

Insects and Other Arthropods of Economic Importance in Indiana During 1979

ROBERT W. MEYER, Department of Entomology
Purdue University, West Lafayette, Indiana

Introduction

Cold weather finally arrived with the new year, with weekly temperatures averaging from 1-17° F. (1-9° C.) below normal through Jan. and Feb. (weather data summarized from "Indiana Weather & Crops"). Even so, soils at most froze to a depth of only 6 inches, protected as they (and many insects) were by snows as much as 20 inches deep. Soil moisture through much of the year ranged from adequate to surplus in the S half of the state. Sporadic flooding was a problem there, and corn planting fell behind that of the N. In the N half of the state soil moisture ranged from short to adequate as early as May and through the summer, but only a few areas suffered losses because of overly-prolonged droughty periods. The rainfall pattern probably resulted in the population patterns observed in the corn borer, which in early instars is sensitive to excess rainfall.

Through much of the year temperatures were on the cool side. The greatest meteorological difference between 1979 and previous years was in solar radiation, which was the lowest on record and much lower than the previous, 1968, low. The total effect of this factor on insects activity is even less well known than its effect on crop yield. Whatever the factors responsible, adverse activity by arthropods was generally less than that of the previous year.

Corn and Small Grains

While there was undoubtedly some damage by western (*Diabrotica virgifera*) and northern corn rootworm (*D. longicornis*) larvae to grain corn, especially since rainfall was not always adequate in the N where these species are more common, the damage was probably little worse than that of 1978, a relatively light year. Since larval counts are difficult to make, the results of adult surveys made in 175 fields from 7-21 Aug will be used as indicators of population levels of western corn rootworms. Mean numbers in the NW dropped from the 1977 figure of 0.7/stalk to 0.5, the NC from 0.9 to 0.7 and the NE from 1.0 to 0.3. West Central figures increased from 0.3 in 1978 (they were not a factor through most of the C districts in 1977) to 0.6, and remained at about 0.3 in the remainder of the C districts. In the S districts they remained under 0.1/stalk. The same trends, though at a lower level, were observed among the northern corn rootworms; there was an increase only in the NE. Ratios of western to northern adults ranged from 90:10 in the NW to 4:96 in the SE. Sticky trap catches in an untreated field in Tippecanoe Co. in 1979 were about as high in totals of both species together as they were in 1977; only the ratios changed. The ratio of WCR:NCR in 1977 was 31:69; in 1978, 70:30; in 1979,

92:8. The total catch in 10 traps of both species in the three years: 17470, 8451, 17460, respectively. Few if any fields needed treatment to prevent economic injury to the silks. Adults were collected in Gibson, Perry, Spencer, Vanderburgh and Warrick counties—all new county records for the WCR.

Larval European corn borers (*Ostrinia nubilalis*) averaged 127/100 stalks in the fall survey, the second highest average in survey history, exceeded only by the 200/100 stalks of the 1978 survey. Since the population in the S half of the state was below this average, this left the N with very high numbers. The NNW corner of the state had the highest average ever obtained in a district—463/100 stalks. A Newton Co. field had an average of 1000/100, and four counties averaged more than 400/100—Pulaski with 598; Starke, 595; Newton, 452; and Jasper, 402. Pupation of the overwintering larvae had begun by mid-May as far north as Porter Co., and adults were collected on 16 May in Knox Co. Black Light (BL) trap collections were at their lowest about mid-July which probably marked the beginning of the second flight (at least in the S), which was still going strong at the end of August when the trapping season ended.

Corn leaf aphid (*Rhopalosiphum maidis*) populations were very late in appearing on grain corn. There is evidence that the greatest damage by this species is done while the tassel is still in the whorl. This year very few populations were observed before the tassel had escaped the whorl, even though populations were observed in sorghum as early as mid-June in Vigo Co. A susceptible variety, N28 x B37, grown to monitor aphid pressure, averaged 103.7 aphids/stalk, counted when the tassel could just be seen. Last year's level: 163.5. Populations began to build in the northern half of the state after tasseling had begun. However, by the end of September 47.5% of the crop had this aphid, sometimes in large numbers and in many places on the stalk. Since the populations were mainly in the N, that area was indeed heavily infested.

Oat bird-cherry aphids (*Rhopalosiphum padi*) were first observed—in small numbers—in Harrison Co. by the beginning of May. This species normally attacks small grains, and does not build to large numbers until the grains are beginning to yellow. At this time they are frequently conspicuous because of their dark color on wheat heads, primarily in the southern half of the state. This year they were practically non-existent on small grains, but increased in such numbers on corn, primarily in the N half of the state, that when handled the stalks became wet and slippery because of crushed bodies of the insects. Green plants sometimes glistened with their honey dew. They apparently do little if any harm to corn but are vectors of barley yellow dwarf disease in small grains. Indeed, late in September they were beginning to move to the newly sprouting wheat in numbers so large that they might have been responsible for injury to that crop in some areas. Their primary host is *Prunus* sp.

Mean percent infestation by the Hessian fly (*Mayetiola destructor*) averaged 1.1 for all wheat cultivators surveyed (USDA, Ind. Crop

Improvement Association and Purdue cooperating), down from the 8.3 of last year. Cultivars having no source of resistance averaged only 2.2%. Cultivars having W38(H₃) sources of resistance averaged 2.1; Ribeiro (H₅), only 0.8. Mean number of puparia/100 stems for all cultivars was 1.3.

Forage Legumes and Soybeans

Fall 1978 oviposition by the alfalfa weevil (*Hypera postica*) in a Harrison Co. alfalfa field averaged 57 eggs/15 cm² by 2 Dec, which was near the end of the oviposition period. About the same number were present 13 Mar, 1979, with little apparent loss due to the winter. On that date the first adults were observed, about 2 weeks earlier than 1978. By 21 Mar, with alfalfa 3 cm tall, eggs averaged 100/15 cm² and larvae were present on about 4% of the stems. By 9 Apr 43% of SC alfalfa was infested, averaging 10 cm and 1.9 larvae/infested plant; treatment was recommended for two-thirds of the fields surveyed. Though growth was lush and tended to mask the damage, treatment was probably in order on nearly all of the alfalfa S of US 50. Perhaps even half of the alfalfa between that highway and Indianapolis would have profited by treatment. Occasional economic damage was observed between Indianapolis and US 30 on the N, but N of US 30 damage again was severe, particularly when dry weather accentuated the damage effected by the weevil.

Disease (see under Beneficial Organisms) arrived too late to prevent severe damage, and the adults that developed from larvae which escaped infection were sometimes numerous enough to delay regrowth.

The first potato leafhopper (*Empoasca fabae*) was observed 7 May in Howard Co. alfalfa. Alfalfa in the S districts was at or near treatment level by mid-June, and early in July the rest of the state had reached that stage. Pest management administrators from the N and C districts frequently named this insect as one of the most severe pests of the year. This year the presence in stubble of economic infestations in scattered fields at both ends of the state was unusual.

The first adult Mexican bean beetle (*Epilachna varivestis*) of the year was swept from alfalfa 9 May in Owen Co. Adults were observed on snap beans in Lawrence Co. 15 May. The first egg mass of the year on soybeans was seen in Jennings Co. 30 May, and first instars were present by 11 June in Lawrence Co. In Owen Co., 21 Jul, 46% were late instar larvae, 49% pupae and about 5% adult in a field in which all stages together averaged 11/meter. This generation was slow beginning ovipositing; in some instances the resulting larvae proved beneficial, helping to remove the leaves of the plants to speed drying. This insect was the only significant pest in soybeans this year. Though infestations were observed in Tippecanoe and Jay counties north of Indianapolis, almost all economic problems with it were south of that city. This means, as one survey showed, about 24% of all soybeans showed feeding by Mexican bean beetles. A goodly portion of the southern fields was infested. At \$6-7/acre, estimates put the acreage

treated at about 400,000, of which about 60% was treated unnecessarily or prematurely.

Vegetables

Of the garden pests the most conspicuous this year was the squash vine borer (*Melittia satyriniformis*); less damaging, but nearly as conspicuous because of the distinctive nature of the injury, was the four-lined plant bug (*Poecilocapsus lineatus*.)

Ornamentals, Forest, Shade and Fruit Trees

Lawn and golf green problems this year included armyworm (*Pseudaletia unipuncta*) larvae and the grubs of the northern masked chafer (*Cyclocephala borealis*). A more general pest, the Japanese beetle (*Popilia japonica*) was noted in a variety of situations. Ornamental plantings suffered heavily from two scales, the oystershell (*Lepidosaphes ulmi*) and the cottony maple (*Pulvinaria innumerabilis*). The prime evergreen pest was probably the European pine sawfly (*Neodiprion sertifer*), and among the deciduous trees, though several species were present, the green fruitworm (*Lithophane antennate*) and cankerworms were the most widespread. Of the insects attacking peaches, the lesser peachtree borer (*Synanthedon pictipes*) was at the highest level in the last four years, as indicated by pheromone traps in Knox Co. Adults were taken at a mean rate of 63/trap/week from 3 May-10 Oct. Of the apple insects, the redbanded leafroller (*Argyrotaenia velutinana*) also reached a four-year peak—18 adults/trap/week from 5 Apr to 17 Oct, in the same county.

The arthropods reported most frequently by nursery inspectors during 1979 were:

1. Fall webworm, *Hyphantria cunea* (Drury)
2. Maple bladdergall mite, *Vasates quadripes* Shimer
3. Bronze birch borer, *Agrilus anxius* Gory
4. Oystershell scale, *Lepidosaphes ulmi* (Linnaeus)
5. Japanese beetle, *Popillia japonica* Newman
6. Spruce needleminer, *Endothenia albolineana* (Kearfott)
7. Birch; leafminer, *Fenusa pusilla* (Lepelletier)
8. Bagworm, *Thyridopteryx ephemeraeformis* (Haworth)
9. Velvet mite, *Eriophyes aceris* (Riley)
10. Peachtree borer, *Sanninoidea exitiosa* (Say)

Man and Animals

There was a slight decline in the number of household pest problems referred to the Extension Service, the second time the total has been under 200/year. There was no significant difference in the species involved from lists of previous years. The German cockroach (*Blattella germanica*) and the eastern subterranean termite (*Reticulitermes flavipes*), remain the main reasons for requesting the services of pest control companies, with no significant change in intensity level. There has been a tendency in recent years for carpenter ants (*Camponotus* sp.) and fleas (primarily *Ctenocephalides felis*) to increase their im-

portance in this respect. And of the more serious problems, there were by mid-October only two confirmed cases of St. Louis encephalitis reported from the state.

Beneficial Organisms

A fungus, *Entomophthora phytonomi*, which has been responsible for keeping the clover leaf weevil (*Hypera punctata*) in check, was observed in many counties this year attacking the alfalfa weevil (*Hypera postica*). While widespread, it was only occasionally intense and then too late to prevent serious damage to alfalfa. One Harrison Co. field, untreated and unharvested, had nearly 100% weevil mortality after the disease struck. Adults however emerged in large numbers from the larvae that had completed their development prior to the onset of the disease.

Parasitism by *Bathyplectes anurus* and *B. curculionis* was measured by rearing alfalfa weevil larvae collected from alfalfa by sweeping. The rate of parasitism by these species surpassed 25% in only the SC district (27%), average 15% statewide (1978:23%). *B. anurus* was collected for the first time from Franklin, Jackson, Johnson, and Orange counties.

A parasite of adult alfalfa weevils (*Microctonus aethioides*), was reared from a wide range of counties from the Ohio River to the Michigan border, and may be presumed to be present over most of the state. It was collected for the first time from 24 counties: Clay, Daviess, Elkhart, Fayette, Franklin, Harrison, Huntington, Jackson, Johnson, Knox, LaGrange, Lake, Morgan, Noble, Owen, Porter, Ripley, St. Joseph, Shelby, Vermillion, Vigo, Wayne, Wells, and Whitley.

Another adult weevil parasite, *Microctonus colesi*, was collected, the first time in the state, from Harrison Co.

The cereal leaf beetle (*Oulema melanopus*) egg parasite, *Anaphes flavipes*, was collected for the first time from Brown, Green, Monroe, Morgan and Owen counties.

The ratios (in percent of the total of these species) among the spotted (*Coleomegilla maculata*), the convergent (*Hippodamia convergens*), the 13-spotted (*H. tredecimpunctata*) and *Cycloneda sanguinea* lady beetles as indicated by sticky trap collections in an untreated Tippecanoe Co. corn field in 1977, 1978, and 1979 follow: 27:65:3:5; 69:6:16:9; and 81:9:3:7. Since the traps are in operation from early June to mid-October, i.e., when the various species peak, the ratios give some indication of the relative abundance of the species, and in this case, the growing importance of *C. maculata*.

Rhinocyllus conicus, a curculionid that feeds as a larva on the seeds of the musk thistle, has apparently established itself in Ohio, Switzerland, and Johnson counties.