the spring of 1965, and a 36-acre field of corn in Ripley County was severely attacked.

Fruit Pests

European red mite (*Panonychus ulmi* (Koch)). The first hatch of over-wintering eggs was on schedule (when trees of the variety Red Delicious were showing pink) but early season development was at least 2 weeks slower than normal. Summer populations were below those of the past 4 or 5 years.

Codling moth (*Carpocapsa pomonella* (L.)). Caused very little loss of commercial apples in Indiana this season. Some worms and stings plagued those growers that missed important covers or tried to stretch coverage too far. In one small isolated orchard near Vincennes in which control measures were omitted, the codling moth population developed to approximately 95% infestation of the apples, thus showing the potential of this insect.

Four-spotted spider mite (*Tetranychus canadensis* (McGregor)). Apparently rare in Indiana. Only a few individuals have been identified in Vincennes' collections. They very closely resemble *T. telarius* in appearance and habits.

San Jose scale (*Aspidiotus perniciosus* (Comst.)). A few orchards are reporting a persistent population of San Jose scale which appears to be resistant to many of the currently recommended control procedures.

Strawberry leaf roller (*Ancylis comptana fragriae* (Walsh & Riley)) required control on strawberries during late May in Corydon area of Harrison County.

Oriental fruit moth (*Grapholitha molesta* (Busck)). Because of the drastic reduction in crop, many growers did not apply all of their spray program this year. As a result, there was a high percentage of flagging by oriental fruit moth in our peach orchards. This situation persisted through much of the season, and I anticipate we will have continued problems next season.

Lesser peach tree borer (*Synanthedon pictipes* (G&R)). This insect is showing a steady increase in peach orchards in southwestern Indiana.

Populations are larger than they have been for many years. Adult emergence began in April and continued into October.

Plum curculio (*Conotrachelus nunephar* (Hbst.)) was not a problem in well kept commercial orchards in southern Indiana during 1965. However, a few instances of injury occurred where proper control measures were not initiated in the petal fall period. A heavy infestation was reported in late June on apple, apricot, peach, plum and almond trees in the Columbia City area of Whitley County.

Two-spotted spider mite (*Tetranychus telarius* (L.)). While some mites were active in April, populations did not reach any economic levels until June. Northern Indiana had much more of a problem with this mite than did southern Indiana.

Red-banded leaf roller (*Argyrotaenia velutinana* (Walker)). Populations were extremely low and except for a few isolated blocks caused no commercial concern.

Forbes scale (*Aspidiotus forbesi* (Johns.)). Not a problem in 1965.

Shot-hole borer (*Scolytus rugulosus* (Ratz.)). Present, but not regarded as an economic problem in properly sprayed orchards. The insect was more prevalent than in the past 2 or 3 years.

Rosy apple aphid (*Anuraphis roseus* (Baker)). Generally contained, but isolated trouble spots did occur in southern Indiana. Some northern Indiana growers had problems this year also. The outbreaks did not take a very great toll so far as harvested apples are concerned.

Apple aphid (*Aphis pomi* (DeG.)). This aphid is persistently present and perhaps was on the increase in southern Indiana this year. It has been a common practice of many of our growers to ignore the apple aphid, or green aphid, and to aim their control measures only at the rosy aphid. This situation may soon have to be changed.

Wooly apple aphid (*Erisoma lanigerum* (Hausm.)) aerial forms are becoming more numerous in orchards in southern Indiana. There is more and more evidence that this insect is escaping normal control measures. It is not of commercial concern at present, but this aphid bears watching.

Garden webworm (*Loxostege similalis* (Guenee)) larvae heavily attacked onions in one area of Clay County during June.

First fall webworm (*Hyphantria cunea* (Drury)) infestation of the season were observed on mulberry June 5 in Harrison County and June 10 in Tippecanoe County. Webworm populations were very prevalent in woodlots and lawns in the suburban Vincennes area, and were a nuisance on the periphery of several orchards. In the Plymouth area of Marshall County, webworms moved from woodlots into adjacent blueberry plantings during early September, causing concern to growers.

Peach tree borer (*Sanninoidea exitiosa* (Say)) infestations were relatively unimportant in commercial orchards during 1965. However, apricot and peach trees in the Lafayette area of Tippecanoe County and Bridgeport area of Harrison County were attacked to the extent that many trees in nurseries and private plantings had to be destroyed.

Apple maggot (*Rhagoletis pomonella* (Walsh.)) infestations were reported on crab apple during mid September in Tippecanoe County.

This insect is not a problem in the southwestern section of Indiana where a number of commercial orchards are located.

Yellow-necked caterpillar (*Datan ministra* (Drury)) larvae were reported severely infesting apples in one area of Cass County during mid July, 1965.

Pear slugs (*Caliroa cerasi* (L.)) were reported injuring cherry trees at Osgood, Ripley County during late June.

Livestock Insects

Cattle grub (*Hypoderma lineatum* (deVillers)) activity during 1964-65 was similar to 1963-64 when high winter counts of grubs were observed in the backs of western feeder stock that had been shipped to Indiana.

Face fly (*Musca autumnalis* (DeGeer)) population trends followed those of 1964 very closely. Summer populations remained low until September when a slight buildup occurred. Generally, this insect was at sub-economic levels during 1965.

Horn fly (*Haematobia irritans* (L.)) populations were slightly higher during 1965 than they were in 1964. Populations were generally low during 1964, so the slight increase in 1965 still left the horn fly at relatively low densities.

Horse fly (*Tabanus atratus* Frabicius) were relatively light in early and middle summer. Populations became more noticeable during the latter part of September, but remained at low densities.

Horse fly (*Tabanus atratus* (Fabricius)) were relatively light in Indiana for the third consecutive year.

Stable flies (*Stomoxys calcitrans* (L.)) were present in heavier densities from late July until October during 1965 than they have been for a number of years. Not only was this insect very annoying around farms, but also in the lake area of north central and northeastern Indiana.

Pests of Man and Households

Boxelder bug (*Leptocoris trivittatus* (Say)) populations were heavier than 1964. This is based upon the increased number of reports of adult migrations into homes during the fall of 1965.

Cat flea (*Ctenocephalides felis* (Bouche)) infestations in homes were more widespread and numerous during 1965 than they have been for several years.

Carpenter bee (*Xylocopa virginica* (L.)) damage to window sills, casings and roof overhangs in areas of Tippecanoe County occurred during May of 1965.

Very few reports of cluster fly (*Pollenia rudis* (Fabricius)) infestations were received from homeowners during 1965.

The giant hornet (*Vespa crabro germana* (Christ)) was collected for the first time in Indiana during 1965. One adult was collected on June 29, in the New Albany area of Floyd County. Two additional collections were made later in the summer, one in Washington County and one in Clark County.

Yellow jacket (*Vespula maculifrons* (Buysson)) populations were unusually heavy in domestic situations throughout Indiana. These insects were very troublesome during the State Fair at Indianapolis.

Japanese weevil (*Calomycterus setarius* Roelofs) was reported severly infesting a home at Logansport, Cass County. The infestation was heavier than anyone remembered seeing for many years.

Larder beetle (*Dermestes lardarius* L.) reports were conspicuous by their scarcity during the spring and summer of 1965.

German cockroach (*Blattella germanica* L.) continued to be the chief pest in eating and food processing establishments. Suspected resistance to chlorinated hydrocarbon insecticides has been reported.

Asiatic oak weevil (*Cyrtepistomus castaneus* (Roelofs)) migrations into homes in extreme southern Indiana began in mid June and continued throughout the summer. This insect was considered to be rather rare in Indiana prior to 1965, and there were never more than a few reports of infestations in any year prior to 1965. Adults were also common on alfalfa in the south central area of the state.

Strawberry root weevils (*Brachyrhinus ovatus* (L.)) began invading homes in southern Indiana in June and continued throughout the summer, spreading northward as the summer progressed. The populations during 1965 were heavier than 1964, which in turn were heavier than normal.

Subterranean termite (*Recticulitermes* spp.) reports were fewer during 1965 than in 1964. These insects remain the major pest of structures in Indiana.

Dog ticks (*Dermacentor variabilis* (Say)) and (*Rhipicephalus sanguines* (Latr.)) were heavy in central Indiana during late spring and early summer.

Bald-faced hornet (*Vespula maculata* (L.)) populations were reported at the highest levels ever observed in the metropolitan Indianapolis area during 1965.

Turf, Tree, Shrub and Forest Insects

The Columbian timber beetle (*Corthylus columbianus* Hopk.) was recovered from sycamore; this represents a new record for the state. In general, populations were at low densities throughout Indiana.

The walkingstick (*Diapheromera femorata* (Say)) is represented by high population densities in one Starke County stand. Black oak dominates the stand but white oaks are present in small numbers and are also fed upon. High populations have been observed for six continuous years and there is evidence that this outbreak has been maintained for over ten years. This annual outbreak contrasts with Michigan, Minnesota and Wisconsin populations which appear in alternate years only.

An ambrosia beetle (*Xyloterinus politus* (Say)) was present in Tippecanoe County in silver maple (new county record) and in silver and red maple in Dubois County.

European pine shoot moth (*Rhyacionia buoliana* (Schiffermuller)) populations were heavier in 1965 than for the past several years.

Honey locust mite (*Eotetranychus multidigituli* Ewing) continued to cause defoliation of thornless honey locust trees in August. Trees weakened by transplanting or other injury appeared to be most severely damaged.

The leafroller (*Tortrix pallorana* Rob.) a pest of recently transplanted pine trees, was hardly noticeable in 1965.

The brown race of the oystershell scale (*Lepidosaphes ulmi* (L.)) continues to be destructive on redbud, silver maple and ash. The overwintering eggs hatched about a week earlier than normal.

The mimosa webworm (*Homadula albizziae* Clarke), a pest of mimosa and honey locust trees which had been of less importance during the 1964 growing season appears to be building up into destructive numbers again. Many trees were heavily webbed in August.

The maple bladder gall (*Vasates quadripedes* (Shimer)), a common problem on silver maple trees, continued to be the source of many inquiries throughout the state.

The eastern tent caterpillar (*Malacosma americanum* (Fabricius)) population was very heavy in the southern 1/3 of the state and was noticeable northward to the Michigan-Indiana state line. Heavy infestations (8 to 15 webs per tree) were noticeable in many southern locations. Locally heavy migrations of the larvae caused concern in southern counties.

European pine sawfly (*Neodiprion sertifer* (Geoffroy)) populations were heavier in 1965 than they have been for the past two years. Damaging infestations in commercial pine plantations were reported from Hamilton, Jasper, Tippecanoe, and Whitley Counties.

The pales weevil (*Hylobius pales* (Herbst)) was increasingly common in Brown, Elkhart, Jennings, Jefferson, Knox, Marion, Monroe, Spencer, Tippecanoe, Warrick and Vanderburgh counties. Many red and Scotch pine trees were killed and adult feeding scars were easily found on the pines in May and June.

The smaller European elm leaf beetle (*Scolytus multistriatus* (Marsh)) was more abundant in 1965 than for the past several seasons. Consequently, the number of trees showing symptoms of Dutch elm disease was larger.

The Zimmerman pine moth (*Dioryctria zimmermani* (Grote)) continues to be a problem in commercial Christmas tree plantations and nurseries. Damage was noticeable in Porter County plantings during the summer of 1965.

Sod webworms (*Crambus* spp.) while common were not as destructive to lawns as in recent years. One possible explanation lies in the fact that heavy damage occurred in 1963 and 1964 when the summer months were characterized by extended periods of drought. During 1965, the middle and late summer period was characterized by below normal temperatures and above normal precipitation, conditions which together promoted vigorous growth of lawns throughout the state, which in turn would tend to outgrow webworm damage. Another possibility is that the cool, wet middle and late summer affected the webworm populations themselves, and caused a reduction in their densities.

The southern pine engraver (*Ips grandicollis* Eichh.) and its frequent associate (*Corticeus parallelus* (Melsh.)) were found infesting red pine trees weakened by the attack of the pales weevil in Spencer County.

The maple petiole borer (*Caulocampus acericaulis* (MacGillivray)) infested several large sugar maples in Tippecanoe County.

The tulip tree callous borer (*Euzophera ostricolorella* Hulst) continues to cause trouble in Marion and Tippecanoe counties.

The tulip tree scale (*Toumeyella liriodendri* (Gmelin)) was very common on yellow poplar, causing disfiguration of trees, lawns, cars, and lawn furniture because of the black sooty mold which grows in the abundant honeydew.

The cottony maple scale (*Pulvinaria innumerabilis* (Rathvon)) was again abundant on silver maples in the Fowler area.

The spruce spider mite (*Oligonychus ununguis* (Jacot)) populations were heavy in Tippecanoe and Madison counties early in the spring. Trees were so heavily webbed that they appeared to be covered with "angle hair."

The bronze birch borer (*Agrilus anxius* Gory) continues to kill many white birch trees throughout the state. The droughty summers of the past several years undoubtedly contributed much to weakening the host trees and making them attractive to the borer.

Nantucket pine moth (*Rhyacionia frustrana* (Comstock)) population continues at low ebb in southern half of the state.

The broad-necked root borer (*Prinous laticollis* (Drury)) was found seriously damaging a shipment of hemlock in a nursery in Marion County.

The fall cankerworm (*Alsophila pometaria* (Harris)) populations, while noticeable, did little damage in 1965.

Bagworm (*Thyridopteryx ephemeraeformis* (Haworth)) populations were generally heavier during 1965 than in 1964. Both evergreen and deciduous trees and shrubs were damaged.

Elm leaf beetle (*Galerucella luteola* (Muller)) adult activity in homes during the spring months was unusually heavy in 1965, and first generation larval infestations on Chinese elm were much heavier and widespread than in recent years. Apparently the cooler than normal middle to late summer temperatures and the normal to above normal precipitation curbed second generation larval development, since reports of damage declined toward the latter part of the summer, and the number of reports of adults entering homes in early fall were no more numerous than in previous years.

Sycamore Lace bug (*Corythucha ciliata* (Say)) caused less damage to trees than in recent years.

Fletcher's scale (*Lecanium fletcheri* Cockerell) was less troublesome on yews than in 1964.

The white-marked tussock moth (*Hemerocampa leucostigna* (J. E. Smith)) caused little concern in 1965.

Juniper tip midge (*Oligotrophus* spp.), a pest of cannaert junipers, was again of little importance during 1965.

May beetle (*Phyllophaga* sp.) adults defoliated pin oaks in areas of Tippecanoe and Marion counties during mid May.

Rose chafer (*Macrodactylus subspinosus* (Fabricius)) adults caused heavy damage to flowers and shrubbery in areas of Noble, Pulaski and Elkhart counties during mid June.

Lilac borer (*Podesesia syringae syringae* (Harris)) was more damaging during 1965 than for a number of years.

A barberry webworm (*Omphalocera dentosa* Grote) infestation was found damaging holly in the Martinsville area of Morgan County during August. This is a new *host* record for this pest in the United States.