

Insects and Other Arthropods of Economic Importance in Indiana in 1983

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Introduction

The 1983 Indiana year from January to October readily divides into 3 climatic "seasons". The first three months (January-March) were warmer and drier than usual, averaging (in Indianapolis) from 3 - 5 degrees (F) warmer than the mean and with less than half the normal precipitation at least during the first 2 months. April ushered in the second "season" with cool, wet weather that delayed planting and slowed development. The third "season" starting about mid-June, brought higher than normal temperatures. Worse still, surface soil moisture, characterized as surplus through May, regressed to mostly adequate through mid-July, to mostly short for the rest of the summer. As an indication of the impact of the drought and heat, 13% of the 7500 corn stalks examined during September and October through most of the state were barren; the dry year of 1980 figure was only 5%. Dry weather seems to increase the incidence of smut in corn. Nine percent of the 7500 stalks had at least some smut galls, and 1% of the ears were supplanted entirely by smut. (The 1980 galls were however generally much larger.) Aflatoxin, produced by the fungus *Aspergillus flavus*, was found to be present in about 3% of the some 500 fields surveyed, also higher than normal.

A second factor impacted the 1983 yield of corn and wheat. The Federal government, in order to cut production, offered growers grain if they would idle acres—the payment-in-kind (PIK) program. About 2,600,000 acres were idled in the corn program (about 40% of the 1982 acres harvested) and 210,000 acres in the wheat program, about 19% of the 1982 crop. PIK acres were to be planted to a cover crop, and if that crop was sorghum, oviposition by corn rootworms might necessitate crop protection measures in 1984. There were growers who planted nothing and did little to control the weeds. These may have weed problems as well as insect problems in 1984. The only insect consistently observed in numbers in PIK acres was the corn flea beetle (*Chaetocnema pulicaria*).

Corn and Small Grains

In 1982 it was estimated that insecticides for the control of the western corn rootworm (*Diabrotica virgifera*) and the northern corn rootworm (*D. barberi*) were used on about 40 % of the corn planted. This year when given the opportunity to idle acres it would seem wisest to idle corn-on-corn acres. If that were possible in all instances the PIK program would have reduced insecticide usage by 40%. No reliable data are available at this time on insecticide usage in 1983. The western corn rootworm both because of its numbers and because there was less moisture in the soil to compensate for the loss of roots was probably more harmful to corn than last year.

The first first-instar of the western corn rootworm was collected 13 June in Tippecanoe Co. A prepupa was collected in Parke Co. on 22 June and the first adult was reported there on 5 July. It is probably that adults were present earlier because all reports at this time were of multiple beetles in each field. In the annual survey of adults, which was conducted at the end of July and the beginning of August—before the migratory flights begin—an average of 0.97 beetles/stalk was counted, the highest average since 1977, the first year of the survey for this insect. Four districts

averaged more than 1 western corn rootworm beetle/stalk (NC, C, SW, SE), a record. Three counties (Sullivan, Jennings and Decatur) averaged more than 2 beetles/stalk, also a record. The counts this year were probably more accurate than in previous years; the extremely hot and dry weather forced the beetles into crevices they were reluctant to leave, resulting in a much more sedentary population.

Counts of the northern corn rootworm in July and August indicated a state average of 0.07 beetles/stalk, half last year's number.

A total of 14,473 specimens of both species was collected on 10 sticky traps in a treated corn field in Tippecanoe Co. from 27 June to 19 September, as compared with 17,366 from 11 Jun to 23 September in 1982. The ratio of westerns to northern was 92:8.

The reduction by 40% of corn acreage would not have affected this year's counts which were mostly pre-migratory. Migration later was limited to 60% of the normal acreage which should result in a concentration, i.e., heavily infested fields next year, but fewer of them, given normal oviposition.

Pupae of the European corn borer (*Ostrinia nubilalis*) were seen by 11 May and 2 males were taken in a BL trap on 20 May (Davies Co.) First generation moths flew from mid-May to mid-July; a Posey Co BL trap collected more than 200/week during the whole month of June. Second generation moths flew from mid-July through August (trapping stopped then) and in very large numbers especially in the north of Indiana. A trap in Jasper Co. collected 1000-plus moths/night for a few nights. Statewide at season's end live larvae/100 stalks averaged 84.2. Except for the northern fourth of the state the average would not have exceeded 50/100 stalks; NC counties averaged 250/100, NE counties averaged 187 while the counties from Montgomery north averaged 145. The 20 year average for the state is 62 larvae/100 stalks. An Elkhart Co. field had an average of 950 larvae/100 stalks, the highest observed in the 300 fields surveyed.

Only 12% of the 7500 stalks surveyed in the fall showed signs of having hosted the corn leaf aphid (*Rhopalosiphum maidis*), and more than half of those had sub-economic populations. This aphid developed to huge numbers in the dry spell of 1980, but failed to do so this time.

Bird cherry oat aphids (*R. padi*), which prefer rather moist environments, were almost absent from corn fields this year, and were no problem in wheat.

Armyworms (*Pseudaletia unipuncta*) and black cutworms (*Agrotis ipsilon*) were only minor problems affecting probably fewer than 1000 acres this year. Neither the corn earworm (*Heliothis zea*) nor the fall armyworm (*Spodoptera frugiperda*) were common in ear tips of field corn this year.

Hessian fly (*Mayetiola destructor*) experienced a good winter and spring, and growers who planted non-resistant varieties of wheat sometimes sustained heavy losses. The data from the only survey made (by the Agriculture Research Service of the USDA, the Indiana Crop Improvement Association and Purdue's Department of Entomology) of this insect indicate the opposite; mean percent infestation for all varieties fell to 0.9%, mean puparia/100 stems 1.1, and only 21% of the fields surveyed were infested, all down from 1982. The reason for the low levels in a year favorable for the fly: only the fields of certified growers are surveyed. They are more likely than the rest to sow seeds with the H6 gene which is highly resistant to the fly, producing a biased sample. It does indicate however that the H6 gene is still an effective protection.

Forage Legumes and Soybeans

An estimated 10,000 acres of soybeans may have been treated to prevent losses

by the Mexican bean beetle (*Epilachna varivestis*), and there may have been some losses in untreated fields especially in the Parke and Montgomery Co. areas. Probably only a few of the treated acres were actually in danger of economic losses due to this insect. As a whole, even though adults were seen in soybeans far beyond their usual range and though, what with the warm winter, populations should have been large, Mexican bean beetles were only a minor problem in 1983.

The first adult of the season swept from alfalfa was collected 4 May in Jackson Co. Eggs were seen on 13 June in Parke Co. and on 16 June in Montgomery Co., where adults numbered 1/meter. Hatching was slow; no larvae were present by 1 July in any field except a Vigo Co. field with an unusually early and for this year heavy population; large larvae were present on 5 July. Pupae were present with occasional new adults by 20 July in Parke Co. Then came the hot days. Pupae, fastened to higher leaves, suffered the highest mortality, but larvae and pupae were also affected, and the populations collapsed.

There were scattered reports of pod feeding by the bean leaf beetle (*Certoma trifurcata*) adults late in the season but these seldom penetrated to the seed and were generally of little consequence.

One of the consequences of the hot, dry weather was the build-up of the twospotted spider mite (*Tetranychus urticae*) in soybeans. First observed in Clinton Co., they were soon reported from scattered locations all over the state. Edge rows were first attacked, and in most instances little more than the edge rows were affected so that treatment of more of the field was seldom warranted.

Adults of the painted lady (*Cynthia cardui*) were first seen in more than the usual numbers in alfalfa fields as early as the first week of May in the WC, SW and SC districts. What appeared to be new second generation adults were seen early in July. There were many reports of this species feeding on soybeans, and adults appeared in large numbers especially on roads separating 2 soybean fields. In one instance, counting only those killed or immobilized by vehicles in a 15-inch band next to a black-top highway, adults averaged 1/foot. Again, like the twospotted spider mite, they were the source of many inquiries but were of little economic consequence.

The alfalfa weevil (*Hypera postica*) larvae in alfalfa increased in numbers from about 25/100 stems on 7 March to about 245/100 stems on 10 May, or, based on the percent of stems infested, from about 12% to about 80%, in the SW and SC districts. During that time the alfalfa grew from an average of 4 to an average of 27 cm. Counts dropped rapidly after that, and the alfalfa quickly recovered. Treatment of infested fields was sporadic and in most instances questionable. The cool wet spring slowed alfalfa development, reducing the yield of the first cutting. The second cutting on well managed fields was generally good.

Potato leaf hopper (*Empoasca fabae*) was an economic pest on second and subsequent cuttings and even necessitated treating some soybean fields. Because of drought, alfalfa yields were so poor after the second cutting that few growers bothered to treat, except in the northern part of the state.

Vegetable Insects

Corn earworms early in the season for this species heavily infested untreated sweet corn grown for processing. Later in the season the same species was economic in commercially grown tomatoes.

The bean leaf beetle was a serious pest in some areas of beans in home gardens.

Striped cucumber beetles (*Acalymma vittata*) were a serious pest of melons and cucumbers through much of the season, even to the extent of feeding on the rinds.

Most other garden pests were present, but not in remarkable numbers.

Fruit Trees

All of the data on fruit tree insects are based on catches in 5 pheromone traps in Knox Co. operated by Thomas Mouzin for the USDA. Only 249 male codling moths (*Cydia pomonella*) were collected during 1983. The range since 1976 runs from 211 to 1392, and the 7 year average (1976-1982) was 551. Moths were caught during every week from mid-May to early Oct, with only 1 clear-cut peak near the end of June.

The 1983 catch of the redbanded leafroller (*Argyrotaenia velutinana*) was 927, with 3 peaks, late April, early July and mid-August. The 7 year average is 1499, the range from 706 to 2941.

The year's catch of the Oriental fruit moth (*Grapholitha molesta*) totalled 1037. The 7 year average is 1844, the range from 426 to 3707.

The lesser peachtree borer (*Synanthedon pictipes*) total was 1591, less than half last year's. Pheromones have been used only 3 years to collect this insect; previously live moths provided the incentive.

The 1983 catch of the peachtree borer (*Synanthedon exitiosa*) was 289, somewhat above the 4 year average of 166.

No traps were in place this year to trap obliquebanded leafrollers (*Choristoneura rosaceana*).

Man and Animals

The following generalizations were provided by Medical Entomologist Michael Sinsko. Mosquito populations overall were down from normal, due to droughty conditions. With mosquito numbers down, the incidence of mosquito-borne diseases was also down. There were no confirmed cases of St. Louis encephalitis, and only 2 confirmed cases of LaCrosse encephalitis. The 7 cases of eastern equine encephalitis among horses in Elkhart and St. Joseph counties apparently were more or less of a spillover from a larger Michigan outbreak. Reports of fleas were about normal. House fly (*Musca domestica*) numbers were down. Reports of head lice (*Pediculus humanus capitis*) have been on the upswing during recent years and 1983 was no exception.

Horn fly (*Haematobia irritans*) and face fly (*Musca autumnalis*) numbers were about normal according to Ralph Williams, Purdue Veterinary Entomologist.

Beneficial Insects

The alfalfa weevil parasites *Bathyplectes anurus* and *B. curculionis* were reared from about 20% of the alfalfa weevil larvae from the NW, WC, C and EC districts, from about 34% of the larvae in the SW and 74% in the SC district. *B. anurus* was collected only, and usually predominated in counties south of Indianapolis. About 2000 larvae were reared; the NC, NE and SE districts were inadequately tested.

The red coccinellids collected on 10 sticky traps in a Tippecanoe Co. corn field are counted each year as a population estimate. The most common of these is *Colomegilla maculata*; this year only 211 were collected. This number may be low because the field was harvested early and the traps were in place only 85 days as compared to the normal 100 or more. The ratio of *C. maculata*:*Hippodamia convergens*:*H. tredecimpunctata*:*Cycloneda sanguinea* was 67:14:1:18. The red coccinellids are also counted in the annual fall corn insect survey which examines 300 fields in 60 counties. This year there were—in the order listed in the ratio above—231:21:4:2, or in ratios, 89:8:2:1. These figures are about average.