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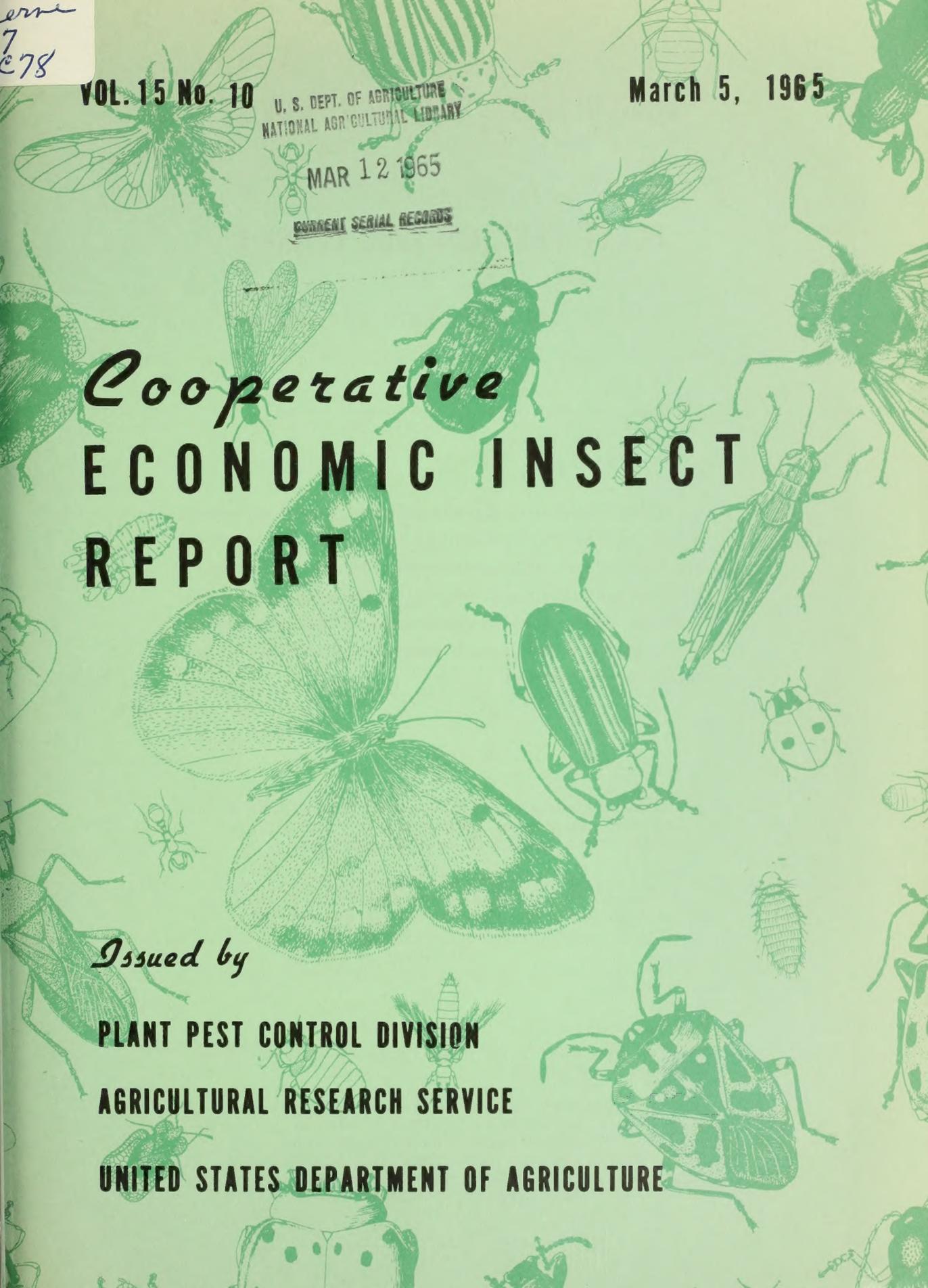
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March 5, 1965

MAR 12 1965

CURRENT SERIAL RECORDS



*Cooperative*  
**ECONOMIC INSECT  
REPORT**

*Issued by*

**PLANT PEST CONTROL DIVISION**

**AGRICULTURAL RESEARCH SERVICE**

**UNITED STATES DEPARTMENT OF AGRICULTURE**

# AGRICULTURAL RESEARCH SERVICE

## PLANT PEST CONTROL DIVISION

### SURVEY AND DETECTION OPERATIONS

The Cooperative Economic Insect Report is issued weekly as a service to American Agriculture. Its contents are compiled from information supplied by cooperating State, Federal, and industrial entomologists and other agricultural workers. In releasing this material the Division serves as a clearing house and does not assume responsibility for accuracy of the material.

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## COOPERATIVE ECONOMIC INSECT REPORT

HIGHLIGHTS

PEA APHID heavy in alfalfa in Lea County, New Mexico, with damage evident in most fields; continues to increase in alfalfa in areas of Arizona where counts ranged 1,000-10,000 per 100 sweeps. (p. 143).

HALL SCALE found on property in Stilson Canyon near Chico in Butte County, California. (p. 144).

FACE FLY becoming annoying in homes in Iowa (p. 145), and CLUSTER FLY active in Logan area of Cache County, Utah (p. 147).

DETECTION

A DESERT GRASSHOPPER (*Tanaocerus rugosus*) reported from California. This is a first record for the United States. (p. 147). New county records reported included the following aphids in California: *Essigella californica* in San Luis Obispo County, *Essigella pini* in Orange County, *Neophyllaphis podocarpi* in Alameda County, and CRESCENT-MARKED LILY APHID (*Neomyzus circumflexus*) from San Mateo County. (p. 145). IMPORTED FIRE ANT (*Solenopsis saevissima richteri*) was reported for the first time in Claiborne County, Mississippi. (p. 147).

CORRECTIONS

See page 168.

SPECIAL REPORTS

Results of Chinch Bug Survey, Fall 1964, reported from Illinois, Indiana and Kansas. (p. 143).

Status of the Screw-worm in the Southwest. (p. 146).

Estimated Losses and Production Costs Attributed to Insects and Related Arthropods Attacking Wheat, Oats, Corn and Soybeans in Illinois in 1964. (pp. 149-151).

Summary of Insect Conditions in the United States - 1964

Cereal and Forage Insects (continued)

Corn, Sorghum and Sugarcane Insects (p. 152).

There is a high potential for a BLACK CUTWORM outbreak in Wisconsin during 1965. (p. 159). WESTERN CORN ROOTWORM poses potential problems for 1965 in Minnesota. (p. 162).

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Reports in this issue are for the week ending February 26 unless otherwise indicated.

WEATHER OF THE WEEK ENDING MARCH 1

The last week of February was mild and mostly sunny in the West but stormy, wet and cold in the East. Temperatures were extremely variable.

TEMPERATURE: It was the second mild week west of the Rockies with temperatures mostly 3° to 4° above normal. From the Rockies eastward, it was much colder in the central Mississippi Valley and continued cool elsewhere. Following a cold wave at the beginning of the week, subzero minima spread over the Great Plains to Texas on the 24th. Freezing extended to the lower Rio Grande Valley on the 25th. Much of Arizona had freezing on the 24th. Rising temperatures the second half of the week reached abnormally high levels with weekend maxima in the 50's and 60's as far north as South Dakota, the Ohio Valley and Pennsylvania.

PRECIPITATION: Mostly less than 0.25 inch of precipitation fell from the Great Plains westward, except for moderate amounts along the Pacific coast and in the extreme northern Rockies. Very widespread precipitation, mostly in the range of 0.5 to 1.5 inches, affected the area extending approximately from Omaha, Nebraska, to San Antonio, Texas, and eastward to the Atlantic coast. A severe storm moved through that area beginning Wednesday, February 24. The main low moved from Mississippi on Wednesday to Pennsylvania on Thursday and to 400 miles north of Montreal, Canada, on Friday. Lowest central pressures were approximately 970 millibars (28.7 inches mercury). Winds were very strong frequently gusting from 40 to 60 m.p.h., or higher, in the eastern Great Lakes area and from Virginia northward. Wind gusts, to 81 m.p.h., were reported at Benton Harbor, Michigan, and 86 m.p.h., at Bar Harbor, Maine. Precipitation fell as snow in central and northern areas but mostly as rain in the South and East. Heavy drifting snow occurred from Missouri to Michigan and much larger areas had drifting snow and hazardous highway conditions. Much of the snow was melted by high temperatures over the weekend leaving the 1-inch-snow line near the Ohio River. East of the Alleghenies there is no snow from southern New England southward. (Summary supplied by U.S. Weather Bureau).

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WEATHER BUREAU'S 30-DAY OUTLOOK

MARCH 1965

The Weather Bureau's 30-day outlook for March calls for temperatures to average below seasonal normals over most of the Nation except for near to above normal in the northeastern quarter. Precipitation is expected to exceed normal over most of the southern half of the Country, while subnormal totals should be confined to the Great Lakes region. Elsewhere near normal amounts are in prospect.

Weather forecast given here is based on the official 30-day "Resume and Outlook" published twice a month by the Weather Bureau. You can subscribe through the Superintendent of Documents, Washington, D.C. 20250. Price \$5.00 a year.

CEREAL AND FORAGE INSECTS

Small Grain Pest Survey in Texas - On February 18 and 19, a survey was made of small grains in the panhandle area in Deaf Smith, Castro, Parmer, Oldham, Potter, Randall, Armstrong, Swisher, Briscoe, Floyd and Hale Counties. GREENBUG (*Schizaphis graminum*) found in all counties; populations ranged from less than 1 to 75 per row foot. Populations most numerous in Hale, Floyd, Briscoe, Parmer, Castro and Deaf Smith Counties. As heaviest populations were in large wheat, visable damage has not occurred. LADY BEETLES absent or very scarce. BROWN WHEAT MITE (*Petrobia latens*), although present in several fields, was light. (Daniels).

GREENBUG (*Schizaphis graminum*) - GEORGIA - Continues light on small grains. (Johnson). OKLAHOMA - Ranged 2-18 per linear foot in wheat in Tillman County. (Okla. Coop. Sur.).

APPLE GRAIN APHID (*Rhopalosiphum fitchii*) - OKLAHOMA - Numbers high in wheat in Tillman County; ranged 40-500 per linear foot in 7 fields checked. (Okla. Coop. Sur.).

ENGLISH GRAIN APHID (*Macrosiphum avenae*) - OKLAHOMA - Averaged 4 per linear foot in wheat in Tillman County and 8 per linear foot in Kiowa County. (Okla. Coop. Sur.).

LEAFHOPPERS - NEW MEXICO - Unspecified species abundant in small grains near Albuquerque, Bernalillo County. Feeding damage evident on foliage. (N.M. Coop. Rpt.).

Chinch Bug Survey, Fall 1964 - Surveys for chinch bug (*Blissus leucopterus*) were conducted in the fall of 1964 in Illinois, Indiana and Kansas. In Illinois, 53 counties in the central part of the State were surveyed. Results were as follows: Four counties were rated as very severe, 10 were severe, 8 were moderate, 1 was light and 30 counties were rated as noneconomic. In Indiana, 10 counties were surveyed in the northwest area. Three counties were rated as very severe, 2 were severe, 1 was light and 4 counties were noneconomic. In Kansas, samples were collected throughout counties in the eastern half of the State. Sixty-six samples were rated as noneconomic and 2 samples were rated as light; these 2 samples were from counties not adjacent to each other. (PPC, Cent. Reg.).

SOUTHWESTERN CORN BORER (*Zea diatraea grandiosella*) - OKLAHOMA - Checks showed 25 percent of cornstalks infested in a Washita County field. (Okla. Coop. Sur.).

GRANULATE CUTWORM (*Feltia subterranea*) - ARIZONA - Continues damaging in lawns and around ornamentals in Phoenix area, Maricopa County. (Ariz. Coop. Sur.).

AN ACARID MITE (*Tyrophagus dimidiatus*) - CALIFORNIA - Medium on barley roots and in soil locally in Ramona, San Diego County. (Cal. Coop. Rpt.).

ALFALFA WEEVIL (*Hypera postica*) - GEORGIA - Larvae infesting alfalfa in northern area; 25-35 percent of plants show damage. (Johnson). SOUTH CAROLINA - Damage noticeable on alfalfa; some treatments started. (Nettles et al., Feb. 23). ARKANSAS - Larvae collected week of February 15 in Mississippi County; above normal temperatures for 2-3 weeks may have been important factor in early occurrence of larvae. (Ark. Ins. Sur.).

A WEEVIL (*Hypera brunneipennis*) - ARIZONA - Larvae increasing again after recent cool weather; counts in Yuma County higher than in Maricopa and Pinal Counties. (Ariz. Coop. Sur.).

PEA APHID (*Acyrtosiphon pisum*) - ARIZONA - Increase continues in alfalfa in Yuma, Maricopa, Pinal and Pima Counties. Ranged 1,000-10,000 per 100 sweeps. (Ariz. Coop. Sur.). NEW MEXICO - Heavy in several fields of alfalfa in Lea County; damage evident in most fields. (N.M. Coop. Rpt.).

SPOTTED ALFALFA APHID (Therioaphis maculata) - ARIZONA - Few medium infestations found in alfalfa in Maricopa and Pinal Counties. (Ariz. Coop. Sur.).

#### FRUIT INSECTS

HALL SCALE (Nilotaspis halli) - CALIFORNIA - Light population found on single almond seedling on property in Stilson Canyon near Chico, Butte County. Det. by R. Wilkey. Host destroyed. (Hawthorne). Three seedling host trees (2 almonds and 1 plum) found in area, but only single almond infested. Small trees cut and burned; stumps treated with suitable herbicide. (PPC, West. Reg.).

CALIFORNIA RED SCALE (Aonidiella aurantii) - CALIFORNIA - Medium on citrus trees in Delano, Kern County. (Cal. Coop. Rpt.).

FORBES SCALE (Aspidiotus forbesi) - FLORIDA - Larvae and adults taken on stem of pecan in nursery at Monticello, Jefferson County. (Miller, Feb. 19).

A SOFT SCALE (Coccus mangiferae) - FLORIDA - Moderate on leaves of mango in nursery at Bradenton, Manatee County. (Bickner, Feb. 18).

CITRUS RED MITE (Panonychus citri) - FLORIDA - Adults severe on leaves of sweet orange trees at Groveland, Lake County. (Fatic, Feb. 19).

CITRUS RUST MITE (Phyllocoptruta oleivora) - FLORIDA - Adults moderate on leaves of 90 percent of 500 citrus plants on research property at Orla Vista, Orange County. (Griffith, Kipp; Feb. 10).

#### TRUCK CROP INSECTS

GREEN PEACH APHID (Myzus persicae) - ARIZONA - Beginning increase in lettuce and in sugar beet seed fields in Maricopa County; some controls necessary. (Ariz. Coop. Sur.).

LEAFHOPPERS (Empoasca spp.) - ARIZONA - Large numbers appearing in some sugar beet fields in Tempe-Mesa area, Maricopa County. (Ariz. Coop. Sur.).

FLEA BEETLES (Epitrix spp.) - ARIZONA - Light to medium infestations appearing in some areas of Pinal County; heaviest in Casa Grande area. (Ariz. Coop. Sur.).

TWO-SPOTTED SPIDER MITE (Tetranychus telarius) - FLORIDA - Adults severe on leaves of 5,000 eggplants in nursery at Plant City, Hillsborough County. (Custead, Feb. 5).

#### FOREST, ORNAMENTAL AND SHADE TREE INSECTS

A PSYLLID (Ceropsylla sideroxyli) - FLORIDA - Nymphs moderate on leaves of false mastic (Sideroxylon sp.) at Hobe Sound, Martin County. (Campbell, Smith; Feb. 17).

A GALL MIDGE (Contarinia pseudotsugae) - CALIFORNIA - Infesting Douglas-fir in Jarbo Gap, Butte County; making many trees unsaleable as Christmas trees. (Wagner, USFS).

SPIDER MITES - CALIFORNIA - Panonychus citri (citrus red mite) heavy on English-laurel nursery stock in San Mateo, San Mateo County. (Cal. Coop. Rpt.). FLORIDA - Tetranychus telarius (two-spotted spider mite) severe on cape-jasmine at garden center in Tampa, Hillsborough County. (Hale, Feb. 2). SOUTH CAROLINA - Unspecified species caused defoliation of several round-leaf hollies in cemetery at Conway, Horry County. (Nettles et al., Feb. 22).

ERIOPHYID MITES - CALIFORNIA - Aceria tuttlei occurred on Aster spinosus locally in Heber, Imperial County. Aceria daleae taken from galls on what is probably Dalea sp. in Winterhaven, Imperial County. (Cal. Coop. Rpt.).

**COCCIDS - MARYLAND - Phenacaspis pinifoliae** (pine needle scale) infesting ornamental pines at Kingsville, Baltimore County. (U. Md., Ent. Dept.). **NORTH CAROLINA - Lecanium spp.** infested camellia locally in Martin County (Feb. 17) and fern locally in Wake County (Feb. 14). (Robertson). **FLORIDA - All stages of Ischnaspis longirostris** (black thread scale) severe on stems and leaves of 5 Asparagus sprengeri plants in nursery (Feb. 17) and all stages severe on 90 percent of 300 spindle palms (Mascarena verschaffeltii) in nursery (Feb. 19); Lepidosaphes maskelli moderate to severe on stem and leaves of 20 Juniperus conferta in nursery (Feb. 17); Asterolecanium pustulans severe on stem of Grevillea robusta in nursery (Feb. 15); all in Miami, Dade County. (Herrmann). Adults of Aspidiotus destructor (coconut scale) severe on leaves of Magnolia sp. and Mammea americana at West Palm Beach, Palm Beach County. (Long, Feb. 19). Chrysomphalus aonidium (Florida red scale) severe on Liriope sp. at Ormond Beach, Volusia County. (Pott, Feb. 12). Lepidosaphes beckii (purple scale) and Coccus hesperidum (brown soft scale) severe on 100 Ilex cornuta plants and adults of Fiorinia theae (tea scale) severe on leaves of 50 Burford holly plants in nursery at Apopka, Orange County. (Musgrove, Feb. 12). **OKLAHOMA - Unaspis euonymi** (euonymus scale) moderate and damaging euonymus plants in Mayes County. (Okla. Coop. Sur.). **CALIFORNIA - Adults and nymphs of Aspidiotus perniciosus** (San Jose scale) heavy on flowering plum in Hayward, Alameda County, and on flowering peach in Guasti, San Bernardino County. Pseudococcus adonidum (long-tailed mealybug) infested myrtle plants locally in Orange, Orange County. (Cal. Coop. Rpt.).

**LESSER PEACH TREE BORER (Synanthedon pictipes)** - FLORIDA - Larvae severe on stems of 2 cherrylaurels at Pensacola, Escambia County. (Condo, Albritton, Feb. 10).

**A CERAMBYCID BEETLE (Callidium sp.)** - CALIFORNIA - Larvae and pupae heavy in redwood in county park at Stowe Ranch, Santa Barbara County. (Cal. Coop. Rpt.).

**CABBAGE LOOPER (Trichoplusia ni)** - CALIFORNIA - Larvae medium and damaging chrysanthemum flowers in Winterhaven, Imperial County. (Cal. Coop. Rpt.).

**APHIDS - NEW MEXICO - Unidentified species** heavy on pansies in home plantings in Las Cruces area, Dona Ana County. (N.M. Coop. Rpt.). **CALIFORNIA - Essigella californica** medium on Monterey pine nursery stock in Arroyo Grande, San Luis Obispo County. E. pini medium on Monterey pine Christmas tree stock in Anaheim, Orange County. Neophyllaphis podocarpi adults heavy on podocarpus nursery stock in Oakland, Alameda County. Neomyzus circumflexus (crescent-marked lily aphid) nymphs and adults heavy on azalea nursery stock in East Palo Alto, San Mateo County. These are all new county records. Aphis gossypii (melon aphid) nymphs and adults heavy locally on hydrangea plants in Fresno, Fresno County. (Cal. Coop. Rpt.).

#### INSECTS AFFECTING MAN AND ANIMALS

**FACE FLY (Musca autumnalis)** - IOWA - Becoming annoying in homes. (Iowa Ins. Inf., Feb. 11).

**CATTLE GRUBS (Hypoderma spp.)** - UTAH - Light to moderate in Rich County; controls now being applied to dairy cattle in Cache County. (Rudd, Tueller, Knowlton). **IOWA -** Appearing in backs of beef and dairy animals. (Iowa Ins. Inf., Feb. 11). **OKLAHOMA - H. lineatum** (common cattle grub) light to moderate on cattle in Bryan, Marshall, Cotton, and Mayes Counties. (Okla. Coop. Sur.). **NORTH CAROLINA - H. bovis** (northern cattle grub) collected from cattle in Alleghany County, January 25; Watauga County, January 28; and Haywood County, February 17. One animal in Watauga County had 40 grubs, about the highest number expected in mountain counties. Det. by W. G. Bruce. (Mount).

STATUS OF THE SCREW-WORM (Cochliomyia hominivorax) IN THE SOUTHWEST

No screw-worm cases have been reported from the Southwestern Eradication Area since January 29, 1965. Arizona, which is not in the area, has not had a case since the week ending November 21, 1964. During the period February 21-27, the Republic of Mexico reported 46 cases: Durango 1, San Luis Potosi 4, Sonora 21, Nuevo Leon 1, Tamaulipas 12, Chihuahua 2 and Veracruz 5. Total sterile flies released: 120,000 in Arizona, 2,930,250 in Texas, and 66,771,200 in Mexico.

| Year  | Positive Cases |            | Negative Cases |            | Ratio of Positive Cases to 100 Cases Negative |            |
|---|----------------|------------|----------------|------------|---|------------|
|   | Current        | Cumulative | Current        | Cumulative | Current                                       | Cumulative |
| Table 1. Comparison of specimens reported during corresponding weeks in 1963 and 1964 in Southwestern Eradication Area.                             |                |            |                |            |   |            |
| 1963  | 0              | 134        | 23             | 157        | 0.00  | 85.35      |
| 1964  | 0              | 0          | 19             | 240        | 0.00  | 0.00       |
| 1965  | 0              | 4          | 21             | 402        | 0.00  | .99        |
| Table 2. Comparison of specimens reported during corresponding weeks and in a corresponding area in 1964 in the United States-Mexico Barrier Zone.* |                |            |                |            |   |            |
| 1964  | 10             | 127        | 6              | 88         | 166.66  | 144.31     |
| 1965  | 36             | 373        | 17             | 237        | 211.76  | 157.38     |
| Table 2A. Mexican portion of Barrier Zone only.   |                |            |                |            |   |            |
| 1964  | 10             | 124        | 5              | 39         | 200.00  | 317.94     |
| 1965  | 36             | 371        | 16             | 146        | 225.00  | 254.10     |

\* Barrier Zone - Area in which screw-worm eradication operations are being carried out in an effort to prevent establishment of self-sustaining screw-worm population in the United States. (Anim. Dis. Erad. Div.).

CATTLE LICE - UTAH - Generally moderate on beef cattle in Rich County and causing more irritation to cattle in Cache County. (Rudd, Tueller, Knowlton). IOWA - Winter control on beef cattle apparently approaching alltime high. (Iowa. Ins. Inf., Feb. 11). OKLAHOMA - Several species heavy on cattle in Bryan, Cotton and Choctaw Counties; moderate in Adair County and light in Mayes County. (Okla. Coop. Sur.). NORTH CAROLINA - Several species much more common on cattle examined in central mountain counties than in 5 northeastern counties. (Mount, Feb. 15-26). GEORGIA - Linognathus vituli (long-nosed cattle louse) and Solenopotes capillatus averaged 2.9 per square inch on cattle in Spalding County February 11. Averaged 1.1 per square inch, January 26, and 1.2 per square inch, February 9, in Putnam County. (Roberts).

TROPICAL RAT MITE (Ornithonyssus bacoti) - CALIFORNIA - Biting humans in residence in Anaheim, Orange County. (Cal. Coop. Rpt.).

ITCH MITE (Sarcoptes scabiei) - IOWA - Symptoms present in untreated hog herds. (Iowa Ins. Inf., Feb. 11).

HOUSEHOLD AND STRUCTURAL INSECTS

CASEMAKING CLOTHES MOTH (Tinea pellionella) - ALABAMA - Large infestation of this species and Anthrenus scrophulariae (carpet beetle) destroyed carpeting in Lee County home. (McQueen).

WEBBING CLOTHES MOTH (Tineola bisselliella) - ALABAMA - Continuous, light infestation observed in home in Lee County. (McQueen).

INDIAN-MEAL MOTH (Plodia interpunctella) - MARYLAND - Observed inside home at Sparks, Baltimore County. (U. Md., Ent. Dept.).

OLD-HOUSE BORER (Hylotrupes bajulus) - NORTH CAROLINA - Damaged pine 2 x 4's in new house in Hyde County. Det. by H. B. Moore. (Westerbeek).

WHITE-MARKED SPIDER BEETLE (Ptinus fur) - NORTH CAROLINA - Large numbers found in mortar of home chimney in Wilson County. (Wray, Feb. 16).

BOXELDER BUG (Leptocoris trivittatus) - MARYLAND - Annoying in home at Ellicott City, Howard County. (U. Md., Ent. Dept.). ALABAMA - Numerous and annoying in several homes and a church in Cherokee County. (Patterson, Ledbetter).

A LEAFHOPPER (Keonolla confluens) - CALIFORNIA - Adults heavy in house and yard east of Tracy, San Joaquin County, and house in Moraga, Contra Costa County. (Cal. Coop. Rpt.).

ORIENTAL COCKROACH (Blatta orientalis) - MARYLAND - Infesting basement and first floor of home in Baltimore. (U. Md., Ent. Dept.).

CLUSTER FLY (Pollenia rudis) - UTAH - Active in and around homes at Logan, Cache County. (Knowlton).

LARGER YELLOW ANT (Acanthomyops interjectus) - NORTH CAROLINA - Of concern in homes in Halifax County February 8, and Wake County February 15 and 22. (Wray). IOWA - Swarming in basements since late December. (Iowa Ins. Inf.).

ANTS - OKLAHOMA - Unspecified ants light in home in Cleveland County. (Okla. Coop. Sur.). NORTH CAROLINA - Prenolepis imparis winged adults numerous in motel in Randolph County. (Wray, Feb. 11).

CLOVER MITE (Bryobia praetiosa) - MARYLAND - Annoying in home at Ellicott City, Howard County. (U. Md., Ent. Dept., Feb. 18).

#### BENEFICIAL INSECTS

CONVERGENT LADY BEETLE (Hippodamia convergens) - OKLAHOMA - Adults light in wheat in Kiowa and Tillman Counties. (Okla. Coop. Sur.).

#### STORED-PRODUCT INSECTS

CIGARETTE BEETLE (Lasioderma serricorne) - FLORIDA - Severe on bag of trout feed at feed store in Wauchula, Hardee County. (Thomas, Feb. 15).

#### MISCELLANEOUS INSECTS

A DESERT GRASSHOPPER (Tanaocerus rugosus) - CALIFORNIA - Collected from desert vegetation 3 miles northeast of Winterhaven, Imperial County, January 23, 1965, by J. L. Ballard and E. Wright. Det. by G. Buxton and verified by H. Grant. This is a new United States record. (Cal. Coop. Rpt.). Species known in Baja California, Mexico. It is not believed to be of economic importance. (ARS).

IMPORTED FIRE ANT (Solenopsis saevissima richteri) - ALABAMA - Unusually heavy mound building observed in Henry County. All mounds examined had many winged forms. In several mounds, built in and around decaying pine stumps, imported fire ants and Reticulitermes flavipes (eastern subterranean termite) are apparently living together in great numbers. (Kimbrough et al.). MISSISSIPPI - Collected for the first time in Claiborne County. (PPC South. Reg., Jan. Rpt.).



ESTIMATED LOSSES AND PRODUCTION COSTS ATTRIBUTED TO INSECTS AND RELATED ARTHROPODS

IN Illinois  
(State or District)

DURING 1964  
(Year)

ATTACKING Wheat  
(Commodity or Crop)

ATTACKING Oats  
(Commodity or Crop)

A. Pest or pest complex: Armyworm

A. Pest or pest complex: Armyworms

B. Number of acres <sup>a</sup> produced (From CRS) <sup>d</sup> No. 1,806,000  
 C. Average yield per acre <sup>a</sup> (From CRS) Units/ 37 bu.  
 D. Price <sup>b</sup> per unit ( bu. ) <sup>c</sup> (From CRS) \$/ 1.35  
 E. Acres <sup>a</sup> needing control No. 321,649  
 F. Acres <sup>a</sup> treated No. 307,650

B. Number of acres <sup>a</sup> produced (From CRS) <sup>d</sup> No. 1,123,000  
 C. Average yield per acre <sup>a</sup> (From CRS) Units/ 50 bu.  
 D. Price <sup>b</sup> per unit ( bu. ) <sup>c</sup> (From CRS) \$/ 1.61  
 E. Acres <sup>a</sup> needing control No. 56,150  
 F. Acres <sup>a</sup> treated No. 54,949

G. Reduction due to not treating where needed:

G. Reduction due to not treating where needed:

H. Loss in yield, percent % 10  
 I. Loss in yield, units per acre <sup>a</sup>, C x H Units/ 3.7 bu.  
 J. Loss in yield, \$ per acre <sup>a</sup>, D x I \$/ 5.00  
 K. Loss in quality, \$ per <sup>a</sup> \$/ -----  
 L. Yield loss for all acres <sup>a</sup>, (E-F) x I Units 51,796 bu.  
 M. Control cost, \$ per acre <sup>a</sup>, \$/ 2.25  
 N. Control cost for all acres <sup>a</sup>, F x M \$ 692,213  
 O. Yield loss for all acres <sup>a</sup>, (E-F) x J \$ 69,995  
 P. Quality loss for all <sup>a</sup>, (E-F) x K \$ -----  
 Q. Combined control cost and losses, N + O + P \$ 762,208  
 R. Percent loss due to each insect in the complex:

H. Loss in yield, percent % 10  
 I. Loss in yield, units per acre <sup>a</sup>, C x H Units/ 5 bu.  
 J. Loss in yield, \$ per acre <sup>a</sup>, D x I \$/ 3.05  
 K. Loss in quality, \$ per <sup>a</sup> \$/ -----  
 L. Yield loss for all acres <sup>a</sup>, (E-F) x I Units 6,005 bu.  
 M. Control cost, \$ per acre <sup>a</sup>, \$/ 2.25  
 N. Control cost for all acres <sup>a</sup>, F x M \$ 123,635  
 O. Yield loss for all acres <sup>a</sup>, (E-F) x J \$ 3,563  
 P. Quality loss for all <sup>a</sup>, (E-F) x K \$ -----  
 Q. Combined control cost and losses, N + O + P \$ 127,298  
 R. Percent loss due to each insect in the complex:

Comment: This is \$504,189 more than the estimated damage done in 1963.  
There was an estimated 192,975 more acres treated in 1964 than in 1963.

Comment: This is \$27,018 more than the estimated damage done in 1963.

- a. Acres, head of cattle or other producing units used by Crop Reporting Service.
- b. Season average price per unit as given by CRS (describe basis).
- c. Bushels, boxes, tons or other marketing units used by CRS; show which in ( ).
- d. Illinois Annual Crop Summary, Dec. 22, 1964.

- a. Acres, head of cattle or other producing units used by Crop Reporting Service.
- b. Season average price per unit as given by CRS (describe basis).
- c. Bushels, boxes, tons or other marketing units used by CRS; show which in ( ).
- d. Illinois Annual Crop Summary, Dec. 22, 1964.

Submitted by Clarence E. White  
 Date January 27, 1965

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 Date January 27, 1965

ESTIMATED LOSSES AND PRODUCTION COSTS ATTRIBUTED TO INSECTS AND RELATED ARTHROPODS

IN Illinois  
(State or District)

DURING 1964  
(Year)

ATTACKING Corn  
(Commodity or Crop)

ATTACKING Corn  
(Commodity or Crop)

A. Pest or pest complex: Armyworms, fall armyworm, grasshoppers, corn leaf aphid

A. Pest or pest complex: Chinch bug

B. Number of acres <sup>a</sup> produced (From CRS) <sup>d</sup> No. 9,114,000

C. Average yield per acre <sup>a</sup> (From CRS) Units/ 78 bu.

D. Price<sup>b</sup> per unit ( bu. ) <sup>c</sup> (From CRS) \$/ 1.13

E. Acres <sup>a</sup> needing control No. 216,913

F. Acres <sup>a</sup> treated No. 179,311

B. Number of acres <sup>a</sup> produced (From CRS) <sup>d</sup> No. 9,114,000

C. Average yield per acre <sup>a</sup> (From CRS) Units/ 78 bu.

D. Price<sup>b</sup> per unit ( bu. ) <sup>c</sup> (From CRS) \$/ 1.13

E. Acres <sup>a</sup> needing control No. 54,684

F. Acres <sup>a</sup> treated No. 48,017

G. Reduction due to not treating where needed:

G. Reduction due to not treating where needed:

H. Loss in yield, percent % 5

I. Loss in yield, units per acre <sup>a</sup>, C x H Units/ 3.9 bu.

J. Loss in yield, \$ per acre <sup>a</sup>, D x I \$/ 4.41

K. Loss in quality, \$ per <sup>a</sup> \$/ ----

L. Yield loss for all acres <sup>a</sup>, (E-F) x I Units 146,648 bu.

M. Control cost, \$ per acre <sup>a</sup>, \$/ 2.25

N. Control cost for all acres <sup>a</sup>, F x M \$ 403,450

O. Yield loss for all acres <sup>a</sup>, (E-F) x J \$ 165,825

P. Quality loss for all <sup>a</sup>, (E-F) x K \$ ----

Q. Combined control cost and losses, N + O + P \$ 569,275

R. Percent loss due to each insect in the complex: Grasshoppers 14.11, armyworms 48.50, fall armyworm 18.41, corn leaf aphid 18.96

H. Loss in yield, percent % 10

I. Loss in yield, units per acre <sup>a</sup>, C x H Units/ 7.8 bu.

J. Loss in yield, \$ per acre <sup>a</sup>, D x I \$/ 8.81

K. Loss in quality, \$ per <sup>a</sup> \$/ ----

L. Yield loss for all acres <sup>a</sup>, (E-F) x I Units 52,003 bu.

M. Control cost, \$ per acre <sup>a</sup>, \$/ 2.25

N. Control cost for all acres <sup>a</sup>, F x M \$ 108,038

O. Yield loss for all acres <sup>a</sup>, (E-F) x J \$ 98,736

P. Quality loss for all <sup>a</sup>, (E-F) x K \$ ----

Q. Combined control cost and losses, N + O + P \$ 166,774

R. Percent loss due to each insect in the complex:

Comment: \_\_\_\_\_

Comment: \_\_\_\_\_

- a. Acres, head of cattle or other producing units used by Crop Reporting Service.
- b. Season average price per unit as given by CRS (describe basis).
- c. Bushels, boxes, tons or other marketing units used by CRS; show which in ( ).
- d. Crop Reporting Service, Illinois Annual Crop Summary, Dec. 22, 1964.

- a. Acres, head of cattle or other producing units used by Crop Reporting Service.
- b. Season average price per unit as given by CRS (describe basis).
- c. Bushels, boxes, tons or other marketing units used by CRS; show which in ( ).
- d. Illinois Annual Crop Summary, Dec. 22, 1964.

Submitted by Clarence E. White  
Date January 28, 1965

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Date January 28, 1965

ESTIMATED LOSSES AND PRODUCTION COSTS ATTRIBUTED TO INSECTS AND RELATED ARTHROPODS

IN Illinois DURING 1964 IN Soybeans

(State or District) (Year) (Commodity or Crop)

ATTACKING Corn (Commodity or Crop)

A. Pest or pest complex: Soil insects

|  |        |                |
|--|--------|----------------|
| B. Number of acres <sup>a</sup> produced (From CRS) <sup>d</sup> | No.    | 9,114,000      |
| C. Average yield per acre <sup>a</sup> (From CRS)                | Units/ | 78 bu.         |
| D. Price <sup>b</sup> per unit ( bu. ) <sup>c</sup> (From CRS)   | \$/    | 1.13           |
| E. Acres <sup>a</sup> needing control                            | No.    | 3,728,537      |
| F. Acres <sup>a</sup> treated                                    | No.    | 4,091,125      |
| F1. Acres needing treatment but not treated                      |        | 2,054,858 e.   |
| G. Reduction due to not treating where needed:                   |        |                |
| H. Loss in yield, percent  | %      | 10             |
| I. Loss in yield, units per acre <sup>a</sup> , C x H            | Units/ | 7.8 bu.        |
| J. Loss in yield, \$ per acre <sup>a</sup> , D x I               | \$/    | 8.81           |
| K. Loss in quality, \$ per <sup>a</sup>                          | \$/    | ----           |
| L. Yield loss for all acres <sup>a</sup> , (E-F) x I             | Units  | 16,027,912 bu. |
| M. Control cost, \$ per acre <sup>a</sup>                        | \$/    | 3.25           |
| N. Control cost for all acres <sup>a</sup> , F x M               | \$     | 13,296,156     |
| O. Yield loss for all acres <sup>a</sup> , (E-F) x J             | \$     | 18,103,299     |
| P. Quality loss for all <sup>a</sup> , (E-F) x K                 | \$     | ----           |
| Q. Combined control cost and losses, N + O + P                   | \$     | 31,399,455     |
| R. Percent loss due to each insect in the complex:               |        |                |

Comment: An additional 192,577 acres were replanted at a total cost of \$1,925,770 and 165,707 acres were treated after emergence at a cost of \$538,548. Total control

- a. costs plus losses due to soil insects were \$33,863,773 or \$6,988,548 less than in 1963 when figured on an equal basis.
- a. Acres, head of cattle or other producing units used by Crop Reporting Service.
- b. Season average price per unit as given by CRS (describe basis).
- c. Bushels, boxes, tons or other marketing units used by CRS; show which in ( ).
- d. CRS, Illinois Annual Crop Summary, Dec. 22, 1964.
- e. Since soil treatments are preventive measures E-F does not apply here.

Submitted by Clarence E. White  
 Date January 28, 1965

ATTACKING Soybeans (Commodity or Crop)

A. Pest or pest complex: Grashoppers, bean leaf beetle, green cloverworm

|  |        |           |
|--|--------|-----------|
| B. Number of acres <sup>a</sup> produced (From CRS) <sup>d</sup> | No.    | 5,798,000 |
| C. Average yield per acre <sup>a</sup> (From CRS)                | Units/ | 25 bu.    |
| D. Price <sup>b</sup> per unit ( bu. ) <sup>c</sup> (From CRS)   | \$/    | 2.70      |
| E. Acres <sup>a</sup> needing control                            | No.    | 76,534    |
| F. Acres <sup>a</sup> treated                                    | No.    | 82,759    |
| G. Reduction due to not treating where needed:                   |        |           |
| H. Loss in yield, percent  | %      | ----      |
| I. Loss in yield, units per acre <sup>a</sup> , C x H            | Units/ | ----      |
| J. Loss in yield, \$ per acre <sup>a</sup> , D x I               | \$/    | ----      |
| K. Loss in quality, \$ per <sup>a</sup>                          | \$/    | ----      |
| L. Yield loss for all acres <sup>a</sup> , (E-F) x I             | Units  | ----      |
| M. Control cost, \$ per acre <sup>a</sup>                        | \$/    | 2.25      |
| N. Control cost for all acres <sup>a</sup> , F x M               | \$     | 186,208   |
| O. Yield loss for all acres <sup>a</sup> , (E-F) x J             | \$     | ----      |
| P. Quality loss for all acres <sup>a</sup> , (E-F) x K           | \$     | ----      |
| Q. Combined control cost and losses, N + O + P                   | \$     | 186,208   |
| R. Percent loss due to each insect in the complex:               |        |           |

beetle 20.63, green cloverworm 29.32

- Comment: This is \$192,510 less than the damage estimated for grasshoppers alone in 1963. Grasshoppers were much lighter this year but green cloverworm and possibly bean leaf beetle were heavier.
- a. Acres, head of cattle or other producing units used by Crop Reporting Service.
- b. Season average price per unit as given by CRS (describe basis).
- c. Bushels, boxes, tons or other marketing units used by CRS; show which in ( ).
- d. Illinois Annual Crop Summary, Dec. 22, 1964.

Submitted by Clarence E. White  
 Date January 27, 1965

SUMMARY OF INSECT CONDITIONS IN THE UNITED STATES - 1964  
(continued from page 140)

CEREAL AND FORAGE INSECTS (continued)

CORN, SORGHUM AND SUGARCANE INSECTS

Highlights:

EUROPEAN CORN BORER was generally less abundant in the Midwest than during the 1963 season. Considerable increases were noted in portions of Kansas and Missouri, but decreases occurred in areas of Nebraska, South Dakota, North Dakota and Minnesota. Adverse weather conditions during egg laying and early development of first-generation borers affected populations in some States. (Status of the European corn borer in 1964 appeared in CEIR 15(2):22-28). ARMYWORM larval infestations were the heaviest in many years in Michigan and the pest caused severe damage to corn in Wisconsin. Outbreaks and problems of this noctuid were reported from several Eastern and Midwestern States, as were outbreaks of FALL ARMYWORM in Southern, Eastern and some Midwestern areas. Damage by this latter pest was reported from Texas to Illinois and Wisconsin and from several areas along the Atlantic coast. SOUTHWESTERN CORN BORER was reported from 4 new counties in Illinois, 11 new counties in Alabama and one new county in Missouri during the 1964 season. The number of girdled stalks in Missouri was down slightly from 1963, but infestations were heavier in Arkansas than they were the previous year. CORN ROOTWORMS continued to be a problem in several areas, with WESTERN CORN ROOTWORM the primary concern on corn in Kansas during 1964, and the dominant species in Nebraska. Western corn rootworm extended its range in South Dakota and caused considerable crop damage there, and infestations were found over a wide area in southern Minnesota, where problems are predicted for the 1965 season. This pest was found for the first time south of the Missouri River in the State of Missouri during the 1964 season. NORTHERN CORN ROOTWORM fed on corn silks and pollen in Wisconsin, Illinois and Missouri, and caused severe silk damage and prevented ear development in many late-planted fields in Indiana, as well as causing significant losses in southern Michigan. RICE WEEVIL was as heavy in corn at harvest time in Louisiana as at any time in several years. CORN LEAF APHID affected corn production in Colorado, as did several other corn insects, and infestations were heavy on this crop in several Midwestern and Eastern States and infested corn and sorghum in some Southern States. CHINCH BUG was more abundant in Illinois than for the past few years and damaged corn and sorghum over much of Texas. SORGHUM MIDGE was generally less severe in Texas during 1964 than in 1963, and was found in Kansas for the first positive record in that State for many years. TWO-SPOTTED SPIDER MITE affected corn production in Colorado, and SPIDER MITES caused some damage to corn in a few Western and Southwestern States. GARDEN SYMPHYLAN was very destructive to corn in southwestern Washington.

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EUROPEAN CORN BORER (*Ostrinia nubilalis*) caused slightly more damage to corn in MISSOURI during 1964 than was recorded in 1963. The 1964 fall abundance survey showed an average of approximately 56 percent of stalks infested with an average of 157 borers per 100 stalks. This was an increase of 11.6 percent of stalks infested and an increase of 81.6 borers per 100 stalks over that of 1963. Although the European corn borer population increased in most districts in Missouri in 1964, the greatest increase was in the southeast district where the average number of borers per 100 plants was 745 compared with 223 in 1963. European corn borer populations built up in eastern KANSAS, but apparently hot, dry weather during July prevented a large population increase in the western portion of the State in 1964. Infestations and damage were considerably less

in NEBRASKA than they were in 1963, as dry weather in July and August held down second-brood infestations. Peak moth flights in Nebraska occurred approximately June 20 and August 10. Winter mortality of European corn borer averaged 31 percent in the main corn-growing area of SOUTH DAKOTA. By June 20, egg laying was well underway and egg counts were generally low with an average of 16 masses per 100 plants. Damage to corn was very spotty throughout the State, with practically no damage evident in some areas. The principal parasites of European corn borer present in South Dakota during the 1964 season were Sympiesis viridula (a eulophid), Horogenes punctorius (an ichneumon) and Macrocentrus gifuensis (a braconid). The fall European corn borer survey in the southeastern corner of NORTH DAKOTA showed 61 percent of plants infested with an average of 1.61 borers per infested plant or 125.45 borers per 100 corn plants. This compares with an average of 391.49 borers per 100 plants in 1963.

Overwintering mortality of European corn borer averaged 16 percent in MINNESOTA. The overwintering population for 1963-1964 was the highest in many years and a damaging population was anticipated in Minnesota for the 1964 season if normal conditions prevailed. Weather conditions, however, were adverse and by late May and June, first-generation larval development was ahead of corn. Adverse weather, slowing corn growth, continued until nearly all egg laying was completed. An occasional field of corn that had tall or more advanced growth did have a relatively high European corn borer population, but such fields were rare. Adverse weather continued into July and August, preventing recovery by the second generation, and moth flights were extended well into September. In early October, second-stage larvae could be found in some fields. The fall abundance survey conducted in October in 67 counties showed European corn borer populations had decreased in all survey districts. The number of overwintering borers is the lowest in Minnesota that it has been in the past 5 years, and populations in 1965 should be moderate. European corn borer does have great recovery potential, however, and adequate numbers are present in the southwest and west central districts of Minnesota to present a possible threat during the 1965 season. Winter survival of European corn borer was high in WISCONSIN. Pupation began by May 5, a week earlier than in 1963, and first adults were taken in blacklight traps May 25. Eggs were first noted in Wisconsin by June 12, first-stage larvae were present June 19, and second-generation eggs hatched by August 21. The fall survey indicated the lowest larval population in Wisconsin since the survey began.

Adverse weather conditions in ILLINOIS during egg laying and early development of first-generation borers reduced the threat of damage by European corn borer during 1964. The first generation was approximately one-half as large as that present in 1963, and 65 percent of the larvae were infected with disease organisms. Second-generation larvae showed only 13 percent infection, which was the lowest on record for field-collected borers in Illinois. This low incidence of disease, combined with fairly good weather conditions, enabled the low first generation to produce a second generation that was almost as large as that present in 1963. There was also a third generation in the southern tip of the State. In the Pulaski-Alexander County area, borers averaged 329 per 100 plants, which was the highest count in Illinois in 1964. This was the first year that a county in the southern portion of the State had a larger population than any of the northern counties. An estimated 28,247 acres were treated to control European corn borer during 1964 in Illinois. European corn borer populations were considerably higher in INDIANA in 1964 than in the previous 2 years. In 1964, the State average was 59.6 borers per 100 plants compared with 35.7 in 1963 and 28.9 in 1962. As in previous years, the highest percentage of infested plants and the greatest number of borers per 100 plants were demonstrated in the north-northwest and north-north central areas; however, infestations were also high in the south-southwest and south-south central areas. In the southwest and south central areas, populations were lower than in 1963 or 1962. In all other areas of Indiana, population estimates were higher than in the previous 2 years. Loss in yield in 1964 approximated 1.5 percent as compared with 1.1 percent in 1963.

In MICHIGAN, peak flight of first-brood moths of European corn borer occurred during the second week in June. Considerable injury to ears of sweet corn resulted from first and second-brood larvae in poorly sprayed fields in Lower Michigan. Injury to field corn continued in the usual relatively light pattern as a result of the widespread use of borer-tolerant hybrids in Michigan. The European corn borer fall survey in OHIO, conducted in 32 western counties and in Wayne County, indicated that the population in the State was up slightly from the previous 2 years. Populations averaged 26.3, 20.1 and 28.0 borers per 100 plants for the years 1962, 1963 and 1964, respectively. Counts made during the 1964 survey varied from virtually no borers in the southern counties to over 300 borers per 100 stalks in some fields in Defiance and Fulton Counties. In general, the 1964 European corn borer population in Ohio was too low to be of economic concern.

European corn borer populations were moderate in MAINE during the 1964 season, with moderate damage to sweet corn reported in York and Cumberland Counties. European corn borer continued present in relatively small numbers throughout NEW HAMPSHIRE during 1964, and there was an approximate 4-percent overall decrease in infestation in VERMONT from that of the previous year. European corn borer required controls on sweet corn in MASSACHUSETTS during the growing season there, but numbers were otherwise very low in most areas of that State. This pest of corn was relatively inconspicuous in RHODE ISLAND.

Both broods of European corn borer were prevalent in sweet corn in central NEW YORK during the 1964 season, but were relatively light in sweet corn in the Hudson Valley, infesting less than 5 percent of ears in most untreated plantings. The species was extremely varied in abundance from field to field, however, infesting over 50 percent of ears in one field at Poughkeepsie in early September. Bird predation on infested stalks was already high in New York by September 23.

The European corn borer spring population of 45 per 100 plants in DELAWARE was somewhat higher than that present in the State in 1963. Pupation was first noted April 9, and by April 27 approximately 50 percent of overwintered borers had completed pupation. The first adult of the season in Delaware was collected in a blacklight trap on May 8 and egg masses were observed on weeds May 14. The average population of 98 borers per 100 corn plants in the fall of 1964 was a 1.3 increase over that for the fall of 1963. The increase in Delaware was greatest (2.5) in Sussex County, where borers averaged 177 per 100 plants and were generally higher during the 1964 season as compared with 1963 in other crops, such as sweet corn, potatoes and peppers. European corn borer infestations followed usual patterns in MARYLAND during 1964, with corn planted before May 10 being moderately to heavily infested in many areas of the State. Populations in corn throughout the season were slightly below normal in all sections of the State. European corn borer infestations in corn were medium in VIRGINIA during the 1964 season and light trap catches of moths were the lowest on record on the Eastern Shore of the State.

European corn borer was light to moderate in corn in several counties of GEORGIA during 1964, but infestations are becoming more general over the State. European corn borer was reported from Franklin County, Georgia, for the first time during 1964. European corn borer caused about the same amount of damage in ALABAMA during 1964 as during 1963, and was reported for the first time from Talladega County. In LOUISIANA, European corn borer infestations were negligibly light and observed only on late corn in Bossier, Caddo, East Carroll and West Carroll Parishes during the 1964 season. European corn borer infestations in ARKANSAS were generally heavier than in 1963. Percent stalk infestation was 34.6 in 1964 compared with 26.7 in 1963 and the average number of borers per 100 plants was 34.5 compared with 14.1 respectively for the same years. The number of borers per acre in Arkansas was 2,404 in 1964 and 1,070 in 1963. Low infestations in late corn in the northwest area probably indicate the absence of a third generation in this portion of the State. Detection surveys for European corn borer conducted throughout NEW MEXICO during the 1964 season were negative.

GARDEN WEBWORM (Loxostege similalis) caused light to heavy damage to corn over MISSOURI during the 1964 season, with damage being heaviest in the southwest and west central areas of the State.

ARMYWORM (Pseudaletia unipuncta) infestations ranged light to heavy in MAINE with damage, primarily to corn, being reported from Farmington and vicinity in Franklin County. In one area near New Sharon, sizeable flocks of birds were reported feeding on the larvae. Outbreak numbers occurred at widely scattered areas in NEW HAMPSHIRE, and light trap collections of moths during the late summer indicated a much heavier outbreak of armyworm might be expected in 1965. A destructive buildup of armyworm occurred in VERMONT during the 1964 season. Although not all fields in any area were infested, damage in some infested corn amounted to 100 percent. Activity subsided by August 5. The last similar outbreak of this pest in Vermont occurred in 1954. Armyworm infestations on sweet corn in MASSACHUSETTS required controls, and very heavy infestations of armyworms, with P. unipuncta probably predominating, occurred in field corn statewide in RHODE ISLAND during a 10-day period in late July. In most occurrences observed in Rhode Island, grassy weeds between corn rows were involved. Sweet corn usually escaped damage where weed control was more complete, even when close to infested forage corn. In CONNECTICUT, armyworm numbers built up on weeds and moved to corn and other crops after weeds were consumed. Damage was extensive for 2 or 3 days until the full extent of the infestations was apparent. Emergency controls were applied and halted damage. In some instances, fire department high pressure hoses were used to treat inaccessible portions of fields because of the lack of aircraft. Barrier strips, harrowed and sprayed around fields, were also successful in Connecticut. Damage to total crop by armyworm was approximately 10 percent, although some fields were severely damaged. Corn appeared to make good recovery after infestations subsided. The armyworm outbreak in Connecticut during 1964 was about one month earlier than infestations usually appear in the State.

Armyworm was not a problem on sweet corn in the Hudson Valley of NEW YORK during the 1964 season. A few larvae were noted in whorls and silks of sweet corn in July, but by August fall armyworm (Spodoptera frugiperda) predominated among the specimens found. Armyworm caused considerable damage to young corn in the eastern half of PENNSYLVANIA, and infested other crops in several parts of that State. Infestation was late in Pennsylvania, appearing in July. Fall armyworm was also numerous at the same time. Armyworm was reported occasionally on corn in VIRGINIA during the 1964 season.

Second-generation larvae of armyworm caused varying degrees of damage to corn and other crops in OHIO during late July, with damage being reported from Ashland, Delaware, Fulton, Huron, Knox, Medina, Putnam, Richland, Seneca and Wayne Counties. Serious damage by armyworm to field corn and small grains was reported from Putnam and Wayne Counties. The heaviest armyworm infestation of many years occurred in southwestern and west central counties of the Lower Peninsula of MICHIGAN during June, with some injury also reported from southeastern counties. Considerable corn acreage was sprayed with generally favorable results, but a few fields were treated unnecessarily under conditions of light infestation and/or delayed timing. An unspecified parasitic tachina fly aided materially in reducing armyworm populations in Michigan during the 1964 season.

First armyworm moths of the season in ILLINOIS were taken April 7 at Urbana, Champaign County, and first larvae were observed in the southern area of the State April 27. By July 6-9, very young larvae were found in grassy fields of corn in the northern part of the State and by July 15 many fields were being treated. An estimated 85,882 acres of corn were treated in Illinois for control of armyworms during the 1964 season. Armyworm severely damaged corn in a portion of Walworth County, WISCONSIN, and caused some damage to corn in the northeastern portion of the State. Moths appeared on April 15 and larvae were noted in corn by June 12. A very heavy moth flight began in mid-June and continued through mid-July, forecasting possible armyworm outbreaks. Although very high, localized populations were present in western Walworth County, natural enemies of armyworm

made chemical treatment impractical in most instances except on sweet corn. By August 7, larval populations decreased in southern areas of Wisconsin and were of little consequence thereafter, but moths were taken in blacklight traps until mid-November.

Armyworm larvae were observed feeding on corn in MISSOURI and were present but caused little damage to the crop in OKLAHOMA. In CALIFORNIA, armyworm infestations were noted on sorghum, corn and milo locally during the 1964 season.

FALL ARMYWORM (Spodoptera frugiperda) affected corn production in COLORADO during the 1964 season. Corn in the southeast portion of the State was infested and some controls were used, but overall losses from corn insects were approximately 10 percent. Fall armyworm infested corn in western Colorado and contributed to losses to the crop that ranged from 5 to 10 percent, although some controls were applied in the area. Fall armyworm and corn earworm (Heliothis zea) populations were high on corn in Mesa, Montrose, Delta and Garfield Counties, Colorado, with 2-4 larvae per ear being found in many fields checked. Controls were of limited value after larvae entered the ear and only few treatments were made. Loss in these four counties of Colorado from these 2 species ranged 4-6 percent. Fall armyworm counts were high on corn and sorghum in NEBRASKA, with larval infestations of 1-40 per 10 ears damaging corn in some fields in southern and eastern areas of the State. Fall armyworm was very abundant on corn and sorghum in KANSAS, being more numerous than usual on these crops, and was noted feeding on corn in MISSOURI during the 1964 season.

Fall armyworm first became active on grain sorghum in OKLAHOMA early in August and increased until heavy populations were damaging this host as well as other crops and gardens throughout most of the State. Activity continued in Oklahoma until late November. Fall armyworm was again widespread and as serious in TEXAS during the 1964 season as it has been over the past several years. Grain sorghum and other crops were damaged in the eastern portion of the State. The outbreak that occurred in Texas during 1964 was comparable to those that occurred in the State in 1960, 1962 and 1963. Fall armyworm developed heavy infestations on late-planted corn during and after August throughout southern and central LOUISIANA, and damaged sweet corn over ALABAMA. Fall armyworm was heavy from southern to northern GEORGIA. Infestations were quite heavy and more severe than in recent years, being general over the State on grain sorghum, corn and other crops.

Fall armyworm larvae severely damaged fields of late corn in WISCONSIN during late August in parts of Columbia, Dodge, Fond du Lac and Sheboygan Counties. Pupation was underway by August 28. Populations were heavy in many fields of corn in ILLINOIS in late July and early August, with ragging of leaves being very noticeable. Controls for fall armyworm were applied to 46,593 acres of corn in Illinois during the 1964 season. In INDIANA, fall armyworm populations remained at insignificant levels throughout the State for the third consecutive year.

A fall armyworm outbreak occurred throughout CONNECTICUT during 1964 and affected approximately 15,000 acres of corn, with some small grains and grasses also involved. This outbreak was probably favored by the dry season in Connecticut this year. Controls were applied to most fields, but were not effective because of the lack of moisture. Fall armyworm occurred on sweet corn in most of NEW YORK, being a problem on Long Island. The application of controls on a 3-day schedule was inadequate. The pest was more abundant than usual in the Hudson Valley, appearing in whorls of corn in July and August and in ears in September. Ear infestations by fall armyworm in untreated corn rose to 15-30 percent after mid-September and was, as usual, not distinguished from corn earworm (Heliothis zea) infestations by growers in New York. Light infestations of fall armyworm occurred on corn in DELAWARE during July and greatly increased later in the season on this crop and on cover crops. Fall armyworm was again prevalent in late planted corn in all sections of MARYLAND, with several fields showing

infestations of 25-60 percent. In VIRGINIA, light to heavy numbers of fall armyworm occurred on corn in several counties through August.

CORN EARWORM (Heliothis zea) was present in light numbers and caused light injury to sweet corn during mid-August in the Auburn area of Androscoggin County, MAINE. Heavy infestations of corn earworm occurred in eastern MASSACHUSETTS late in the 1964 season and control was difficult in many instances. Corn earworm was common in forage corn during early August in a field at Kingston, Washington County, RHODE ISLAND, and was heavily parasitized by Apanteles sp. (a braconid) or a related parasite.

A heavy flight of corn earworm moths appeared in central NEW YORK the last week-end of August, and by mid-September canning corn with no protection was 50 percent infested with larvae. Corn earworm was the leading pest of sweet corn in the Hudson Valley during the 1964 season. This pest was detected in about one percent of tassels on early corn varieties in the area in June and light moth activity and hatching occurred as expected in July. A control program was started with 2 sprays at a 5-day interval on silks appearing in July. A full program on silks at a 4-day interval was advised by mid-July, and by mid-August, a 3-day interval was adopted. Corn earworm in treated ears at harvest rose to 15-25 percent in August. A heavy moth flight began in late August and a 48-hour interval was suggested for dusting and, in the case of hot weather, for sprays as well; however, most growers were discouraged by drought and weak markets and remained on the 3-day schedule. Peak moth flight occurred the night of August 31-September 1. Moth activity in New York at the end of August was reflected in marked increases in infestations in ears picked after September 7, when infestation ranged 60-70 percent. On dusted corn on one large farm, the 2-day interval for dusts held infestation to a small percentage until mid-September, but spraying at the 3-day interval allowed infestations of 10-20 percent; however, on this late corn, killing frost on September 6 reduced concern about end-of-year infestation. On the whole, corn earworm was less severe in New York during 1964 than it was in 1955.

Corn earworm infestations appeared late in PENNSYLVANIA in 1964, with early and midseason corn escaping damage. Late season corn, however, was heavily damaged. First corn earworm adults of the season in DELAWARE were collected in a blacklight trap on May 30 and by the week of June 20, larvae were general throughout the State in sweet corn. Peak adult flight occurred during the last week of August and the first week of September, at which time counts averaged over 60 per night in one trap. Following this peak flight, considerable larval damage occurred to late plantings of sweet corn in Delaware as well as several types of beans. Corn earworm populations in late corn in MARYLAND were above normal during the 1964 season. During late August and September, ear infestations of 25-100 percent were common in all sections of the State. In VIRGINIA, corn earworm infestations were medium in corn during 1964.

Corn earworm infestations were light throughout OHIO during 1964. In INDIANA, however, populations approached normal levels this season after the extremely low infestations that were present in that State in 1963. A fall survey revealed that on a statewide basis, 9.4 percent of the corn plants in Indiana were infested in 1964 compared with 2.0 percent in 1963 and 17.6 percent in 1962. Highest corn earworm infestations in 1964 occurred in the southern part of the State, particularly in the southwest and south-southwest areas where infestations in corn were 17.6 and 14.8 percent, respectively. General flights of corn earworm moths into MICHIGAN were delayed until the first week of September, with heavy flights occurring during the warm evenings of September 7, 8 and 9, as indicated by blacklight trap catches. Many eggs were deposited before cool weather slowed moth activity during the second week in September. Late-stage larvae were common in very late plantings of sweet corn and field corn in Michigan the last week of September and early October, with only light injury to these crops in southern counties of the State. Corn earworm moth flights were heavy in ILLINOIS during July and August, and some late field corn and most sweet corn in the State was heavily infested unless well treated.

In WISCONSIN, corn earworm moths were taken in light traps July 3, larvae were observed by July 24 and pupation was underway by August 21. Eggs were found by August 28, with treatments underway shortly after.

A local infestation of corn earworm occurred in popcorn in the Fargo area of Cass County, NORTH DAKOTA, and larval damage to corn in NEBRASKA was less than one percent in nearly all fields. Corn earworm infested almost 100 percent of early planted sweetcorn in the Wichita area of Sedgwick County, KANSAS; 15-20 eggs could be counted on many silks in June. Early planted sweet corn in northeastern Kansas was almost entirely free of damage, but late planted sweet corn was almost 100 percent infested. In MISSOURI, corn earworm populations were generally light on corn during the 1964 season.

Corn earworm damage to whorls and ears of corn was general over GEORGIA during 1964 and heavier than in recent years. It was not uncommon to find 75 percent of whorls or ears damaged by this pest and in many fields infestation was 100 percent. Corn earworm also caused moderate damage to heads of sorghum in Georgia this season. Corn earworm damage in ALABAMA was about the same as in 1963, with sweet corn heavily damaged in southern, central and northern areas of the State in 1964. Corn earworm caused the usual amount of damage to sweet corn throughout LOUISIANA during the 1964 season, with heaviest populations prevalent in the southern half of the State. In TEXAS, corn earworm damaged field and sweet corn throughout the State. Activity of corn earworm in OKLAHOMA was first noted in alfalfa in early May and by early June was common in this crop in the southern half of the State. Infestations continued to increase until heavy populations were damaging grain sorghum, corn and other crops during early July. Infestations remained moderate to heavy through September and the pest continued active in Oklahoma until late October.

Corn earworm affected corn production in COLORADO during the 1964 season, causing losses in the northeastern part of the State. Controls were applied in the southeastern area where losses from several pests were approximately 10 percent. Corn earworm infested corn in western Colorado this season, where some controls were applied, and was responsible for a portion of the 5-10 percent loss to the corn crop in that portion of the State. Corn earworm populations were high on corn in Mesa, Montrose, Delta and Garfield Counties, Colorado, with 2-4 larvae per ear in many fields checked. Controls were of limited value after larvae entered ears and few control measures were used. Loss to corn ranged 4-6 percent from a complex of corn earworm and fall armyworm (*Spodoptera exigua*) in these 4 counties of Colorado. Corn earworm infested a majority of corn ears checked in NEW MEXICO for possible infestation by European corn borer (*Ostrinia nubilalis*). Corn earworm caused heavy damage to corn in all areas of ARIZONA during the 1964 season, and populations were high on corn grown for canning in UTAH. Egg surveys forecasted the impending outbreak of 60 to 100-percent infestations on canning corn in Utah. Corn earworm infested corn throughout CALIFORNIA during 1964, with local infestations observed on this crop, sorghum and millet throughout the season. First corn earworm adults of the season in WASHINGTON were trapped June 4 in Grant County and June 12 in the Yakima Valley. Larvae became unusually abundant by mid-August, numbers being heavier than during the previous 3 years.

STALK BORER (*Papaipema nebris*) caused noticeable damage to corn in margins of fields in NEBRASKA, and severely damaged a field of castor-beans during the 1964 season. Stalk borer was especially prevalent in eastern SOUTH DAKOTA where larvae destroyed entire marginal rows of corn, and the pest was light on corn near Lidgerwood in Richland County, NORTH DAKOTA. Larvae of stalk borer were light on seed corn at various locations in VIRGINIA through August. In MAINE, a borer tentatively determined as stalk borer, occurred in moderate numbers and caused moderate damage to corn in the Wells area of York County in mid-June.

CUTWORMS were of considerable concern on corn in various parts of the Nation during the 1964 season. Cutworms were destructive to field corn in the Hudson Valley of NEW YORK in the Millbrook area during June, the principal species being GLASSY CUTWORM (*Crymodes devastator*). No cutworms were noted on sweet corn in

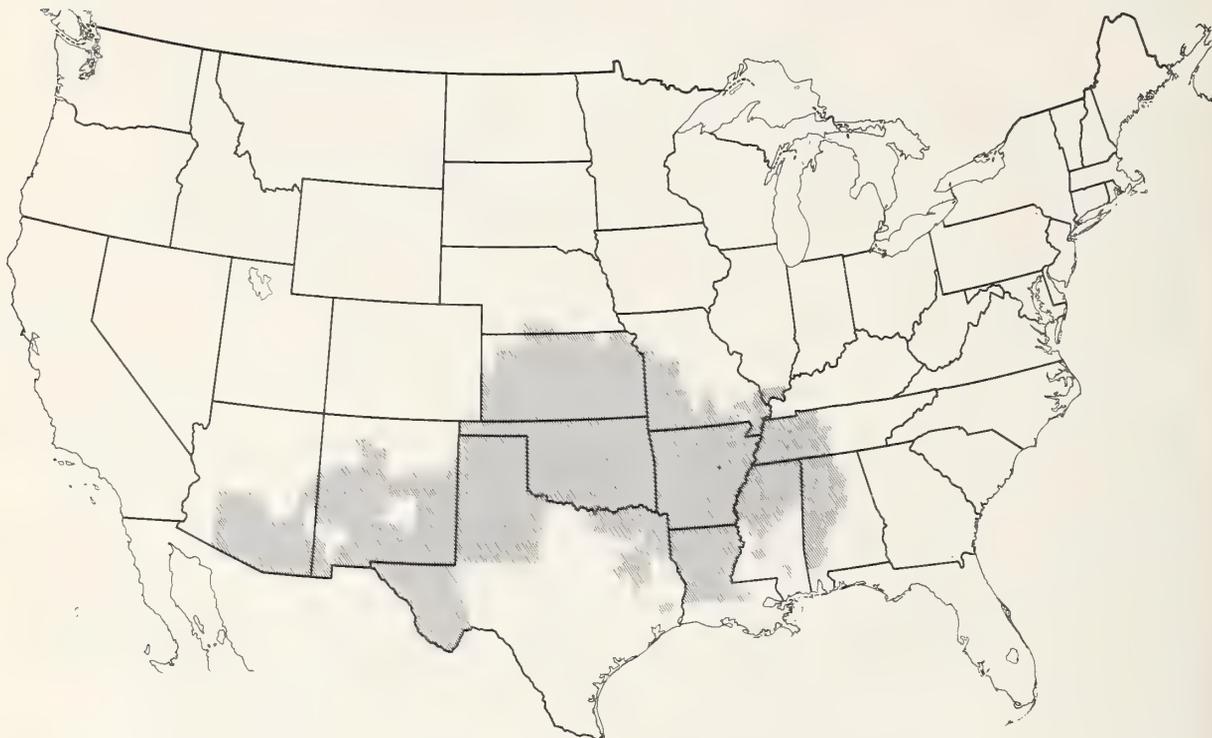
the area, however. Various cutworms, especially BLACK CUTWORM (Agrotis ipsilon) and VARIEGATED CUTWORM (Peridroma saucia), caused moderate to heavy injury to young corn following sod in a considerable number of fields over MARYLAND. Glassy cutworm destroyed an estimated 50 percent of 11 acres of corn near Holmesville in Holmes County, OHIO. Also in Ohio, black cutworm, DINGY CUTWORM (Feltia subgothica) and CLAY-BACKED CUTWORM (Agrotis gladiaria) caused varying degrees of damage, but no severe outbreaks of these species were reported in the State. Various species of cutworms caused greater than usual injury in MICHIGAN during late May through mid-June. Light to serious injury was reported from many counties in the Lower and Upper Peninsulas, and some fields of corn where sod was turned under harbored large populations of these pests. Localized infestations of black cutworm caused moderate economic damage to corn seedlings in the northern half of INDIANA and in several scattered western areas of the State. Various species of cutworms, mainly black cutworm, caused damage to corn in all districts of ILLINOIS. An estimated 192,577 acres were replanted and 165,707 acres were treated for control of these pests. Black cutworm caused severe damage to individual fields of corn in WISCONSIN in early June. The pest became a serious problem in scattered areas in the southern portion of the State, necessitating some replanting and treatment. High counts of moths in blacklight traps during the fall of 1964 indicated a high potential for infestation in the 1965 season.

Various cutworms, but primarily black cutworm, were damaging to corn in MINNESOTA in June, with infestations scattered throughout the southern third of the State. Stand reduction and, at times, complete loss of stand occurred and many fields were replanted. Due to the extremely dry conditions in this portion of Minnesota this season, cutworms were feeding beneath the soil surface. Control was very poor under these conditions, as insecticides were not reaching the cutworms. Extensive damage to sweet corn by unspecified cutworms was observed in the Rochester area of Olmsted County, Minnesota, which resulted in replanting on a large scale. Corn in southeastern and central SOUTH DAKOTA was seriously hindered by cutworms, many fields having to be replanted due to feeding of these pests on the plants. Larval infestations of black cutworm damaged corn, sorghum and castor-beans, necessitating replanting in some fields in eastern areas of the State. Also in NEBRASKA, WESTERN BEAN CUTWORM (Loxagrotis albicosta) damaged ears of corn in York County, and feeding injury was observed in Buffalo and Dawson Counties. Several fields of corn in northwestern MISSOURI were replanted because of damage by black cutworm and dingy cutworm. Black cutworm caused severe loss of corn seedlings in Brazos County, TEXAS. SORGHUM WEBWORM (Celama sorghiella) was present over local areas in southern and central sections of Texas, but infestations were generally low during the 1964 season. Scattered, heavy infestations of variegated cutworm appeared in sorghum fields in ARIZONA during August and September, and local infestations of BEET ARMYWORM (Spodoptera exigua) occurred on sorghum, corn and milo in CALIFORNIA during the season.

SOUTHWESTERN CORN BORER (Zeadiatraea grandiosella) was found for the first time in Johnson, Massac, Pope and Union Counties, ILLINOIS, during the 1964 season, bringing to 6 the number of known infested counties in the State. Most infested fields had less than one percent of plants infested. One late field of corn had 24 percent of plants infested, with one larva per infested plant on September 24. At this time, 70 percent of larvae in this heavily infested field were spotted and 30 percent were white. No plant breakage was observed. On November 9, this field in Illinois was re-examined and 13.3 percent of larvae were still spotted, 83.4 percent were white and 3.3 percent were dead. There was an average of 0.88 living larva per infested plant. Most infested plants were broken off within 4 inches above ground level. Southwestern corn borer populations remained at low levels in KANSAS during the 1964 season. A 5-percent survival of overwintering southwestern corn borer larvae was recorded in southwestern MISSOURI in the spring of 1964. Emergence of spring-generation adults in the southeast occurred during the last week of May. First adults of the season in Missouri were taken at Portageville, New Madrid County, on July 2. The percent of girdled stalks was highest in the southeastern district, being 23

percent opposed to 10.2 percent in the southwest district, but represented a decrease of 2.3 percent from the 1963 average. Cape Girardeau County, in the southeastern area, was the only newly infested county recorded in Missouri during 1964. Southwestern corn borer was present in OKLAHOMA this season but caused little damage.

#### DISTRIBUTION OF SOUTHWESTERN CORN BORER



Southwestern corn borer infestations were heavier in ARKANSAS during the 1964 season than they were in 1963. Fall survey showed 8.5 percent stalk lodging compared with 2.2 percent in 1963, and lodged stalks per acre were 528 in 1964 compared with 180 in 1963. Moths from overwintering larvae became active in mid-May in the southern part of the State, and pupae of first-generation larvae appeared about June 20 in this area. Moths, which gave rise to third-generation southwestern corn borer larvae, appeared about August 15, and some second-generation larvae were still girdling stalks and going below ground level as early as August 22 in southern Arkansas. In LOUISIANA, infestations by first-generation southwestern corn borer larvae ranged 4-17 percent on corn in the Shreveport area of Caddo Parish during May. Second-generation populations were much lighter than expected, apparently as a result of drought, and infested less than 10 percent of plants. Southwestern corn borer was reported from 11 new counties in ALABAMA during 1964, extending the range of this pest in the State eastward from the 15 counties known to be infested in 1963. In combination with SOUTHERN CORNSTALK BORER (*Diatraea crambidoides*), southwestern corn borer caused considerable damage to corn in northern and northwestern sections of Alabama, especially to mid and late-season corn and sweet corn in home gardens. Southwestern corn borer, European corn borer and southern cornstalk borer were the most serious pest combination on sweet corn in the northwestern counties of the State during the season.

Southwestern corn borer larval populations heavily damaged late-planted sorghum and some fields of corn in ARIZONA during July and August, with peaks of infestation reached during late August in Maricopa, Pinal, Graham and Cochise Counties.

SUGARCANE BORER (Diatraea saccharalis) infestations in LOUISIANA were lighter than usual for the third consecutive year following a winter mortality estimated at 88 percent. Infestations sufficiently heavy to justify insecticide applications generally did not occur before late July or August, and many fields required no treatment. Levels of resistance to a certain chlorinated hydrocarbon intensified and became more widespread in Louisiana. Heavy, local populations of sugarcane borer occurred on corn in the gulf coast area of TEXAS during 1964.

CORN ROOT WEBWORM (Crambus caliginosellus) severely infested seedling corn throughout VIRGINIA, and larvae were more troublesome to young corn during early June in areas of Kent County, DELAWARE, than in previous years.

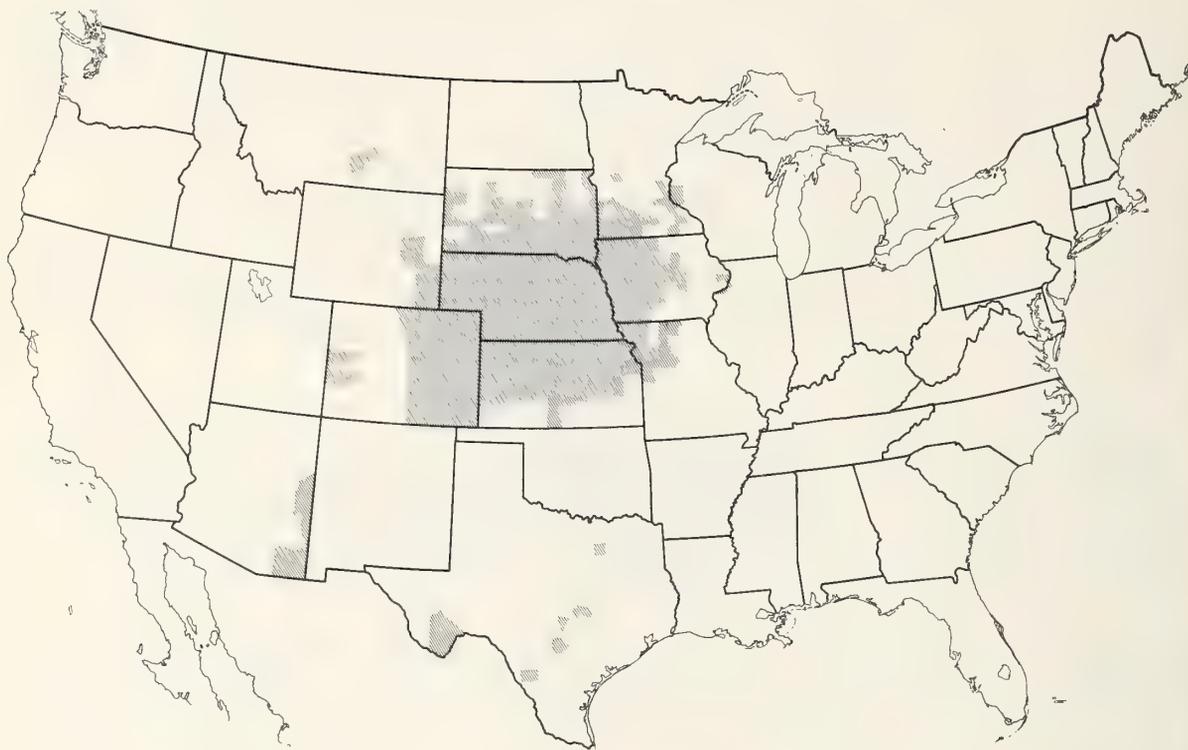
SOD WEBWORMS (Crambus spp.) were a general problem in many fields of corn following sod in MARYLAND, with some replanting necessary in eastern and central sections of the State during the 1964 season. Sod webworms destroyed 33 percent of a 10-acre field of corn near Mount Eaton in Wayne County, OHIO, on May 25, and 25 percent of a corn planting was lost in Hancock County by June 3. Sod webworms caused considerable damage to field corn in Williams County, Ohio, in mid-June.

Field infestations of ANGOUMOIS GRAIN MOTH (Sitotroga cerealella) continued low in LOUISIANA during 1964. The growing of corn varieties with excellent shuck coverage in the State is believed to be the major factor responsible for such low infestations in the field. Infestations of PINK SCAVENGER CATERPILLAR (Sathrobrotia rileyi) in Louisiana were well below normal in corn and limited to ears which had been damaged by birds. Pink scavenger caterpillar and larvae of a SKIPPER (Lerodea eufala eufala) infested plantings of corn, sorghum and millet locally in CALIFORNIA during the 1964 season.

CORN ROOTWORMS (Diabrotica spp.), but primarily WESTERN CORN ROOTWORM (Diabrotica virgifera), continued to be the primary concern on corn in KANSAS during the 1964 season. Resistance to some chlorinated hydrocarbon insecticides now extends from Norton to Rush to Saline to Brown Counties; however, resistance has not developed in all fields within this area of Kansas. Adults of SOUTHERN CORN ROOTWORM (D. undecimpunctata howardi) were first observed in NEBRASKA in mid-May, but numbers remained light to moderate on a wide variety of plants. Western corn rootworm and NORTHERN CORN ROOTWORM (D. longicornis) appeared on corn in July. Adult surveys in Nebraska during 1964 showed western corn rootworm to be the dominant species in the State. Larval feeding and larval damage were first noted June 11, with heavy damage occurring mostly in fields where no controls were applied. Western corn rootworm continued to extend its range into new counties in SOUTH DAKOTA and caused considerable crop damage during the 1964 season. Hatching of Diabrotica spp. was first detected about June 15 in a Hutchinson County research plot, and damage to plants was reported in Lincoln County the following week. Larval counts during the summer were as high as 100 or more per plant, with averages of 20-25 larvae per plant considered conservative. Adults of western corn rootworm were observed July 7 in Union County. Adult populations ranged 1-25 per plant during mid-July in the southeastern region with an average of 3 adults per plant. Generally, corn rootworm populations in South Dakota were considered to be as high as or higher than 1963 populations and more widely spread in untreated fields in 24 southeastern counties. Economic damage in untreated fields in some areas of South Dakota was extremely high, with entire root systems removed. Western corn rootworm and northern corn rootworm were again major corn pests in southern MINNESOTA. Northern corn rootworm was predominant generally, but western corn rootworm increased in importance. Lodged and damaged corn was observed as far north as Carver and Wright Counties during the 1964 season. In the past, most damage occurred in southern counties of Minnesota. The most severe damage in 1964 was observed in the southwestern area of the State and was due to western corn rootworm. This damage was intensified by drought conditions and was severe. Infestations, however, were

scattered and at times very localized. Soil insecticide treatments were applied to more than one million acres planted to corn in 1964. This was the first year organic phosphate insecticides were used to any extent for controlling soil insects in Minnesota and results were very erratic.

#### DISTRIBUTION OF WESTERN CORN ROOTWORM



A survey for western corn rootworm was conducted during the 1964 season in Minnesota to determine spread in the State. This pest of corn was first found in the State in 1961 in Rock and Pipestone Counties, and during 1962 and 1963 had spread eastward to the Minnesota-Wisconsin State line and northward in Minnesota to Pope County. Western corn rootworm increased in importance in the southwestern area where it appears to have replaced northern corn rootworm in many fields. *D. virgifera* is of prime importance in the southwestern part of Minnesota, overshadowing *D. longicornis* in 5 or 6 counties and comprises a lower, but still important, percentage of total rootworm populations in 8 or more counties. The survey revealed the rapid movement of western corn rootworm into other areas of Minnesota from 1961 to 1964. A potential for problems during the 1965 season exists in Rock, Nobles, Jackson, Pipestone, Murray and Cottonwood Counties. In the surrounding counties of Lincoln, Lyon, Redwood, Brown, Watonwan and Martin, scattered fields can be expected to have problems during the 1965 season, and there is the possibility that individual problems with western corn rootworm will develop in fields well outside of this area. To broaden the potential in Minnesota, any fields where 4 or 5 beetles were found per plant in 1964 problems may be expected in 1965. Western corn rootworm was found for the first time in WISCONSIN in the River Falls area of Pierce and St. Croix Counties during the 1964 season. In ILLINOIS, one adult of western corn rootworm was found in a field of corn in Rock Island County on August 26 for the first record of this pest in that State, but surveys in other western and northwestern counties were negative. Eggs of northern corn rootworm began hatching in northwestern MISSOURI

during the week ending June 13, which was 2 weeks later than in 1963. Adults were first observed early in the week ending July 11 in Atchison County. Plant lodging due to rootworm damage in Atchison, Holt and Nodaway Counties ranged 5-51 percent in fields treated with organophosphate insecticides and up to 100 percent in fields not treated with these insecticides. Losses in Missouri this season ranged from a few bushels per acre to complete loss because some fields were not worth harvesting. Western corn rootworm was found for the first time in Cass, Jackson, Lafayette and Saline Counties, the first records in the State south of the Missouri River, as well as in Carroll, Livingston, Grundy, Sullivan, Putnam and Schuyler Counties during the 1964 season.

Western corn rootworm affected the production of corn in COLORADO during the season, with losses occurring in the northeastern area. Losses to corn ranged 5-10 percent from all pests affecting this crop in the State this year, with controls being applied for western corn rootworm and two-spotted spider mite (Tetranychus telarius). Western corn rootworm infested corn in southeastern Colorado, contributing to the overall loss of 10 percent to this crop in that area and also contributed to the 5 to 10-percent loss to corn in the western portion of the State. Western corn rootworm was found in only one locality in the western area, where numbers were moderate on corn and no controls were needed. This infestation occurred in the Montrose area of Montrose County where high numbers have been present in previous years. Damaging numbers of western corn rootworm were not found or reported on corn in the Arkansas Valley of Colorado during 1964. High numbers of this pest were found in isolated fields of corn in Platte and Goshen Counties, WYOMING, where damage was more severe than in 1963. Adults were first found July 29, and ranged 8-12 per 100 plants, with as many as 20 adults per plant in one field in Goshen County. A slight amount of larval damage was noticeable in Wyoming this season.

Northern corn rootworm larvae were about one-fourth grown by June 10 in WISCONSIN, with populations high in a few fields. Adults were noted emerging July 7 and feeding on corn silks and pollen. Counts of 5 per stalk were common. Damage by this species was minimal throughout most of Wisconsin in 1964. Adults were common in fields of corn in ILLINOIS by July 20. Feeding on 0-25 (average 7.3) percent of corn silks was noted in the central district August 3-6, where beetles ranged 0-100 (average 25) per 100 plants. Lodging of corn in this portion of Illinois was common in many fields. Northern corn rootworm was noted feeding on corn in MISSOURI during the 1964 season.

Northern corn rootworm adults caused severe silk damage and prevented ear development in many late-planted fields of corn in INDIANA. Populations are increasing in fields that are continuously in corn in Henry, Franklin, Wells and Montgomery Counties. In Montgomery County, the loss due to larval feeding was 30 bushels per acre where adjacent treated rows produced 94 bushels per acre in 1964. Spotty populations of northern corn rootworm in MICHIGAN caused significant loss in southern counties, mostly in fields of continuous corn. Problems were reported in Washtenaw, Monroe, Branch and Cass Counties and adults emerged in numbers during mid-July from research plots in Cass County. Northern corn rootworm adult populations on corn in OHIO were lower than in 1963. All but late corn in the State escaped damage due to cutting of silks, which resulted in the reduction of kernel development. Northern corn rootworm continued scarce in the Hudson Valley of NEW YORK during 1964, with a few adults being noted on silks in September as usual.

Southern corn rootworm was present throughout ALABAMA during 1964 but was serious only in isolated fields of corn. The pest damaged corn seedlings in localized areas of Brazos and Fayette Counties, TEXAS, and was noted feeding on corn during the 1964 season in MISSOURI.

TOOTHED FLEA BEETLE (Chaetocnema denticulata) was abundant on untreated sweet corn in the Hudson Valley of NEW YORK, scoring leaves of corn and grasses. CORN FLEA BEETLE (C. pulicaria), however, was not detected on sweet corn in this area of the State all season, which is a record for the period from 1952 to 1964.

Adults of corn flea beetle were noticeable on young corn throughout most of DELAWARE by mid-May and were common on late-planted corn during early August. Populations were heavy on young corn in May and June in all sections of MARYLAND, and conspicuous leaf injury was also prevalent on more advanced corn in the State during July and August. Corn flea beetle was noted feeding on corn in MISSOURI during the 1964 season. DESERT CORN FLEA BEETLE (*C. ectypa*) caused moderate damage to corn and feed sorghums in Washington County, UTAH, and local infestations of another FLEA BEETLE (*Systema taeniata*) were observed on sorghum, corn and milo in CALIFORNIA.

RICE WEEVIL (*Sitophilus oryzae*) populations were as heavy in corn at harvest time in LOUISIANA as at any time during the last several years. Thirty percent of ears and 7 percent of kernels were infested at harvest in the Baton Rouge area of East Baton Rouge Parish. Bird damage contributed significantly to infestation by this pest; approximately 80 percent of bird-damaged ears was infested compared with about 20 percent of ears which were not damaged by birds. Emigration of rice weevil from storage bins in the Baton Rouge area began about April 1 and continued at low level until after the first week of June, at which time numbers increased rapidly to peak in mid-July. After this time, populations in the area decreased to very low numbers and remained so until late November.

MAIZE BILLBUG (*Sphenophorus maidis*) was present on corn throughout ALABAMA during 1964 but was serious only in isolated fields. Infestations of another BILLBUG (*S. callosus*) were more noticeable in GEORGIA than in 1963 and are possibly on the increase after several years of decline. Infestations were more general and heavier on corn than in the past 3 or 4 years. *S. callosus* occasionally infested corn in VIRGINIA during the 1964 season. In MISSOURI, unspecified BILLBUGS were reported feeding on corn during the season.

Larvae of unspecified SAP BEETLES were moderate in field and sweet corn in Washington and Iron Counties, UTAH. CORN SAP BEETLE (*Carpophilus dimidiatus*) was commonly found during August feeding on corn ears and stalks previously damaged by other insects in NEBRASKA, and *Carpophilus sayi* and *Glischrochilus quadrisignatus* were abundant in many fields of corn in ILLINOIS that were infested by European corn borer (*Ostrinia nubilalis*). A few infestations of corn sap beetle were reported in VIRGINIA and medium infestations of *Carpophilus* spp. were reported on sweet corn at some locations in the State through August. DUSKY SAP BEETLE (*C. lugubris*) and a 4-spotted sap beetle were numerous in early corn in the Hudson Valley of NEW YORK, chiefly in tunnels of European corn borer; however, the usual larval broods of these pests on kernels in midsummer did not become a problem during the 1964 season.

SUGAR-BEET WIREWORM (*Limonus californicus*) severely damaged seed corn in Yakima County, WASHINGTON, early in May. Unspecified WIREWORMS affected corn production in COLORADO during 1964 where losses occurred in the northeastern area of that State, and damaged a field of sorghum in NEBRASKA, necessitating replanting. *Melanotus* spp. were noted feeding on corn during the season in MISSOURI, and unspecified species of wireworms caused moderate damage to corn in Guadalupe County, TEXAS. Another WIREWORM (*Melanotus communis*) caused the replanting of 50 acres of corn on a farm in Camden County, NORTH CAROLINA, during the first week of May and caused extensive damage to 2 acres of a 20-acre field of corn in Washington County during the fourth week of May. No reports of damage by this wireworm were received from the mountain counties of North Carolina where considerable damage occurred in some fields in 1963. Pupation was observed during mid-June in the Washington County field and a few callow adults were present.

SUGARCANE BEETLE (*Euethola rugiceps*) was present throughout ALABAMA during 1964, but was serious only in isolated fields of corn.

JAPANESE BEETLE (*Popillia japonica*) began appearing in light, scattered adult populations by mid-June in INDIANA. Although many of these infestations were of local concern to homeowners, agricultural damage was restricted to a limited infestation in Newton County in the northwest section of the State. On 6 selected farms in this area, adult damage to corn silks averaged 70 percent of plants. Peak activity was apparently reached by the end of July. Japanese beetle was occasionally reported as being of concern on corn in Indiana. In MARYLAND, larvae of ASIATIC GARDEN BEETLE (*Maladera castanea*) damaged 5 acres of young field corn near Salisbury, Wicomico County, in May. A SCARAB (*Anomala* sp.) was light to moderate on corn in the Rio Grande Valley of TEXAS.

CORN LEAF APHID (*Rhopalosiphum maidis*) infested sorghum, corn and milo locally in CALIFORNIA during the 1964 season. In NEVADA, populations were generally low as they were during 1963, except for some heavy infestations on corn in Churchill County during September. Corn leaf aphid caused light to moderate damage to corn in UTAH. Populations on corn were about the same in WYOMING as they were in 1963. The pest first appeared in late July in the southeastern area and fields ranged 20-75 percent infested. Populations in northwest Wyoming were slightly lower, infestations ranging 0-55 percent. Large colonies numbering over 300 adults and nymphs were found in almost all instances this season.

Corn leaf aphid affected corn production in COLORADO during 1964, with losses occurring in the northeastern portion of the State. This aphid infested sorghum in eastern and southeastern areas, where yield reduction ranged 1-2 percent and some controls were applied. Damaging numbers were not found or reported on corn in the Arkansas Valley of Colorado during the 1964 season; however, this aphid appeared on sorghum in all areas of the valley. Survey during late July showed approximately 90 percent infestation of whorls of sorghum in fields checked in Prowers, Bent, Otero, Crowley and Pueblo Counties. Generally, however, numbers appeared not to affect head emergence in these counties and damage was undetermined. Damaging populations of corn leaf aphid built up on corn and sorghum in NEBRASKA during July and August. Populations were generally the same or slightly higher in SOUTH DAKOTA than they were in 1963. Many fields of corn had infestations of 100 percent with a small percentage having tassels rendered ineffective due to honeydew. In NORTH DAKOTA, corn leaf aphid was very abundant on corn in the southeastern area toward the latter part of the season.

Corn leaf aphid colonies appeared by July 10 in southern WISCONSIN, increasing rapidly in a few areas, particularly in the central portion of the State, and browning of leaves was noticed by July 24. Controls were used in some fields in Columbia and Green Lake Counties. A population collapse occurred in early August and no further problems were reported in Wisconsin. Small numbers of corn leaf aphid were present in most fields of corn in ILLINOIS, with occasional fields having heavy populations on up to 8 percent of plants by July 20. There was a noticeable decrease about August 10 when 20-90 percent of aphids were dying due to disease and parasitism. Numerous predators of corn leaf aphid were also noted at this time. An estimated 11,136 acres of corn were treated for control of this aphid in Illinois during the 1964 season.

Corn leaf aphid populations reached maximum development by mid-July in the southern quarter of INDIANA and systematically developed northward. Infestations in 1964 exceeded those of 1963 in Indiana and this high population density, combined with summer drought conditions, resulted in considerable loss in yield. Maximum infestation was found in the northern half of Indiana this year where 67 percent of plants were infested. Extremely high populations of this aphid built up over the entire corn-growing area of Lower MICHIGAN during early August. Plants under stress from drought suffered most, as high populations continued until late August. Corn leaf aphid was considered responsible for more state-wide loss of corn production in Michigan during the 1964 season than any of the other corn insects, with pollen production and pollination being greatly reduced in some fields of late corn. In OHIO, populations or remnants of populations of corn leaf aphid were found consistently in nearly every field

of corn included in the European corn borer survey in 32 western counties and in Wayne County. It was impossible to assess the damage caused by this aphid, but apparently many of the populations in various fields had been quite heavy during the season.

Corn leaf aphid was noted feeding on corn in MISSOURI and infestations ranged moderate to heavy on grain sorghum in many areas of OKLAHOMA during the 1964 season. Corn leaf aphid was heavy and widespread on field corn during the season in ALABAMA, but damage was undetermined. Sweet corn, however, was damaged throughout the State.

A few infestations of corn leaf aphid were reported in VIRGINIA through August, but heavy numbers were present on mature corn at several locations on the Eastern Shore of MARYLAND in August, with controls applied to several fields in Dorchester County. This aphid was abundant on corn throughout DELAWARE also beginning in August. Corn leaf aphid was spotted in many areas of PENNSYLVANIA and infestations were very heavy on some plants, preventing ear development. Populations in sweet corn were very high in Erie County, NEW YORK, this season, and appeared in the Hudson Valley in June and increased rapidly in July. By mid-August, the population increase ended and the pest was then largely confined to spaces between husks. Predators and parasites were abundant, but the cause of early decline in populations was not clear. Sooty mold did not become a problem in New York because of dry weather. Corn leaf aphid was first noted in RHODE ISLAND on forage corn in Kingston, Washington County, on July 31, and probably could be found on corn statewide during the remainder of the summer. The pest apparently was economically insignificant in the State this season. Extremely large populations of this aphid developed on sweet corn in several fields in Hampden County, MASSACHUSETTS, but no controls were applied.

APPLE GRAIN APHID (Rhopalosiphum fitchii) occurred on corn in several locations in CALIFORNIA, and another aphid, R. padi, infested corn, sorghum and millet plantings locally. A light, fall buildup of ENGLISH GRAIN APHID (Macrosiphum avenae) caused some damage to sorghums in Yuma County, ARIZONA, during October. CORN ROOT APHID (Anuraphis maidiradicis) was noted feeding on corn in MISSOURI during the 1964 season, and the species severely damaged roots of corn in one section of VIRGINIA.

A CORN LEAFHOPPER (Dalbulus maidis) was collected for the first time in LOUISIANA during 1964. Light populations occurred on corn infected with a corn virus, some of which was corn stunt virus, during late August and September in St. Landry, Rapides, Avoyelles, Webster, Claiborne, Catahoula and Concordia Parishes. This leafhopper was also collected in Conway County, ARKANSAS, on October 15, 1964. The only previous record in the State was a collection in 1947.

CHINCH BUG (Blissus leucopterus) was more abundant than for the last few years in ILLINOIS, damaging marginal rows of corn. Nymphal populations varied 0-100 per corn plant; however, heavy rains in May promoted luxuriant growth of foxtail in some fields and nymphs fed on and killed this grass, thus saving corn from more severe damage. An estimated 48,014 acres of corn were treated for the control of this pest in Illinois during the 1964 season. Nymphs were abundant in August and damaged occasional fields of corn. Chinch bug caused slight damage to border rows of corn adjacent to infested millet seedlings in northwest INDIANA, and the pest occasionally damaged corn in VIRGINIA. Chinch bug was present throughout ALABAMA but damage was serious only in isolated fields. Chinch bug occurred on grain sorghum and corn in TEXAS, with damage reported from over much of the State, and attacked corn in the southeastern area of the State during early July.

FALSE CHINCH BUG (Nysius ericae) infested grain sorghum in Roosevelt and Luna Counties, NEW MEXICO. CONCHUELA (Chlorochroa ligata) caused noticeable damage to heads of grain sorghum during August in many fields in the Deming-Columbus area of Luna County.

Several species of THRIPS were again abundant and caused streaking on young corn in all sections of MARYLAND, especially during May and June. An unspecified thrips caused very noticeable silvering in many fields of corn in ILLINOIS, and unspecified species fed on corn in MISSOURI. Thrips activity and some feeding signs were noted in some fields of corn in NEBRASKA, and these pests had some effect on corn production in COLORADO during the year.

SORGHUM MIDGE (Contarinia sorghicola) infestations were generally less severe over TEXAS than in 1963, except for late-planted fields where damage was heavy. General infestations were present in the south plains area, but these were not so severe as in 1963 due in part to drought and early planting. Sorghum midge was present but caused little damage in OKLAHOMA, and was found in Riley County, KANSAS, in late fall, which was the first positive record of this pest in the State for many years. SEED-CORN MAGGOT (Hylemya platura) was afforded favorable conditions for development by a wet, cool, late spring in VIRGINIA. This pest was present in ALASKA, but was of minor importance during the 1964 season there. CORN LEAF BLOTCH MINER (Agromyza parvicornis) was noted feeding on corn in MISSOURI during the season.

TWO-SPOTTED SPIDER MITE (Tetranychus telarius) affected corn production in COLORADO by causing losses to this crop in the northeastern area of the State. Losses in the area from damaging pests ranged 5-10 percent, with controls being used for two-spotted spider mite and western corn rootworm (Diabrotica virgifera). Two-spotted spider mite infested sorghum in eastern and southeastern areas of Colorado, where reduction in yield amounted to 1-2 percent; limited controls were applied. Two-spotted spider mite infested corn in southeastern Colorado where loss to the crop was approximately 10 percent from all pests, and contributed to losses of 5-10 percent to corn in the western area of the State. Some controls were applied in these areas. Although two-spotted spider mite is usually a problem on corn in Mesa, Montrose, Delta and Garfield Counties, Colorado, high numbers failed to develop during the 1964 season and few controls were used.

SPIDER MITES (Tetranychus spp.) were a serious problem on corn and sorghum in the Arkansas Valley of COLORADO during the 1964 season. These pests began appearing on lower leaves of corn in the Arkansas Valley in mid-June and developed high populations by late July. Populations in Prowers and Bent Counties developed later than in western counties of Colorado, but by the end of the season extensive damage to untreated fields occurred in all areas. Tetranychus spp. infested most fields of sorghum in the Arkansas Valley to some extent, and by late August, mite infestations throughout the leaves had occurred in many fields. Generally, heads had emerged by this time and it is not known how much effect these mites had on yield. Large numbers of unspecified spider mites appeared on corn in Goshen and Platte Counties, WYOMING, in late July, causing varying degrees of damage to leaves. A small amount of dusting was done, but infestations were light in most fields. Populations remained present during August in Wyoming, but suddenly declined in early September. In NEVADA, infestations of Oligonychus spp. and Tetranychus spp. were heavy on corn in Churchill County, light to medium in Pershing County and light in remaining counties where corn is grown. Tetranychus spp. caused considerable damage to grain sorghum in the Brazos River Bottom area in the central section of TEXAS during the 1964 season.

BANKS GRASS MITE (Oligonychus pratensis) populations were heavy and caused lower leaves of corn to turn brown and dry in fields near Estancia and McIntosh in Torrance County, NEW MEXICO, and light, scattered populations of this mite occurred on corn in the southern half of the panhandle area of NEBRASKA during the 1964 season.

GARDEN SYMPHYLAN (Scutigera immaculata) was very destructive to corn in the southwest portion of WASHINGTON, probably because of the cool, wet season, and caused losses to corn in northeastern COLORADO.

An estimated 4,091,125 acres of cornland was treated to control SOIL INSECTS before or at planting time in ILLINOIS this year.

Several insects were damaging to sugarcane in FLORIDA during 1964. Localized infestations of LESSER CORNSTALK BORER (Elasmopalpus lignosellus) were frequent during the dry winter months of 1963-1964 with damage exceeding that observed over the past 4 years. WIREWORM damage to plant cane, primarily by Melanotus communis remained heavy in fields where proper controls were not followed at time of planting. Some stand losses were as great as 40 percent. Infestations of SUGARCANE BORER (Diatraea saccharalis), as in past years, were sporadic during 1964. Newly developed sugarcane acreages generally located several miles from the shores of Lake Okeechobee sustained heavier damage from this pest than the area adjacent to the lake that has been under cultivation for many years. Maximum damage appears to be less for the 1964-1965 crop, with bored joints seldom exceeding 20 percent as compared with 40 percent at harvesttime in 1962-1963. With the increased acreages of sugarcane in Florida during recent years, there has been an increase in the importance of sugarcane borer.

Other pests of sugarcane in Florida during 1964 included YELLOW SUGARCANE APHID (Sipha flava), a WEST INDIAN SUGARCANE DELPHACID (Saccharosydne saccharivora) and a SHARP-NOSED LEAFHOPPER (Draeculacephala portola). Infestations of these pests were sporadic during the season and moderately heavy. During the spring of 1964 there was considerable concern over heavy populations of Sipha flava on young sugarcane. Although this aphid caused some discoloration and stunting, plants always appeared to outgrow damage.

The more important foliage feeding insects that occurred on sugarcane in Florida during 1964 included a CLIMBING CUTWORM (Leucania latiuscula), SOUTHERN ARMYWORM (Prodenia eridania), FALL ARMYWORM (Spodoptera frugiperda) and a GRASSWORM (Mocis sp.). During the spring and fall, there was considerable feeding by L. latiuscula, but plants appeared to outgrow this damage.

ARMYWORM (Pseudaletia unipuncta) and CORN EARWORM (Heliothis zea) were unusually heavy on field corn at Hastings in St. Johns County, Florida, and fall armyworm was heavy on this crop in Jackson County during the summer. An unspecified STINK BUG was very damaging to young kernels of field corn at Hastings, Florida. This latter pest is a major factor in the raising of clean corn.

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#### CORRECTIONS

CEIR 12(28):722 - A LEAF BEETLE (Luperus concavus) - WASHINGTON, should read IDAHO

CEIR 15(4):49 - Coccids in Florida - Line 13: Phenacaspis cockerelli (a soft scale) should read Phenacaspis cockerelli (an armored scale).

CEIR 15(6):77 - Highlights, line 8 - A WEEVIL (Xylosandrus compactus) should read A SCOLYTID BEETLE (Xylosandrus compactus).

CEIR 15(6):78 - Forest, Ornamental and Shade Tree Insects - Line 5 - a BARK BEETLE (Xylosandrus compactus) should read a SCOLYTID BEETLE (Xylosandrus compactus).

CEIR 15(9):121 (DETECTION) - Page numbers for the following should be changed to read: STONEFLIES p. 128; a WHITEFLY (Dialeurodes kirkalyi) p. 126; IMPORTED FIRE ANT (Solenopsis saevissima richteri) p. 128.



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